

MINUTES OF FOURTH MEETING OF “TECHNICAL COMMITTEE FOR IMPLEMENTATION OF FRAMEWORK ON RENEWABLES AT THE STATE LEVEL”

Venue : CERC, New Delhi

Date : 01-06-2016

List of Participants : At **Annexure - I (Attached)**

1. The fourth meeting of Technical Committee for implementation of Framework for Renewables at State level was held under chairmanship of Mr. A. S Bakshi, Member, CERC on 1st June 2016. Mr. Bakshi welcomed all the members and informed that M/s. Idam Infrastructure Advisory Private Limited (Idam Infra) in consortium with The Energy Resources Institute (TERI) has been hired as Consultant to the Technical Committee. Dr. S K Chatterjee, JC (RA), CERC introduced Mr. Ajit Pandit, (Director, Idam Infra) to the committee members.

Discussion

2. Mr. S.K. Soonee, (CEO, POSOCO) presented the progress update and informed the committee about Sub-committee's visit to SLDCs of Maharashtra, Tamil Nadu, Karnataka and Delhi. Interaction with several other States happened via video conferencing. He further elaborated upon the meeting with Forum of Load Dispatchers (FOLD) along with the SLDC survey for benchmarking and scale of operations in which 25 entities participated (including DVC). Based on the findings of the Sub-committee, a draft report has been prepared and circulated. Subsequently, the learnings have been used to evolve a Model Energy Metering Accounting and Settlement System (E-MASS) (the presentation is **attached** as **Annexure-II**).
3. The importance of defining interface points and ensuring main, check and standby meters at all points was highlighted. In addition, Automatic Meter Reading (AMR) should be deployed, but currently only ten States have it. Similarly, communication links have to be strengthened to ensure optimum use of AMR.
4. Mr. Soonee emphasized that it is time that the concept of Distribution System Operator (DSO) should be introduced in India, especially with expected large scale deployment of rooftop solar projects. DSO will be an independent

operator having no conflict of interest. Mr. A. B. Bajpai (Member, MPERC) suggested that DSO has to be acknowledged in the regulations. Mr. Deepak Lad (Member, MERC) expressed concern over the ambiguity between scope of SLDCs and DSO. It was clarified that DSO will report to SLDC and the State Regulator. In a way, DSO may act as sub-SLDC.

5. It was discussed that Hydro Power plants must be incentivized when used for peaking as they are supporting the grid during critical times. This may be incorporated in the overall tariff structure.
6. Mr. Soonee expressed his concern that during production cost modeling the RE production cost is taken as zero. This creates a discrepancy in the accounting and settlement. Secondly, it was underscored that no entity should be exempted from submission of deviation data irrespective of whether they are being penalized for default or not.
7. It was also proposed that India should adopt a 5 minute settlement period instead of 15 minutes for better granularity and ramp monitoring. Mr. R. R. Rathode (Member, RERC) expressed concern on the readiness of States to implement this. Mr. Soonee suggested that it can be implemented in a phased manner. This may sensitize the manufactures and SLDCs to adopt the same for further installations.
8. Mr. Soonee acknowledged that the Ancillary Services Regulations have benefitted the sector and the results are encouraging. He also emphasized that a slight error in metering will be always there and must be accepted within the limits as unsettled account.
9. Mr. D. B. Manival Raju (Member, KERC) informed that KERC has issued final Regulations on Scheduling, Forecasting and Deviation Settlement of RE sources.

Decisions

1. It was agreed that States shall give their feedback and comments on the draft report within 15 days.
2. Interaction of Sub-Committee with SLDCs in West Bengal, Rajasthan, Meghalaya is expected to be complete by 15th June 2016. Submission of final report to the Committee will happen by July 2016.
3. The Consultant shall visit Tamil Nadu and Madhya Pradesh and shall present their findings at the next meeting. The Consultant shall prepare Model Regulations and Procedures over the course of the project and guide the SLDCs in preparation of DPR for States, if required.
4. It was suggested that funds for roll-out of E-MASS may be requested from a Central Government fund, such as the PSDF. In this context, it was

emphasized that the States must hire and build out the requisite team, as suggested by POSOCO, for planning and implementation at the State level.

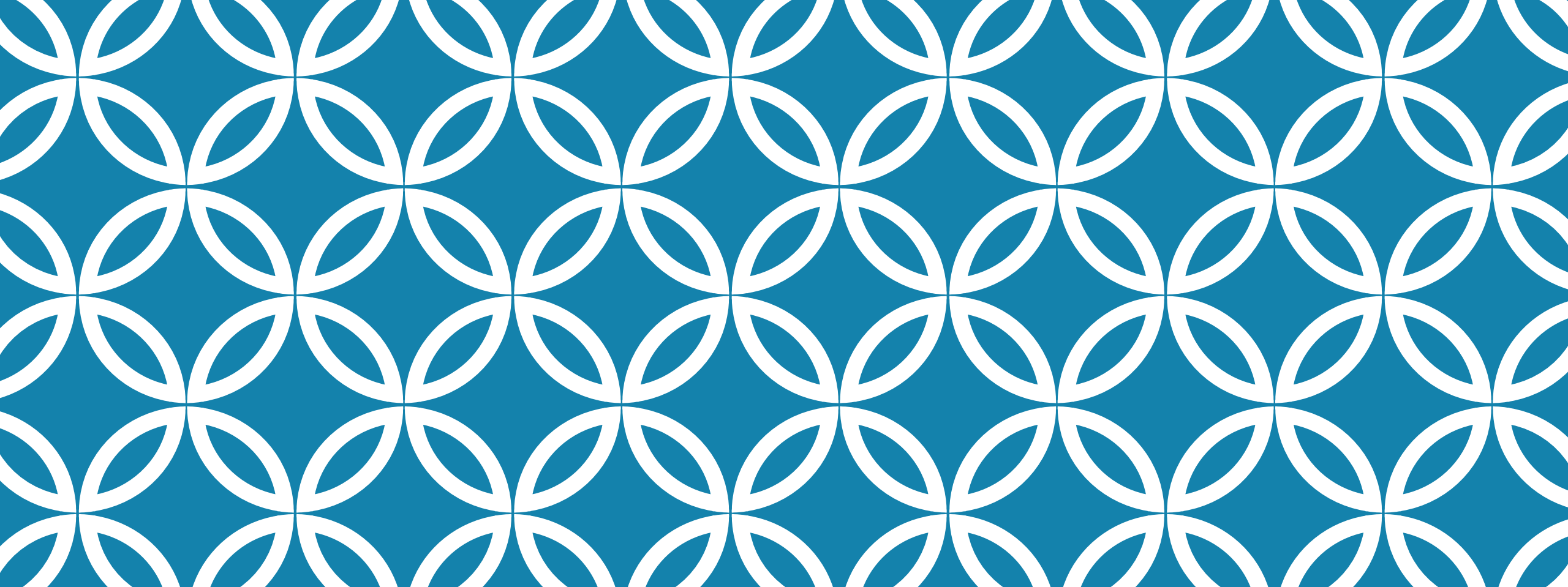
5. It was agreed that there is an urgent need for an autonomous organization which will handle all Information Technology (IT) related projects and requests from system operators and manage a centralized database system for Power Sector. Such a body will have experts from IT and Power sector, akin to the Centre for Railways Information System (CRIS), that develops and manages all IT applications for Indian Railways. This may be one of the recommendations of the final report.

