

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

Venue : "TAMARIND" HALL, Convention Centre
India Habitat Centre, Lodhi Road
New Delhi- 110 003.

Dates : 10th - 11th June, 2015

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 FOR thereafter took agenda items for consideration.

Day – 1: 10th June, 2015

Business Session – I

Agenda Item No. 1 : Confirmation of the Minutes of the 47th Meeting of "FOR" held on 6th April, 2015 at CSOI, New Delhi.

The Forum noted and endorsed the minutes of the 47th Meeting of "FOR" held at Civil Services Officers' Institute (CSOI), New Delhi on 6th April, 2015.

Agenda Item No. 2 : Consideration and approval of Balance Sheet and Audited Accounts of "FOR" for FY 2014-15.

Smt. Shubha Sarma, Secretary, CERC/FOR explained the salient features of the Balance Sheet of FOR for the FY 2014-15. The balance sheet and the audited accounts were considered and approved.

Agenda Item No. 3 : Reference from MoP on “Reviewing and determination of energy charges for supply of electricity by a generating company to a distribution licensee under already concluded Power Purchase Agreements (PPAs) and where the coal is being sourced from coal mines auctioned or allotted under Coal Mines (Special Provisions) Second Ordinance, 2014 and Rules framed thereunder”.

The Forum considered the reference received from Ministry of Power, GOI on Reviewing and Determination of energy charges for supply of electricity by a generating company to a distribution licensee under already concluded Power Purchase Agreements (PPAs) and where the coal is being sourced from coal mines auctioned or allotted under Coal Mines (Special Provisions) Second Ordinance, 2014 and Rules framed thereunder". The same was noted by the Forum for further necessary action by the Appropriate ERCs.

Agenda Item No. 4 : Presentation and Discussion on “Electricity Supply Monitoring Initiative”.

A presentation (enclosed as Annexure - II) on “Electricity Supply Monitoring Initiative (ESMI)” was made by Shri Shantanu Dixit, on the Electricity Supply Monitoring Initiative taken up by Prayas Energy Group, a Pune based NGO.

During the presentation, it was conveyed that low voltage, frequent interruptions and load shedding is a concern for electricity consumers in India. Moreover reliable data about supply quality is often missing, which hampers consumers' ability to hold distribution companies accountable. In this backdrop, Electricity Supply Monitoring Initiative has been undertaken, which accesses real-time, reliable data that fills this crucial knowledge gap in empowering consumers. ESMI can be utilized to assess hours of power supply as well as perform comparative analysis of supply quality across different locations. At present, ESMI has been launched at 60 locations across 8 States including 5 mega cities, with a few hundred more locations to be covered in the coming months.

It was also stated that ESMI employs state-of-art internet of things (IoT) technology and a plug-in device that combines a voltage recorder and a communication modem. The device can be installed at any location in an ordinary power supply socket. The ESM records voltage every minute at its location and sends the data to a central server using a standard mobile data network. This initiative is aimed at providing Regulatory Commissions and other stakeholders with evidence-based feedback to improve effectiveness of various programs. The initiative also provides for sharing the overall supply quality information through its website.

The Forum appreciated the initiative. Some of the ERCs volunteered to use the system for monitoring standards of performance of utilities.

Agenda Item No. 5 : Presentation and Discussion on the Study commissioned by "FOR" on “Roll-out Plan for Introduction of Competition in Retail Sale of Electricity”.

DR. Sushanta K. Chatterjee, Joint Chief (RA), CERC, explained the context of the study and highlighted that in the light of the proposal for a framework bringing in competition in retail electricity supply in India through separation of carriage and content in electricity distribution as part of the Electricity (Amendment) Bill, 2014, MoP, requested the FOR to evolve model transfer scheme. Accordingly, "FOR" has commissioned a study to recommend on "Roll out Plan for Introduction of Competition in Retail Sale of Electricity (Separation of Carriage & Content)".

After following due process, the "FOR" Secretariat engaged M/s. Pricewaterhouse Coopers (PwC) as Consultant to undertake this study. Simultaneously, the "FOR" Secretariat also constituted a Core Group consisting of experts from academia, industry, NGOs working in the area of energy / electricity, Government / Private utilities, Regulatory officers etc. to examine the options suggested by the Consultant, hold deliberations and provide their expert advice / opinion to suggest various options to roll out separation of carriage and content. A presentation (**enclosed** as **Annexure - III**) based on the draft report "Roll out Plan for Introduction of Competition in Retail Sale of Electricity" was made by the Consultant on the findings of the study undertaken.

The presentation majorly included the objectives for introducing competition in retail supply of electricity, different stages for introducing retail supply competition and alternative roll-out plans.

- **Stages:-**

- **Stage-1 – “Functional Separation of Distribution Utilities”** : It was proposed that during this stage (with a time-line of 1-2 years), the current discoms would be segregated into distribution and retail supply companies clearly defining their roles and responsibilities while

equipping them with sufficient financial and human resources to take on their roles. Various activities under this stage inter alia include defining functional entities, their roles and responsibilities, allocation of financial losses, transfer of existing PPAs, consumer interface, CGRF mechanism, standards of performance, universal service obligation, tariff determination mechanism, balance sheet segregation, human resource planning and other appropriate technical studies etc.

- **Stage-2 – “Preparation for Competition”** : It was proposed that during this stage (with a time-line of 2-3 years, after completion of stage-1) steps would be taken to make the market conducive for retail supply competition, while removing the entry barriers for new retail supply companies, thereby creating a level playing field for all. Various activities under this stage inter alia include allocation of technical and commercial losses, reduction of cross-subsidies, up-gradation of metering, consumer database etc.
- **Stage-3 – “Onset of Competition”** : It was proposed that during this stage (this will be after completion of stage-2, and an ongoing activity till the time all categories are open for competition) new retail supply companies would be given licenses to facilitate the retail consumer with choice. Various activities under this stage inter alia include allocation of existing PPAs, consumer switching mechanism, procurement of new PPAs, balancing and settlement, tariff determination, provider of last resort, extension of universal service obligation etc.

Variants of roll-out plan were proposed based on loss reduction and power procurement as drivers of efficiency and competition. In each of the approaches, pros and cons in respect of various critical issues were detailed and recommendations made. The critical issues inter alia include defining distribution functions (i.e., network operations, planning operations, system operations, market operations etc.) cross-subsidy (through universal charge (UC) fund or direct Government subsidy), loss allocation (technical and commercial losses between the distribution and supply companies), cherry-

picking, phasing of competition (top-down approach), universal service obligation, allocation of regulatory assets and losses, allocation of PPAs, metering, balancing and settlement, provider of last resort, consumer interface, consumer switching between the supply companies, standards of performance, determination of tariff, consumer database, etc.

The Forum, subsequent to detailed deliberations on the findings of the study, decided that in addition to the approaches suggested in the study, a framework which provides for bottom-up phasing of competition i.e., initially opening the competition for consumers with a connected load of 20kW and below and gradually opening the competition upwards in phases, may also be designed and included in the report.

The Forum, with the above observation, approved the study report for forwarding to the Ministry of Power.

Agenda Item No. 6 : Recommendations of the Standing Committee on Energy (2014-15) on Electricity (Amendment) Bill, 2014.

The Forum noted the recommendations of the Standing Committee on Energy (2014-15) placed before the Parliament on Electricity (Amendment) Bill, 2014.

Day – 2 : 11th June, 2015

Business Session – I

Agenda Item No. 7 : Interaction of the Forum of Regulators (FOR) with the Members of Central Advisory Committee (CAC) of CERC.

The Chairperson, CERC/FOR welcomed the Members of the Central Advisory Committee (CAC) for an interaction with the Members of the Forum of Regulators(FOR). In his opening remarks, the Chairperson observed that the Central Advisory Committee has been taking up crucial issues relating to the power sector for discussion, analysis and finding possible solutions to the problems aimed at overall development of the sector.

In furtherance to the decision taken during the last meeting of the Central Advisory Committee, a Sub-Committee under the Chairmanship of Shri R.V. Shahi was formed to delve into the issues relating to transmission congestion. The Sub-Committee finalized its report and Shri R.V. Shahi, Chairman of the Sub-Committee presented the report to the Chairperson, CERC/FOR. A brief summary of findings and recommendations of the Sub-Committee are –

1. Congestion has become prominent due to advent of merchant power plants, more particularly in specific zones due to multiple reasons.
2. The gap between TTC (Total Transmission Capacity) and ATC (Available Transmission Capacity) attributable to States.
3. Probabilistic Load forecasting optimization tools be employed for planning.
4. Variable load/generation in renewables and its impact on transmission planning needs to be taken care. There is a need to identify balancing capacity to manage the fluctuations.
5. Forest clearance being major impediment in timely development of transmission systems.

6. TTC/ATC may be improved in near-term by resorting to measures like installation of phase shifting transformers, FACTS controllers and damping controllers, Dynamic reactive power compensation devices such as SVCs, STATCOMs etc.
7. Appropriate measures be taken for information dissemination to facilitate stakeholders and operational feedback by SLDCs be made mandatory through appropriate Regulations.
8. Reliability standards need to be planned for Indian Power System.

During the interaction of the Members of the Forum of Regulators with the Members of the Central Advisory Committee, the following issues came up for discussion :-

1. The current installed capacity exceeded 260 GW, but the peak load met by the system does not exceed 142 GW and therefore, there exists a paradox of unutilized capacity and load shedding for consumers. It has been observed that discoms have been indifferent to power procurement through Case-1 route. Evidently, no new generation projects are coming up. Power generation through diesel is an expensive option. Therefore, discoms should be persuaded to buy power preferably through Case-1 route and avoid load shedding.
2. State transmission utilities are found to be adopting a very conservative approach while addressing the issue of intra-State transmission of power. They are required to be encouraged to invest in transmission projects to ensure availability of more transmission capacity.
3. The recognized losses of State utilities crossed Rs.80,000 Cr., apart from the unrecognized financial losses of the utilities. Reasons for accumulation of losses inter alia include, non-revision of tariff on a periodical basis, mounting interest costs on loans availed by the discoms, lack of control over AT&C losses, lack of capital investment in up-gradation and augmentation of network etc.

4. Valuable suggestions received from stakeholders are often rejected by the ERCs citing mere technical reasons, although such suggestions require the attention of the ERCs on merit basis.
5. Timely regulatory interventions will definitely help in mitigating the problems.
6. Large number of petitions are pending with ERCs and templates could be prepared to reduce the pendency.
7. Discoms should resort to using technology extensively to achieve success in bringing down the losses. If recovery of CoS is not possible for the entire discom areas, at least measures should be taken to initiate recovery of CoS initially in cities / urban areas.

The above realities were noted. However, the following observations were made by the regulators :-

1. Financial health of discoms does remain a concern. Fundamentally, structural changes in the basic framework are required to be taken up for addressing this problem.
2. For the past four years, all the ERCs have been issuing tariff orders / true up orders (including suo-motu orders) annually .
3. Number of petitions received in the Commissions has increased exponentially (viz. CERC alone received 652 petitions in 2014-15 in comparison to 196 in 2008-09). The enormity and complexity of the petitions cannot be undermined. Besides, simple petitions like determination of provisional tariff are also leading to lengthy hearings and substantial efforts of the Commission go into disposing of the petitions.
4. As regards AT&C losses, the utilities are generally directed to achieve specific targets and trajectory. Such losses owing to non-adherence to the directions have to be borne by the utilities.
5. If tariffs are to be determined truly reflecting the cost of supply, tariff for domestic consumers will be higher than commercial tariff due to difference of losses in transmission. Therefore, regulators take a cautious approach while designing the tariff.

6. In most of the States, agricultural consumers are not metered and are highly subsidized. Metering of this segment of consumers would result in (a) correct measurement of loss levels, (b) better power procurement planning and (c) accurate estimation of subsidy required for the category. All this can be achieved if the segregation of agriculture feeders is carried out. However, such segregation has been carried out in a few States and cost involved for such segregation is high.
7. The Financial viability of distribution business is also affected due to high cost of power purchase. Increasing costs of fuel and other costs have been resulting in higher generation costs and it is required to be debated as to how the generation costs could be brought down.
8. It was also suggested that the possibility of allocation of cheapest power to the low paying capacity consumer categories may be debated extensively.

Business Session – II

Agenda Item No. 8 : Presentation and Discussion on “Model Regulations on Smart Grid”.

The Forum considered the “Draft Model Regulations on Smart Grid” placed before it during the 47th Meeting held on 6.4.2015 at New Delhi and constituted a Working Group which could study the proposed draft regulations in detail and submit its recommendations to the Forum for final decision.

In furtherance to the above decision, a Working Group was constituted by the Chairperson, CERC/FOR. The Working Group met on 24.4.2015 at New Delhi and on 22.5.2015 at Jaipur and discussed the draft model regulations threadbare. Based on the recommendations of the Working Group, the draft model regulations were revised (**enclosed as Annexure - IV**) and a presentation

on the revised draft regulations (**enclosed as Annexure - V**) was made by the "FOR" Secretariat.

During the presentation, the issues relating to objective and scope of model regulations, constitution of Smart Grid Cell, its role and responsibilities, life cycle of smart grid plan / programme / projects and other miscellaneous provisions of the model regulations, were discussed.

During the course of discussion, the Forum observed that the terms “Smart Meter”, “Wide Area Measurement Systems (WAMS)” should be defined appropriately.

After discussion, the Forum approved the draft model smart grid regulations for dissemination amongst the SERCs / JERCs.

Agenda Item No. 9 : Reference from DERC on “Rise in electricity tariff in Delhi – Response of DERC to the clarifications sought by Government of NCT of Delhi”.

The Forum noted the matter related to the clarifications sought by Government of NCT of Delhi (GNCTD) from DERC on “Rise in electricity tariff in Delhi” and the reply of DERC to GNCTD.

Agenda Item No. 10 : Reference of Deviation Settlement Mechanism / UI Charge for tariff purposes.

The Forum considered the matter related to using the Deviation Settlement Mechanism Charge / UI Charge as a reference for tariff purposes. The Forum, observed that CERC vide its CERC (Deviation Settlement Mechanism and related matters) Regulations, 2014 repealed the CERC UI Regulations 2009 and accordingly, all references to UI in any Regulations,

Standards, Codes or Procedures of CERC are deemed to be replaced with the "Deviation Settlement Mechanism" (DSM).

The Forum noted that some PPAs between generating companies (especially based on RE sources like co-gen etc.) and the distribution companies are in existence for sale of electricity at a tariff rate linked to Unscheduled Interchange (UI) charges.

CERC has issued Deviation Settlement Mechanism (DSM) Regulations which provide *inter alia* for deterrents in the form of DSM charges for deviation from schedule. Accordingly, the DSM / UI mechanism needs to be seen as a deterrent, and not as a regular power sourcing option.

In the light of the above, the Forum agreed that DSM / UI charge cannot be used as a reference for payment of tariff for any generation.

Agenda Item No. 11 : Presentation and Discussion on the Study commissioned by "FOR" on “Performance of Distribution Utilities”.

In furtherance to the decision of the Forum for carrying out a study on “Performance of Distribution Utilities”, the Secretariat of "FOR", after following due process, appointed M/s Ernst & Young LLP as the Consultant for carrying out the study.

The Consultant submitted the draft report and made a presentation (enclosed as **Annexure - VI**) on the findings of the study. The presentation included, key performance indicators (technical, financial and commercial aspects), weights given to these key performance indicators and finally categorization of the distribution licensees into five different categories, based on their scores.

The distribution licensees under consideration were compared against each other and their performance evaluated based on 4 constructs (Profitability, Channel efficiency, Solvency and Techno-commercial efficiency) and related 12 parameters and grouped into five categories. The 12 parameters, *inter alia* include, Gross Margin without subsidy, Profit per unit input energy, Difference in CAGR between Revenue and expenses, number of days of receivable and number of days of payable, ratio of capex and depreciation, interest service coverage ratio and debt to equity ratio, fixed assets coverage ratio, AT&C losses and Employee cost per unit input energy and trend of AT&C losses. Based on the importance of each performance indicator (derived from its impact on the overall performance of the utilities) weights were assigned. The findings have been compared to national level estimates for a detailed analysis of the performance of the utilities. Relevant gaps in the performance of DISCOMs were identified and appropriate measures/mechanisms for enhancing the efficacy of the utilities have been suggested.

It was decided that the ERCs will validate the data (as referred to in the draft report) within a month. Based on the validated data, the report may be finalized.

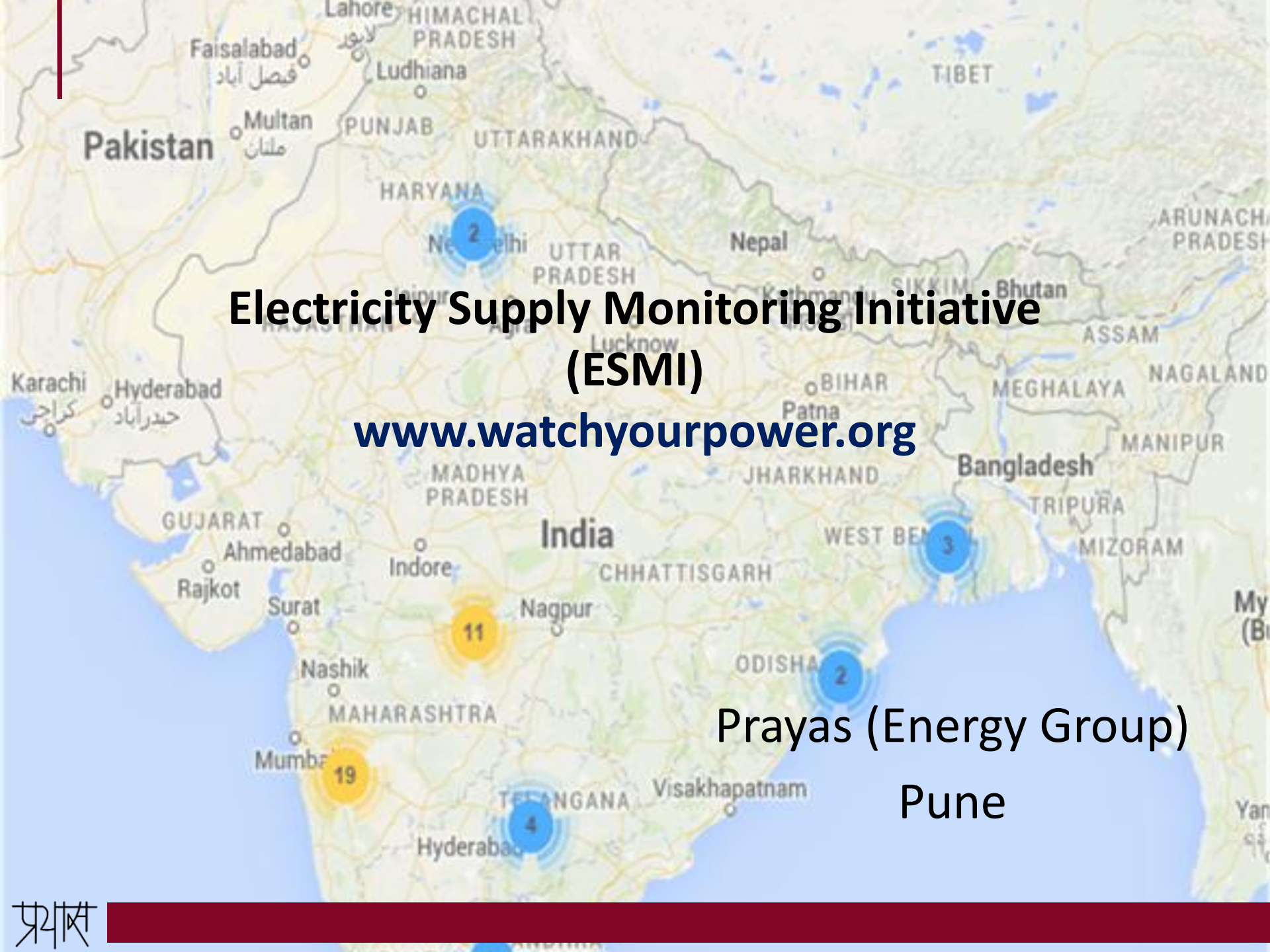
A vote of thanks was extended by Smt. Shubha Sarma, Secretary, CERC/FOR. She conveyed sincere thanks to all the dignitaries present in the meeting. She also thanked the staff of “FOR” Secretariat for their arduous efforts at organizing the meeting. The meeting ended with a vote of thanks to the Chair.

LIST OF PARTICIPANTS ATTENDED THE FORTY EIGHTH MEETING
OF
FORUM OF REGULATORS (FOR)
HELD DURING 10TH – 11TH JUNE, 2015 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 Basharat Ahmed Dhar Chairperson	J&KSERC
09.	Justice (Retd.) Shri N.N. Tiwari Chairperson	JSERC
10.	Shri S.K. Chaturvedi Chairperson	JERC for Goa & All UTs except Delhi
11.	DR. Dev Raj Birdi Chairperson	MPERC
12.	Shri Anand Kumar Chairperson	MSERC
13.	Shri Vishwanath Hiremath Chairperson	RERC
14.	Shri T.T. Dorji Chairperson	SSERC
15.	Shri S. Akshayakumar Chairperson	TNERC
16.	Shri Niharendu Chakraborty Chairperson	TERC

17.	Shri Desh Deepak Verma Chairperson	UPERC
18.	Shri R.K. Kishore Singh Member	JERC for M&M
19.	Shri M.S. Puri Member	HERC
20.	Shri H.D. Arun Kumar Member	KERC
21.	Shri K. Vikraman Nair Member	KSERC
22.	Shri Sivapada Swain Member	OERC
23.	Shri H. Srinivasulu Member	TSERC
24.	Shri K.P. Singh Member	UERC
25.	Smt. Ssubha Sarma Secretary	CERC/FOR
26.	DR. Sushanta K. Chatterjee Joint Chief (RA)	CERC
SPECIAL INVITEES		
27.	Shri A.K. Singhal Member	CERC
28.	Shri A.S. Bakshi Member	CERC
29.	Shri Pankaj Batra Chief Engr.	CEA
30.	Shri M.K. Anand Chief (Fin.)	CERC
31.	Shri S.C. Shrivastava Jt. Chief (Engg.)	CERC
32.	Shri Akhil Kumar Gupta Jt. Chief (Engg.)	CERC
CAC OF CERC		
33.	Shri T.L. Sankar Advisor	Administrative Staff College of India (ASCI)
34.	Shri R.V. Shahi	Former Secretary, MOP
35.	Shri Pradeep S. Mehta Secretary General	Consumer Unity & Trust Society (CUTS)
36.	Shri Shantanu Dixit Coordinator (Energy Group)	Prayas, Pune
37.	Shri Deepak Amitabh Chairman & Managing Director	PTC India Limited

38.	Shri Anil Sardana Managing Director	Tata Power Company Limited
39.	Shri Ashok Khurana Director General	Association of Power Producers (APP)
40.	Shri K. Ramanathan Distinguished Fellow	The Energy & Resources Institute (TERI)
41.	Shri Vneet S. Jaain CEO (Power)	Adani Power Limited
42.	Shri Satish Jindal Chief Executive Officer	JSW Power Trading Company Limited
43.	Shri Bhasker U. Mete President, GEA	Maharashtra State Electricity Power Gen. Corpn. Limited
44.	Shri Kirti J. Amin President	Kisan Vikas Sangh
45.	Shri Man Singh Additional Member (Electrical)	Representative of Railway Board
46.	Shri S.K. Agrawal Executive Director (Coml.).)	Representative of NHPC Limited
47.	Shri D.K. Sood Executive Director (Coml.).)	Representative of NTPC
48.	Shri R.P. Singh Director (Personnel)	Representative of PGCIL
49.	Shri Kapil Sharma Head (Regulatory Affairs)	Representative of Reliance Infrastructure Limited
50.	Shri Sandeep Sarin Deputy Director	Representative of CII
51.	Shri C.S. Krishnadev Deputy Director (Energy)	Representative of FICCI
52.	Shri Tirlok Singh Chief Engineer – ARR & TR	Representative of PSTCL
53.	Ms. Mandakini Ghosh Advocate	Representative of JWALA (NGO)
54.	Shri K.K. Agarwal Director & CEO	Representative of Jindal Power Limited
55.	Shri G.N. Sreekumaran Consultant	Representative of Department of Consumer Affairs.

