MINUTES OF THE 88TH MEETING OF THE FORUM OF REGULATORS (FOR)

Venue: Mussoorie, Uttarakhand

Date: 13th October, 2023 (Friday)

Time: 10:00 hrs

List of participants: Annexure-I

Chairperson, Uttarakhand ERC (UERC) welcomed the Chairperson, FOR/CERC and the Chairpersons / Members of all the State and Joint Commissions for joining the 88th FOR meeting being hosted by UERC. In his welcome remarks, the Chairperson, Uttarakhand ERC appreciated the role being played by the Forum of Regulators as a crucial platform for power sector regulators to converge, collaborate, and enhance the sustainability and regulation of the power industry. Giving a brief overview of the Uttarakhand power sector, he informed that the Uttarakhand power sector comprises predominantly hydro generators with State-owned generating companies having installed hydro capacity of 1420 MW and private gas-based power plants supplying 321 MW. Besides, around 600 MW of solar power plants have been installed in the State. During different seasons, the State faces varying power demands, with reliance on state generating stations, allocations from the central sector generating stations, and short-term purchases including through traders, power exchange, market, etc. to meet these demands. During winter, due to reduced hydro generation in the State, there is greater dependence on short-term purchases to meet the deficit. He added that the transmission system in the State is managed by PTCUL, while distribution and retail supply are handled by UPCL, the sole distribution licensee serving approx. 28.5 lacs consumers in the State. On the consumer empowerment front, there are a total of 9 CGRFs spanning across the State.

2. Thereafter, the Chairperson, FOR/ CERC extended a warm welcome to all the members and thanked the Chairperson, Uttarakhand ERC (UERC) for hosting the meeting. He highlighted the past accomplishments of the Forum in addressing challenges within the power sector and its role in the harmonious and holistic development of the power sector. Reflecting on the 87th FOR meeting in Tripura held in August 2023, he referred to the deliberations held and lauded the active participation and efforts of the members on the way forward for meeting the challenges faced by the Commissions and the power sector as a whole.

3. The Chairperson FOR / CERC also informed the Forum that Uttarakhand is blessed with huge hydro potential. Notedly, the State does not have any coal, diesel or nuclear-based

generation. Uttarakhand also holds significant untapped potential for small hydropower generation. He applauded UERC's commendable effort towards the development of the sector. He also took the opportunity to acknowledge the role and contribution of Shri R.K. Pachnanda, Chairperson, HERC, who will be demitting office soon, for his contribution to the functioning of the Forum and wished him every luck in all his future endeavours. He also thanked the Chairperson, UERC for his enthusiasm and tireless effort along with his team for hosting the event.

Subsequently, the agenda items were taken up for discussion.

AGENDA ITEM. NO. 1: CONFIRMATION OF THE MINUTES OF THE 87TH FOR MEETING HELD ON 25th AUGUST 2023

4. Dy Chief (RA), CERC apprised the Forum of the discussions of the 87th FOR meeting and action taken points of the said minutes. After deliberations, the Forum unanimously approved the minutes of the 87th FOR meeting.

AGENDA ITEM NO. 2: REFRENCES FROM HPERC

A) FIXATION OF TRAJECTORY BY THE STATE ELECTRICITY REGULATORY COMMISSION (SERCS) OF THE DISCOMS FOR LOSSES REDUCTION ON THE BASIS OF AT&C AND AS AGREED BY DISCOMS WITH GOI AS PRESCRIBED IN THE ELECTRICITY (SECOND AMENDMENT) RULES, 2023.

5. The Forum was apprised of the reference from Himachal Pradesh ERC about the implementation of the rules issued by the Ministry of Power (MOP) regarding the approval of Aggregate Technical and Commercial (AT&C) losses. According to the Rules, State Commissions are supposed to approve AT&C loss figures based on agreements between State and central governments in national schemes. However, HPERC has stated that there are some implementation issues in this context.