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

ANNEXURE - I

**LIST OF PARTICIPANTS ATTENDED THE FOURTH MEETING OF THE
TECHNICAL COMMITTEE FOR “IMPLEMENTATION OF
FRAMEWORK ON RENEWABLES AT THE STATE LEVEL” HELD ON
01.06.2016 AT THE CERC OFFICE, NEW DELHI**

1	Mr. A. S Bakshi, Member	CERC
2	Mr. S. K Soonee, CEO	POSOCO
3	Mr. S Akshay Kumar	TNERC
4	Mr. A. B Bajpai, Member	MPERC
5	Mr. Deepak Lad, Member	MERC
6	Mr. D. B Manival Raju	KERC
7	Mr. P. Rama Mohan, Member	APERC
8	Mr. Raghuvendra S. Rathore, Member	RERC
9	Mr. P J Thakkar, Member	GERC
10	Dr. Sushanta K. Chatterjee, JC(RA)	CERC
11	Ms. Shruti Deorah, Advisor (RE)	CERC
12	Mr. Ajit Pandit	IDAM INFRA
13	Mr. Akhil K Gupta, Engg. Division	CERC
14	Ms. Shilpa Agarwal, DC(Engg.)	CERC
15	Mr. Vivek Pandey	POSOCO
16	Mr. Rajiv Porwal	POSOCO
17	Mr. Jyotish K. Pal	IDAM INFRA
18	Mr. Tanay Tarany, RA	FOR



E-MASS OF INDIA

FOR Technical Committee
Meeting – 01 June 2016

Romance should never begin with sentiment. It should begin with science and end with a settlement - Oscar Wilde

PROGRESS UPDATE

SLDCs visits: Maharashtra, Tamil Nadu, Karnataka, Delhi

- 23-Jan, 30-Jan, 15-Feb, 10-Mar 2016

Formation of Web group – EMASS of India

FOLD briefing: 02-March-2016

SLDC survey for Benchmarking and Scale of Operations: Apr-2016

- 25 entities participated (including DVC)