A map of India and surrounding regions (Pakistan, Nepal, Bangladesh, Tibet, Bhutan, Myanmar) with numbered circles indicating electricity supply monitoring locations. The circles are numbered 2, 3, 4, 11, and 19. Circle 2 is in Delhi, circle 3 is in West Bengal, circle 4 is in Hyderabad, circle 11 is in Nagpur, and circle 19 is in Mumbai. The text 'Electricity Supply Monitoring Initiative (ESMI)' is overlaid on the map.

Electricity Supply Monitoring Initiative (ESMI)

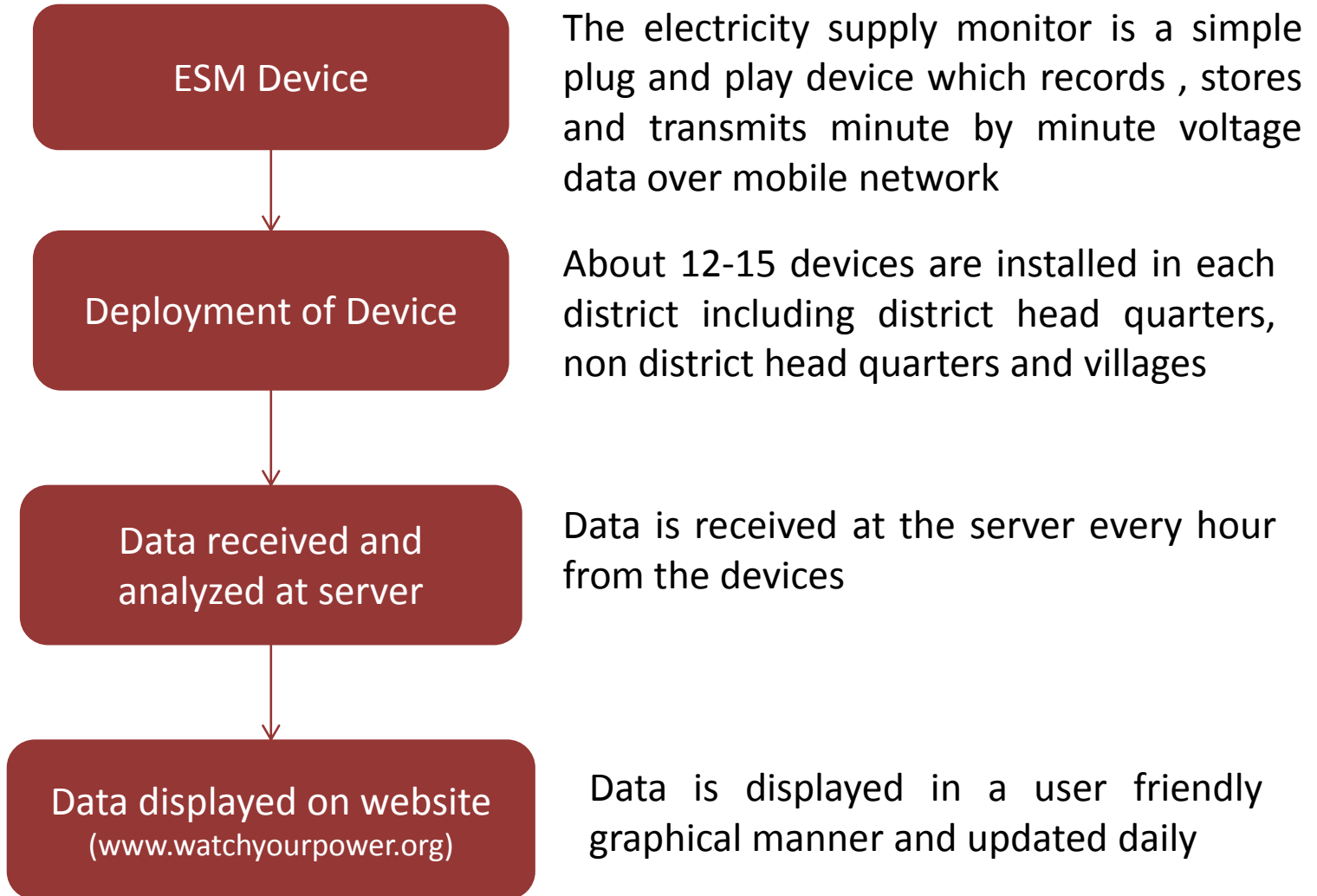
www.watchyourpower.org

Prayas (Energy Group)
Pune

About ESMI

- **What is ESMI ?**
 - Near real time, automated voltage monitoring
 - Data loggers with communication modem
- **Motivation**
 - Poor Voltage, supply interruptions and load shedding have been a contentious issue
 - Need for increasing transparency and building evidence of actual supply quality at consumer end
- **Objectives**
 - Provide **evidence based feedback** of actual supply quality
 - Facilitate effective action by utilities, regulators and policy makers alike to improve supply quality

How ESMI works ??



ESMI Expanse

ESM deployment statistics (As on 31 st March 2015)	
States	9
Districts	16
Total Locations	60
-Megacities	20
-District Headquarters	5
-Other Municipal Corporations	12
-Gram Panchayat (Rural)	23
Available Data (Location hours)	180,000



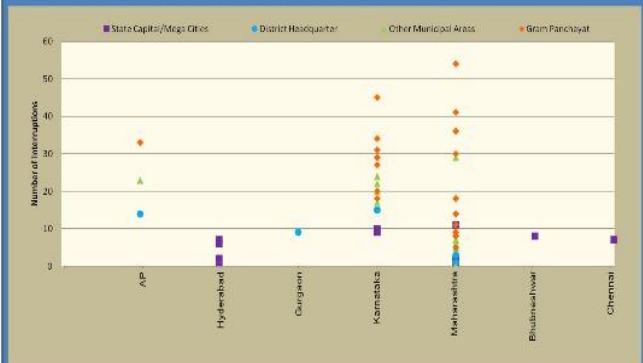
Click on location icons to view supply quality



Analysis Reports

Number of supply interruptions (>15 min) at various ESMI locations during February 2015

The chart shows number of ESMI locations in different states and the rural and urban locations. It also shows total number of supply interruptions at each location during the month.



Coverage

62 Locations across 9 states

Compare

You can watch power quality across multiple locations simultaneously

Download

Click to download reports and data for locations

Get Involved

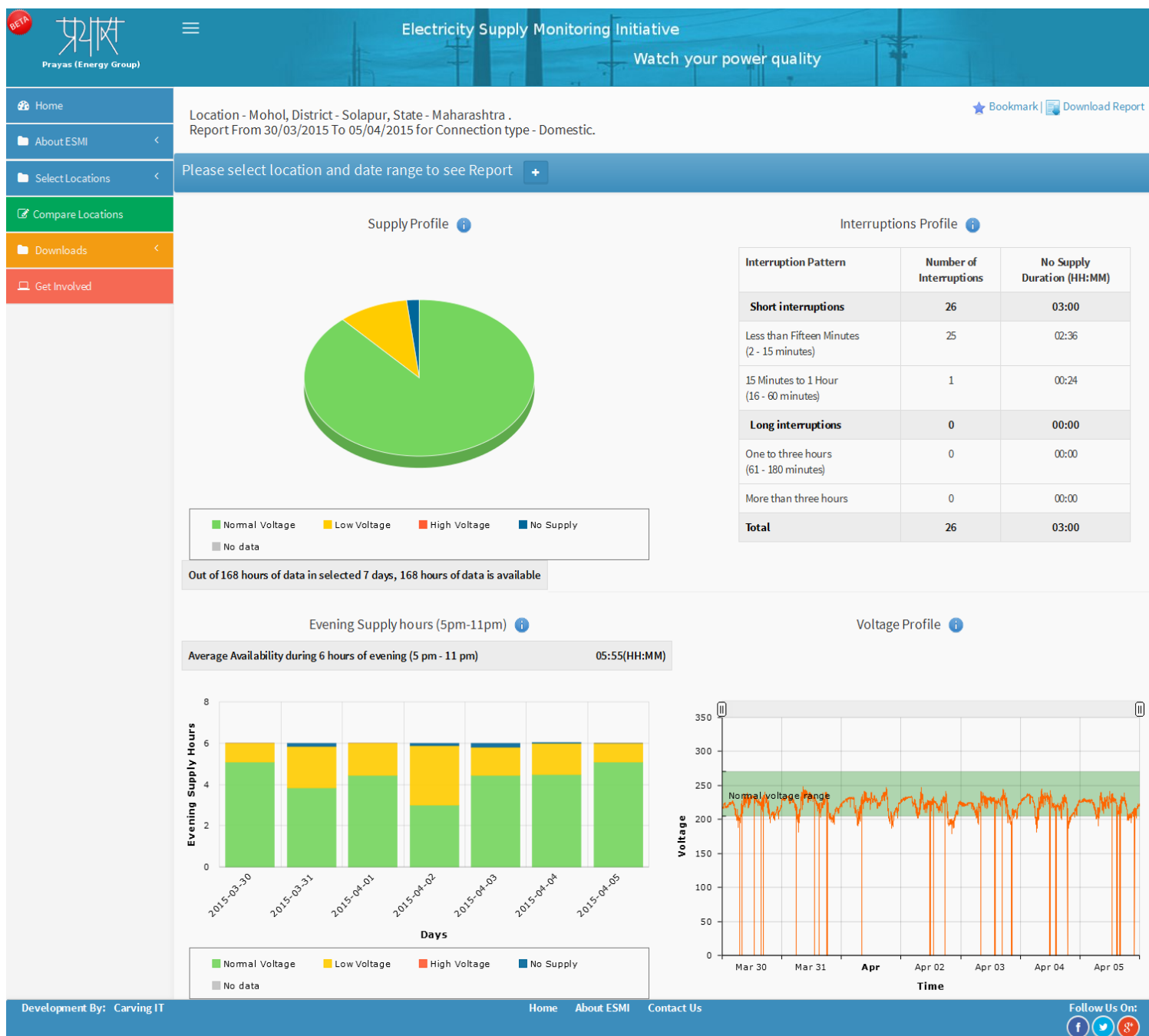
Click here to know how you can engage with the initiative

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ESMI FAQ

BETA


Prayas (Energy Group)

☰

Electricity Supply Monitoring Initiative

Welcome....Tarunima Prabhakar ▾

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Get Involved

FAQ's

Electricity Supply Monitors

- What is an Electricity Supply Monitor?**
The electricity supply monitor is an electronic device as small as a handheld radio. It is a rugged unit that is used to measure voltage across electricity line.

The device measures and records voltage across a live electricity supply line for every minute and transmits the same over GPRS network to a central server. The device is designed to work as a plug and play unit and starts working as soon as it is plugged into a plug point. The device can only measure voltage supply and cannot be used to measure your electricity consumption.

The device contains simple, inexpensive components which consume very little power by themselves. In field testing's it is observed to have consumed less than one unit of electricity per month.

Methodology

- What is the method of data collection / recording?**
The initiative intends to collect data from different locations to get a broad sense of voltage and quality supplied to areas. To achieve this objective a set of ESM devices are installed at various locations spread across the country. Each of these devices records minute by minute voltage at an accuracy of ± 4 volts across a live electricity supply line and sends the recorded voltage to a central server. The devices are designed to operate within the supply range of 130-300 Volts, within which the device records voltage. In conditions of power outage the device compute zero voltage recordings and send it to the server. Thus the devices are capable to capture all interruptions in the electricity supply at a location. Type of consumer connection (Domestic, Non-domestic and Agricultural) are also documented and displayed on the website.
- How is the collected data represented?**
The website provides for all users to visualise voltage supply quality at different locations through pre-defined charts. On selecting a particular location on the map or through a search process the Reports get loaded. For each location it is possible to view four unique charts for any period of 31 days displaying the aggregate **i) electricity supply quality, ii) the interruptions profile, iii) availability of supply during evening hours and iv) minute by minute voltage profile across the selected time period.** Each location report displays the type of consumer, category of location (state capital, District Headquarters, Other Municipal areas and gram panchayat), the name of location, the district and state where the data is being received from and voltage quality and quantity information for a selected duration of time.

Interruption Classification

- What are the types of interruptions that are captured and how are they classified?**

Voltage Classification




- What do the Low, Normal and High voltages in the graphs indicate?**

Data Availability and Sharing

- Is the data displayed on the website available for download?**
- What if I want data for my research/ analysis?**

Development By: Carving IT

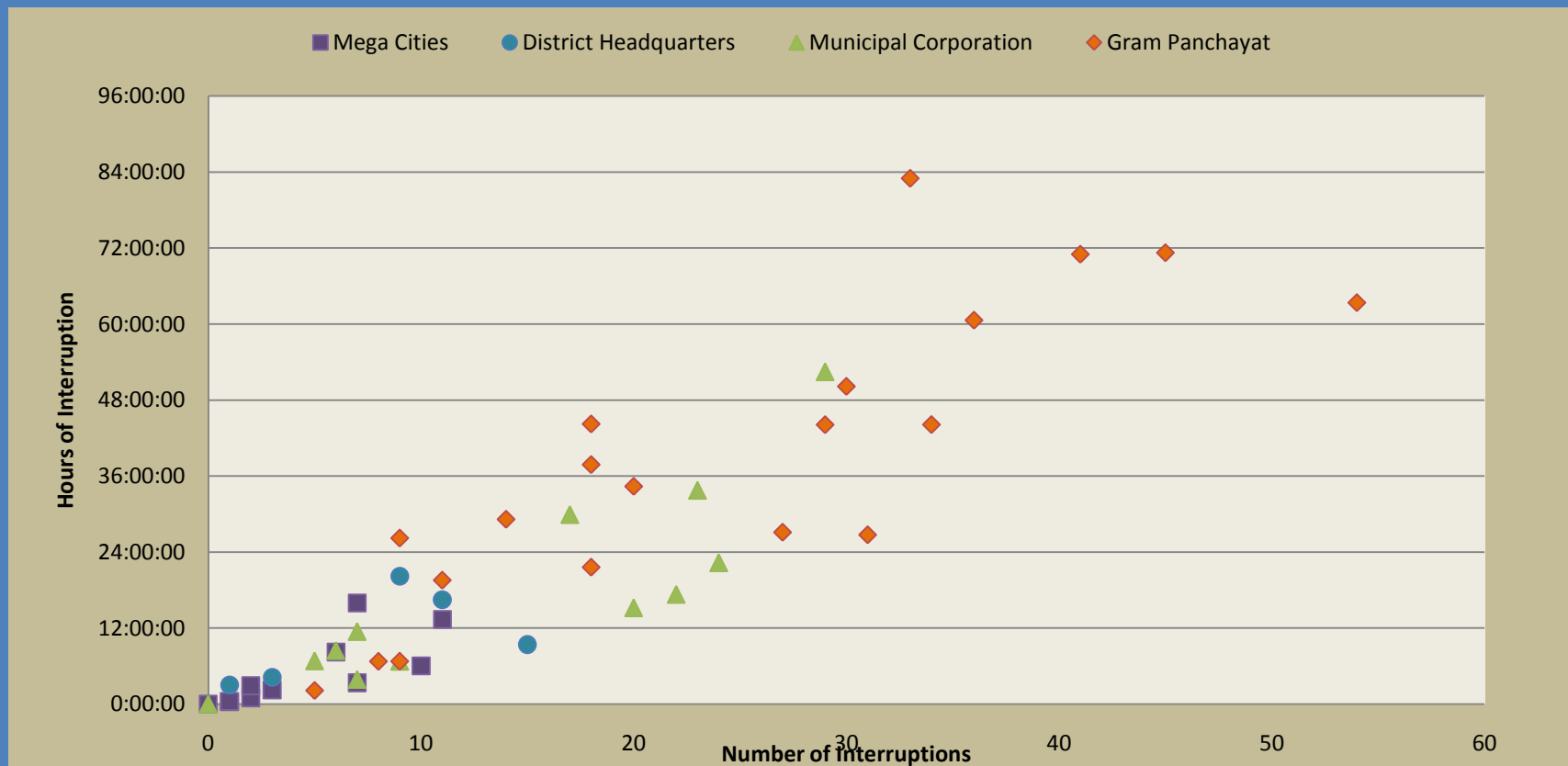
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Sample analysis using ESMI data

Number of interruptions (>15 min) and no supply hours during February 2015

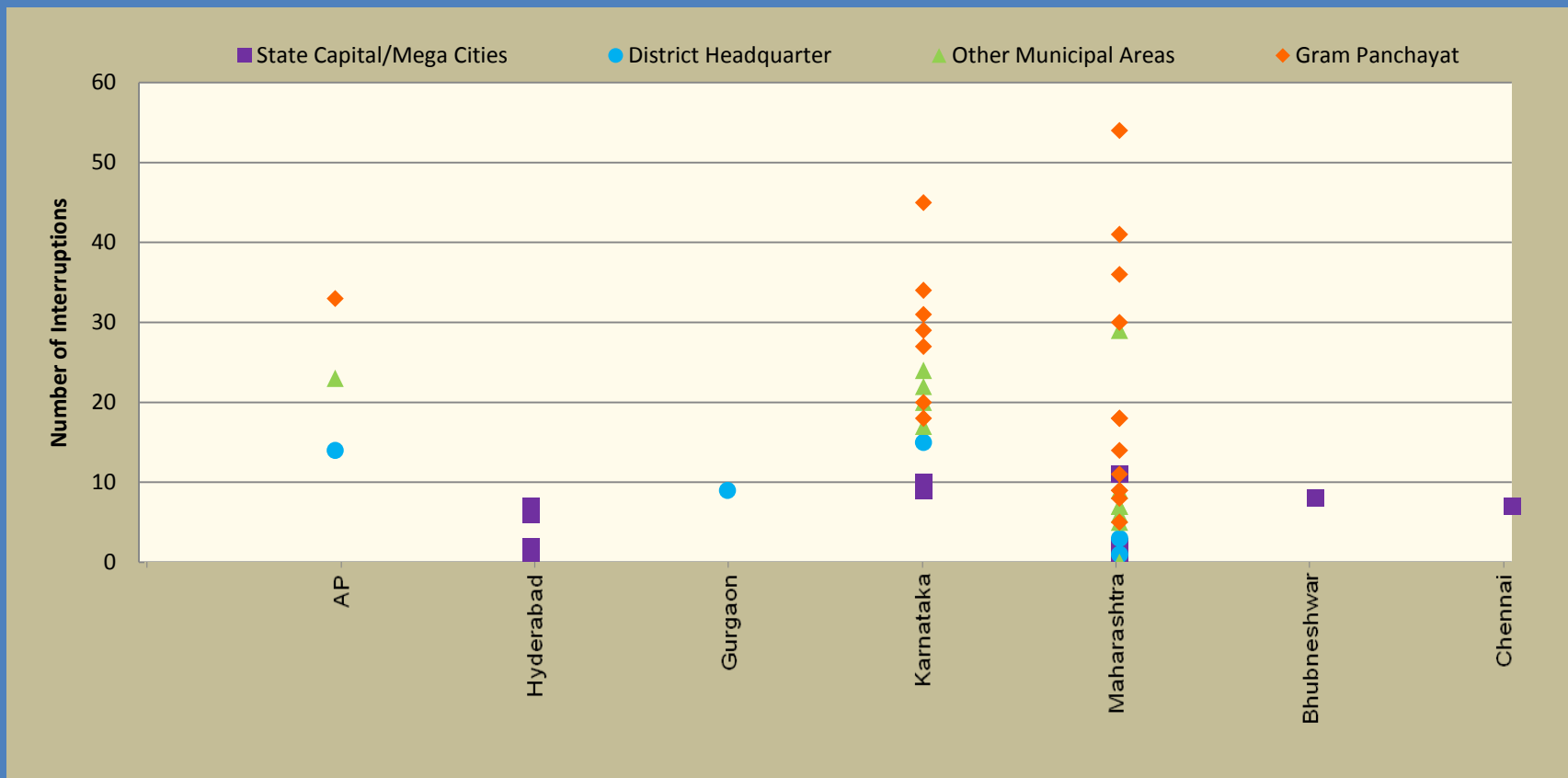
The chart shows supply quality for different urban and rural (Gram Panchayat) areas covered by ESMI. Nearly 60% of these locations experienced more than 5 interruptions (>15 min) leading to more than 10 hours of outage during the month. Note that most of these locations are in other municipal corporations or gram panchayat areas.



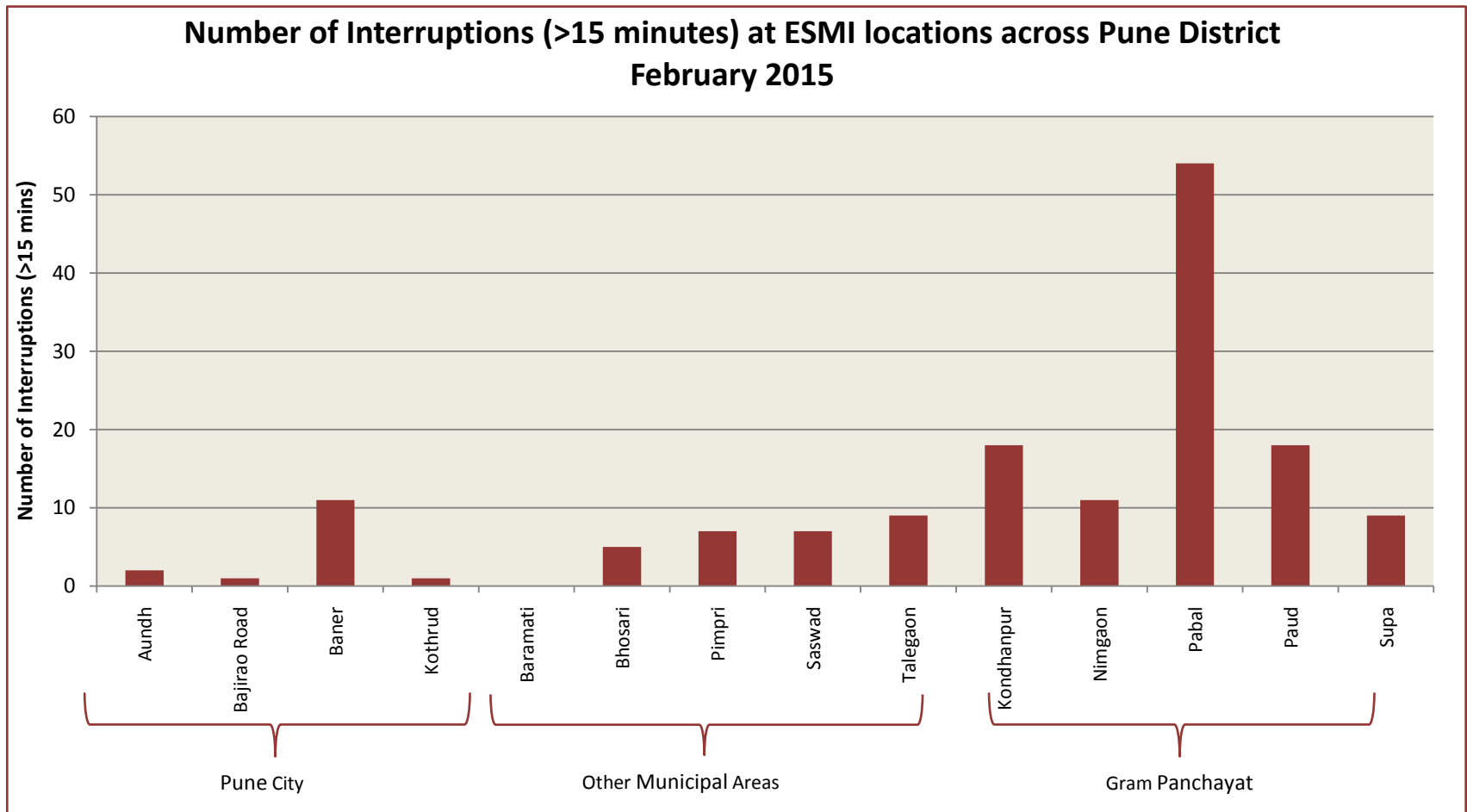
Sample analysis using ESMI data

Number of supply interruptions (>15 min) at various ESMI locations during February 2015

The chart shows number of ESMI locations in different states and the rural and urban locations. It also shows total number of supply interruptions at each location during the month.