6. Chairperson, HPERC informed that MOP's rules mandate the use of AT&C loss figures for fixing loss reduction trajectory, but since these figures are as suggested by the Discoms,

often ignore the efficiency improvement target set by the regulations. Also, with the introduction of the Revamped Distribution Strengthening Scheme (RDSS), AT&C losses have been reported to be increasing in Himachal Pradesh which earlier had a decreasing trend. The trajectory given by the Government of India was already achieved by the State. Further, in Himachal Pradesh, AT&C losses are low due to nearly 100% metering and efficient bill collection, with exceptions like delayed payments by government bodies. Hence, the government's direction to SERCs to follow the Discom-provided trajectory for AT&C losses may need to be reviewed.

7. Chairpersons of JERC (Goa & UTs), Madhya Pradesh, Uttarakhand and Uttar Pradesh ERC also expressed similar concerns.

8. After detailed deliberation, the Forum decided that SERCs may provide data related to AT&C losses (in a format) to the FOR Secretariat, which will compile, analyse and send the information to the Ministry of Power for reconsideration.

B) LONG TERM SUSTAINABILITY OF THE DISCOMS —COMMITTEE TO FORMULATE GUIDELINES FOR REDUCING EMPLOYEE COST OF THE DISCOMS.

9. Chairperson, HPERC apprised the Forum that the sustainability of the Discoms is a matter of concern as they continue to operate at a loss. The focus seems to be on addressing losses rather than improving efficiency. In Himachal Pradesh, the employee cost is exceptionally high, accounting for about 33% to 35% of expenses. The Commission's approval is required for new recruitments, except for technical positions, which has created friction between Discoms and the Commission. Additionally, there is a trend of creating numerous divisions and subdivisions near residences, which adds to the inefficiencies and further leads to an increase in tariffs. Discoms also blame SERCs for not allowing their prudent costs.

10. After detailed deliberation, the Forum decided that a Working Group may be constituted to study the viability of Discoms with a special focus on loss reduction, employee and other issues affecting the viability of the Discoms. A benchmarking may be done for employee related costs and losses depending on the topographical structure of the State. The composition of the said WG will be as follows:

i.	Chairperson, MPERC	-	Chairman of the Working Group
ii.	Chairperson, HPERC	-	Member
iii.	Chairperson, CSERC	-	Member
iv.	Chairperson, PSERC	-	Member
v.	Chairperson, APSERC	-	Member
vi.	Chairperson, TERC	-	Member
vii.	Chairperson, RERC	-	Member
viii.	Chairperson, JERC (Goa & UTs)	-	Member
ix.	Member (Finance), CERC	-	Member

AGENDA ITEM NO. 3: SELF-SUSTAINING MODEL FOR SMART METER IMPLEMENTATION UNDER RDSS- REFRENCES FROM MINISTRY OF POWER

11. Dy Chief (RA), CERC apprised the Forum about a reference from the Ministry of Power regarding smart meter implementation under RDSS which was a self-financing model. The MoP letter mentioned, inter-alia about APDCL of Assam having installed smart meters for 15 feeders resulting in a gain of around Rs. 40 per meter per month. Thereafter, the representatives of APDCL made a presentation on their experience **(Annexure-II).**

12. The representatives of APDCL explained the context of Smart Metering with Advanced Metering Infrastructure (AMI), the smart meter ecosystem, its associated benefits and the status of smart meters in APDCL. The representatives of APDCL informed that the attendees that they have conducted a comparative analysis to study the behavioural change of consumers after installing smart meters. They found that consumers have become more aware of their electricity usage leading to a trend of decreased consumption. Smart meter installations have also helped them increase billing and collection efficiency and reduction of technical and commercial losses of the Discoms resulting in financial gains. They also informed that they had conducted a performance analysis post-installation of smart meters for a sample set of consumers which indicated significant savings per consumer with an increasing trend in savings. Finally, they presented various consumer engagement initiatives that APDCL had undertaken.