SLDC Interaction through Video Conference: May-2016

- Gujarat, Madhya Pradesh, Andhra Pradesh, Telangana

Review by EMASS Web group

Draft Report: May 2016

MANDATE FOR INTRA STATE BALANCING & SETTLEMENT SYSTEM

Section 32 of Electricity Act 2003

Section 5.7.1 (b) of National Electricity Policy 2005

Section 6.2 (1) of Tariff Policy 2006 & 2016

Recommendations of the Forum of Regulators – June 2006 and 2008

Regulation 6.4.1 of Indian Electricity Grid Code 2010

Recommendations of Niti Ayog for Renewable Integration – Feb 2015, Dec-2015

Para 2.3.2 of the Pradhan Committee – 2008

CERC Order on Roadmap for Reserves – Oct 2015

CERC Framework for Forecasting Scheduling and Imbalance Handling for RES- Aug 15

NAVIGATION GUIDES

K.P. Rao Committee recommendations, 1990

- Merit Order Operation through two part tariff
- Water Valuation

Bhanu Bhushan

- ABC for ABT

Sally Hunt- Making Competition Work in Electricity

- Four pillars of good market design

Peter Cramton, William Hogan, Steven Stoft

Edison Electric Institute- Power Market Auction Design

- Multi-Settlement System

CEA Metering Regulations

Other References



INTRA STATE BALANCING & SETTLEMENT SYSTEM- STATUS

Delhi - 01.04.2007

Madhya Pradesh - 30.10.2009

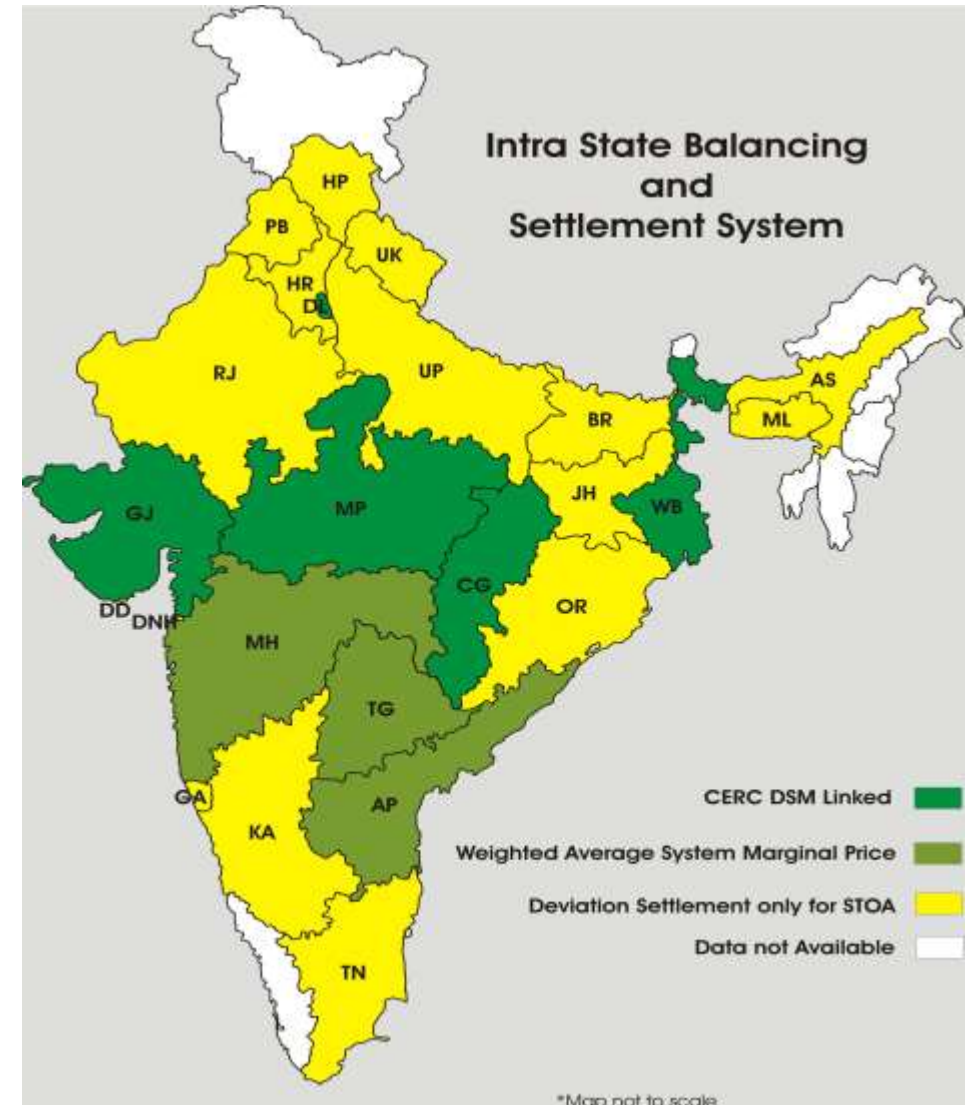
West Bengal - 01.04.2008

Gujarat - 05.04.2010

Chattisgarh - 01.11.2014

Maharashtra - 17.05.2007

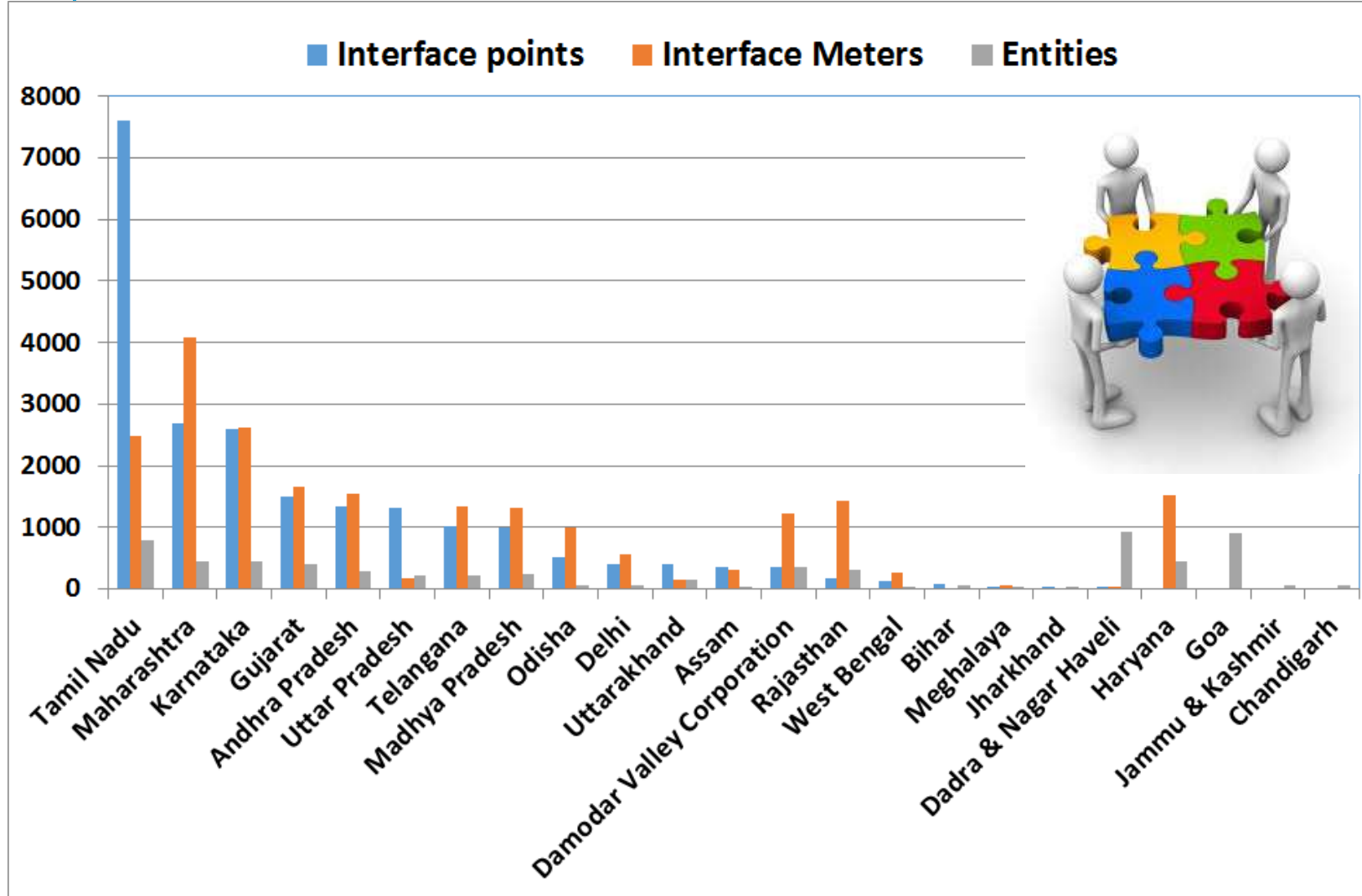
Andhra Pradesh & Telangana



“You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete”

R. Buckminster Fuller

INTERFACE BOUNDARY & ENTITIES



Coordination effort in SLDC is significantly high with large number of Entities, Interface points / Meters

It would increase with growth in RES entities and growth in STOA transactions at InSTS / ISTS

Few of the large States have Area LDCs or Sub-LDCs

Pooling of RES desirable at IntraSTS level

REMC and DSO need to be established

Adequacy of Interface Meters is essential

“The biggest human temptation is to settle for too little”- Thomas Merton

INTERFACE ENERGY METER

Accuracy Class

- 0.2 for Active, 0.5 for Reactive Energy (exception)

Least Count

- 15-minutes
- 30-minutes (AP, TG)
- 5 slots in a day (TN)

Automatic Meter Reading System

- Survey size: 25 Control Areas
- Complete AMR: 6 Control Areas
- Partial AMR: 4 Control Areas
- Manual collection: 15 Control Areas

Total number of Interface points

- > 21576

Total number of Interface Meters

- ~ 21,676 (Poor redundancy evident)

