



GOVERNMENT OF INDIA  
**MINISTRY OF POWER**



# Experience sharing Workshop on Metering

under

# Integrated Power Development Scheme

**MYSORE, 30-JAN-2018**



# Integrated Power Development Scheme (IPDS)



- Due Importance given to metering by GOI
  - No new connections to be released without meters
  - 100% Metering for all
  - Energy auditing and accounting to segregate commercial and technical losses besides identifying theft prone pockets
- Coverage of metering component under IPDS
  - Static meters for feeders, distribution transformers and all consumers for un-metered connections, replacement of faulty & EM meters.
  - Prepaid meters in Govt. establishment
  - AMI / Smart meters
  - Boundary meters for ring fencing of non-RAPDRP towns
  - AMR for Feeders, Distribution transformer and high load consumers
  - Net metering for Rooftop solar installations



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# Consumer Metering



- Gol provided support under various schemes such as APDP, APDRP, R-APDRP, IPDS etc. for replacement of faulty as well as EM meters.
- Further, use of pre-paid and smart meters emphasized for improving Billing and Collection efficiency in Discoms to reduce AT&C losses.
- Average level of consumer metering is around 89%, with 28 out of 50 Govt. owned Utilities showing more than 90% consumer metering.
  - [NR States](#): 82%
  - [SR States](#): 91%
  - [ER States](#): 90%
  - [WR States](#): 93%
  - [NER States](#): 95%
- Large number of consumers are still unmetered, with EM meters or with defective meters, which does not enable proper accounting of energy, Gol sanctioned >2.5 crore consumer meters under IPDS and DDUGJY.
- Gol requested States to go for smart/prepaid meters only in place of normal meters and exercise aggregation of quantities to achieve the benefits from economy of scale.



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# AMR (Automatic Meter reading)



- 100% system metering (Feeders, DTs and boundary points) for energy auditing and accounting at each of the transformation level need to be completed to facilitate accounting of energy distributed and consumed in every part of the network.
- With implementation of AMR for System and HT consumer meters along with billing cum cash collection and energy accounting – under RAPDRP, Part-A, Utilities are able to derive benefits and take corrective measures based on exceptions generated.
  - Downloadable static meters with latest state of the art technology and open protocol meters were installed, which is able to fulfill all functionalities required by the utilities.
  - Common MDM-meter data management (suitable for all make of meters) used to extract vast information and make it meaningful to be read on a common data base for exception based monitoring, reporting etc.

## Type of meters envisaged and Standard:

“AC, 3 Phase, 3 / 4 Wire, CT/PT operated fully Static and AMR compatible Tri-Vector Energy Meters, complying IS:15959 (including amendment 2), IS: 14697 /1999 (reaffirmed 2004) and IS-15707 for measurement of different electrical parameters including Active Energy (KWH), Reactive Energy (KVARH), Apparent Energy (KVAH) etc.”



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# Prepaid metering system



- Prepaid meters require customer to make advance payment before use of electricity. If available credit is exhausted then supply of electricity is disconnected by the relay, which is re-connected only when consumer recharges credit again.
- Prepaid metering of electricity enhances utility revenue and reduces costs in multiple ways: accelerated cash-flow; theft avoidance; bad debt reduction; no cost towards meter reading & billing; lower administrative costs; advance demand planning; and no disconnect/re-connect costs
- Installation of pre-paid metering system is envisaged under IPDS only in Govt. establishments ~ 1,55,000 Prepaid meters, valuing Rs.160 cr. ([Details](#))

## Type of meters envisaged and Standard:

- **Indian Standard IS15884 for AC Direct Connected Static Prepayment meters already exists and many Utilities have already installed prepaid meters during last >10 years.**