Sample analysis using ESMI Data

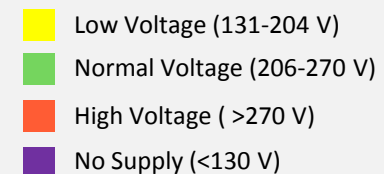
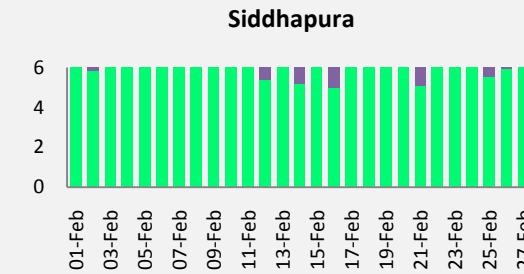
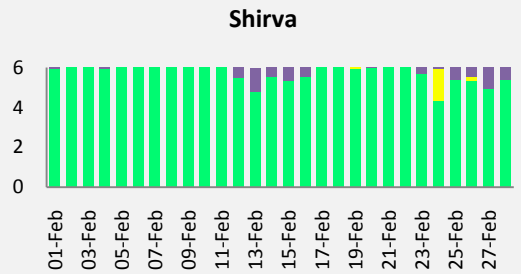
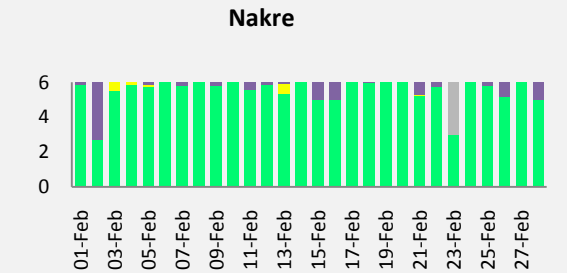
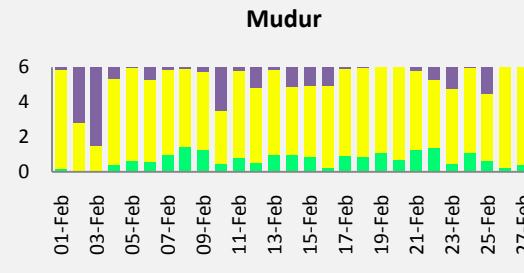
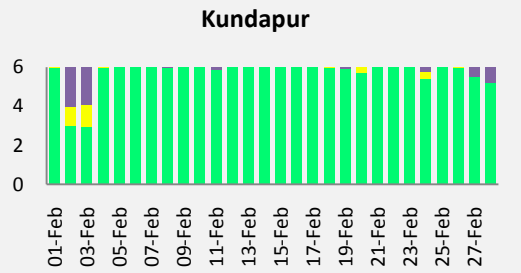
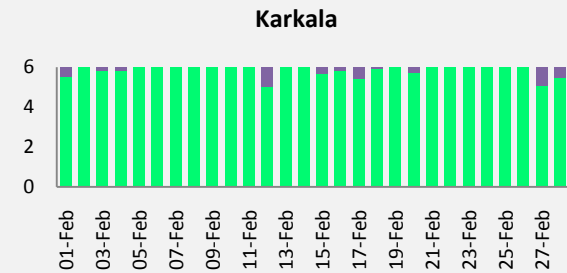
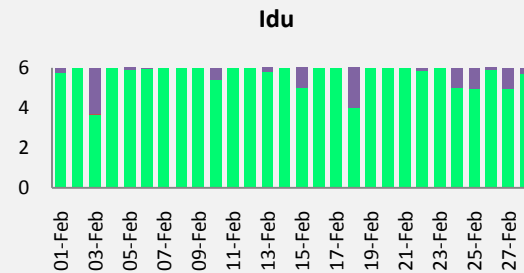
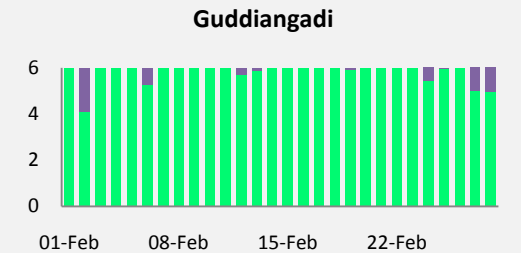
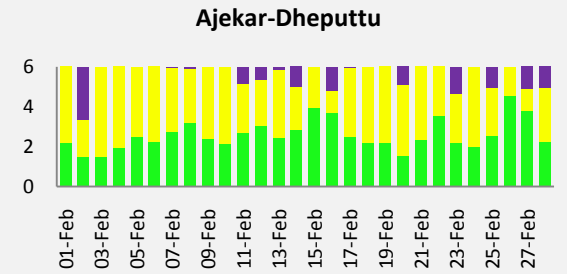
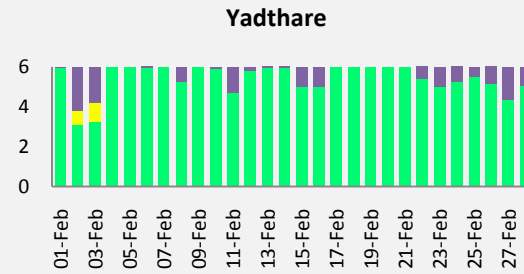
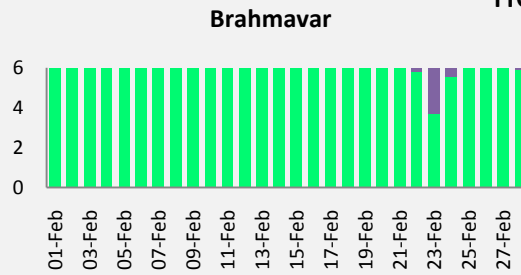


**Average hours lost due to interruption at ESMI locations across Pune District
February 2015**

Pune City : 4 hours
Other Municipal Areas : 6 hours
Gram Panchayat : 30 hours

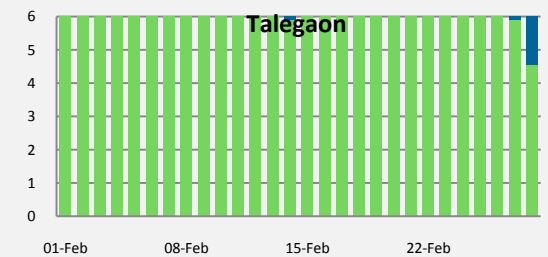
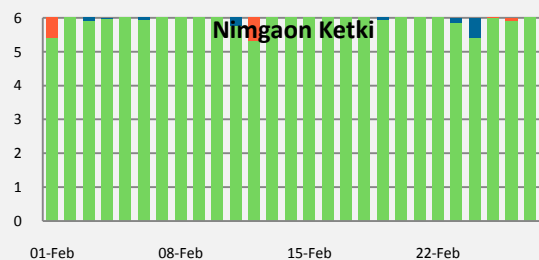
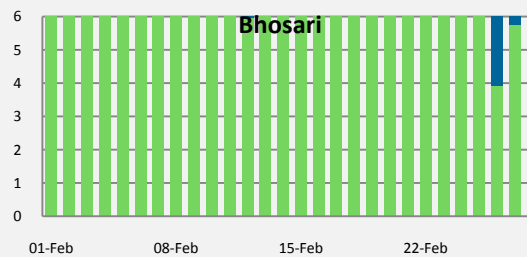
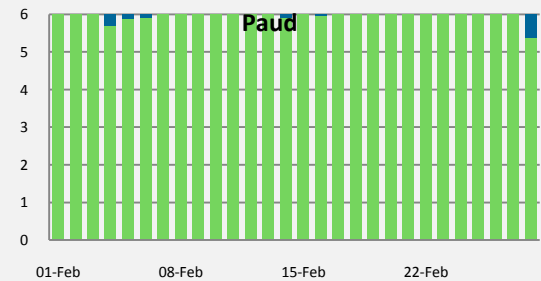
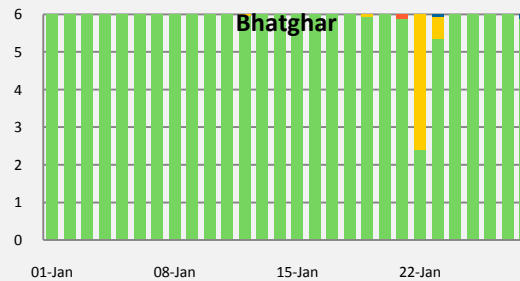
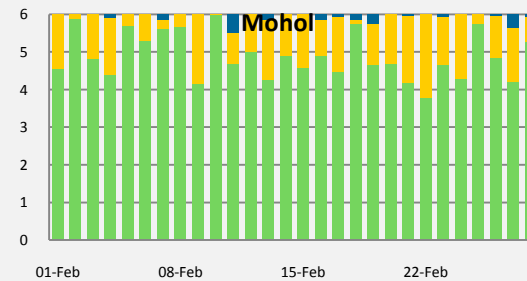
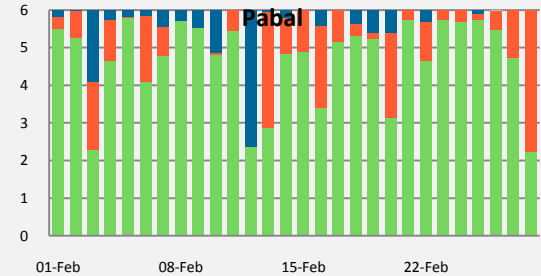
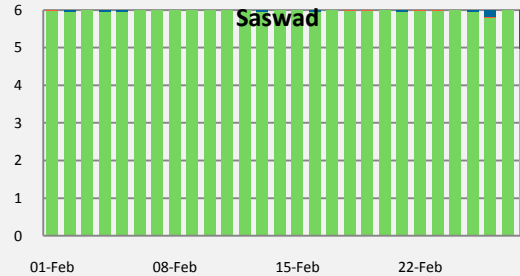
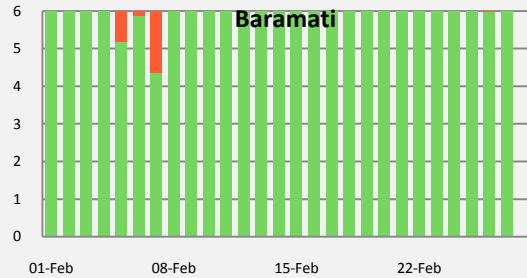
Sample analysis using ESMI Data

Evening hours (5 PM- 11 PM) supply quality in Udupi District (non district headquarters), Karnataka - February 2015



Sample analysis using ESMI Data

Evening hours (5 PM- 11 PM) supply quality in Pune District (non district headquarters), Maharashtra - February 2015



Low Voltage (131-204 V)

High Voltage (>270 V)

No Supply (<130 V)

Normal Voltage (206-270 V)

What next..

- In coming few months we plan to expand ESMI to 700 – 800 new locations spanning across eight states.
- We will continue to share this data from all locations with utilities, regulators and consumers.
- Data from ESMI also creates opportunities for further research in drawing linkages between electricity supply and people's health and livelihood and many other aspects relating to power supply.

Key takeaways

- Technology and costs are no more a barrier for automated monitoring systems
 - Monitoring 10,000 feeders would cost just about 30-40 Crore
 - Utilities should be mandated to ensure full transparency and accountability of service quality
 - Regulators should use such systems to monitor compliance with service quality standards and load shedding
- Reliable service quality data can help :
 - Ensure accountability of investments in distribution infrastructure
 - Estimation of demand supply gap
 - Planning and accountability for short term power purchase
 - Tariff-Service quality linkages

Thank you

For more information visit :

watchyourpower.org

or

prayaspune.org/peg

Or write to us at :

esmi@prayaspune.org

About ESM device

- The energy consumed by the device is less than a unit per month
- Accuracy + /- 2-3 %
- Devices are rigorously tested before they are deployed
- Precautions ensured during deployment
 - Ensure device is not connected to UPS /stabilizers plug point
 - Device is connected to spare plug point to not hinder daily activities
 - Device is also connected to direct supply line where possible
- Recorded erratic supply , long outages are confirmed from consumer feedback
- Data received from ESMI can be verified with data provided by Utilities at feeder level
- Each device costs about Rs. 10,000 - 15,000 (depending on specific model and cost of mobile data package)

Business Unit

Roll out plan for introduction of Competition in Retail sale of electricity

Final Presentation

*Strictly Private
and Confidential*

10 June 2015

Agenda

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2	Stage wise approach for introduction of retail supply competition	7
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Appendices

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2	Limiting cross subsidies to wheeling charge	59
3	Illustrations for Allocation of PPAs	61
4	Stage wise tasks	67

Introduction

Review of Electricity (Amendment) Bill, 2014

Some of the major changes envisaged in the Electricity (Amendment) Bill 2014 are as follows –

• Current Discoms are to be split into Distribution (carriage) and Incumbent Supply (content) businesses	Section 2 <i>“Supply licensee” means a person authorised under section 14 to supply electricity to consumers...</i>
• Duties and Functions of Distribution and Supply businesses defined separately	Section 42 – Duties of Distribution licensee Section 51A – Duties of Supply licensee
• Multiple Supply licensee allowed in a license area	Section 14 <i>.... Commission may grant a licensee to two or more persons for supply of electricity within the same area of supply...</i>
• Single Distribution company envisaged in a license area	Section 12 <i>... Commission shall not grant licence to more than one distribution licensee in any area of distribution...</i>
• Intermediary Company to be formed for taking over existing PPAs	Section 2 (35B) <i>Intermediary Company means the entity succeeding to the existing PPA and procurement arrangements of the relevant distribution licensees.....</i>
• Transfer scheme to be made by state governments for segregation of content and carriage businesses	Section 131 (4A) <i>...scheme for transfer of such of the functions, the property, interest in property, rights and liabilities of the distribution licensees relating to supply of electricity to a company who shall be the incumbent supply licensee for the concerned area of supply...</i>

FOR report on introduction of competition in retail supply

***Introducing
competition in
retail electricity
supply in India***
Forum of
Regulators

3 June, 2013



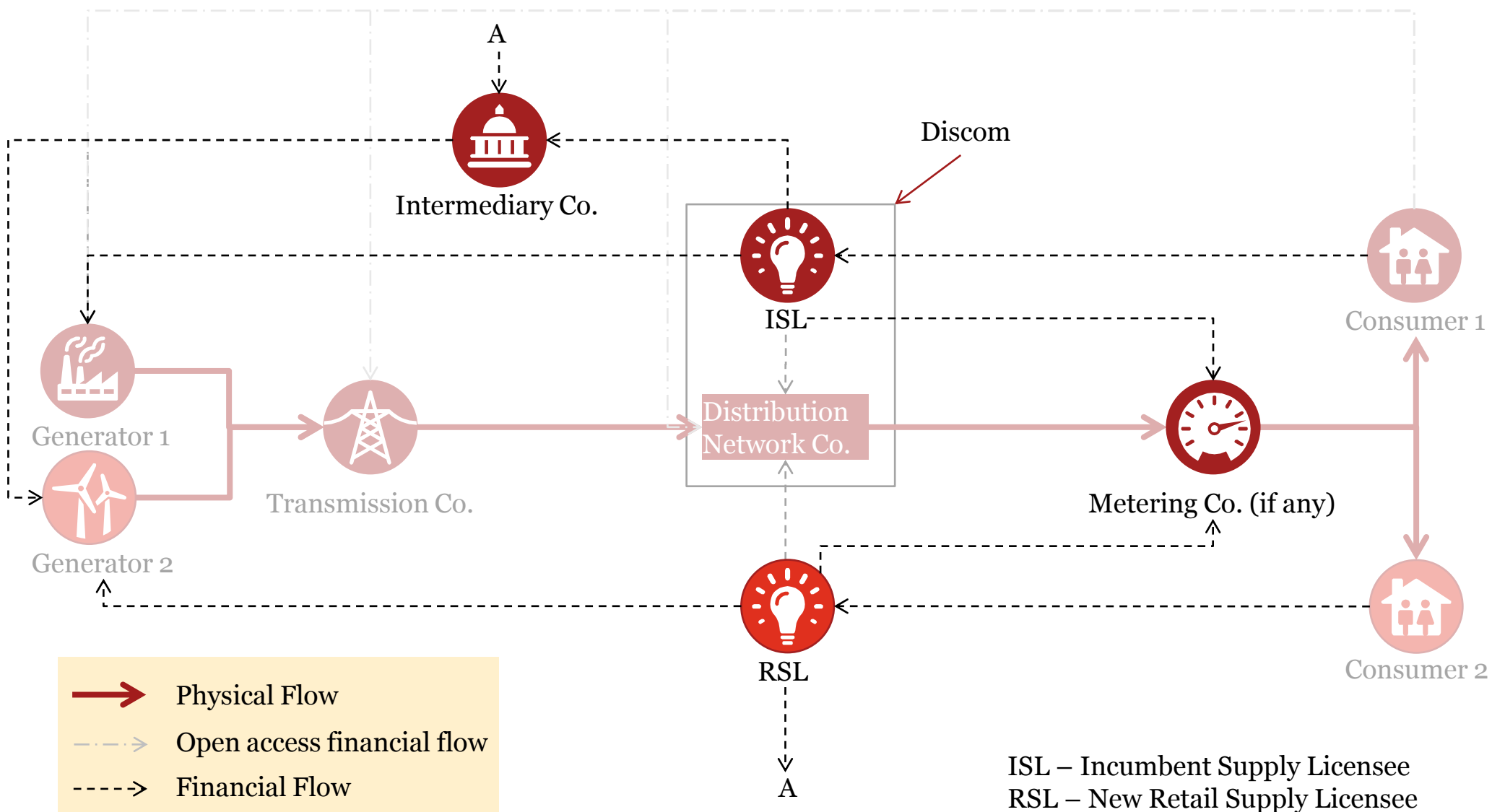
The major points highlighted in this report were:

1. **Development of a Wholesale Market** – so as to reduce dominant position of generators and improve power procurement efficiencies
2. **Cost Reflective Tariffs** – so as to reduce cross subsidies
3. **Treatment of existing distribution and financial losses** – allocation between distribution and retail supply businesses
4. **Suitable supply infrastructure** – need for advanced metering in competitive segment of the market
5. **Segregation of ownership of the distribution (wire) and retail supply functions** – so as to bring neutrality in distribution network
6. **Phased approach with clear milestones** – a timeline was suggested for various phases of implementation
7. **Provision for Provider of last resort** – Duty to Connect and Duty to Supply a consumer
8. **Standards of Performance** – division of SOPs between Distribution and Supply functions

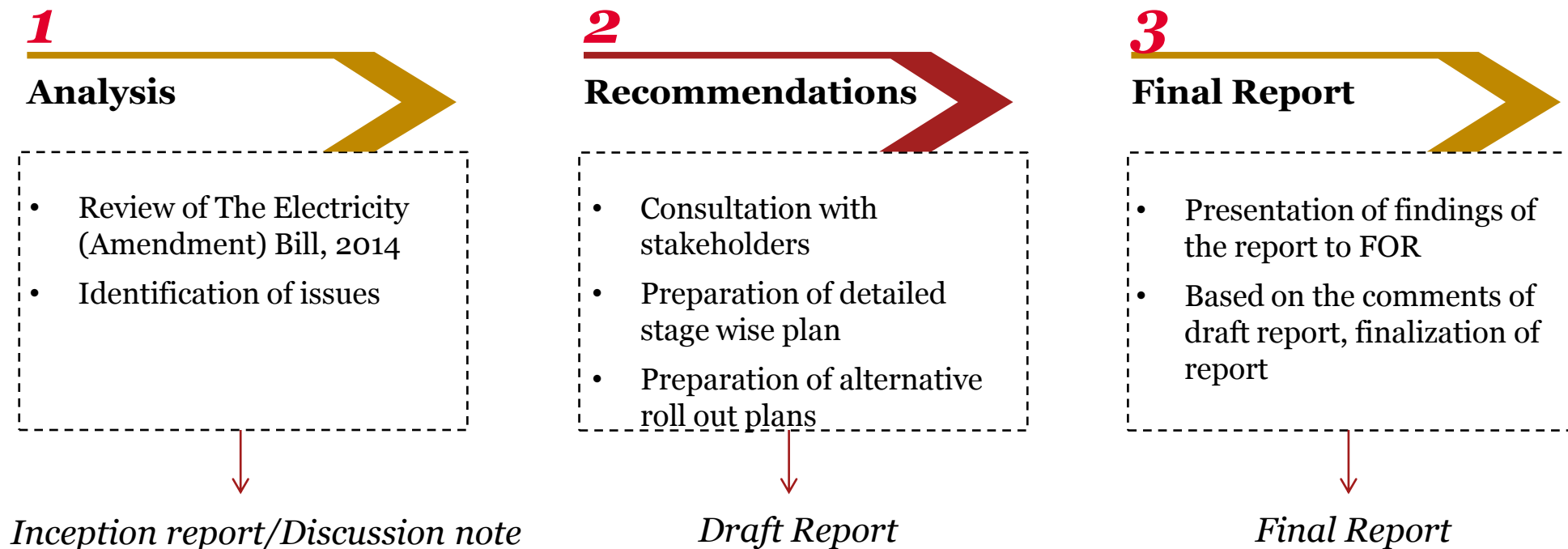
Objectives for introducing Retail Supply Competition

Objective	How can Retail Supply Competition help achieve this objective?
Improvement in efficiency and loss reduction	The licensees can focus on their respective responsibilities. Distribution company would focus entirely on technical and operational efficiency, while the retail supplier would focus entirely on power procurement and consumer interface
To give choice to consumers	Choice allows consumers to differentiate between suppliers on the parameters like quality of supply, supply tariffs and customer service. This in turn puts pressure on Supply companies to improve their services.
Improved access and availability of power	Owing to focused investments of distribution in network up gradation and increased efficiencies in power procurement by Retail Supply Competition, in the long run power availability to consumers will improve
Efficient power procurement	In order to capture a greater market share in their supply area, the retail supply companies would work towards improving efficiency in power procurement.