10 SLDCs have the requisite set up for data collection through AMR

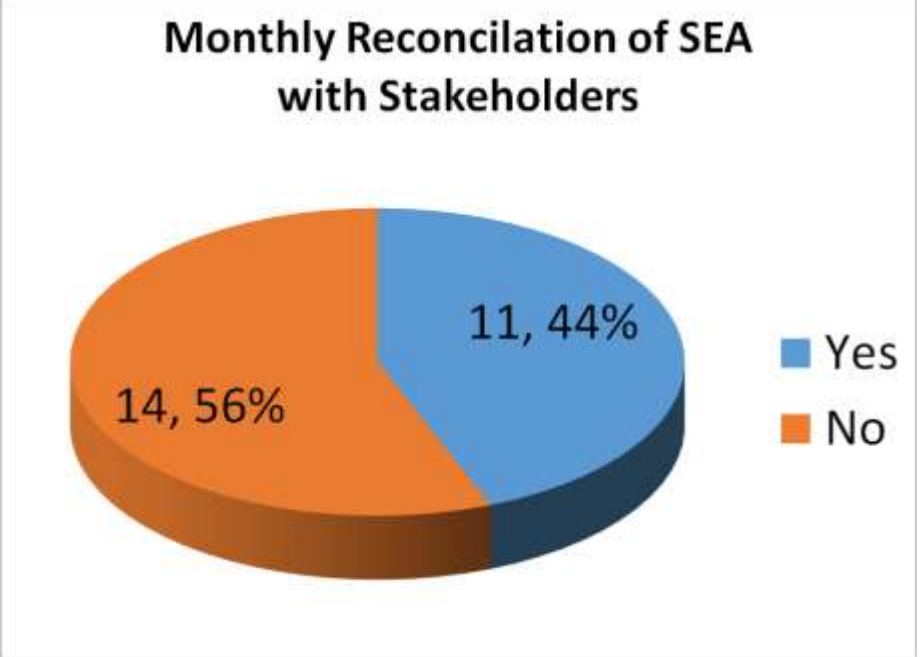
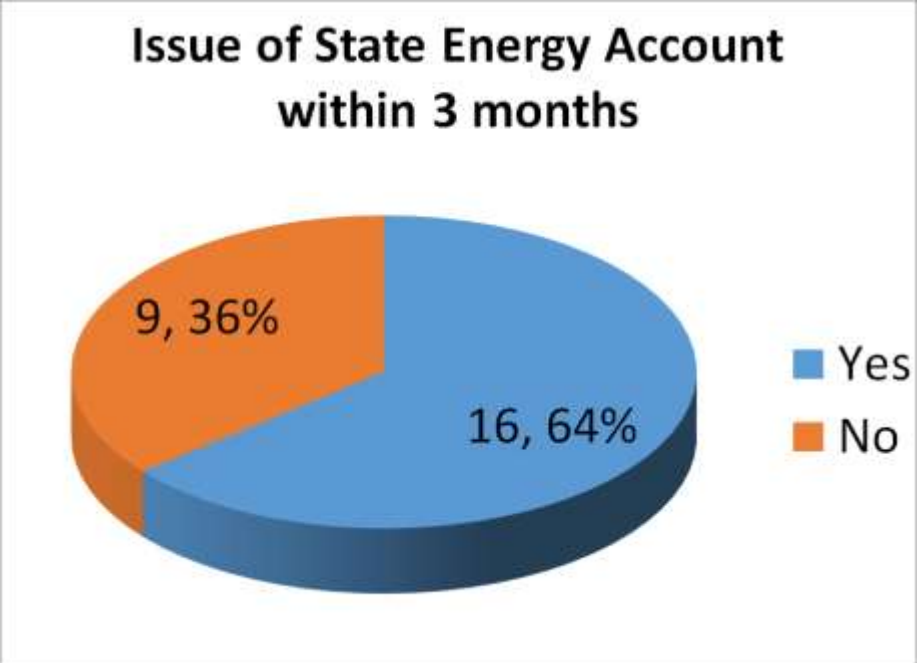
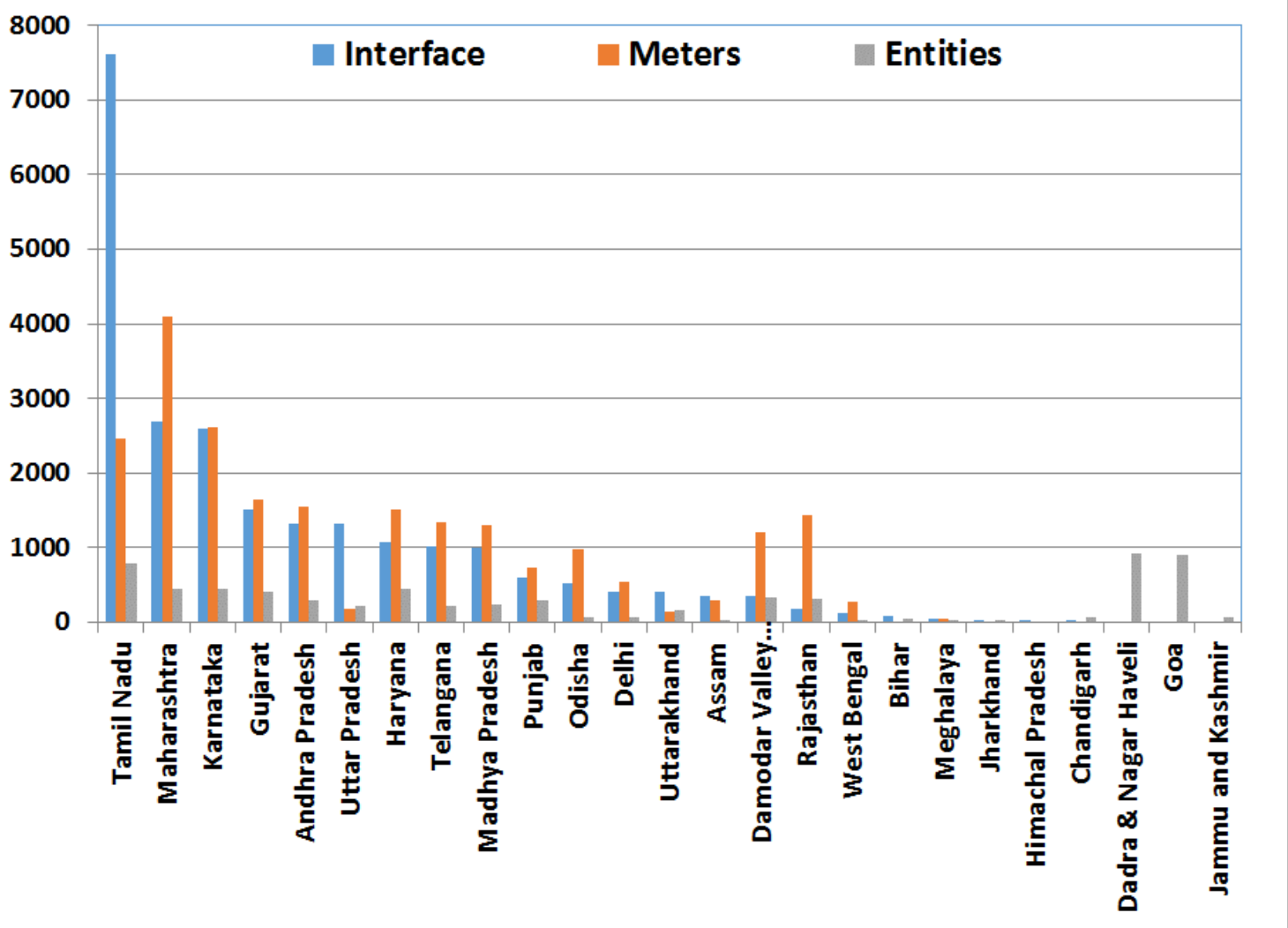
Only 25 % of Meters read through AMR