13. After detailed deliberation, members of the Forum requested APDCL to conduct a counter-factual analysis for the previous years and establish a correlation between the increase in revenue and installation of smart meters, which would in turn reflect the revenue increase solely attributable to smart meters installation. The report may be forwarded to the FOR secretariat which could then be circulated to the other SERCs.

AGENDA ITEM NO. 4: IMPLEMENTATION OF CERC REGULATIONS ON IEGC, GNA AND SHARING OF TRANSMISSION CHARGES AND LOSSES - PRESENTATION BY REPRESENTATIVE OF CERC

14. The Forum was informed of the recent CERC notifications on IEGC, GNA, and the Sharing of Transmission Charges and Losses. Chief (RA), CERC mentioned that as per the Electricity Act, 2003, the State Grid Codes have to be in accordance with the Grid Code notified by CERC. As such, the new Grid Code issued by CERC and made effective from the 1st October 2023 assumes importance. States' Regulations to align in concordance with the notifications issued in compliance with the Electricity Act 2003. Thereafter, Jt Chief (Engineering), CERC made a presentation on the above-mentioned CERC Regulations **(Annexure-III).**

15. Jt. Chief (Engg.), CERC stated that IEGC is the mother code for the Indian Power Sector that defines the roles of various organizations, optimal power systems operations, power market support, planning, connection, commissioning, reactive power compensation and various other verticals. During the presentation, she elaborated on the ideation behind the Resource Planning Code, Connection Code, Protection Code, Commissioning and Commercial Operating Code, Scheduling and Dispatch Code which included SCED and SCUC, and Cyber Security Code. Chief (RA), CERC drew attention to the important provisions of Resource Adequacy and reserves, which are a must for the safe and secure operation of the grid and for meeting the consumer demand in all time horizons optimally. He also emphasized upon the concept of obligation to supply by the Gencos even if they opt for Unit Shut Down (USD). Jt. Chief (Engg.), CERC further briefed the Forum about provisions of the GNA Regulations, specifically on the enhanced flexibility and improved power dispatch capabilities under the new GNA regime.

16. Chairperson, TNERC requested the Forum to develop a Model GNA framework so that the same can be adopted by the SERCs.

17. The Forum noted the same and decided that the same may be referred to the Standing Technical Committee for a suitable recommendation for consideration by the Forum.

ANEGDA ITEM NO. 5: REPORT OF THE FOR SECRETARIAT ON DATA CAPTURED ON REGULATORY WEBTOOL MAINTAINED BY IITK - REFERENCE FROM FOR SECRETARIAT

18. Dy Chief (RA), CERC apprised the Forum about a report prepared by the FOR Secretariat on data captured in the Regulatory Webtool maintained by IITK, on two topics viz. timelines of Tariff and ACoS-ABR ratio. It was highlighted that some States have not updated the data, resulting in gaps. Furthermore, it was informed that the nodal officers of the ERCs are expected to provide the data into the tool, which would be verified by IIT Kanpur.

19. Chairpersons of TNERC, HERC and BERC informed that data with regard to their States were either missing or not correct. Chairperson, HPERC raised concerns about this process and suggested the need for software development that can extract the data automatically from the Commission website, without requiring direct intervention from nominated officials. Members also sought the list of nodal officers available with the FOR Secretariat for their information.

20. After discussion, the Forum agreed on the need for better engagement with the nodal officers on the issue and also endorsed the idea of exploring the development of software solutions that can automate the process of capturing and populating the Regulatory Tool website.

ANY OTHER AGENDA ITEM AND CONCLUSION

22. VENUE OF NEXT FOR MEETING

Chairperson, OERC offered to host the next meeting of the Forum in Konark, Orissa in January, which was accepted by the Forum.

23. ADDRESS BY OUTGOING CHAIRPERSON, HERC

Chairperson, HERC, in his address, stated that it was a great privilege and honour for him to be part of the Forum. He added that the Forum has been executing its functions with great firmness be it conducting meetings, forming sub-committees, research work and generating ideas. He stated that being part of FOR was extremely enriching. He wished FOR for its further glory and success.