Industry structure under Retail Supply Competition



Approach adopted for the study



Stage wise approach for introduction of retail supply competition

Stages of introducing retail supply competition

	Stage	Time period to complete
1	<u>Functional Separation of Discoms:</u> In this stage, the current Discoms would be segregated into Distribution and Retail Supply Companies. Their roles and responsibilities will be defined and they would be equipped with enough financial and manpower resources to take on those roles.	1-2 year(s)
2	<u>Preparation for Competition:</u> In this stage the, steps would be taken to make the market conducive for retail supply competition. Entry barriers would be removed for the new retail supply companies in order to create a level playing field for all.	Start: after stage 1 objectives are achieved Completion time: 2-3 years after completion of Stage 1
3	<u>Onset of Competition:</u> New Retail Supply Licenses would be given in this stage in order to give retail consumer choice.	Start: after stage 2 objectives are achieved This stage will be an ongoing activity till the time all categories are open for competition

Stage wise tasks for introducing retail competition

Major issues

Stage 1 – Functional Separation of Discoms

1. Defining new functional entities
2. Defining Roles & Responsibilities
3. Allocation of financial losses
4. Transfer of existing PPAs
5. Consumer Interface
6. GGRF Mechanism
7. Standards of performance
8. Universal Service Obligation
9. Tariff Determination Mechanism
10. Balance sheet segregation
11. Human resource planning
12. Technical studies of as-is condition

Stage 2 – Preparation for Competition

1. Ownership of Retail Supply Company
2. Allocation of Technical and Commercial Losses
3. Reduction of Cross Subsidies
4. Up gradation of metering
5. Consumer Database

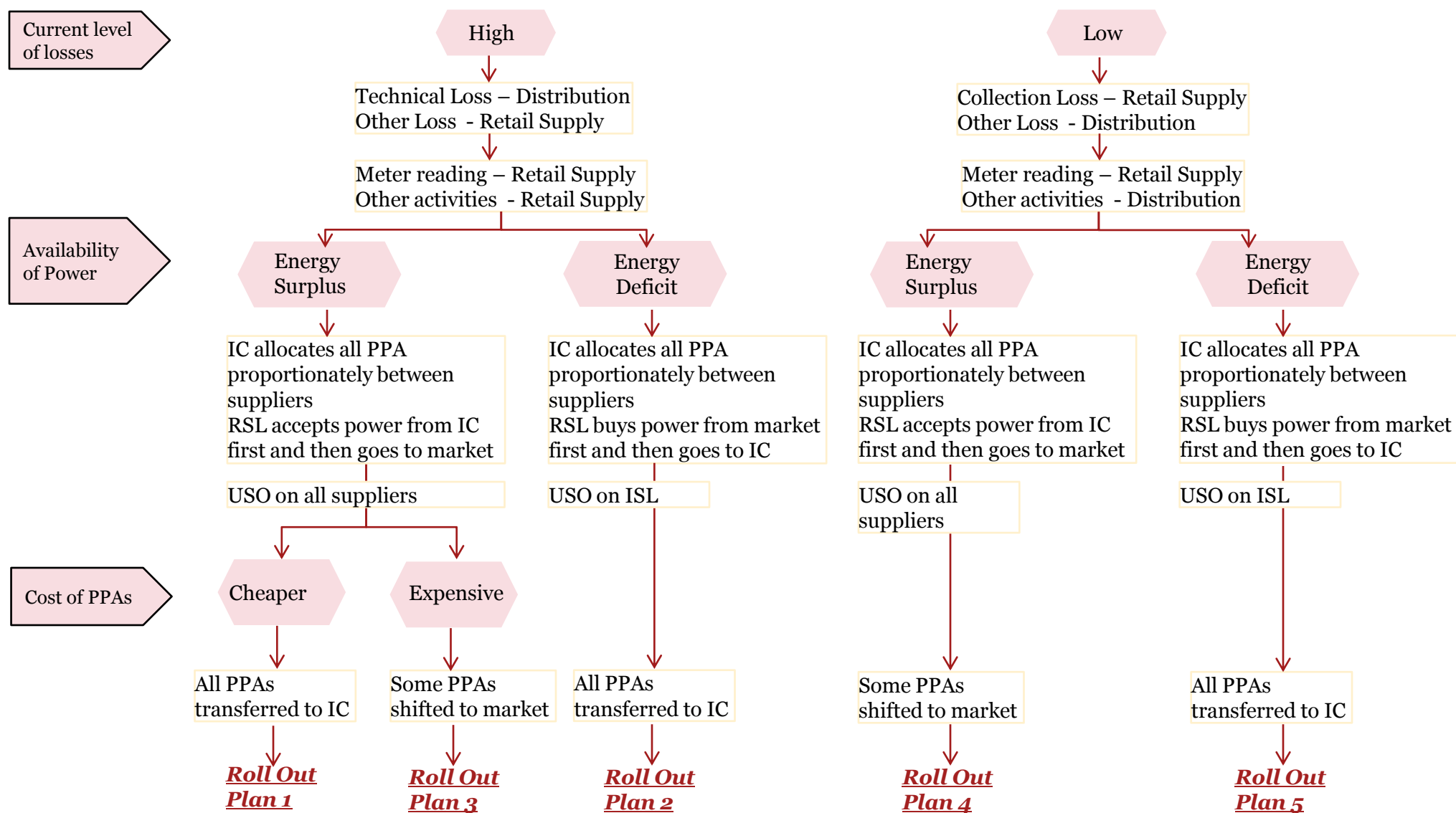
Stage 3 – Onset of Competition

1. Entry of second Retail Supply Company
2. Phases for opening market to competition
3. Allocation of existing PPAs
4. Consumer switching mechanism
5. Procurement of new PPAs
6. Balancing and settlement
7. Tariff Determination
8. Defining POLR
9. USO extends to new retail suppliers

Alternative roll out plans

Section 3 – Alternative roll out plans

Factors for decision



Section 3 – Alternative roll out plans

Loss Levels	Availability of power	Cost of PPA	Scenario	Loss Allocation	Meter Services	USO	Allocation of PPAs
High	Surplus	Cheaper	I	Tech – Distribution Others – Retail Supply	Retail Supply	All Suppliers	RSL->IC IC-> Proportionate allocation with no dissolving of PPAs
High	Deficit	Cheaper	II	Tech – Distribution Others – Retail Supply	Retail Supply	ISL	RSL->IC IC-> ISL with no dissolving of PPAs
High	Surplus	Expensive	III	Tech – Distribution Others – Retail Supply	Retail Supply	All Suppliers	RSL->IC IC-> Proportionate allocation with some dissolving of PPAs
High	Deficit	Expensive	Same as II	Tech – Distribution Others – Retail Supply	Retail Supply	ISL	RSL->IC IC-> ISL with no dissolving of PPAs
Low	Surplus	Cheaper	IV	Collection – Retail Supply Other - Distribution	Distribution	All Suppliers	RSL->IC IC-> Proportionate allocation with some dissolving of PPAs
Low	Deficit	Cheaper	V	Collection – Retail Supply Other - Distribution	Distribution	ISL	RSL->IC IC-> ISL with no dissolving of PPAs
Low	Surplus	Expensive	Same as IV	Collection – Retail Supply Other - Distribution	Distribution	All Suppliers	RSL->IC IC-> Proportionate allocation with some Dissolving of PPAs
Low	Deficit	Expensive	Same as V	Collection – Retail Supply Other - Distribution	Distribution	ISL	RSL->IC IC-> ISL with no dissolving of PPAs

Section 3 – Alternative roll out plans

Roll out plan for scenario I (1/2)

(applicable in states with high levels of losses, surplus power and cheaper PPAs than market | Gujarat (PGVCL), Sikkim | Driving force for efficiency – Loss Reduction)


	Distribution Business	Incumbent Supply Business (ISL)	New Retail Supply Business (RSL)	SLDC	Intermediary Company (IC)
Cross Subsidy	Universal Charge (UC) Fund A UC fund will cover any revenue gap created due to tariff realignments as per cross subsidies reduction trajectory			or	Direct Government Subsidy The State Government funds the gap between tariffs and cost of supply
Loss Allocation	Technical Losses	Commercial Losses (Hooking, Inaccurate metering, Meter tampering/bypassing, collection inefficiency) Losses to be measured voltage wise		<i>Initial level of losses (technical and commercial) to be estimated & factored in regulated tariff with trajectory for reduction in subsequent years. Loss reduction will be driver for efficiency in this plan.</i>	
Cherry Picking	Will not be an issue as cross subsidy and losses are taken care of as above				
Phasing of competition		Based on Reducing Connected Load <ul style="list-style-type: none">Initially 1 MW and aboveLater 100 kW and aboveFurther all consumers			
USO		For all consumers	For consumers open to competition (as per phasing)		
Regulatory Assets & losses	Regulatory Assets & Un-recognised financial losses		→ <ul style="list-style-type: none">Amortised using a Universal Charge (UC), orSupport from State Government, orHybrid approach of the two above methods		
PPA Allocation		<ul style="list-style-type: none">All suppliers mandatorily take power from allocated by ICFor any remaining requirement they go to either wholesale market or enter into new PPAs			<ul style="list-style-type: none">All PPAs are transferred to ICIC proportionately allocates power between all suppliers based on consumer mix/load

Roll out plan for scenario I (2/2)

	Distribution Business	Incumbent Supply Business (ISL)	New Retail Supply Business (RSL)	SLDC	Intermediary Company (IC)
Metering		Meter Reading, and Other activities (Meter installation/replacement, ownership of metering assets, meter operations and testing)			
Balancing & Settlement		<ul style="list-style-type: none"> Suppliers give schedule to SLDC. Payment to generators based on this Actual consumption of Suppliers measured using Advanced Metering. These are then used for deviation settlement. 	Advanced meter mandatory for RSL	Existing arrangement of energy accounting at Distribution periphery to continue	
POLR		<ul style="list-style-type: none"> On ISL in 1st year After 1st year, as decided by SERC 			
Consumer Interface		1 st time connection, Billing, Complaints and Grievances			
Switching	One year of lock in period after switching, to start with (to be reviewed by the regulator subsequently)				
SOP	<ul style="list-style-type: none"> Separate SOPs for Retail Supply and Distribution Business To be enforced by regulator 				
Tariff Determination	Regulated Tariff	Consumers not open to competition – Regulated Consumers open to competition – Ceiling Tariff			
Consumer Database	Owned and Maintained	Data collected and shared with Distribution business			
Distribution Functions	Network Ops (DNO) Planning Ops (DPO)			System Ops (DSO) Market Ops (DMO)	

Roll out plan for scenario II (1/2)

(applicable in states with high levels of losses, deficit power and cheaper PPAs than market | Arunachal Pradesh, Assam, Bihar (BSEB, NBPDC & SBPDCL), Jammu & Kashmir, Jharkhand, Manipur, Meghalaya, Mizoram, Nagaland, Odisha (CESU, NESCO, SESCO & WESCO), Tripura, Uttar Pradesh (DVVN, KESCO, MVVN, Pasch VVN & Poorv VVN) | Driving force for efficiency – Loss Reduction)

- Loss Reduction)	Distribution Business	Incumbent Supply Business (ISL)	New Retail Supply Business (RSL)	SLDC	Intermediary Company (IC)
Cross Subsidy	Universal Charge (UC) Fund A UC fund will cover any revenue gap created due to tariff realignments as per cross subsidies reduction trajectory		or	Direct Government Subsidy The State Government funds the gap between tariffs and cost of supply	
Loss Allocation	Technical Losses	Commercial Losses (Hooking, Inaccurate metering, Meter tampering/bypassing, collection inefficiency) Losses to be measured voltage wise		<i>Initial level of losses (technical and commercial) to be estimated & factored in regulated tariff with trajectory for reduction in subsequent years. Loss reduction will be driver for efficiency in this plan.</i>	
Cherry Picking	Will not be an issue as cross subsidy and losses are taken care of as above				
Phasing of competition		Based on Reducing Connected Load <ul style="list-style-type: none">Initially 1 MW and aboveLater 100 kW and aboveFurther all consumers			
USO		For all consumers			
Regulatory Assets & losses	Regulatory Assets & Un-recognised financial losses		 <ul style="list-style-type: none">Amortised using a Universal Charge (UC), orSupport from State Government, orHybrid approach of the two above methods		
PPA Allocation		<ul style="list-style-type: none">All suppliers mandatorily take power from allocated by ICFor any remaining requirement they go to either wholesale market or enter into new PPAs			<ul style="list-style-type: none">All PPAs are transferred to ICIC proportionately allocates power between all suppliers based on consumer mix/load

Roll out plan for scenario II (2/2)

	Distribution Business	Incumbent Supply Business (ISL)	New Retail Supply Business (RSL)	SLDC	Intermediary Company (IC)
Metering		Other activities (Meter installation/replacement, ownership of metering assets, meter operations and testing)			
Balancing & Settlement		<ul style="list-style-type: none"> Suppliers give schedule to SLDC. Payment to generators based on this Actual consumption of Suppliers measured using Advanced meter. These are then used for deviation settlement. 	Advanced meter mandatory for RSL	Existing arrangement of energy accounting at Distribution periphery to continue	
POLR		<ul style="list-style-type: none"> On ISL in 1st year After 1st year, as decided by SERC 			
Consumer Interface		1 st time connection, Billing, Complaints and Grievances			
Switching	One year of lock in period after switching, to start with (to be reviewed by the regulator subsequently)				
SOP	<ul style="list-style-type: none"> Separate SOPs for Retail Supply and Distribution Business To be enforced by regulator 				
Tariff Determination	Regulated Tariff	Consumers not open to competition – Regulated Consumers open to competition – Ceiling Tariff			
Consumer Database	Owned and Maintained	Data collected and shared with Distribution business			
Distribution Functions	Network Ops (DNO) Planning Ops (DPO)			System Ops (DSO) Market Ops (DMO)	

Section 3 – Alternative roll out plans

Roll out plan for scenario III (1/2)

(applicable in states with high levels of losses, surplus power and expensive PPAs than market | Haryana (UHBVNL), Madhya Pradesh (Madhya, Paschim & Purv Kshetra VVCL), West Bengal| Driving force for efficiency – Loss Reduction)

	Distribution Business	Incumbent Supply Business (ISL)	New Retail Supply Business (RSL)	SLDC	Intermediary Company (IC)
Cross Subsidy	Universal Charge (UC) Fund A UC fund will cover any revenue gap created due to tariff realignments as per cross subsidies reduction trajectory			or	Direct Government Subsidy The State Government funds the gap between tariffs and cost of supply
Loss Allocation	Technical Losses	Commercial Losses (Hooking, Inaccurate metering, Meter tampering/bypassing, collection inefficiency) Losses to be measured voltage wise		<i>Initial level of losses (technical and commercial) to be estimated & factored in regulated tariff with trajectory for reduction in subsequent years. Loss reduction will be driver for efficiency in this plan.</i>	
Cherry Picking	Will not be an issue as cross subsidy and losses are taken care of as above				
Phasing of competition		Based on Reducing Connected Load <ul style="list-style-type: none">Initially 1 MW and aboveLater 100 kW and aboveFurther all consumers			
USO		For all consumers	For consumers open to competition (as per phasing)		
Regulatory Assets & losses	Regulatory Assets & Un-recognised financial losses		→	<ul style="list-style-type: none">Amortised using a Universal Charge (UC), orSupport from State Government, orHybrid approach of the two above methods	
PPA Allocation		<ul style="list-style-type: none">All suppliers mandatorily take power from allocated by ICFor any remaining requirement they go to either wholesale market or enter into new PPAs			<ul style="list-style-type: none">Some older PPAs are dissolved, rest transferred to ICIC proportionately allocates power between all suppliers based on consumer mix/load

Roll out plan for scenario III (2/2)

	Distribution Business	Incumbent Supply Business (ISL)	New Retail Supply Business (RSL)	SLDC	Intermediary Company (IC)
Metering		Other activities (Meter installation/replacement, ownership of metering assets, meter operations and testing)			
Balancing & Settlement			Advanced meter mandatory for RSL	Existing arrangement of energy accounting at Distribution periphery to continue	
		<ul style="list-style-type: none"> Suppliers give schedule to SLDC. Payment to generators based on this Actual consumption of Suppliers measured using Advanced meter. These are then used for deviation settlement. 			
POLR		<ul style="list-style-type: none"> On ISL in 1st year After 1st year, as decided by SERC 			
Consumer Interface		1 st time connection, Billing, Complaints and Grievances			
Switching	One year of lock in period after switching, to start with (to be reviewed by the regulator subsequently)				
SOP	<ul style="list-style-type: none"> Separate SOPs for Retail Supply and Distribution Business To be enforced by regulator 				
Tariff Determination	Regulated Tariff	Consumers not open to competition – Regulated Consumers open to competition – Ceiling Tariff			
Consumer Database	Owned and Maintained	Data collected and shared with Distribution business			
Distribution Functions	Network Ops (DNO) Planning Ops (DPO)			System Ops (DSO) Market Ops (DMO)	

Section 3 – Alternative roll out plans

Roll out plan for scenario IV (1/2)

(applicable in states with Low levels of losses, surplus power and cheaper PPAs than market | Delhi (BSES Rajdhani, BSES Yamuna & TPDDL), Goa, Gujarat (DGVCL, MGVCL & UGVCL), Haryana (DHBVNL), Himachal Pradesh, Punjab, Rajasthan (AVVNL, JDVVNL & JVVNL) | Driving force: power allocation)

	Distribution Business	Incumbent Supply Business (ISL)	New Retail Supply Business (RSL)	SLDC	Intermediary Company (IC)
Cross Subsidy	Universal Charge (UC) Fund A UC fund will cover any revenue gap created due to tariff realignments as per cross subsidies reduction trajectory		or	Direct Government Subsidy The State Government funds the gap between tariffs and cost of supply	
Loss Allocation	All other Losses (technical, hooking, meter tampering/bypass)	Collection inefficiency Losses		<i>Initial level of losses (technical and commercial) to be estimated & factored in regulated tariff with trajectory for reduction in subsequent years.</i>	
Cherry Picking	Will not be an issue as cross subsidy and losses are taken care of as above				
Phasing of competition		Based on Reducing Connected Load <ul style="list-style-type: none">Initially 1 MW and aboveLater 100 kW and aboveFurther all consumers			
USO		For all consumers	For consumers open to competition (as per phasing)		
Regulatory Assets & losses	Regulatory Assets & Un-recognised financial losses		→	<ul style="list-style-type: none">Amortised using a Universal Charge (UC), orSupport from State Government, orHybrid approach of the two above methods	
PPA Allocation		<ul style="list-style-type: none">All suppliers mandatorily take power from allocated by ICFor any remaining requirement they go to either wholesale market or enter into new PPAs			<ul style="list-style-type: none">Some older PPAs are dissolved, rest transferred to ICIC proportionately allocates power between all suppliers based on consumer mix/load

Roll out plan for scenario IV (2/2)

	Distribution Business	Incumbent Supply Business (ISL)	New Retail Supply Business (RSL)	SLDC	Intermediary Company (IC)
Metering	Other activities (install/replace, ownership of assets, operations & testing)	Meter Reading			
Balancing & Settlement			Advanced meter mandatory for RSL	Existing arrangement of energy accounting at Distribution periphery to continue	
POLR		<ul style="list-style-type: none"> Suppliers give schedule to SLDC. Payment to generators based on this Actual consumption of Suppliers measured using Advanced meter. These are then used for deviation settlement. 			
Consumer Interface		<ul style="list-style-type: none"> On ISL in 1st year After 1st year, as decided by SERC 			
Switching	One year of lock in period after switching, to start with (to be reviewed by the regulator subsequently)				
SOP	<ul style="list-style-type: none"> Separate SOPs for Retail Supply and Distribution Business To be enforced by regulator 				
Tariff Determination	Regulated Tariff	Consumers not open to competition – Regulated Consumers open to competition – Ceiling Tariff			
Consumer Database	Owned and Maintained	Data collected and shared with Distribution business			
Distribution Functions	Network Ops (DNO) Planning Ops (DPO)			System Ops (DSO) Market Ops (DMO)	

Roll out plan for scenario V (1/2)

(applicable in states with Low levels of losses, deficit power and cheaper PPAs than market |Andhra Pradesh (APCPDCL, APEPDCL, APNPDCL & APSPDCL), Chhattisgarh, Karnataka (BESCOM, CHESCOM, GESCOM, HESCOM & MESCOM), Kerala, Maharashtra (MSEDCL), Puducherry, Tamil Nadu (TANGEDCO), Uttarakhand | Driving force: power allocation)

	Distribution Business	Incumbent Supply Business (ISL)	New Retail Supply Business (RSL)	SLDC	Intermediary Company (IC)
Cross Subsidy	Universal Charge (UC) Fund A UC fund will cover any revenue gap created due to tariff realignments as per cross subsidies reduction trajectory		or	Direct Government Subsidy The State Government funds the gap between tariffs and cost of supply	
Loss Allocation	All other Losses (technical, hooking , meter tampering/bypass)	Collection inefficiency Losses		<i>Initial level of losses (technical and commercial) to be estimated & factored in regulated tariff with trajectory for reduction in subsequent years.</i>	
Cherry Picking	Will not be an issue as cross subsidy and losses are taken care of as above				
Phasing of competition		Based on Reducing Connected Load <ul style="list-style-type: none">Initially 1 MW and aboveLater 100 kW and aboveFurther all consumers			
USO		For all consumers			
Regulatory Assets & losses	Regulatory Assets & Un-recognised financial losses		→	<ul style="list-style-type: none">Amortised using a Universal Charge (UC), orSupport from State Government, orHybrid approach of the two above methods	
PPA Allocation		<ul style="list-style-type: none">All suppliers mandatorily take power from allocated by ICFor any remaining requirement they go to either wholesale market or enter into new PPAs			<ul style="list-style-type: none">All PPAs are transferred to ICIC proportionately allocates power between all suppliers based on consumer mix/load

Roll out plan for scenario V (2/2)

	Distribution Business	Incumbent Supply Business (ISL)	New Retail Supply Business (RSL)	SLDC	Intermediary Company (IC)
Metering	Other activities (install/replace, ownership of assets, operations & testing)	Meter Reading			
Balancing & Settlement		<ul style="list-style-type: none"> Suppliers give schedule to SLDC. Payment to generators based on this Actual consumption of Suppliers measured using Advanced meter. These are then used for deviation settlement. 	Advanced meter mandatory for RSL	Existing arrangement of energy accounting at Distribution periphery to continue	
POLR		<ul style="list-style-type: none"> On ISL in 1st year After 1st year, as decided by SERC 			
Consumer Interface		1 st time connection, Billing, Complaints and Grievances			
Switching	One year of lock in period after switching, to start with (to be reviewed by the regulator subsequently)				
SOP	<ul style="list-style-type: none"> Separate SOPs for Retail Supply and Distribution Business To be enforced by regulator 				
Tariff Determination	Regulated Tariff	Consumers not open to competition – Regulated Consumers open to competition – Ceiling Tariff			
Consumer Database	Owned and Maintained	Data collected and shared with Distribution business			
Distribution Functions	Network Ops (DNO) Planning Ops (DPO)			System Ops (DSO) Market Ops (DMO)	

Thank you

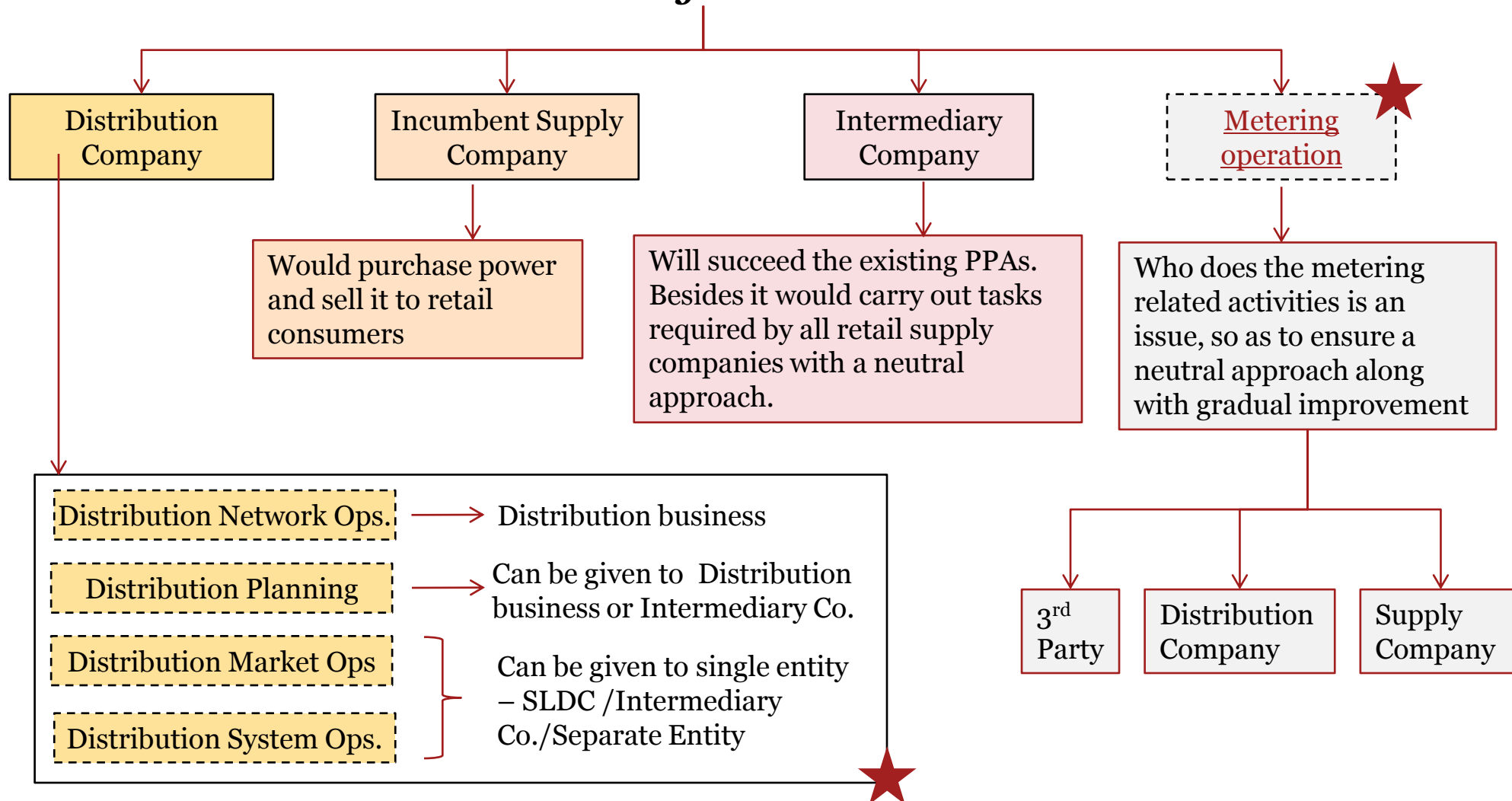
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Major Issues