Interface Meter Vendors

- Secure, L&T, Elster, ABB, Wallby, Alstom

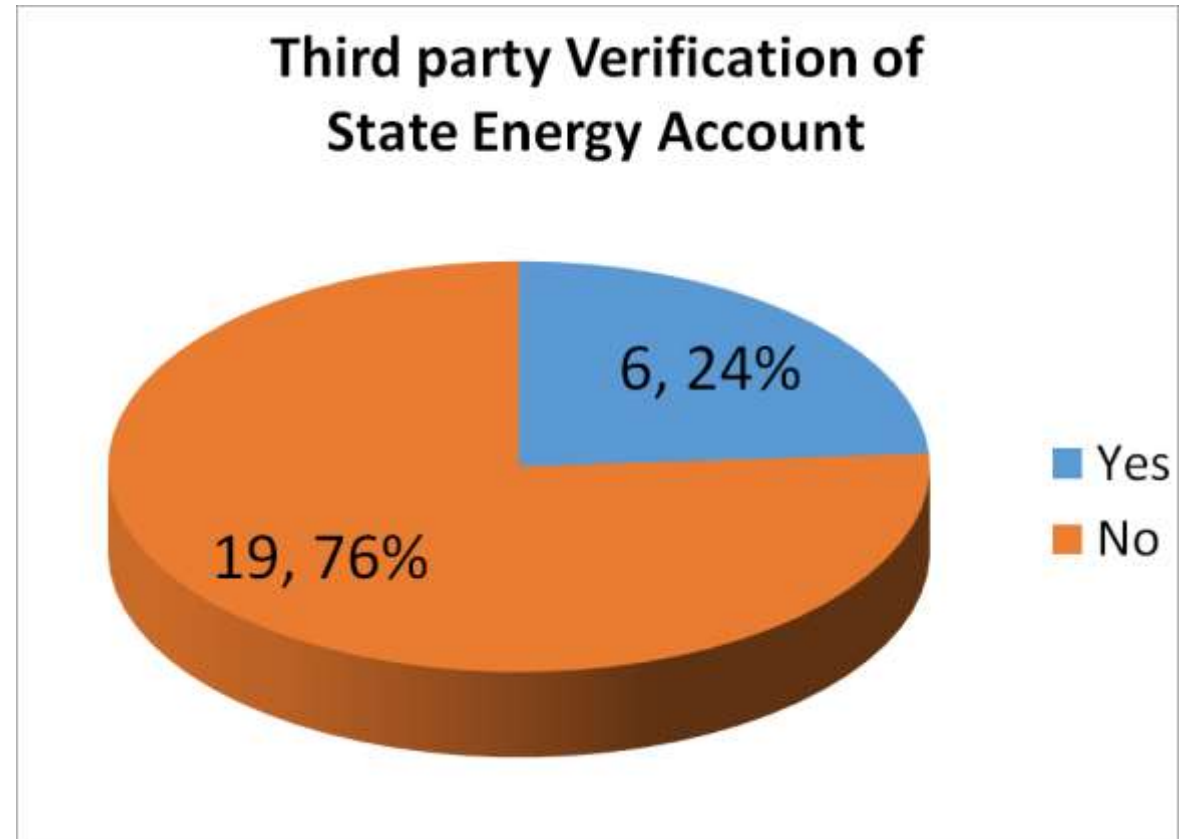
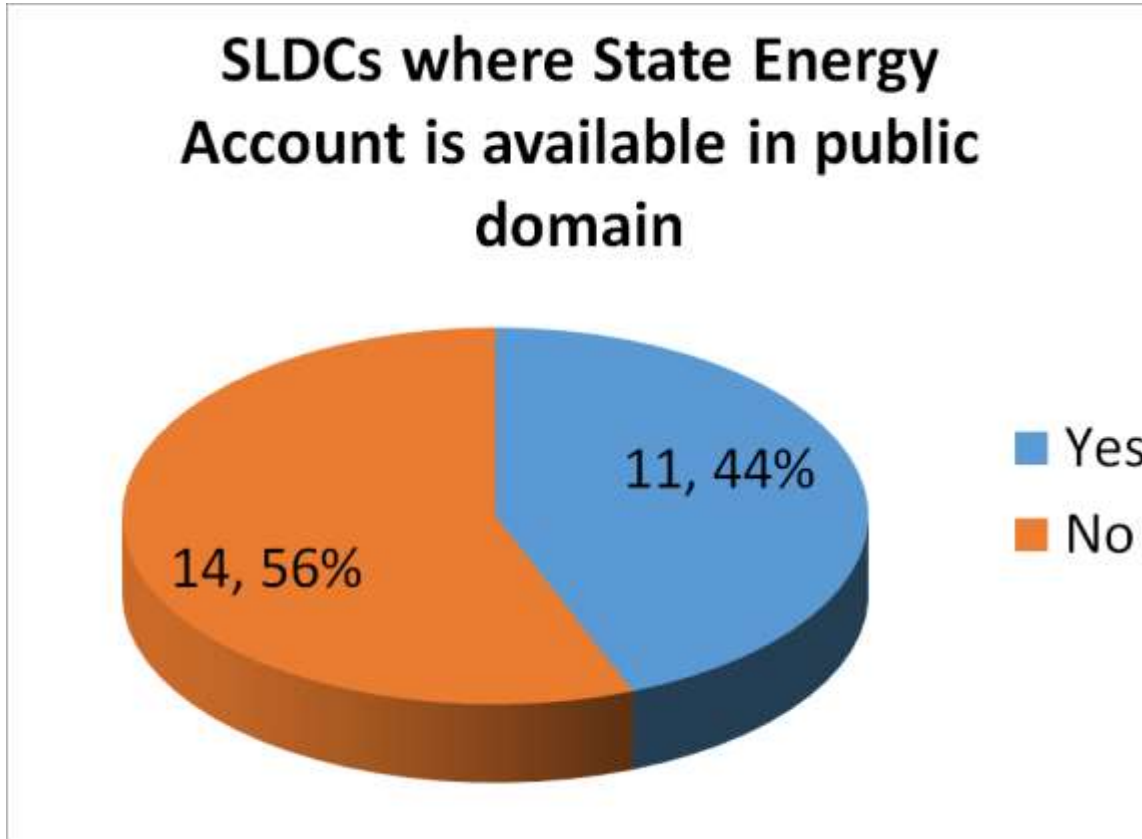
“In God we trust, all others must bring data” – W. Edwards Deming

ENERGY METERING AND ACCOUNTING



“Only accountants can save the world - through peace, goodwill and reconciliations” - Anonymous

INTEGRITY AND PROBITY OF ACCOUNTS



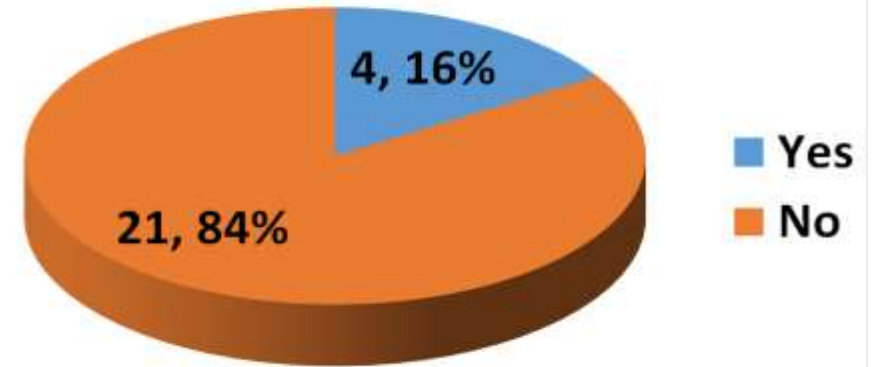
A lack of transparency results in distrust and a deep sense of insecurity – Dalai Lama