24. VOTE OF THANKS

Delivering the vote of thanks Secretary, FOR/CERC extended his heartfelt gratitude to all the members of the Forum for their valuable contribution and active participation in enriching the discussion. He extended his special thanks to the Chairperson, FOR / CERC for his guidance and inspiration. He also took the opportunity to express special thanks to the Chairperson, UERC and his team who have made wonderful arrangements to ensure that the event is a success and also for a very hospitable stay. He also appreciated the efforts of the FOR secretariat for the efforts they have put for conducting the meetings and making them a success.

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ANNEXURE – I

LIST OF PARTICIPANTS OF THE

88TH FORUM OF REGULATORS ("FOR") MEETING

HELD ON FRIDAY, THE 13TH OCTOBER, 2023.

AT MUSSOORIE (UTTARAKHKAND)

S. No.	NAME	ERC
01.	Shri Jishnu Barua Chairperson	CERC/FOR – in Chair.
02.	Shri R.K. Joshi Chairperson	APSERC
03.	Shri Kumar Sanjay Krishna Chairperson	AERC
04.	Shri Hemant Verma Chairperson	CSERC
05.	Shri Anil Mukim Chairperson	GERC
06.	Shri R.K. Pachnanda Chairperson	HERC
07.	Shri D.K. Sharma Chairperson	HPERC
08.	Justice (Shri) Amitav Kumar Gupta Chairperson	JSERC
09.	Shri Alok Tandon Chairperson	JERC for State of Goa & UTs
10.	Shri Lokesh Dutt Jha Chairperson	JERC for UTs of J&K and Ladakh
11.	Shri S.P.S. Parihar Chairperson	MPERC
12.	Shri Sanjay Kumar Chairperson	MERC
13.	Shri Suresh Chandra Mahapatra Chairperson	OERC
14.	Shri Viswajeet Khanna Chairperson	PSERC
15.	Dr. B.N. Sharma Chairperson	RERC
16.	Shri K.B. Kunwar Chairperson	SSERC
17.	Shri M. Chandrasekar Chairperson	TNERC
18.	Shri T. Sriranga Rao Chairperson	TSERC
19.	Shri D. Radhakrishna Chairperson	TERC

20.	Shri Arvind Kumar Chairperson	UPERC
21.	Dr. M.V. Rao Chairperson	WBERC
22.	Shri D.P. Gairola Chairperson Incharge	UERC
23.	Shri Arun Kumar Sinha Member	BERC
24.	Shri A.J. Wilson Member	KSERC
25.	Shri Harpreet Singh Pruthi Secretary	CERC/FOR
26.	Dr. Sushanta Kumar Chatterjee Chief (Regulatory Affairs)	CERC
SPECIAL INVITEES		
ERC		
27.	Shri I.S. Jha Member	CERC
28.	Shri Arun Goyal Member	CERC
29.	Shri Pravas Kumar Singh Member	CERC
30.	Shri M.K. Jain Member	UERC
FOR SECRETARIAT / OTHERS		
31.	Ms. Shilpa Agarwal Jt. Chief (Engg.)	CERC
32.	Ms. Rashmi S. Nair Dy. Chief (RA)	CERC
33.	Shri Sanidhya Baruah DGM (IT)	APDCL
34.	Shri Asif Nasir AGM (IT)	APDCL