Defining new functional entities

Existing Discoms



Reduction of Cross Subsidies (1/2)

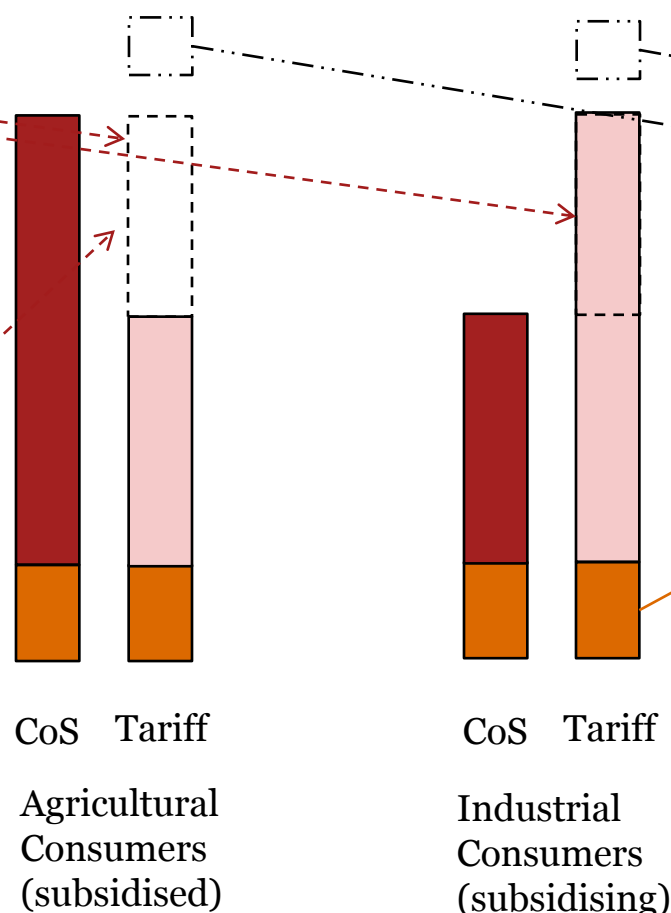
Approaches to negate effect of cross subsidies -

1. Y-o-Y tariff hikes –

Tariff hike
Tariff matched with CoS

4. Direct subsidy –

State Government directly funds the gap between CoS and Tariff



2. UC Charge –

Uniform non by-passable charge on all consumers
Fund created from this charge used to revenue-cost gap

3. Limit subsidies to wheeling charge –

Makes a level playing field for all retail suppliers

Wheeling tariff

Reduction of Cross Subsidies (2/2)

Approach	Pros	Cons
Year on year tariff hike	<ul style="list-style-type: none"> • Cost reflective tariffs: all consumer categories as envisaged in Tariff Policy would be paying tariffs as per their cost of supply 	<ul style="list-style-type: none"> • Political will: to increase tariff for agricultural or domestic consumers could have socio-economic consequences • Ability to Pay: electricity being an essential item, steep tariff hikes could lead to protests
Universal Charge	<ul style="list-style-type: none"> • Transparent mechanism: this allows user to know the amount of benefit he/she is receiving/giving as cross subsidy • Government can fund UC of marginalised consumers: State Govt. in order to prevent socio-economic consequences of tariff hikes 	<ul style="list-style-type: none"> • Complex mechanism: the calculation of UC by SERC, its collection by Supply Companies and allocation by Intermediary Company would entail complex implementation • UC would indirectly lead to tariff hikes: for consumers who do not get government support
Limit subsidies to the wheeling charges	<ul style="list-style-type: none"> • Level Playing field for all retail supply companies – irrespective of supply company a consumer chooses the absolute amount of cross subsidy benefit would remain same 	<ul style="list-style-type: none"> • The wheeling charges may not be enough to consummate the current high levels of cross subsidies
Direct subsidy from Government	<ul style="list-style-type: none"> • Can be implemented immediately: this could be used as a temporary measure • Transparent mechanism: this allows user to know the amount of benefit he/she is receiving/giving as cross subsidy • Direct approach: this does not penalise other consumers for extending benefit of lower tariffs to some consumers 	<ul style="list-style-type: none"> • Additional financial burden on state: Also the financial burden would increase year on year as consumer sales increase or cost of supply increases.

Allocation of technical and commercial losses

Type of Loss	Allocation to -		
	Approach 1	Approach 2	Approach 3
Technical	Distribution	Distribution	Distribution
Commercial			
Theft by Hooking	Distribution	Distribution	Retail Supply
Inaccurate metering	Distribution	Retail Supply	Retail Supply
Theft by Meter tampering/bypassing	Distribution	Retail Supply	Retail Supply
Collection inefficiency	Retail Supply	Retail Supply	Retail Supply

Factors for consideration

↓
Easy to implement. But may lead to conflict of interest

↓
Metering would be required at several levels

↓
SOPs would need to ensure that hooking cases reported by Supplier are resolved by Distribution Company

Another option, in case metering is a licensed activity, the commercial losses (other than collection inefficiency) can be allocated to the metering company

Universal Service Obligation (1/3)

USO obligation on -

Retail
Consumers open
for Competition



Retail Consumers
not open for
Competition



Approach 1

Incumbent
Supply Co.

Incumbent
Supply Co.

Energy Planning: Only the incumbent supplier would have to make arrangements for all consumers in case it is called upon to service USO obligation

Approach 2



Incumbent
Supply Co.

Energy Planning: All retail supply companies would have to make arrangements for all consumers

However in case power is not available with supplier, it will have to either -

- Refuse to supply and pay penalty, or
- Procure power inefficiently and pass on the costs to consumers

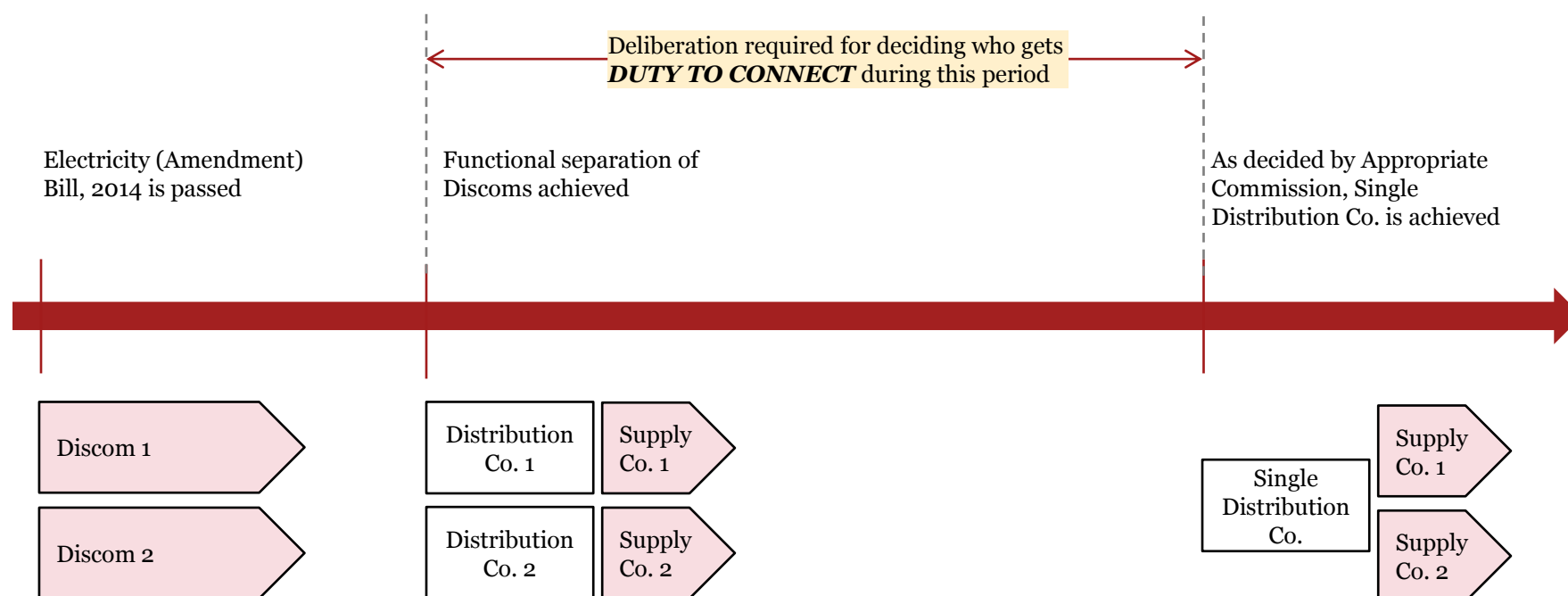
Universal Service Obligation (2/3)

Issue/Approach	Approach 1 (D5A)	Approach 2 (D5B)
USO Obligation		
For consumers open to competition	USO obligation on <i>Incumbent Retail Supply Company</i>	USO obligation on <i>all Retail Supply Company</i>
For consumer not open to competition	USO obligation on <i>Incumbent Retail Supply Company</i>	USO obligation on <i>Incumbent Retail Supply Company</i>
Issue		
Energy availability and planning	Only the incumbent retail supply company would have to make arrangements for all consumers in case it is called upon to service USO obligation	All retail supply companies would have to make arrangements for all consumers in case they are called upon to service their USO obligations.
Scrutiny and penalty mechanisms	The incumbent Retail Supply Company being the POLR will be allowed to collect a regulated tariff as allowed by SERCs	It will need to be deliberated that based on what conditions will a Retail Supply Company be allowed to refuse service to the consumer.

Universal Service Obligation (3/3)

In areas like Mumbai wherein multiple Distribution Companies exist, it needs to be deliberated whether

- Which one of them would divest their network assets so as to ensure there is a single Distribution network provider in any area of supply
- Who would get the 'Duty to Connect' under USO obligation



Delimitation: Area of Supply (1/2)

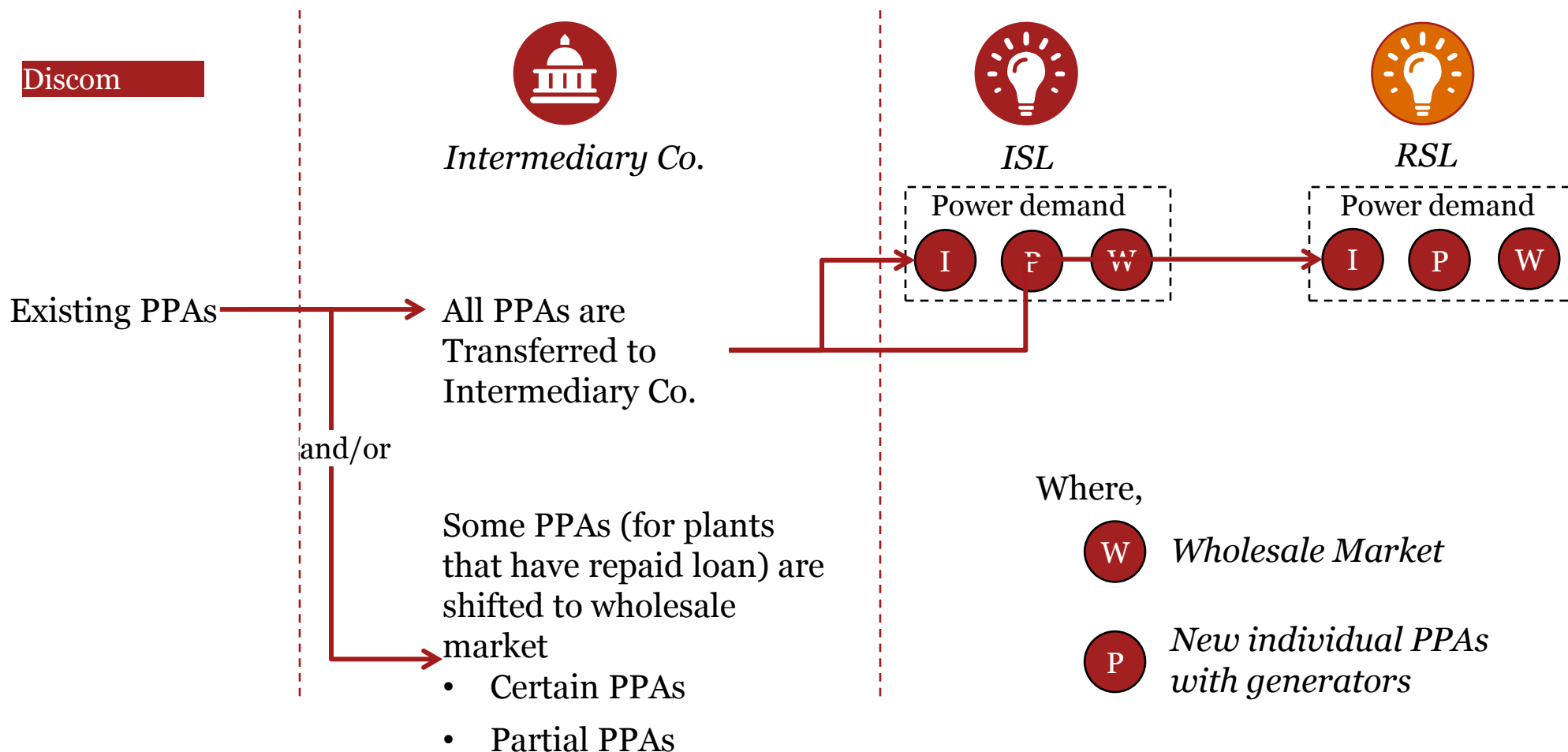
The license area offered to the new retail supply companies could be either same as the area of supply of current discoms or broken up into smaller areas. The pros and cons of these approaches are as follows -

Issue/Approach	Approach 1 – same area of supply	Approach 2 – breaking up area of supply
Size of current area	<p>(if USO on all suppliers) new retail supplier could find big area of supply as an entry barrier</p> <p>(if USO on incumbent supplier) new supply company could chose whom to supply</p>	Bigger areas could be broken down to attract new players with less capital also
Loss variation	Average losses could be given to all suppliers	Suppliers could cherry pick areas with lower loss levels, to supply electricity
Consumer density	<p>(if USO on all suppliers) new retail supplier could find a dense area of supply as an entry barrier</p> <p>(if USO on incumbent supplier) new supply company could chose whom to supply</p>	Denser areas could be broken down to attract new players with less capital also
Consumer profile	Variation of consumer profiles would average out in a bigger area of supply	Suppliers could cherry pick areas with better consumer profiles, to supply electricity

Delimitation: Phasing (2/2)

Approach	Pros	Cons
Increasing connected load	Greater efficiency: since consumer with smaller load may have max contribution to losses	<ul style="list-style-type: none"> • Difficulty in implementation • Nonstarter for reforms: new supply companies could find this proposition not attractive enough • Switching costs
Decreasing connected load	<ul style="list-style-type: none"> • Early adaptors: Consumers with large loads are more likely to take advantage of retail supply competition • Starter for Reforms: Lower losses among large consumers would be incentive for suppliers 	Cherry Picking: In case situations of cross subsidies and loss levels are not improved, good consumers of existing supply companies could migrate
Increasing annual consumption	Greater efficiency: consumer with lower sales may have max contribution to losses	<ul style="list-style-type: none"> • Changing consumption patterns: inc/dec of energy consumption could pose difficulties • Difficulty in implementation • Nonstarter for reforms: new supply companies could find this proposition not attractive enough • Switching costs
Decreasing annual consumption	Early adaptors: Consumers with large loads are more likely to take advantage of retail supply competition	Changing consumption patterns: inc/dec of energy consumption could pose difficulties
Area of sales	<ul style="list-style-type: none"> • Areas with lower losses could be opened to competition first to attract new supply co. or vice versa • Pilot scheme could be introduced in some areas 	Determination of area wise losses and allocation between retail supply companies would be an issue
Consumer categories	• Categories with lower losses could be opened to competition first to attract new suppliers or vice versa	Determination and allocation of consumer category wise losses would be an issue

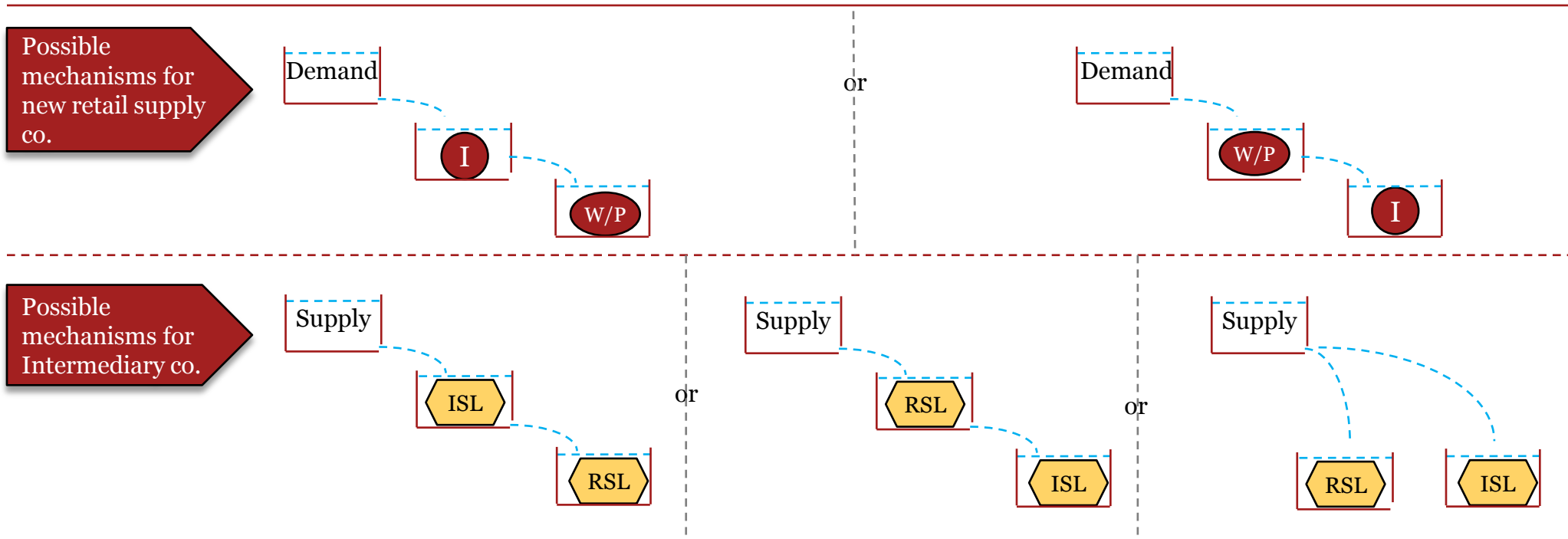
Allocation of PPAs (1/4)



Allocation of PPAs (2/4)

Approach	Pros	Cons
Transfer all PPAs to Intermediary Company	<ul style="list-style-type: none"> Existing contacts between generators and discoms to continue with both parties getting long term financial certainty 	<ul style="list-style-type: none"> Hampers development of wholesale market due to lesser unavailability of un-tied power Expensive PPAs due to increased cost pass through could leave retail supply companies un-competitive
Transfer certain PPAs to Intermediary Company	<ul style="list-style-type: none"> Helps in development of wholesale market Select expensive PPAs or PPAs where loan has been repaid could be dissolved 	<ul style="list-style-type: none"> A mechanism would have to be developed to select PPAs to be dissolved. The mechanism needs to be objective, transparent and acceptable to all stakeholders including lenders.
Transfer partial PPAs to Intermediary Company	<ul style="list-style-type: none"> Easy to implement. Leaves no subjectivity in the hands of Intermediary Company to select PPAs to be dissolved 	<ul style="list-style-type: none"> This approach could not go well with financial institutions which use PPAs as securities against loan to generators Separate percentages (for part of PPA to be dissolved) could need to be devised for different types of generation plants with different age

Allocation of PPAs (3/4)



Therefore there are 6 approaches so as to match demand of supply companies with the supply of Intermediary Company, as follows-

- I. RSL → IC → Market | IC → ISL → RSL
- II. RSL → Market → IC | IC → ISL → RSL
- III. RSL → IC → Market | IC → RSL → ISL

- IV. RSL → Market → IC | IC → RSL → ISL
- V. RSL → IC → Market | IC → Proportionate allocation
- VI. RSL → IC → Market | IC → Proportionate allocation

Allocation of PPAs (4/4)

Factors for selecting approach towards PPA allocation –

- **No Financial Loss to Intermediary Company:** approach adopted should be such that financial losses to Intermediary Company can be avoided, as the Intermediary Company would not have any assets to set off these losses
- **Proportionate distribution of profit/loss between all Supply Companies:** Approach adopted should be such that any opportunity gain or loss to be made by retail supply companies gets distributed among them proportionately.