METER DATA ARCHIVAL & UTILIZATION

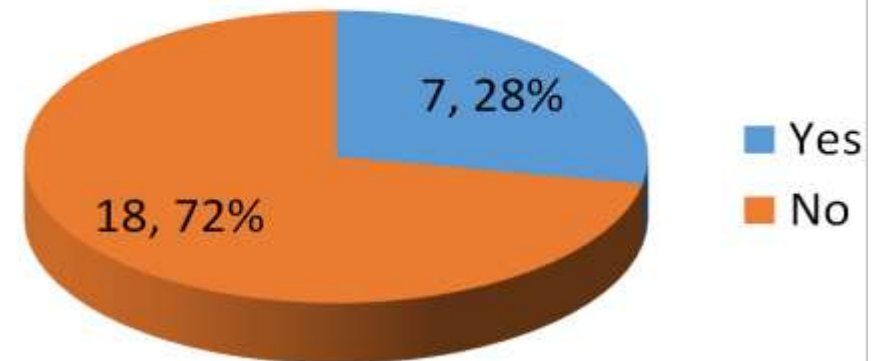
Formats Used for archival

- Oracle Database – 5
- CSV / MS Excel – 3
- Text / Raw -3
- Others- NA

Meter Data on website



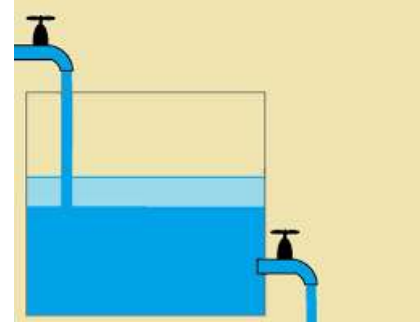
Meter Data Used for Load Forecasting



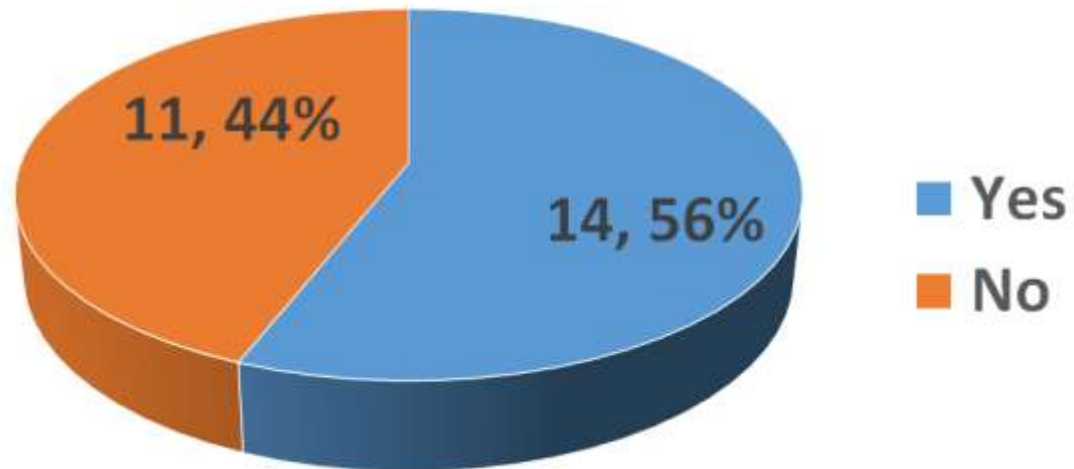
Numbers have important story to tell. They rely on you to give them a voice – Stephen Few

DEVIATION POOL ACCOUNT

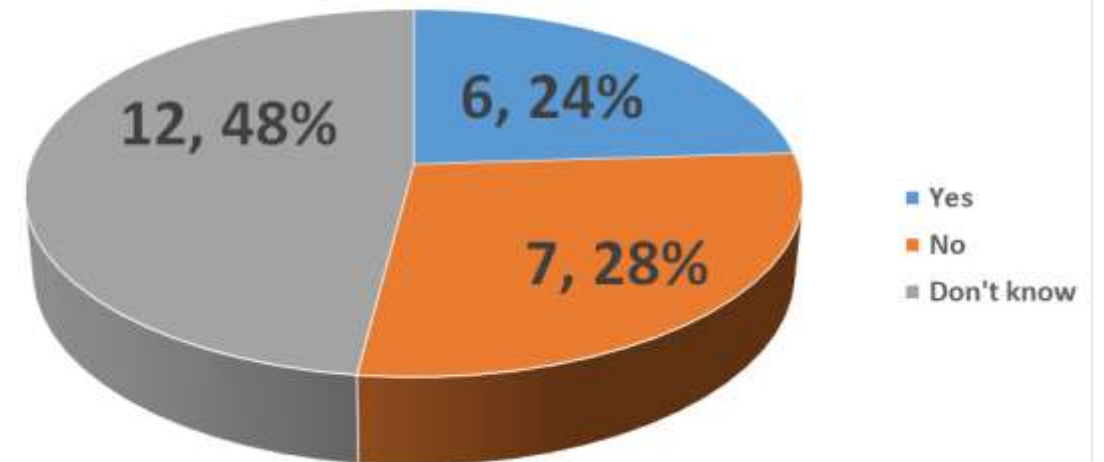
~ 100 crore per week



Pool Account Administration by SLDC



Availability of Payment Security Mechanism



“The least initial deviation from the truth is multiplied later a thousand fold”-Maya Angelou

METROLOGY CHALLENGES

Meter Adequacy : Main, Check, Standby, Redundant

Database upkeep (Meter number, CT/PT ratio)

Meter Maintenance (Testing, Calibration, Synchronization)

Meter Data Collection and archival

Metering Errors

Bad data detection, substitution / estimation

Data processing, validation

Data Security

Data retrieval for utilization

IT Hardware/Software maintenance, Upgrade, Interoperability



**“You can’t manage
what you can’t
measure” –
Edwards Deming**

ENERGY ACCOUNTING CHALLENGES

Post facto changes – Allocations, Schedules

Reconciliation of Implemented Schedule

Revision in Account of Super Pool

Apportionment of Super Pool liabilities among Sub-Pool members

Transmission Loss Scheduling, Accounting, Tracking

DEVIATION SETTLEMENT CHALLENGES

Delay in collection of Energy Meter Data

Settlement of Deviations by entities exempted from Deviation liability

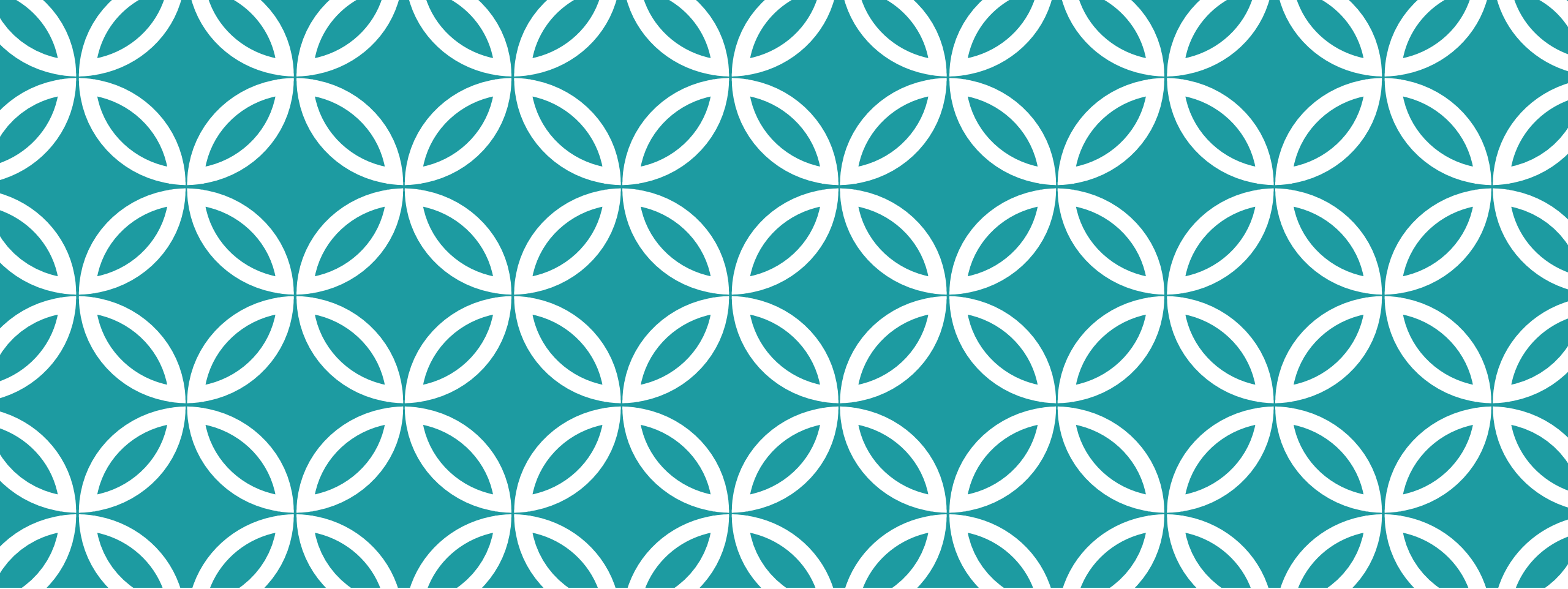
Rate to be used for Deviation Settlement -*No Post facto computation of rates*