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# Issues in implementation

- Enabling provisions by State Electricity Regulatory Commissions (SERCs)-

Mandate use of Pre-paid metering system	<ul style="list-style-type: none"> <li>• NEP says: Pre-paid meters should be encouraged.</li> <li>• Financial Restructure Package (FRP) envisages installing pre-paid meters for Govt. Consumers.</li> <li>• FOR has recommended that “All state utilities should try prepaid meters for target consumers viz Government/PSU establishments, temporary connections, tenancy metering etc.”</li> </ul>
Separate/discounted and simplified tariff for prepaid consumer category to encourage use of pre-paid metering system	<ul style="list-style-type: none"> <li>• Regulators in many states such as WB, Delhi, HP etc. simplified tariffs.</li> <li>• JERC and many other SERCs (Delhi, UP, Haryana etc.) have allowed rebate on pre-paid tariff.</li> <li>• HERC has come out with a separate regulation for pre-paid metering system in Haryana in Sep. 2015.</li> </ul>
Address issues like power to disconnect/re-connect in case money gets exhausted in meter	HERC vide above regulation has clarified that provision of Sec-56 of Electricity Act 2003 apply to supply of electricity through post-payment mechanism and shall not apply for supply through pre-payment system.

# Issues in implementation

- Cost of vending system for pre-paid metering and its subsequent operation & maintenance
- Cost benefit/viability of providing pre-paid meters to consumers with low load
- Automatic data compilation for data analytics/planning/loss reduction etc. without monthly regular meter reading.

**In case of pre-paid meters in offline mode with no data communication facility, energy accounting is done through punching of ABC code (generated in the meter) in the vending system before next recharge token generation and/or analyzing the recharge pattern of the consumers. But, for pre-paid meters having data communication facility, online energy accounting is feasible.**



# AMI /Smart metering system



- AMI systems are used for metering as well as monitoring the energy uses by consumer and its control
  - near real-time meter readings, power outage notification, load disconnection/re-connection and power quality monitoring.
  - allow different prices for consumption based on the time of day and season, which can be used to reduce peaks in demand.
  - AMI/Smart meters can offer following benefits to Utilities/consumers-
    - AT&C loss reduction
    - Brown out/black out (selected load control/disconnect/re-connect)
    - Time of day uses / peak load clipping/ Demand Response
    - Enabler for Power quality improvement





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# AMI /Smart metering system



## Smart meters under IPDS-

- Approx. 1.57 Lakh, valuing Rs.185 Cr sanctioned in SCADA towns ([Details](#))
- Smart Metering Pilot Project for 91,648 consumers comprising of 78,254 Nos. single phase and 13,214 Nos. three phase meters in old Kashi area - Rs.67.51 crore also sanctioned
- Smart metering solutions under consideration of MoP to Utilities/States on the basis of improvement in UDAY Performance Parameters within overall outlay of Rs.750 crores, wherein States have made DPRs either on CAPEX or a combination with revenue recovery model ([Details of DPRs submitted](#))
  - IPDS funding - 60% (85% for special category states) would be admissible only for CAPEX portion (i.e. cost of smart meters, head end system and communication equipment) limited to a maximum of Rs.2000/- per node.



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# AMI /Smart metering system



## Smart meter Specification and requirements wrt Indian context-

- Indian Standard IS 16444, Part-I for direct connected single and three phase Smart Energy Meters and IS 16444, Part-II for CT operated Smart meters have been finalized by BIS. Also, IS 15959 for communication protocols has been finalized
- Functional Requirements of Advanced Metering Infrastructure (AMI) In India has been finalized by CEA in August 2016, which includes Technical specifications of smart meters and communication protocols as per above BIS.
- Strategy for roll out of Advance Metering Infrastructure in the States/UTs issued by CEA to all the States on 31<sup>st</sup> August 2016.
  - Utilities for rolling out AMI in the States area wise or Feeder wise, preferably in higher loss pockets initially to take full advantage of smart metering solution.
- Standard Bidding Document/RfP for appointment of AMI Implementing Agency for rolling out of smart grid projects being prepared by NPMU in association with CEA.



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# Implementation issues



- Enabling provisions by SERCs to address various issues like power to disconnect/re-connect, load control/brown out etc.
- Enabling provisions by SERCs on the policy of alert / alarm, policy on using In-home Display unit etc.
- Regulatory framework on special tariff provisions for real time billing and incentives in case of consumer participating in demand response program
- Cost implications of AMI implementation and subsequent maintenance cost
- Selection of communication technology based upon its availability in various terrain and ensuring proper Service Legal Agreements (SLAs) by service providers on a long term basis to ensure it does not become obsolete during next 10-15 years.
- Interoperability between multiple HES of AMI and cyber security issues.