Approach for PPA allocation		Availability of Energy	
		Energy Surplus	Energy Deficit
Cost of PPAs	PPAs expensive than market	<u>D6E</u> RSL->IC->Market IC->Proportionate allocation	<u>D6F</u> RSL->Market->IC IC->Proportionate allocation
	PPAs cheaper than market	<u>D6E</u> RSL->IC->Market IC->Proportionate allocation	<u>D6F</u> RSL->Market->IC IC->Proportionate allocation

[Click here](#) for detailed illustrations

Allocation of PPAs – other issues (1/2)

- 1. Who bears the financial loss in case Intermediary Company is unable to fulfil its PPA obligations** – such losses can be taken care by
 1. State Government support
 2. Socialisation through Universal Charge
- 2. Parameters basis which allocation will be done** - considering factors like Duration of PPAs, average/peak demand of consumers with each Supply company, consumer mix of Supply companies, size of PPAs etc.
- 3. PPA allocation or Power allocation**
- 4. Price for allocation**
 - Actual cost of PPA
 - Uniform/Average cost
 - Differential Bulk Supply Tariff (based on consumer mix)
- 5. Fixed or Dynamic allocation of PPAs/Power**

Allocation of PPAs – other issues (2/2)

Approach	Pros	Cons
Regarding price of allocating PPAs		
Actual cost of PPA	<ul style="list-style-type: none"> Ease of settlement between generator and retail supply company 	<ul style="list-style-type: none"> Certain Retail Supply Companies could get stuck with costlier PPAs or PPAs which expire soon Inter-regional or inter-category cross subsidies could get created
Uniform/Average cost	<ul style="list-style-type: none"> Level playing field could be created for all retail supply companies 	<ul style="list-style-type: none"> Settlement with generators due to several escalable and non escalable components could become an issue
Differential Bulk Supply Tariff	<ul style="list-style-type: none"> Could be used as a tool for cross subsidy management 	<ul style="list-style-type: none"> Inter-regional or inter-category cross subsidies could get created
Regarding allocation mechanism		
Fixed allocation of PPAs/Power	<ul style="list-style-type: none"> No need to define consumer switching frequency. Supply companies will have to trade power among themselves to account for any change in consumer base 	<ul style="list-style-type: none"> Mechanism would have to be developed for trading among retail supply companies Accounting for different duration of PPAs would become more complex due to inability to refresh allocation based on consumer base of supply company
Dynamic allocation of PPAs/Power	<ul style="list-style-type: none"> Will allow Intermediary Company to adopt for any changes in power scenario in future 	<ul style="list-style-type: none"> The frequency at which consumers would be allowed to switch supply company would have to be linked with frequency of refreshing dynamic allocation of PPAs

Metering services

Activity	Approach 1	Approach 2	Approach 3
Meter Reading	Retail Supply Company	Retail Supply Company	Distribution Company
Other Meter related	3 rd Party	Retail Supply Company	Distribution Company

Activity	Approach 4	Approach 5
Meter Reading	3 rd Party	Retail Supply Company
Other Meter related	3 rd Party	Distribution Company

Factors for consideration

Each of the above mentioned approach is considered along with approach adopted towards loss allocation (3 possible approaches, as discussed in earlier slides)

Metering services Approach I

- Meter reading – Retail Supply Company
- Other activities – 3rd Party Company

New Scenario: Losses allocated to 3rd party company assuming metering is a licensed activity

Loss allocation	Approach 1 (D2A)	Approach 2 (D2B)	Approach 3 (D2C)	Approach 4
Technical Loss	Distribution	Distribution	Distribution	Distribution
Hooking Loss	Distribution	Distribution	Retail Supply	3 rd party company
Inaccurate Metering	Distribution	Retail Supply	Retail Supply	3 rd party company
Meter tampering	Distribution	Retail Supply	Retail Supply	3 rd party company
Collection Loss	Retail Supply	Retail Supply	Retail Supply	Retail Supply
Possibility to fudge Losses	Unlikely as supplier would have to generate lesser billing	Both meter tampering and collection loss with supplier, thus no incentive to fudge losses	Since all commercial losses are allocated to Supplier, it would make efforts to reduce them	Unlikely as supplier would have to generate lesser billing
Hooking losses	Supplier would have no incentive to report	Supplier would have no incentive to report	Supplier would have incentive to report	3 rd party would have incentive to report
Meter tampering / bypassing losses	Supplier would have no incentive to report	Supplier would have incentive to reduce the losses	Supplier would have incentive to reduce the losses	3 rd party would have incentive to reduce the losses
Conflict of Interest	Duty to install meter applicable on 3 rd Party, but Supplier responsible (as per Section 55 of EA2003)			
Capital investment	3 rd party can do focused investments			
Ease of billing	Both meter reading and bill generation with same entity			
Number of visits to consumer	Separate visits for meter reading and meter operations			
Ease of consumer switching	No change required in metering			

Metering services *Approach II*

- Meter reading – Retail Supply Company
- Other activities – Retail Supply Company

Loss allocation	Approach 1 (D2A)	Approach 2 (D2B)	Approach 3 (D2C)
Technical Loss	Distribution	Distribution	Distribution
Hooking Loss	Distribution	Distribution	Retail Supply
Inaccurate Metering	Distribution	Retail Supply	Retail Supply
Meter tampering	Distribution	Retail Supply	Retail Supply
Collection Loss	Retail Supply	Retail Supply	Retail Supply
Possibility to fudge Losses	Unlikely as the supplier would have to generate lesser billing	Both meter tampering and collection loss with supplier, thus no incentive to fudge losses	Since all commercial losses are allocated to Supplier, it would make efforts to reduce them
Hooking losses	Supplier would have no incentive to report	Supplier would have no incentive to report	Supplier would have incentive to report
Meter tampering / bypassing losses	Supplier would have no incentive to report	Supplier would have incentive to reduce the losses	Supplier would have incentive to reduce the losses
Conflict of Interest (as per Section 55 of EA2003)	Duty to install meter with supplier itself		
Capital investment	May lead to duplication		
Ease of billing	Both meter reading and bill generation with same entity		
Number of visits to consumer	Single visit for meter reading and meter operations		
Ease of consumer switching	Change required in metering		

Metering services *Approach III*

- Meter reading – Distribution Company
- Other activities – Distribution Company

Loss allocation	Approach 1 (D2A)	Approach 2 (D2B)	Approach 3 (D2C)
Technical Loss	Distribution	Distribution	Distribution
Hooking Loss	Distribution	Distribution	Retail Supply
Inaccurate Metering	Distribution	Retail Supply	Retail Supply
Meter tampering	Distribution	Retail Supply	Retail Supply
Collection Loss	Retail Supply	Retail Supply	Retail Supply
Possibility to fudge Losses	Distribution Co. could inflate billing to hide meter tampering/ bypass or hooking losses	Distribution Co. could inflate billing to hide hooking losses	Since commercial losses are allocated to Supplier, Distribution would not have incentive to fudge
Hooking losses	Distribution Co. would have incentive to reduce the losses	Distribution Co. would have incentive to reduce losses	Distribution Co. would have no incentive to reduce losses
Meter tampering / bypassing losses	Distribution Co. would have incentive to reduce the losses	Distribution Co. would have no incentive to reduce losses	Distribution Co. would have no incentive to reduce losses
Conflict of Interest (as per Section 55 of EA2003)	Duty to install meter applicable on Distribution Co. but Supplier responsible		
Capital investment	Could be difficult to invest capital		
Ease of billing	Meter reading and billing with separate entities		
Number of visits to consumer	Single visit for meter reading and meter operations		
Ease of consumer switching	No change required in metering		

Metering services *Approach IV*

- Meter reading – 3rd Party Company
- Other activities – 3rd Party Company

New Scenario: Losses allocated to 3rd party company assuming metering is a licensed activity

Loss allocation	Approach 1 (D2A)	Approach 2 (D2B)	Approach 3 (D2C)	Approach 4
Technical Loss	Distribution	Distribution	Distribution	Distribution
Hooking Loss	Distribution	Distribution	Retail Supply	3 rd party company
Inaccurate Metering	Distribution	Retail Supply	Retail Supply	3 rd party company
Meter tampering	Distribution	Retail Supply	Retail Supply	3 rd party company
Collection Loss	Retail Supply	Retail Supply	Retail Supply	Retail Supply
Possibility to fudge Losses	No incentive to fudge losses	No incentive to fudge losses	No incentive to fudge losses	3 rd party company could inflate billing to shift losses
Hooking losses	3 rd party would have no incentive to report or reduce loss	3 rd party would have no incentive to report or reduce loss	3 rd party would have no incentive to report or reduce loss	3 rd party would have incentive to report or reduce loss
Meter tampering / bypassing losses	3 rd party would have no incentive to report or reduce loss	3 rd party would have no incentive to report or reduce loss	3 rd party would have no incentive to report or reduce loss	3 rd party would have incentive to report or reduce loss
Conflict of Interest	Duty to install meter applicable on 3 rd Party Co. but Supplier responsible (as per Section 55 of EA2003)			
Capital investment	Can do focused investments			
Ease of billing	Meter reading and billing with separate entities			
Number of visits to consumer	Single visit for meter reading and meter operations			
Ease of consumer switching	No change required in metering			

Metering services *Approach V*

- Meter reading – Retail Supply Company
- Other activities – Distribution Company

Loss allocation	Approach 1 (D2A)	Approach 2 (D2B)	Approach 3 (D2C)
Technical Loss	Distribution	Distribution	Distribution
Hooking Loss	Distribution	Distribution	Retail Supply
Inaccurate Metering	Distribution	Retail Supply	Retail Supply
Meter tampering	Distribution	Retail Supply	Retail Supply
Collection Loss	Retail Supply	Retail Supply	Retail Supply
Possibility to fudge Losses	Unlikely as the supplier would have to generate lesser billing	Both meter tampering and collection loss with supplier, thus no incentive to fudge losses	Since all commercial losses are allocated to Supplier, it would make efforts to reduce them
Hooking losses	Appropriate entity will take care on consumer visit	Appropriate entity will take care on consumer visit	Appropriate entity will take care on consumer visit
Meter tampering / bypassing losses	Appropriate entity will take care on consumer visit	Appropriate entity will take care on consumer visit	Appropriate entity will take care on consumer visit
Conflict of Interest (as per Section 55 of EA2003)	Duty to install meter applicable on Distribution Co. but Supplier responsible		
Capital investment	Could be difficult to invest capital		
Ease of billing	Meter reading and billing with supplier		
Number of visits to consumer	Separate visit for meter reading and meter operations		
Ease of consumer switching	No change required in metering		

Balancing and Settlement

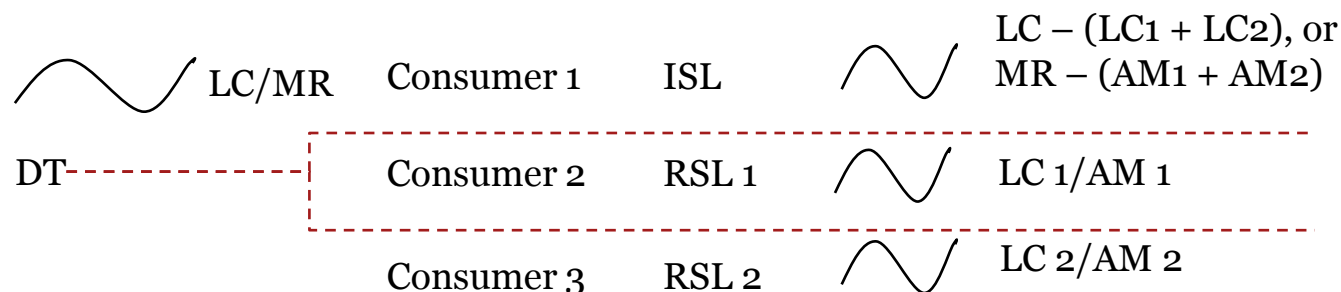
Approach 1 –

Making Advanced metering compulsory for new Retail Supply Companies

or

Approach 2 –

Based on consumer category wise sample load curve



Approach	Pros	Cons
Making Advanced metering compulsory for new retail supply companies	<ul style="list-style-type: none"> Would ensure gradual replacement of existing metering by Advanced metering Actual values of power consumption for each supplier can be calculated 	<ul style="list-style-type: none"> High cost of Advanced metering could become entry barrier for new retail supply companies
Based on consumer category wise sample load curve	<ul style="list-style-type: none"> No need of expensive Advanced metering in initial stages 	<ul style="list-style-type: none"> Would not give actual values of power consumption of retail supply companies

LC – Load Curve

AM – Advanced Metering

Consumer Interface

Issue/Approach	Approach 1	Approach 2	Approach 3
Features			
Interface for retail consumer	Supply Company	Distribution Company	Supply Company
Interface for open access consumer	Supply Company	Distribution Company	Distribution Company
Resolution of supply related issues	Supplier would take care at its end	Distribution Company would redirect to supplier	Supplier would take care at its end
Resolution of network issues	Supplier would redirect to Distribution Company	Distribution Company would take care at its end	Distribution Company would take care at its end
Parameters			
Ease of consumers	Single Interface	Single Interface	Multiple Interface
Setting the accountability	Could misguide consumer and shift blame	Could misguide consumer and shift blame	Supplier and Distribution both accountable for respective issues
Duplication of work	Complaints/queries/requests would have to be routed from supply to distribution companies	Complaints/queries/requests would have to be routed from distribution to supply companies	Duplication of efforts could be prevented
Need for new customer care assets	The existing customer care centres would be shifted to retail supplier	The existing customer care centres would be shifted to Distribution Co.	New assets would have to be developed

Standards of Performance (SOPs)

The list of current SOPs will be allocated between the new entities based on the division of roles and responsibilities, as follows -

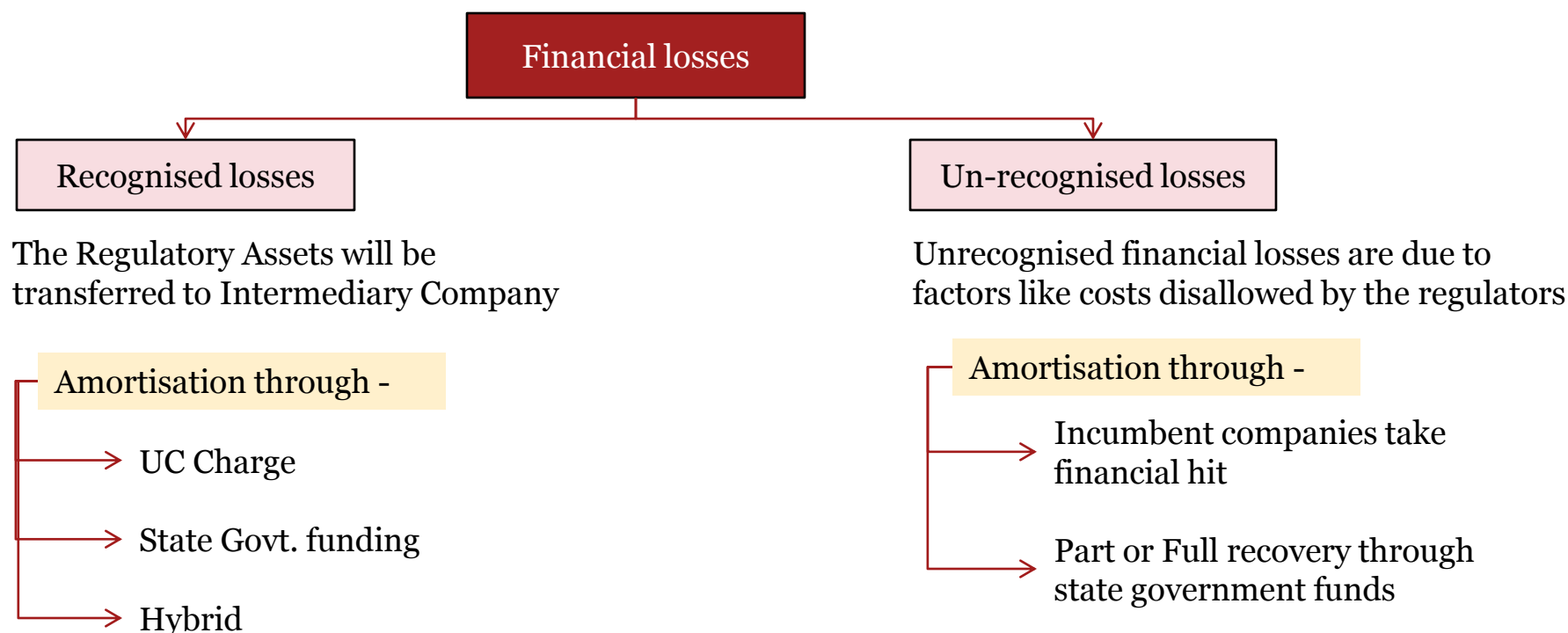
SOP	Distribution	Supply	Intermediary	Metering (if any)
Operation of Call Centre		✓		
Restoration of Supply	✓			
Quality of Supply	✓	✓		
Meter Complaints				✓
Shifting of meter	✓			✓
Shifting of service lines	✓			
New Connection	✓	✓		
Additional Load	✓	✓		
Transfer of Ownership		✓		
Change of Category		✓		
Temporary supply of Power		✓		
Consumer bill complaint		✓		
Disconnection of Supply	✓	✓		
Reconnection of Supply	✓	✓		

Tariff Determination

SERCs will determine unbundled tariffs individually for Distribution Company, Retail Supply Company and Intermediary Company, as follows -

Tariff for Distribution Co.	Tariff for Retail Supply Co.	Intermediary Co.
<p>The SERCs would determine a regulated tariff allowing for –</p> <ul style="list-style-type: none"> • Network Capex • Opex • Losses 	<p>For consumers not open to competition -</p> <p>The SERCs would determine a regulated tariff, allowing for–</p> <ul style="list-style-type: none"> • Capital assets • Power Purchase cost • Opex • Losses <hr/> <p>For consumers open to competition –</p> <p>For new Supply Companies, a ceiling tariff would be set</p>	<p>The SERCs would determine following allowed costs -</p> <ul style="list-style-type: none"> • Costs towards PPAs • Opex

Allocation of financial losses - Regulatory Assets (RA) and un-recognised financial losses (1/2)



Allocation of financial losses - Regulatory Assets (RA) and un-recognised financial losses (2/2)

Approach	Pros	Cons
Regarding recognised financial losses (Regulatory Assets)		
Universal Charge (UC)	<ul style="list-style-type: none"> Transparent mechanism: UC would be shown as a separate item in the consumer bill 	<ul style="list-style-type: none"> Additional financial burden on consumers: Since UC is non by-passable it adds financial burden on even small and marginalised consumers
State Govt support	<ul style="list-style-type: none"> One time settlement: existing RAs can be amortised as a one-time benefit by Government funds 	<ul style="list-style-type: none"> Additional burden on tax payers Fiscal deficit of State Governments may not allow this financial burden In case of private utilities the State Government would not be able to extend support
Hybrid	<ul style="list-style-type: none"> Government Support to select consumers: The UC obligations of only marginalised consumers like agricultural category could be funded by State., the rest paying UC themselves 	<ul style="list-style-type: none"> Additional burden on tax payers Fiscal deficit of State Governments may not allow this financial burden In case of private utilities the State Government would not be able to extend support
Regarding unrecognised financial losses		
Incumbents take a hit	<ul style="list-style-type: none"> Right signal improve efficiencies in future: sends a signal to industry that efficiency improvement is only way out 	<ul style="list-style-type: none"> Allocation between companies: allocation between Distribution and Supply company will be an issue
Full or part recovery allowed	<ul style="list-style-type: none"> Sector viability: would help utilities to raise funds in future and ensure sector viability 	<ul style="list-style-type: none"> Deterrent for efficiency improvement: companies who managed to reduce losses efficiently would be penalised indirectly

Thank you

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MODEL SMART GRID REGULATIONS

State Electricity Regulatory Commission (Smart Grid) Regulations, 20XX

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- 5. Constitution of Smart Grid Cell, Its Roles & Responsibilities**

Chapter – IV : Smart Grid Process

- 6. Baseline research and development of data**
- 7. Formulation of Smart Grid Plan, Programme, Project**
- 8. Approval of Smart Grid Plan, Programme, Project Document**
- 9. Execution of Smart Grid Plan, Programme, Project**
- 10. Mechanism for Cost Recovery**

Chapter V: Smart Grid Project Evaluation

- 11. Monitoring, Evaluation, Measurement and Verification of execution and performance of the Smart Grid Plan, Programme, Project**
- 12. Smart Grid Plan, Programme, Project Completion Report**
- 13. Miscellaneous**

CHAPTER – 1: GENERAL

1. Short Title, Extent and Commencement

- (1) These Regulations may be called the (Name of State) Electricity Regulatory Commission (Smart Grid) Regulations, 20XX.
- (2) These Regulations shall be applicable to all Generating Companies, Transmission Licensees, Distribution Licensees and consumers in the State and connected to the state grid.
- (3) These Regulations shall come into force on the date of their publication in the Official Gazette.

2. Definitions

- (1) Unless the context otherwise requires, for the purpose of these Regulations:-

- (a) 'Act' means the Electricity Act, 2003 and amendments thereof;
- (b) 'Advanced Metering Infrastructure (AMI)' including smart meters means the infrastructure required to enable the Distribution Licensee to accurately collect, monitor and analyse real-time consumption data from consumers, communicate price signals to consumers and where permitted control load;
- (c) 'Aggregator' is an entity registered with the Distribution Licensee to provide aggregation of one or more of the services like demand response services under the demand response mechanism, Distributed Generation, Energy Storage etc. within a control area;
- (d) 'Commission' means Appropriate State Electricity Regulatory Commission or Joint Electricity Regulatory Commission as the case may be;
- (e) 'Cyber Security' means protecting information, equipment, devices, computer, computer resource, network, programmes, data, communication device and information stored therein from unauthorised or unintended access, use, disclosure, disruption, modification or destruction;
- (f) 'Electric Energy Storage' means a set of technologies capable of storing previously generated energy and releasing energy at a later time to feed electricity into grid. Electric storage technologies may store energy as potential, kinetic, chemical, or thermal energy, and include various types of batteries, flywheels, electrochemical, capacitors, compressed air storage, thermal storage devices and pumped hydroelectric power and able to generate electricity;
- (g) 'Interoperability' means the measure of ease of integration between two systems or software components to achieve a functional goal;
- (h) 'Key Performance Indicator (KPI)' is a type of performance measurement to evaluate its success, or to evaluate the outcome of a particular activity in which it is engaged;
- (i) 'Smart Grid' means an electricity networks that can integrate the actions of all users connected to it using advanced metering, communication and information technology to deliver electricity efficiently, sustainably, reliably and securely;
- (j) 'Wide Area Measurement Systems (WAMS)' is advanced measurement technology, information tools, and operational infrastructure that

- facilitate the understanding and management of the increasingly complex behaviour exhibited by large power systems;
- (2) The words and expressions used and not defined in these Regulations but defined in the Act, Rules and Regulations framed thereunder shall have the meaning assigned to them in the Act, Rules and Regulations.

Chapter II: Smart Grid Objectives and guidelines

3. Smart Grid Objectives

- (1) The objectives of these regulations are to enable integration of various smart grid technologies and measures to bring about economy, efficiency improvement in generation, transmission and distribution licensee operations, manage the transmission and distribution networks effectively, enhance network security, integrate renewable and clean energy into the grid and micro grids.
- (2) The objectives also include enhancing network visibility and access, promoting optimal asset utilization, improving consumer service levels thereby allowing for participation in operations of transmission licensees, distribution licensees through greater technology adoption across the value chain in the electricity sector and particularly in the transmission and distribution segments.

4. Guidelines on Smart Grid process

- (1) The Commission may from time to time issue guidelines for the generating company, transmission licensee, distribution licensee in execution of the activities including but not limited to,
- a. Formulation of Smart Grid programmes
 - b. Implementation of Smart Grid programmes
 - c. Cost Effectiveness Assessment of Smart Grid programmes
 - d. Monitoring and Reporting of Smart Grid Plans and programmes
 - e. Essential requisites for Smart Grid programmes
 - f. Customer engagement and participation
 - g. Customer data protection
 - h. Training and capacity building
 - i. Methodology for setting Smart Grid plans and funding levels
 - j. Database development framework and information system requirements
- (2) Issuance of such guidelines shall not be a pre-requisite for preparation and submission of the Smart Grid plan by the generating company, transmission licensee, distribution licensee

Chapter III: Smart Grid Cell

5. Constitution of Smart Grid Cell, its roles & responsibilities

- (1) Every transmission licensee, distribution licensee shall, constitute Smart Grid Cell within three months of notification of these regulations
- (2) The Smart Grid Cell so constituted shall have the authority and necessary resources so as to execute the functions assigned to it under these Regulations
- (3) The Smart Grid Cell shall be responsible for:

- a. Baseline study and development of data
 - b. Formulation of Smart Grid Plans, Programmes, Projects,
 - c. Design and development of Smart Grid projects including cost benefit analysis, plans for implementation, monitoring & reporting and for measurement & verification
 - d. Seeking necessary approvals to Smart Grid Plans, Programmes, Projects
 - e. Implementation of Smart Grid programmes
 - f. Any other additional function that may be assigned by the Commission from time to time
- (4) The transmission licensee, distribution licensee may combine activities related to energy efficiency, demand side management and Smart Grid implementation within the same cell.

Chapter IV: Smart Grid Process

6. Baseline study and development of data

- (1) Transmission licensee, distribution licensee shall undertake baseline study to identify the targets and final outcomes for Smart Grid project programmes. The transmission licensee, distribution licensee shall also build the necessary database.
- (2) Transmission licensee, distribution licensee shall undertake study to estimate potential for employment of specific efficiency technologies and applications, establish key performance indicators, and determine existing baseline technical conditions.
- (3) On the basis of the results of baseline study, the transmission licensee, distribution licensee shall develop smart grid programme for its area of supply.