Reconciliation of Deviation Account and Deviation Charges

Recovery of Deviation Charges, Handling Default

Treatment of Tax, Interest on Pool funds

"The truth is rarely simple and never pure." Oscar Wilde



ROADMAP

1. FACILITATING ECONOMIC DESPATCH

Identifying marginal cost of generation – separate from fixed cost

Separate tariff for peak and off-peak power

Intra State Hydro Tariff on the lines of CERC Hydro tariff

Allocation of existing PPA between Distribution Licensees

Incentivize Flexibility - Pumped storage, Load following, Peaking, Cycling

2. ENSURING INTERFACE METER ADEQUACY

Define Interface Boundary and Distribution Voltage level

Placement of Adequate Interface Meters as per CEA Metering Regulations

Automated Meter Reading of all locations and Interface meters

Submission of dummy reading to be a necessary condition before granting pool membership to an entity

Report enclosures

- Technical Specification of Interface meters
- Common Metering Errors

3. IMPLEMENTATION OF SCHEDULING MECHANISM

Freedom and Choice to market players for Portfolio Management

Conversion of Energy Banking Contracts into separate reciprocal contracts with distinct buyer and seller in each direction

Day-ahead scheduling based on merit order with a well defined time-line.

Schedules to be sacrosanct – No post facto changes

Leapfrog to 5-min scheduling and settlement

Web-based software for scheduling, open access request processing

4. REAL-TIME GENERATION DISPATCHING

SCADA / EMS / PMU for visualization and situational awareness

Maintaining Reserves for contingencies and for controlling ACE

Merit-order based dispatch by SLDC

Imbalance management through Ancillary Services

Predefined rules for congestion management / alleviation and Curtailment

5. IMPLEMENTATION OF ENERGY ACCOUNTING SYSTEM

Ex-ante schedule to be used as reference for energy accounting

Double Entry System: Withdrawal (Debit) for every Injection (Credit)

Energy Scheduled to be paid and settled between the parties concerned

Computation and trending of Transmission Charge for every settlement period

No post facto administration of transmission losses

System of Maker Checker

Periodic Reconciliation

6. IMPLEMENTATION OF SETTLEMENT SYSTEM

Each Intra State Grid connected Entity (Conventional Gen, RE Gen, CPP, OA Consumer)

to be a member of the pool and separately accountable for deviation

Mutual settlement of contractual charges between buyers and sellers

Pool settlement for deviations from schedule

Deviation Settlement Mechanism based on “causer pays” principle

Reactive Energy Settlement similar to ISTS

State pool to be delinked from super and sub-pool to avoid circular referencing, frequent truing up and recursive solution

Non zero sum pool by design to maintain reserves

Periodic Reconciliation

7. TRANSPARENCY

Schedule of Charges to be known upfront

- Transmission charges (Postage Stamp to start with)
- System Operators charges

Information in public domain

- Schedule, Meter data, Deviation A/c, Energy A/c, Discrepancy statements
- Interchange Computation Formula, Energy Meter reading

Data sharing for research and academic use

8. INTEGRITY AND PROBITY OF ACCOUNTS

Yearly submission of Interface meter configuration before ERC by SLDC

Mandatory third-party Process Audit

Statutory Audits for financial accounts

S. No.	Position	Section	No. of Persons
1	Divisional Head	Market Operation	1
2	Chief Coordinator	Scheduling	1
3	Chief Coordinator	Open Access	1
4	Chief Coordinator	Energy Metering	1
5	Chief Coordinator	Energy Accounting	1
6	Chief Coordinator	Settlement & Clearing	1
7	Chief Coordinator	Fees & Charges	1
8	Executive-Same day scheduling (assuming 5-Shift Groups)	Scheduling	5
9	Executive-Day ahead scheduling		2
10	Executive-Reconciliation & Implemented scheduling		1
11	Executive-Open Access-Bilateral	Open Access	1
12	Executive-Open Access-Collective		1
13	Executive-Open Access-Accounting		1
14	Executive-Open Access-Compliance, NoC & e-bidding		1
15	Executive-Meter Data Collection & Processing	Energy Metering	1
16	Executive-Metering architecture & Logistics		1
17	Executive-Weekly Accounts	Energy Accounting	1
18	Executive-Transmission Loss Administration		1
19	Executive-Monthly Accounts		2
20	Executive-Disbursal & settlement of pool accounts	Settlement & Clearing	1
21	Executive-Financial Settlement		1
23	Executive-Statutory and Legal Compliances		1
24	Executive-User Registration	Fees & Charges	1
25	Executive-SLDC Fees & Charges		1
	Total		30

9. HUMAN RESOURCE

Divisional Head – 1

Sub-Divisions – 6

Scheduling Coordinators – 8

Open Access Coordinators – 4

Metering Coordinators – 2 (with AMR)