**FOR has issued a Model Smart Grid Regulations in year 2015, which discusses many of the issues mentioned above and suggested various approach to be followed by respective SERCs for formulation, approval and execution of SG projects, apart from their monitoring and evaluation etc.**



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# Conclusion



- AT&C loss reduction is contingent upon improvement in the Billing efficiency.
- Since a large number of consumers are still unmetered, or with defective consumer meters, which does not enable proper accounting of the energy, GOI has sanctioned more than 2.5 cr consumer meters under IPDS & DDUGJY.
- Smart meters ensure on demand energy audits, prepaid meters ensures billing and collection in advance to DISCOMs.
- **MoP has advised Utilities for installation of Smart meters in areas that have a feasibility of communication for all consumers above monthly electricity utilization of ~ 500 Units and then upto 200 units in second phase. Consumers in remote locations and in rural areas may opt for Pre-paid meters.**
- **EESL has gone for the procurement of 5 million Smart Meters for UP and Haryana. States may like to contact EESL to get the advantage of economy of scale through aggregation of quantities of Smart/prepaid meters.**



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# Learnings from the experience sharing at CESC, Mysore



- SG pilot project in CESC, Mysore encompasses most of the features, hybrid comm technologies (RF from meter to DCU and GPRS from DCU to Control center).
- No meter reader in the project area and 100% meter data available for billing, apart from auto disconnection & re-connection from remote.
- Minimum outages and improved power supply reliability through SCADA, Outage Management, FPI, DT Monitoring units etc. leading to better consumer satisfaction and increased operational efficiency of Discom
- Consumer voluntary participation in Demand Response, leading to Peak load reduction
- Better load forecast
- **Issue of meter data communication:** Appropriate communication technology (RF/GPRS/3g/4g/PLCC) need to be selected by Utilities as per local site conditions, network availability, cost-benefit analysis etc.



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# Learnings from the experience sharing at CESC, Mysore



- EESL has selected GPRS communication in the 5 mn smart meters in UP and Haryana as per the conscious decision taken by Utilities (**implementation in urban area only**), challenges, if any may be overcome due to large volume and commitments from service providers.
- EESL has selected a MDM solution which can integrate multiple make of meters
- They planned for using cloud based services (HW) to reduce overall project cost.
- **Issue of high cost of Smart meters/AMI:** PFC as well as EESL requested Utilities in line with MoP guideline for aggregation of smart & prepaid meter and submit their requirements to EESL to achieve economies of scale.
- EESL will implement the projects on BOOT or CAPEX model.
- NSGM as Nodal agency can provide support to Utilities.



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# Discom/ Organization Participation



S No.	Name (Ms/ Mr)	Org/Utility Name
1	Rajesh Manjhu, IAS	MD.MGVCL
2	D Kiran, IRS	CESC
3	Md. Sadique Alam, IAS	CESU
4	R Jayakumar	GESCOM
5	S P Sakkari	HESCOM
6	N K Sharma	PSPCL
7	K Ramakrishna	MESCOM
8	Abhijit Deshpande	MSEDCL
9	Navin Arora	JVVNL
10	Arvind Rajvedi	PVVNL
11	K T Mahanthappa	CESC
12	Abhijit Ganguly	WBSEDCL
13	Elftab Ahmed	CESC
14	Kulesh Sharma	APDCL
15	Bharat	APDCL
16	Sandhya Barua	APDCL
17	Gangadhar Patel	WESCO
18	P Kumaran	KSEBL
19	Santanu Bose	APDCL
20	Sujeet Kumar	NBPDCL

S No.	Name (Ms/ Mr)	Org/Utility Name
21	Vineet Kumar	SBPDCL
22	Kesavadas. V	KSEBL
23	M Shanthy	BESCOM
25	K Sunil Kumar	BESCOM
26	N Narasimha	CESC
27	Chandrashekar	CESC
28	P. Rani	TANGEDCO
29	K. M. Manigopal Rajan	CESC
30	Umesh.C	CESC
31	Humeera Haneef	CESC(Mysore)
32	Mahesh Chandra	CESC(Mysore)
33	Rajesh K.S.	CESC(Mysore)
34	A K Mishra	NSGM
35	Ajay Sharma	EESL
36	R K Bhanote	EESL
37	Deven Patel	Enzen Global



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# धन्यवाद।



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