7. Formulation of Smart Grid Plan, Programmes, Projects

- (1) The transmission licensee, distribution licensee shall submit an integrated Multi-Year Smart Grid Plan for their respective Licence areas along-with Multi-Year Tariff Petition or ARR Petition, for the approval of Commission.
- (2) All Smart Grid projects requiring investments of more than Rupees 10 Crores (or such sum as specified by the Commission) shall be submitted to the Commission for prior approval of investments:

Provided that investments of less than Rupees 10 Crores (or such sum as specified by the Commission) shall not require prior approval of the Commission if it is part of Multi-Year Smart Grid Plan of the utility approved by the Commission:
- (3) The proposal for Smart Grid Projects shall include
 - (i) Detailed Project Report
 - (ii) Customer engagement and participation plan as applicable
 - (iii) Training and capacity building plan and
 - (iv) any other information that may be stipulated by the Commission from time to time:

Provided that the detailed project report would include inter alia description of the project, objective and rationale for the project, technical feasibility study, projected financial implications, target stakeholders, detailed cost benefit analysis detailing all costs qualitative and quantitative in nature, assessment of the project, in line with the

cost effectiveness guidelines issued by the Commission, proposed mechanism for recovery of costs, delivery strategy, implementation mechanism, implementation schedule, performance incentives if any, monitoring and evaluation plan, plan for increasing awareness among the stakeholders.

- (4) A list of indicative components of Smart Grid Projects is appended as Schedule-X.

8. Approval of Smart Grid Plan, Programme, Project Document

- (1) The Commission shall approve a Smart Grid Programme, Project if it is in line with the Objectives set out in Section 3 of the Regulations.
- (2) The Commission may take assistance and advice of such experts as it deems necessary for examining the proposal submitted by the transmission licensee, distribution licensee.
- (3) The Commission while according approval to the proposals, may identify costs, if any, relating to the programme, project, and decide the methodology, procedure, process for recovery of such costs.
- (4) The Commission may provide the incentive / dis-incentive mechanism for the transmission licensee, distribution licensee linked to the execution, implementation and performance during the life of the project. The Commission may also specify financial incentives/dis-incentives to participating consumers to encourage active and effective participation in the Smart Grid programs.
- (5) The Commission may modify the proposal as deemed fit in order to ensure its consistency with overall objectives.

9. Execution of Smart Grid programmes, projects

- (1) The transmission licensee, distribution licensee shall undertake execution of the project, programme in line with the approval given by the Commission and other directions issued by the Commission from time to time.
- (2) The transmission licensee, distribution licensee shall normally adopt the system standards as per Regulations notified by the CEA. In such case where no standards or regulations are notified by the CEA the appropriate standards, regulations notified by the appropriate Commission shall be applicable. In respect of network, communication, products, interoperability and cyber security, the standards as provided by BIS or such appropriate authority shall be adopted. Where these standards are not yet in place, relevant IEC/IEEE/ANSI Standards shall be followed in that order.
- (3) The Regulations relating to standards of performance as notified by the Commission shall apply. Assessment of performance of the Smart Grid projects shall be carried out for incentivizing/penalizing performance of transmission licensee, distribution licensee. The Commission may specify and require implementation of additional standards of performance to maximize the benefits and ensure compliance of the Smart Grid performance standards proposed..
- (4) Transmission licensee, distribution licensee and other agencies responsible for implementation of the Smart Grid programmes, projects shall ensure that protection of consumer data and consumer privacy is accorded the highest levels of priority.

10. Mechanism for Cost Recovery

- (1) Transmission licensee, distribution licensee shall identify the net incremental costs, if any, associated with planning, design and implementation of programmes
- (2) Transmission licensee, distribution licensee may propose methodology for recovery of net incremental costs through tariff or any other mechanism
- (3) In order to qualify for cost recovery, each program must be
 - i. Approved prior to implementation and
 - ii. Implemented in accordance with the approved program plan and

Chapter V: Smart Grid Project Evaluation

11. Smart Grid Programme, Project Completion Report

- (1) The transmission licensee, distribution licensee will prepare and submit a detailed Programme, Project Completion Report and submit the same to the Commission within one month of completion of such programme.
- (2) The Report shall cover the programme, project expenses, physical achievements, constraints and difficulties faced, and deviations, if any.
- (3) Transmission licensee, distribution licensee shall place the completion report in public domain through its website.

12. Monitoring, Evaluation, Measurement and Verification of execution and performance of the Smart Grid Programme, Project

- (1) The Smart Grid programme, project shall be monitored and evaluated based on appropriate methodology including Key Performance Indicators as decided by the Commission using suitable measurement and verification protocols identified for each of the individual programmes, projects by the Commission.
- (2) Transmission licensee, distribution licensee shall also submit an evaluation report to the Commission, which inter alia will include outcomes, benefits, lessons learnt and way forward.

13. Miscellaneous

- (1) The Commission may, at any time add, vary, alter, modify or amend any provisions of these regulations. If any difficulty arises in giving effect to the provisions of these Regulations, the Commission may, by general or specific order, make such provisions not inconsistent with the provisions of the Act, as may appear to be necessary for removing the difficulty.
- (2) The Commission may, from time to time, issue orders and directions in regard to the implementation of the regulations and procedures to be followed.

A list of indicative components of Smart Grid Projects

1. Automated Metering Infrastructure (AMI)
2. Demand Response
3. Micro-Grids
4. Distribution SCADA/Distribution Management
5. Distributed Generation
6. Peak Load Management
7. Outage Management
8. Asset Management
9. Wide Area Measurement Systems
10. Energy Storage Projects
11. Grid Integration of Renewables
12. Electric Vehicle including Grid to Vehicle (G2V) and Vehicle to Grid (V2G) Interactions
13. Smart Grid Data collection and analysis
14. Tariff Mechanism including interruptible and dynamic tariffs, time of use, critical peak pricing, real time pricing etc

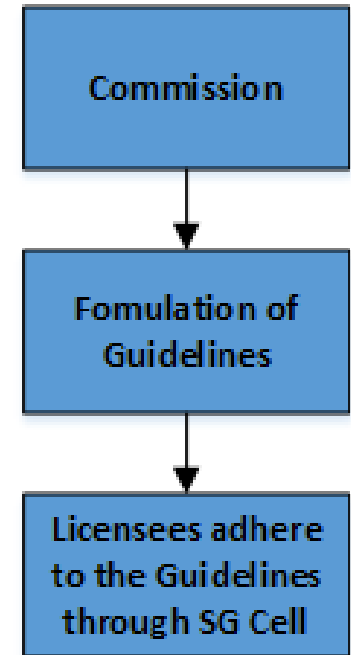
Model Smart Grid Regulations

Objectives

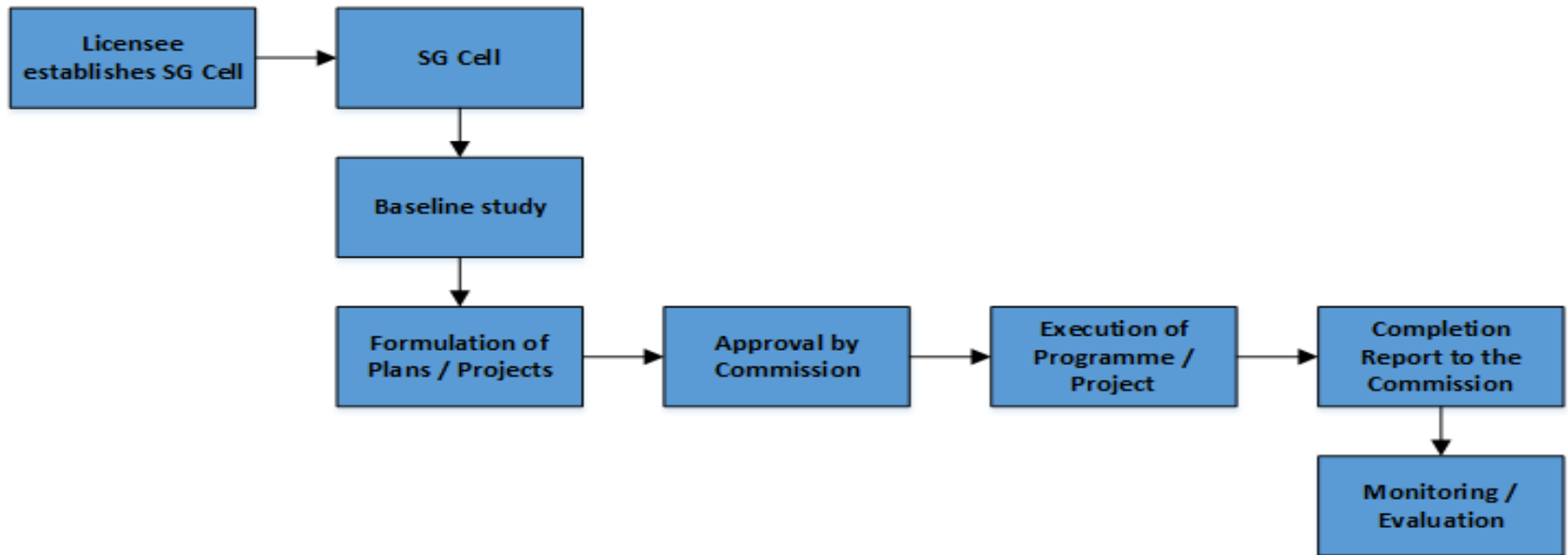
- To enable integration of various smart grid technologies and measures to bring about economy, efficiency improvement in generation, transmission and distribution licensee operations, manage the transmission and distribution networks effectively, enhance network security, integrate renewable and clean energy into the grid and micro grids.
- Enhancing network visibility and access, promoting optimal asset utilization, improving consumer service levels thereby allowing for participation in operations of transmission licensees, distribution licensees through greater technology adoption across the value chain in the electricity sector and particularly in the transmission and distribution segments.
- **Applicable to Generation companies, Transmission licensees and distribution licensees**

Guidelines by Commission

- Formulation
- Implementation
- Cost Effectiveness Assessment
- Monitoring and Reporting
- Essential requisites for Smart Grid programmes
- Customer engagement and participation
- Customer data protection
- Training and capacity building
- Methodology for setting Smart Grid plans and funding levels
- Database development framework and information system requirements
- Issuance of such guidelines shall not be a pre-requisite



Smart Grid Cell



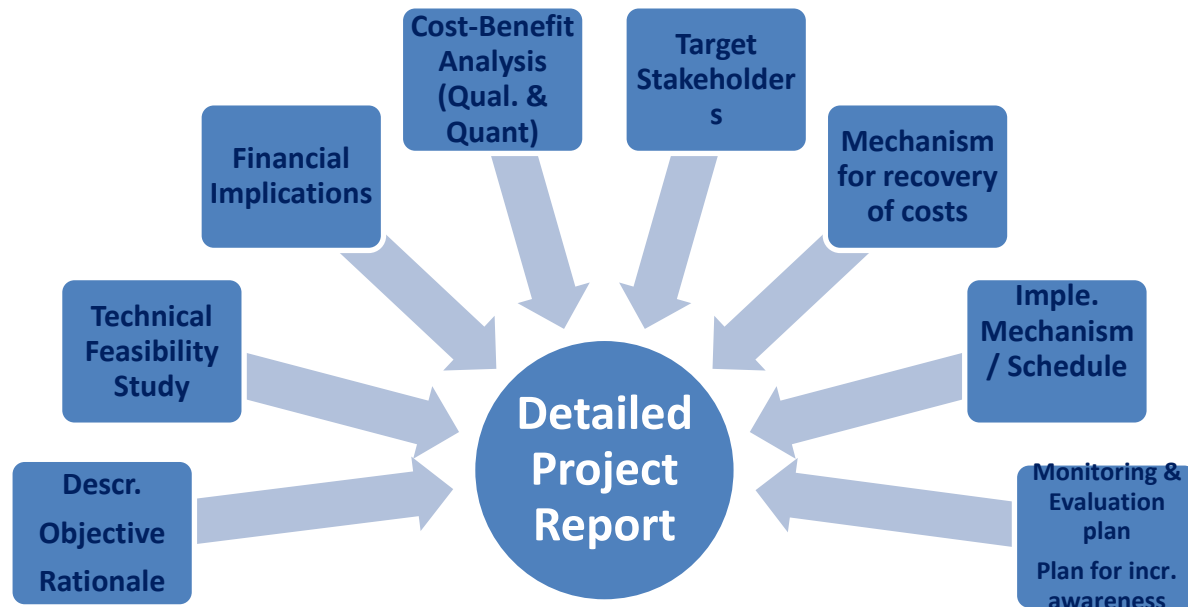
- Baseline study and development of data
- Formulation of Smart Grid Plans, Programmes, Projects,
- Design and development of Smart Grid projects including cost benefit analysis, plans for implementation, monitoring & reporting and for measurement & verification
- Seeking necessary approvals to Smart Grid Plans, Programmes, Projects
- Implementation of Smart Grid programmes
- Any other additional function that may be assigned by the Commission from time to time
- The transmission licensee, distribution licensee may combine activities related to energy efficiency, demand side management and Smart Grid implementation within the same cell

Baseline study and development of data

- **Identify the targets and final outcomes for Smart Grid project programmes.**
- **Build the necessary database.**
- **Estimate potential for employment of specific efficiency technologies and applications**
- **Establish key performance indicators, and determine existing baseline technical conditions.**
- **On the basis of the results, develop smart grid programme**

Formulation of Smart Grid Plan, Programmes, Projects

- Submission of integrated Multi-Year Smart Grid Plan along-with MYT Petition or ARR Petition
- Prior approval of Commission for projects requiring investments of more than Rs. 10 Cr. **(Commissions to determine the threshold)**
- The proposal to include Detailed Project Report, Customer engagement and participation plan, Training and capacity building plan.



Approval of Smart Grid Plan, Programme, Project Document

- The Commission shall approve a Smart Grid Programme (in line with the Objectives)
- The Commission may take assistance and advice of such experts
- The Commission may identify costs, if any, and decide the methodology, procedure, process for recovery of such costs.
- The Commission may provide the incentive / dis-incentive mechanism linked to the execution, implementation and performance during the life of the project.
- The Commission may modify the proposal as deemed fit in order to ensure its consistency with overall objectives

Execution of Smart Grid Programmes, Projects

- Execution of the project, programme in line with the approval given by the Commission.
- Adoption of system standards as per CEA Regulations notified by the CEA. Else, regulations notified by the appropriate Commission shall be applicable.
- In respect of network, communication, products, interoperability and cyber security, the standards of BIS or relevant IEC/IEEE/ANSI Standards shall be followed in that order.
- Standards of Performance Regulation of the Commission shall apply.
- The Commission may specify additional standards of performance to maximize the benefits.
- The agencies responsible for implementation of the Smart Grid programmes, projects shall ensure that protection of consumer data and consumer privacy is accorded the highest levels of priority.

Mechanism for Cost Recovery

- Identification of the net incremental costs, if any, associated with planning, design and implementation of programmes
- Transmission licensee, distribution licensee may propose methodology for recovery of net incremental costs through tariff or any other mechanism
- In order to qualify for cost recovery, each program must be
 - Approved prior to implementation and
 - Implemented in accordance with the approved program plan

Completion Report

- Submits a detailed Programme, Project Completion Report to the Commission within one month of completion of such programme.
- The Report shall cover the programme, project expenses, physical achievements, constraints and difficulties faced, and deviations, if any.
- Transmission licensee, distribution licensee shall place the completion report in public domain through its website

Monitoring, Evaluation, Measurement and Verification of execution and performance

- The Smart Grid programme, project shall be monitored and evaluated based on appropriate methodology including Key Performance Indicators as decided by the Commission using suitable measurement and verification protocols identified for each of the individual programmes, projects by the Commission.
- Transmission licensee, distribution licensee shall also submit an evaluation report to the Commission, which inter alia will include outcomes, benefits, lessons learnt and way forward.

Thank you

Indicative list of components of Smart Grid Projects

- **Automated Metering Infrastructure (AMI)**
- **Demand Response**
- **Micro-Grids**
- **Distribution SCADA/Distribution Management**
- **Distributed Generation**
- **Peak Load Management**
- **Outage Management**
- **Asset Management**
- **Wide Area Measurement Systems**
- **Energy Storage Projects**
- **Grid Integration of Renewables**
- **Electric Vehicle including Grid to Vehicle (G2V) and Vehicle to Grid (V2G) Interactions**
- **Smart Grid Data collection and analysis**
- **Tariff Mechanism including interruptible and dynamic tariffs, time of use, critical peak pricing, real time pricing etc.**

Forum of Regulators

Study on Performance of Distribution Utilities

June 2015



Building a better
working world

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Agenda Scope and Approach

Key observation

Categorization Methodology

Recommendation

Performance Analysis

Identifying KPI

- Identifying Basic Parameters

Performance Assessment

Impact of Policy

- Impact of Regulatory Decision

Clustering

Bench Marking and Gaps Identification

- Recommendation

Brief description of Key Financial, Techno– commercial parameters

Gross margin (%)	$(\text{Total Revenue} - \text{Power purchase cost}) / \text{Total Revenue}$
Gross margin with subsidy(%)	$(\text{Total Revenue} - \text{Power purchase cost} - \text{subsidy}) / \text{Total Revenue}$
Net profit margin (%)	$\text{Profit after tax} / \text{Total Revenue}$
Net profit margin (without subsidy)	$\text{Profit after tax (without subsidy)} / \text{Total Revenue (without subsidy)}$
Receivables (no of days)	$365 / (\text{Revenue from sale of power} / \text{Average account receivables})$
Payables (no of days)	$365 / (\text{Cost of purchase of power} / \text{Average account payables})$
Debt/equity	$(\text{Long term debt} + \text{Short term debt}) / \text{Net worth}^*$
Interest coverage ratio	$(\text{PAT} + \text{Depreciation} + \text{Interest expense}) / \text{Interest expense}$
Debt service coverage ratio	$(\text{PAT} + \text{Depreciation} + \text{Interest expense}) / (\text{Interest expense} + \text{Principal paymet due in the year})$
ROE (%)	$\text{Profit after tax} / \text{Net worth}^*$
Fixed asset coverage ratio	$\text{Net fixed assets} / \text{Total debt}$
AT&C loss (%)	$(\text{Net input energy} - \text{Energy Realized}) / \text{Net input energy}$

*Net worth = Equity + Reserves + Accumulated Profits, Losses – Miscellaneous expenses not written off

Key observations from FY2010 to FY2013 at National level

1. Profitability

The States that have shown substantial improvement in terms of increase in book profit or reduction in book losses in FY2013 vis-à-vis FY2012 are Bihar, Jharkhand, Odisha, Assam, Haryana, Punjab, Rajasthan, Tamil Nadu, Chhattisgarh and Maharashtra.

Parameter	FY2010	FY2011	FY2012	FY2013
Average Revenue (w/o subsidy)	2.68	3.03	3.30	3.76
Average Cost of Supply	3.55	3.98	4.55	5.01
Gap w/o subsidy	0.87	0.95	1.25	1.25
Gap on subsidy booked basis	0.40	0.65	0.88	0.81
Gap on subsidy received basis	0.61	0.68	0.94	0.83

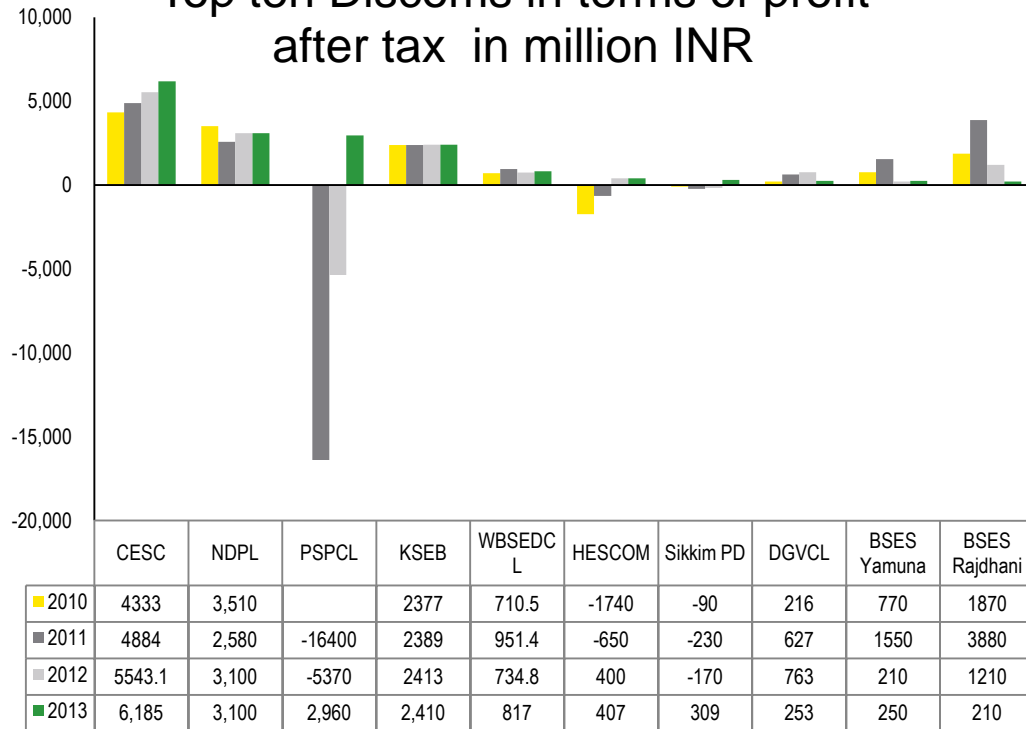
2. Subsidy

Parameter	FY2010	FY2011	FY2012	FY2013
Subsidy booked	-	227.05	300.09	369.64
Subsidy received	-	203.34	257.71	361.10

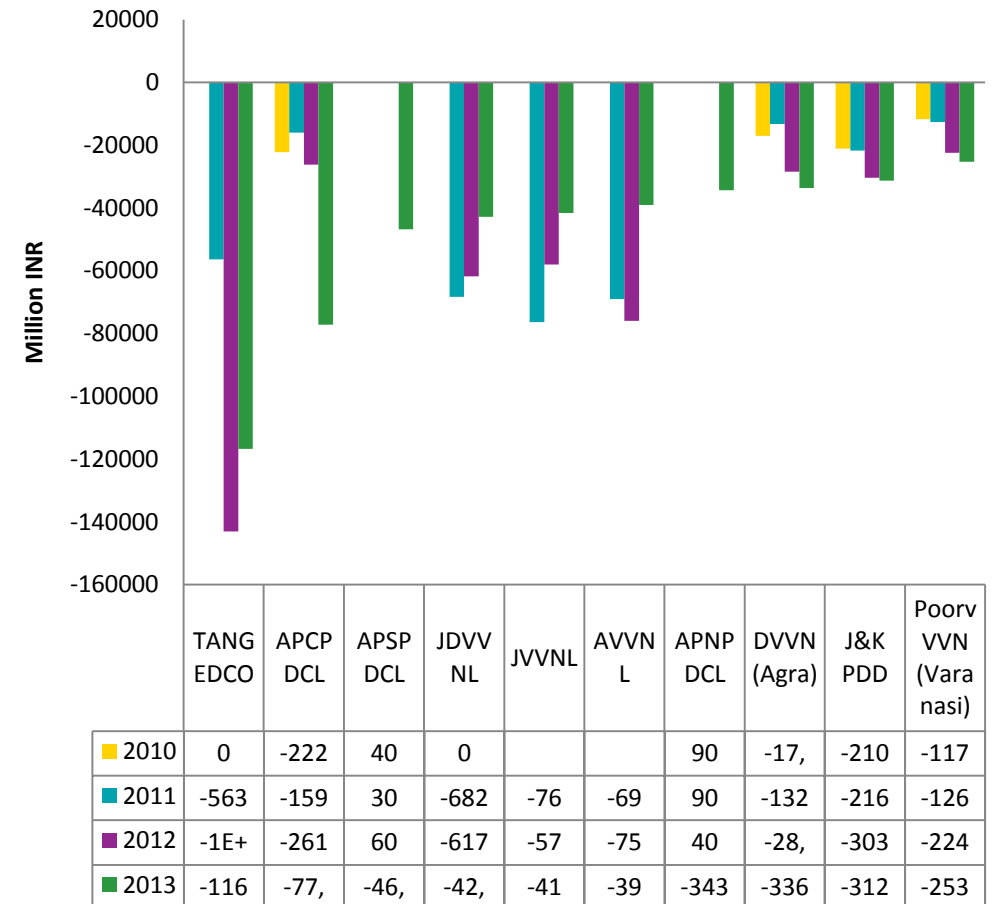
Subsidy booked as a percentage of revenue from sale of power increased to 12.81% in FY2013 as compared to 12.44% in FY2012. (10.93% in FY2011).