Energy Accounting Coordinators – 4

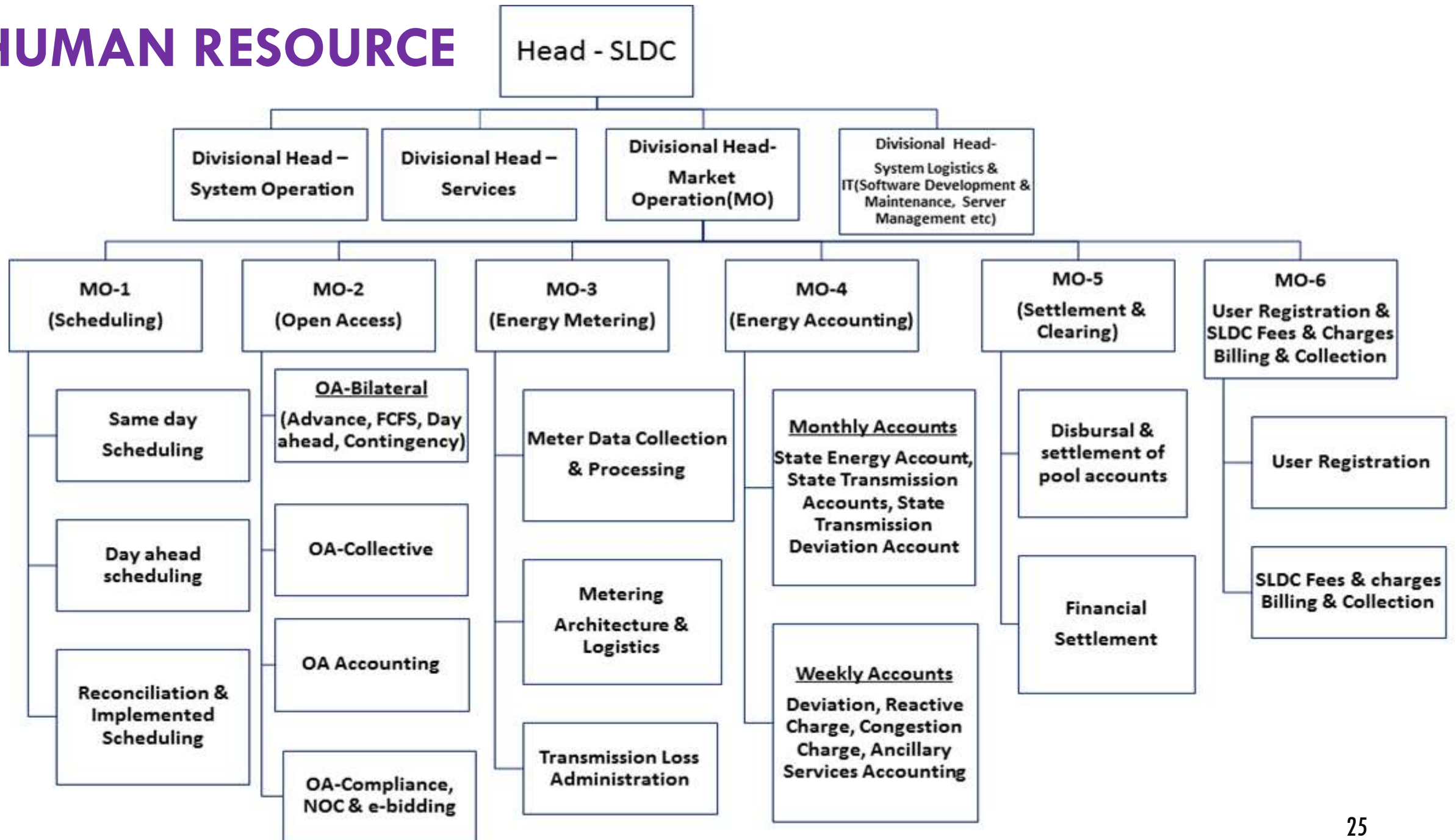
Settlement Coordinators – 3

User Registration Coordinators -2

Total = 30

Separate team for IT hardware and software maintenance

HUMAN RESOURCE



HR SKILL DEVELOPMENT

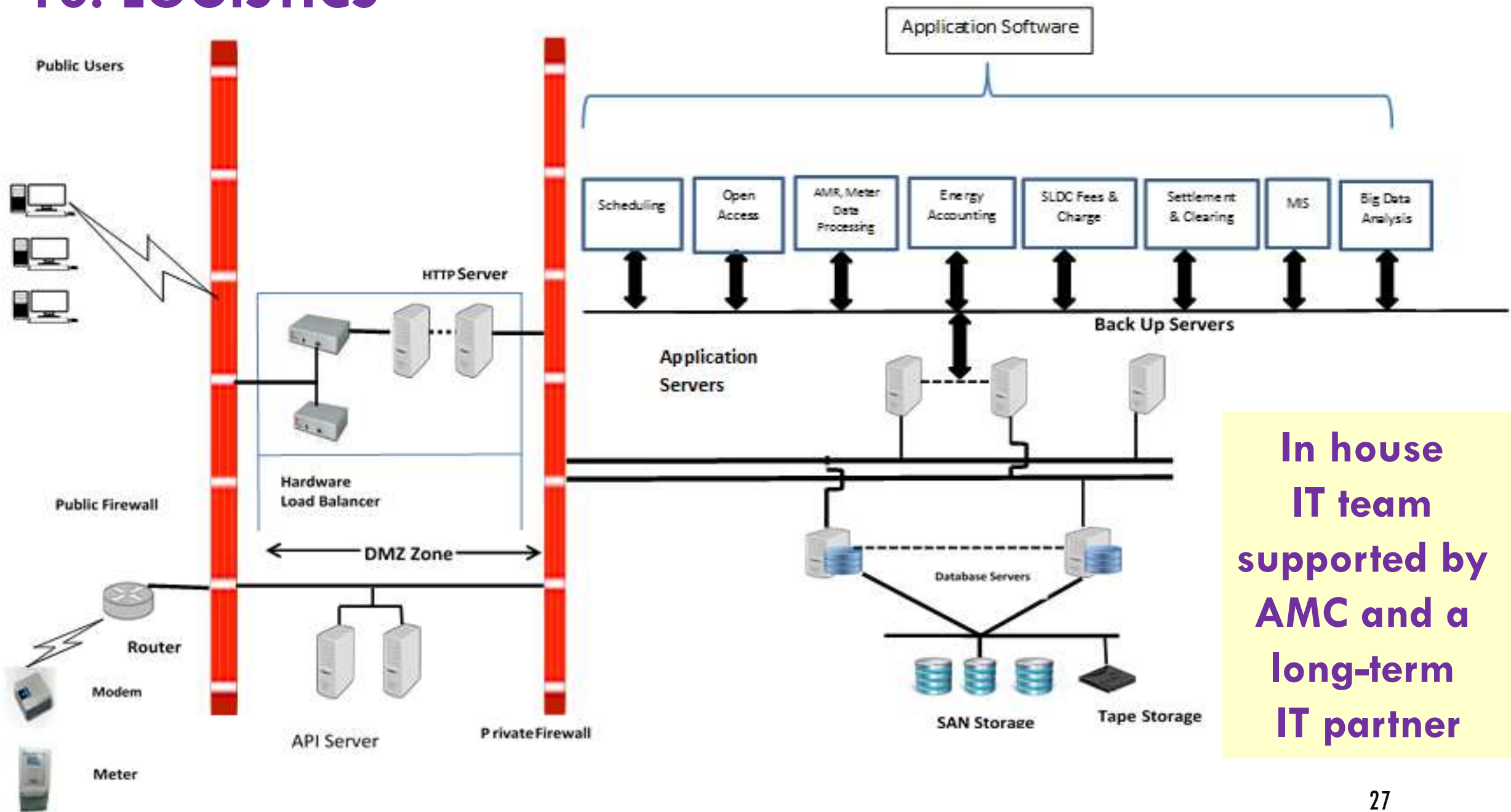
Stakeholder Workshops

Skill development programme for SLDC personnel

Certification Programme

- Financial Accounting
- Settlement System
- Energy Accounting
- Taxation and Statutory Compliances

10. LOGISTICS



**In house
IT team
supported by
AMC and a
long-term
IT partner**

CASE STUDY — CENTRE FOR RAILWAYS INFORMATION SYSTEM

CRIS is an autonomous organization under the Ministry of Railways

Develops and manages Information Technology applications of the Indian Railways

Current portfolio of projects covers

- Passenger ticketing, freight operations, train dispatching and control, crew management,
- e-procurement, management of Railways' fixed and moving assets and production of rolling stock

HR strength include

- Pool of competent IT professionals, whose skillsets include System architecture, system analysis and design, and program development
- Experienced group of serving and former Railway personnel with domain knowledge and system implementation skills

Collaborative model of working to ensure the delivery of cost-effective, sustainable information systems

Similar Model for LDCs could be contemplated OR Vendor development programme to be taken up aggressively

11. STOA REGISTRY AND CLEARING AGENCY

Central clearing house for STOA approvals similar to depositories in capital market

Depository and repository for OA approvals by SLDCs and ATC for inter state transmission

Integrated IT based system to facilitate automatic issuance of OA clearance

Mitigation of systemic risk and credit risk for all Regulatory Pool Accounts

Guarantee of settlement of trades to all members maintaining adequate margins

- Exposure limits for each player derived from past record of credit worthiness

WAY FORWARD

Interaction with SLDC West Bengal, Rajasthan, Meghalaya : by 15 June 2016

Consultation with FOLD : by 30 June 2016

Submission of Final Report to FOR Committee : by July 2016

Appointment of Consultants

Preparation of Detailed Project Report for States by Consultants

PSDF funding

Roll out- Model DPR, Model Regulations and Procedures

**“And a step backward, after making a wrong turn,
is a step in the right direction.”
- Kurt Vonnegut, (Piano Player)**

THANK YOU !