The subsidy released by the State Government has been about 98% of the subsidy booked by the utilities in FY2013. (85% in FY2012).

Top ten Discoms in terms of profit after tax in million INR



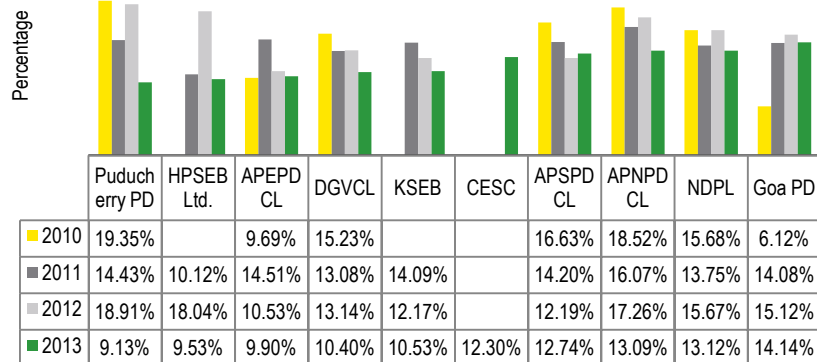
Bottom ten Discoms in terms of profit after tax in million INR



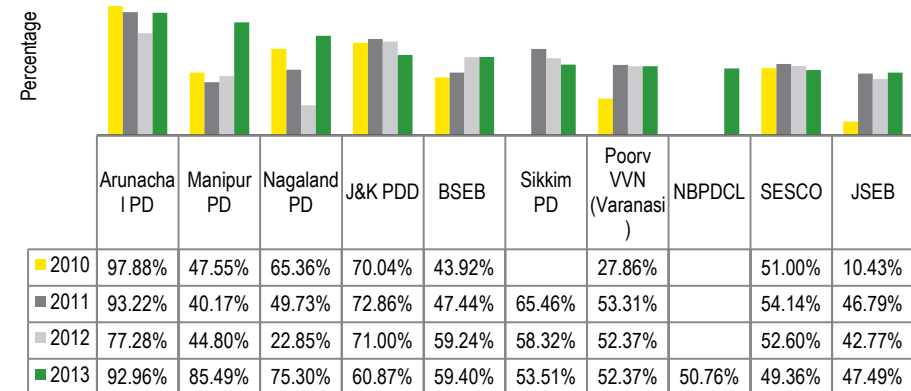
3. AT&C losses

AT&C losses reduced to 25.4% in FY2013 from 26.3% in FY2012 and 26.0% in FY2011 and Collection efficiency increased to 94.3% in FY2013 from 93.2% in FY2012 (94.1% in FY2011)

Top ten Discoms in terms of AT&C Losses

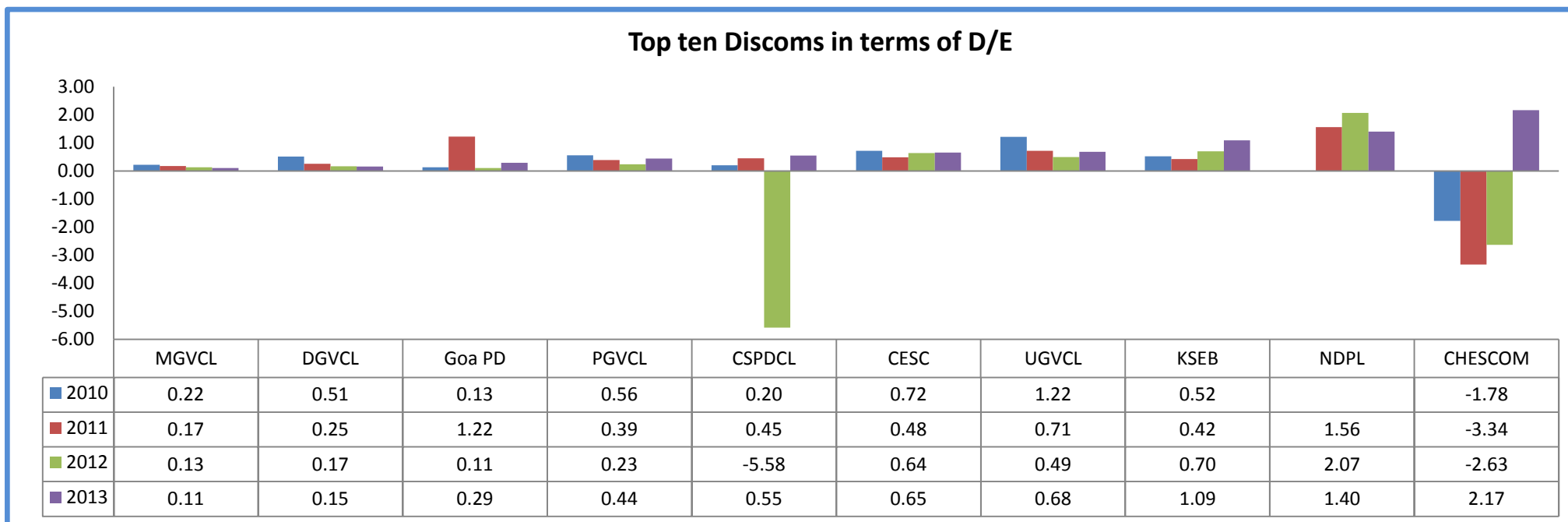


Bottom ten Discoms in terms of AT&C Losses



The national average of AT&C losses are 25.38 % in 2013. Out of 62 DISCOMs studied, 27 DISCOMs have AT&C losses lower than national average while 35 DISCOMs have AT&C losses higher than national average.

4. Debt to Equity

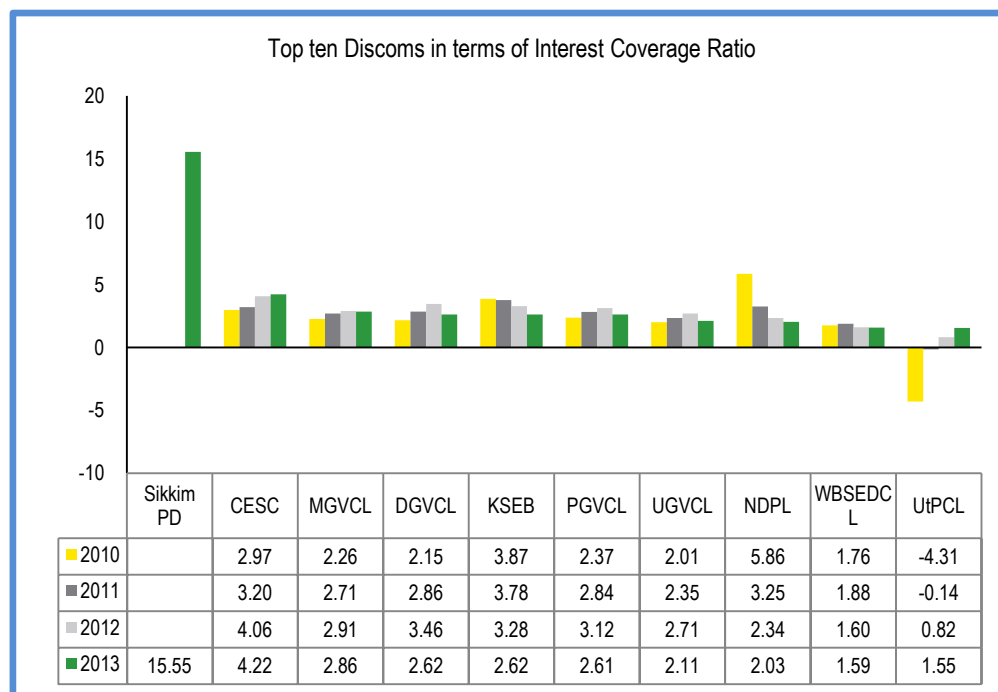


D/ E Break up		
No of DISCOMS having Positive D/E	No of DISCOMS having negative D/E	Insufficient information
20	28	14

Debt to Equity Ratio	
DISCOMS having D/E below 2.33	DISCOMS having D/E above 2.33
10	10

Interest service coverage ratio

5. The interest coverage ratio (ISCR) is a measure of a company's ability to meet its interest payments. The interest coverage ratio is a measure of the number of times a company could make the interest payments on its debt with its EBIT. It determines how easily a company can pay interest expenses on outstanding debt.



Interest coverage ratio		
No of DISCOMs with Positive ISCR	No of DISCOMs with Negative ISCR	Insufficient information
20	34	8

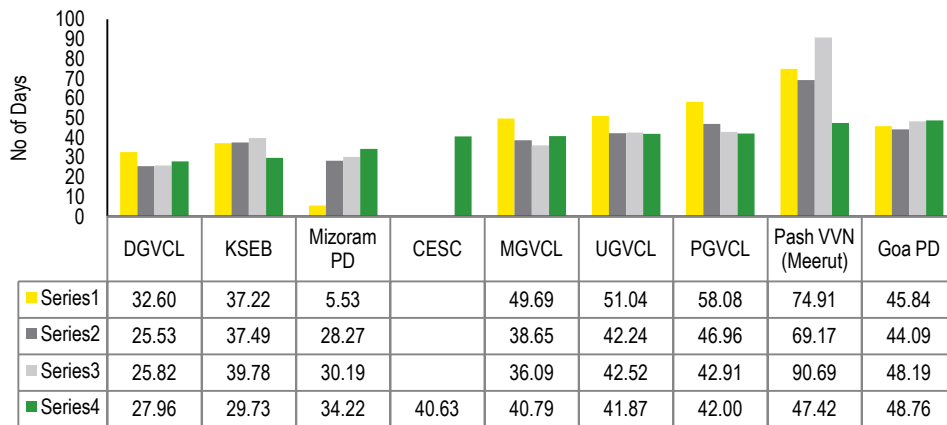
- The average interest coverage ratio (ICR) of 62 DISCOMs in 2013 is -0.78, means on an average DISCOMs could not pay their interest obligations

Key observations from FY2010 to FY2013 at National level

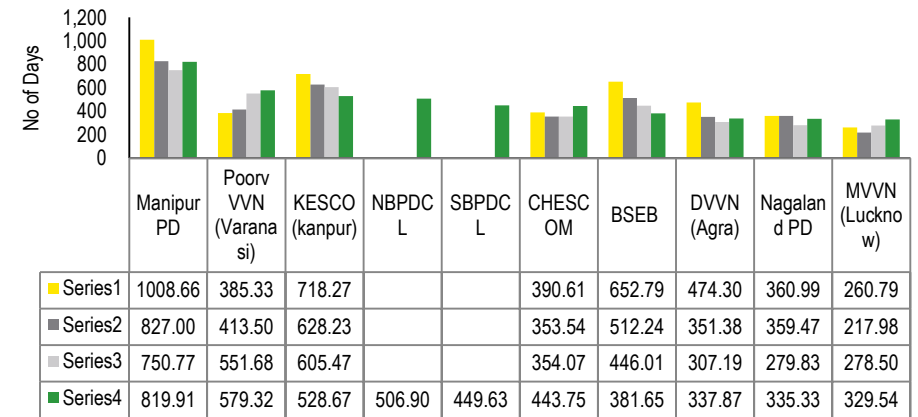
6. Receivables-

DISCOMs of Delhi, Rajasthan, Gujarat and Andhra Pradesh (except APNPDCL), HPSEB Ltd., PSPCL, KSEB, TANGEDCO, Mizoram PD and Goa have receivables of less than 60 days. Whereas, NBPDC, SBPDCL, Sikkim PD, Arunachal PD, Manipur PD, MePDCL, Nagaland PD, DISCOMs in Uttar Pradesh (except PVVNL), CHESCOM and MP Madhya Kshetra VVCL) have high level of receivables of more than 200 days sale

Top ten Discoms in terms of no of days of Recievable



Bottom ten Discoms in terms of no of days Recievable



No of days of receivable

No of DISCOMs with less than 60 receivable days	No of DISCOMs with more than 60 receivable days	Insufficient information
13	41	8

No of days of receivable

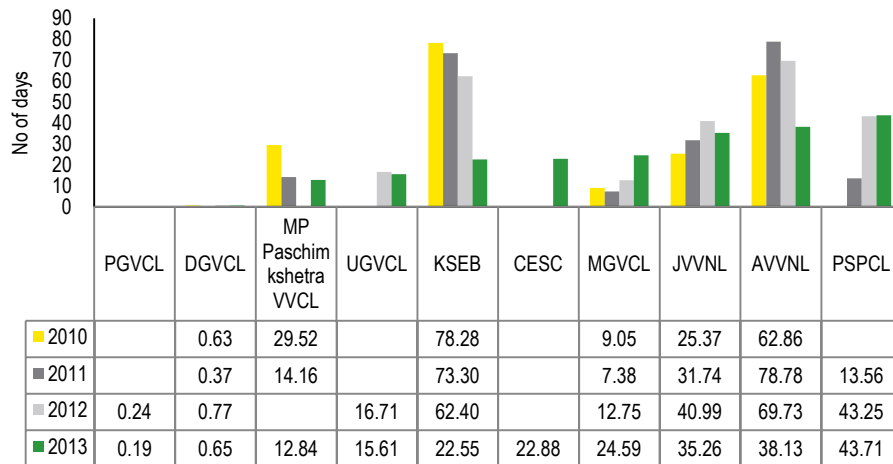
No of DISCOMs with receivable less than national average	No of DISCOMs with receivable less than national average	Insufficient information
23	31	8

Key observations from FY2010 to FY2013 at National level

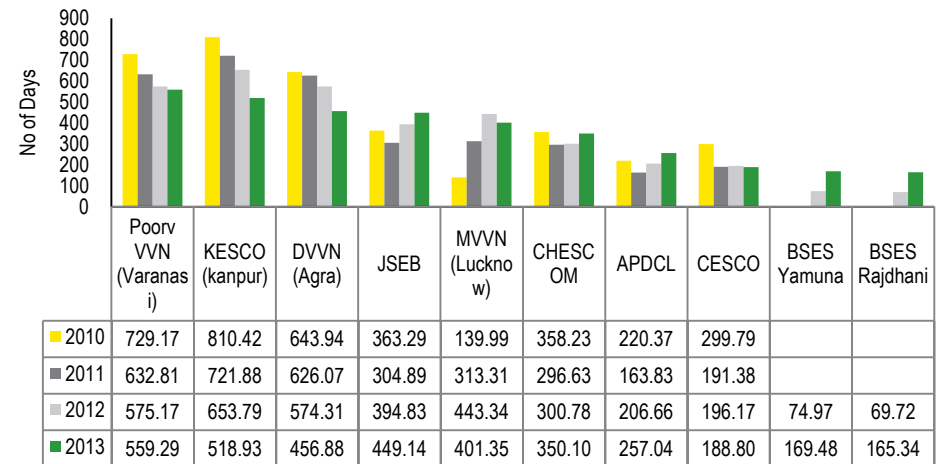
7. Payables-

The national average of number of days of payables for 2013 is about 104 days, while in 2012 it was 98, in 2011 it was 97, while in 2010 it was 109.

Top 10 Discom in terms of No of Days of payable



Bottom ten Discoms in terms of no of days payable



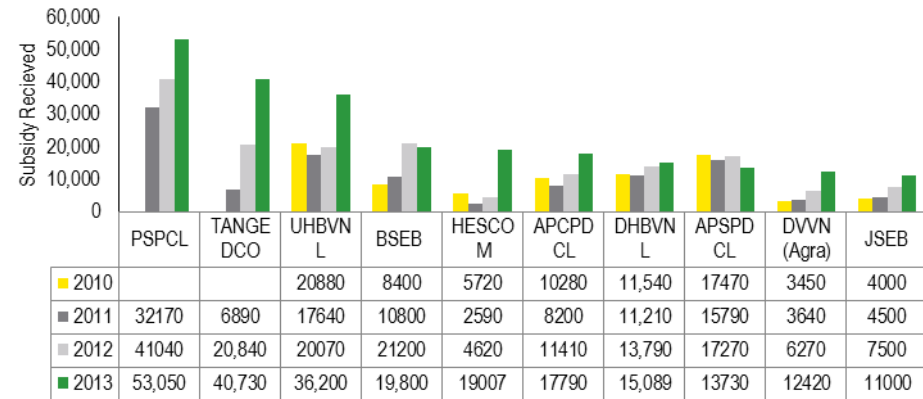
No of days of payables		
No of DISCOMs with less than 60 payable days	No of DISCOMs with more than 60 payable days	Insufficient information
11	36	15

No of days of payables		
No of DISCOMs with less than 60 payable days	No of DISCOMs with more than 60 payable days	Insufficient information
22	25	15

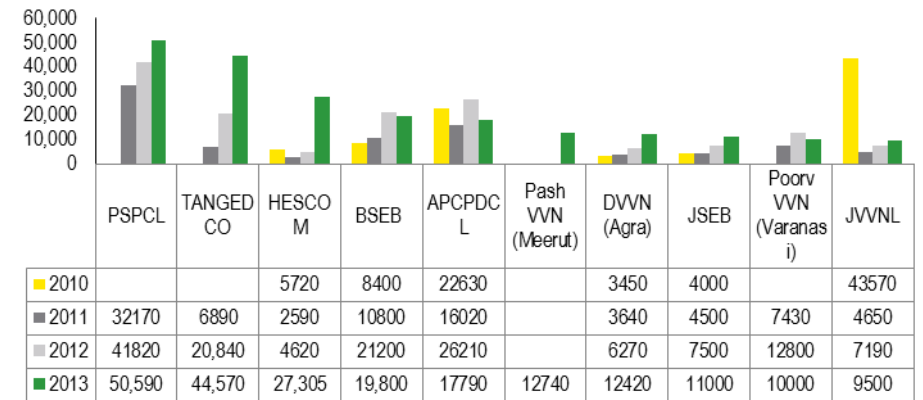
8. Regulatory Asset and Subsidy

States with Highest Regulatory Asset Build-up State Regulatory Assets (Rs billion)	
State	Rs billion
Tamil Nadu	256.44
Rajasthan	160.33
Delhi	71.90
Kerala	60.18
Haryana	23.44
West Bengal	21.75
Punjab	13.52

Top ten Discoms in terms of Subsidy Received million INR



Top ten Discoms in terms of Subsidy Booked million INR



Categorization of discoms

Profitability			Channel Efficiency			Solvency			Techno-commercial efficiency		
40%			15%			25%			20%		
Gross Margin without Subsidy	Profit per unit input energy	Difference in CAGR between Revenue and growth	No of days of Receivables	No of days of Payables	Ratio of Capex and Depreciation in the year	Interest Service Coverage Ratio	Debt to Equity Ratio	Fixed Asset Coverage Ratio	AT &C losses	Employee cost per unit input energy	AT&C Loss-trend
15%	15%	10%	7.5%	2.5%	5%	7.5%	12.5%	5%	7.5%	7.5%	5%

Category A	Category B	Category C	Category D	Category E
Very High financial & operational performance	High to moderate financial and operational	Moderate to below average financial and operational performance capability	Below average to low financial and operational performance capability	Low to very low financial and operational performance capability

Weights of key parameters

Score	Gross Margin without Subsidy	Profit per unit input energy	Difference in CAGR of Revenue and cost	No of days of Receivables	No of days of Payables	Ratio of Capex and Depreciation	Interest Coverage Ratio	Debt to Equity Ratio	Fixed Asset Coverage Ratio	AT &C losses	Employee cost per unit input energy	AT&C Loss-trend
5	More than 10%	More than 0.05	Above 5%	Less than 60 days	Less than 60 days	More than 7	More than 2	Less than 2	More Than 5	Less than 15%	Less than .25	More Than 30%
4	Between 10% and 5%	Between 0.05 and 0.02	Between 5% and 2%	Between 60 to 90 days	Between 60 to 90 days	Between 7 and 4	Between 1.33 and 2	Between 2 and 3	Between 5 and 2	Between 15 % and 25%	Between .25 and .35	Between 30% and 20%
3	Between 5% and 0%	Between 0.02 and 0	Between 2% and 0%	Between 90 to 120 days	Between 90 to 120 days	Between 4 and 2	Between 1 and 1.33	Between 3 and 4	Between 5 and 2	Between 25% and 30%	Between .35 to 0.50	Between 20% and 5%
2	Between 0% and (10)%	Between 0 and (0.5)	Between - 0% and (5)%	Between 120 to 150 days	Between 120 to 150 days	Between 2 and 1	Less than 1 but more than zero	Between 4 and all higher positive values	Between 2 and 1	Between 30 % and 35%	Between 0.50 and 1	Between 5% and 0%
1	Below (10)%	Less than (0.5)	Below (5) %	Over 150 days	Over 150 days	Below 1	Negative	Negative	Below 1	More than 35%	More than 1	Negative

Categorization of discoms

Category A	Category B	Category C	Category D	Category E
CESC DGVCL MGVCL PGVCL UGVCL	CSPDCL HESCOM KSEB MESCOM MSEDCL NDPL PSPCL UtPCL WBSEDCL	APDCL BESCOM BSES Rajdhani BSES Yamuna GESCOM Goa PD HPSEB Ltd. MeECL/MePDCL NESCO Pash VVN (Meerut) Sikkim PD	APCPDCL APEPDCL APNPDCL APSPDCL AVVNL CESCO CHESCOM DHBVNL JDVVNL JVVNL Mizoram PD MP Madhya kshetra VVCL MP Paschim kshetra VVCL MP Purv kshetra VVCL NBPDC Puducherry PD SBPDCL SESCO TANGEDCO TSECL WESCO	Arunachal PD DVVN (Agra) J&K PDD JSEB KESCO (kanpur) Manipur PD MVVN (Lucknow) Nagaland PD Poorv VVN (Varanasi) UHBVNL

Key observations

Category	Key observations
A	<ul style="list-style-type: none"> Consistent track record of profitable growth- Profit per unit positive for all DISCOMs from FY2010 to FY2013 Cost reflective tariffs- Difference between tariff and average cost of supply is either positive or marginally negative Comfortable capital structure- Debt to Equity ratio below 1 for all DISCOMs AT&C losses less than 15% for all DISCOMs, except PGCVL (AT&C loss of ~30.0%) Healthy cash collection from consumers, collection days less than 45 for all DISCOMs
B	<ul style="list-style-type: none"> Profit per unit above (0.25) paisa for all DISCOMs AT&C losses below ~ 30% except WBSEDCL High leverage level, net worth positive for all DISCOMs, except UtPCL. Difference between tariff and average cost of supply is either positive or marginally negative Moderate to high receivable days, varies from 58 for PSPCL to 172 for NDPL.
C	In between Category B and Category E
D	
E	<ul style="list-style-type: none"> Profit per unit highly negative for all DISCOMs High AT&C losses (above 30% for all DISCOMs) Negative net worth resulting in adverse capital structure, Debt to Equity ratio negative for all DISCOMs Difference between tariff and average cost of supply is negative and gap is above Rs 1.5 Significantly stretched receivable and payable days, varies from ~ 250 days for Arunachal PD to above 800 days for Manipur PD

Thank you

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