ANNEXURE - II

Self Sustaining Model for Smart Meter Implementation under RDSS in Assam

88th Meeting of Forum of Regulators

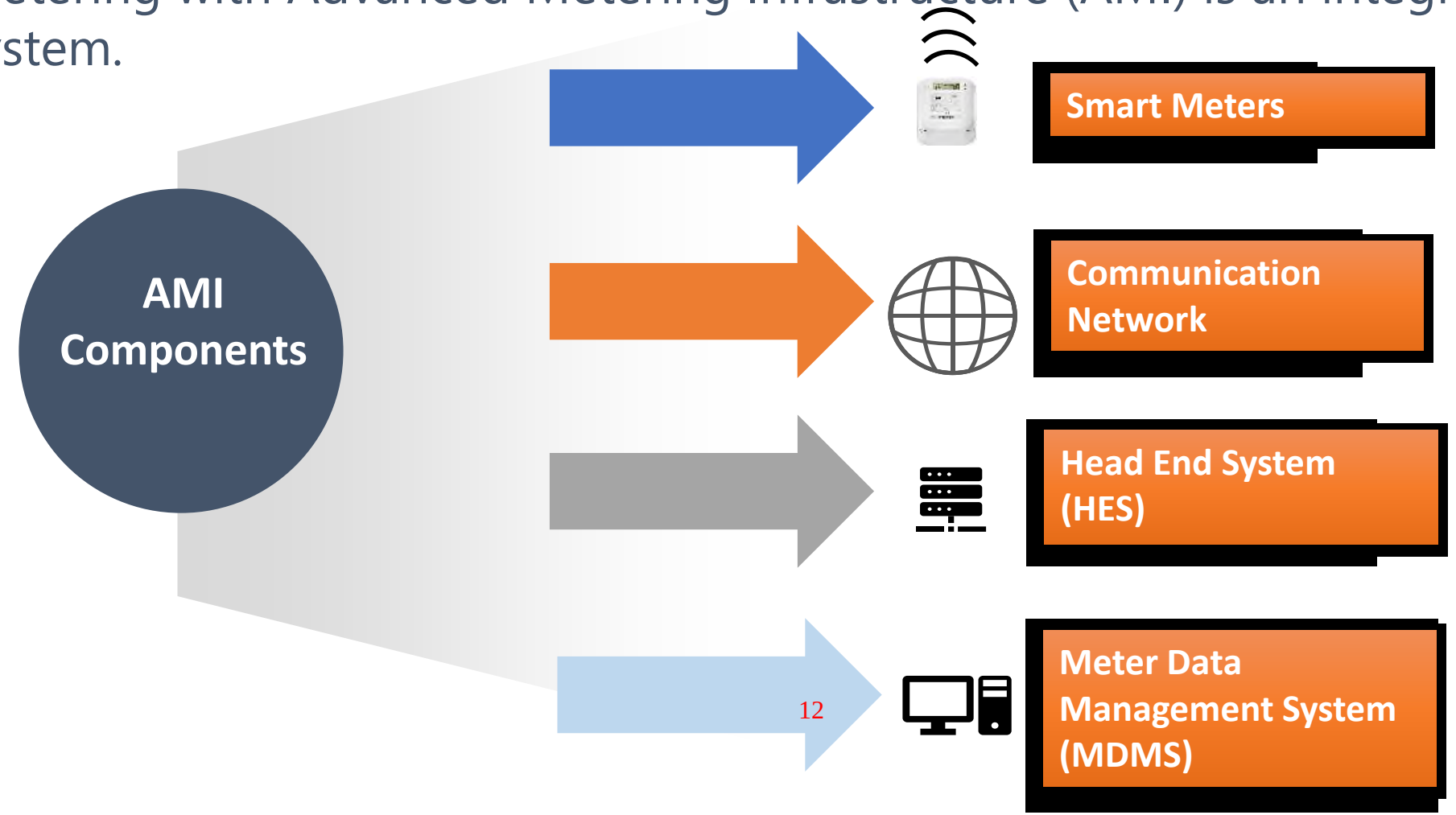
Mussoorie

Brief overview

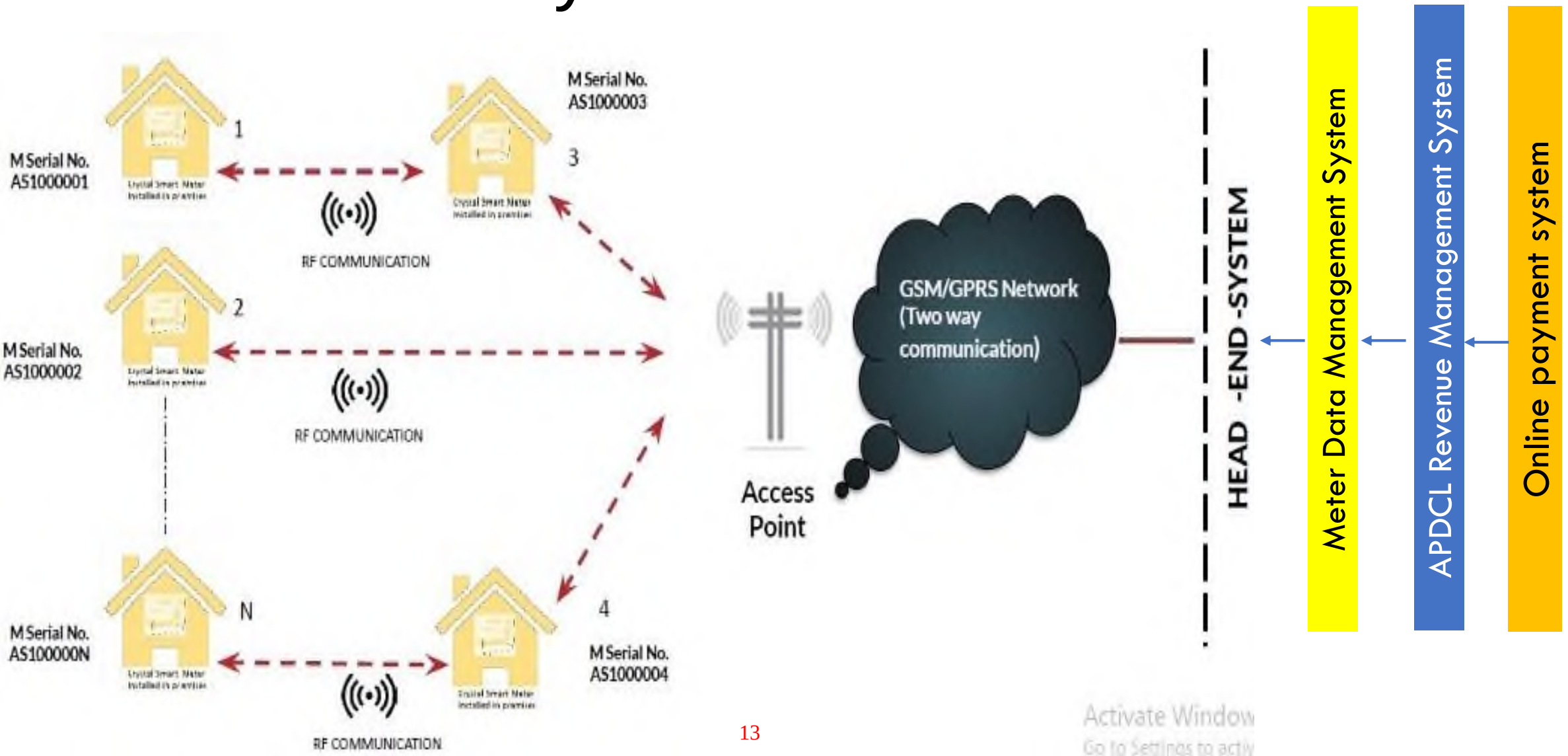
- What is Smart Meter
- Background
- Mandate of government & current progress
- Benefits of smart meters
- Behavoiural change of smart meter consumers
- Performance analysis
- Consumer Engagement

Introduction

- Smart meter is an electronic meter with two-way communication. Smart Metering with Advanced Metering Infrastructure (AMI) is an integrated system.



Smart Meter Ecosystem



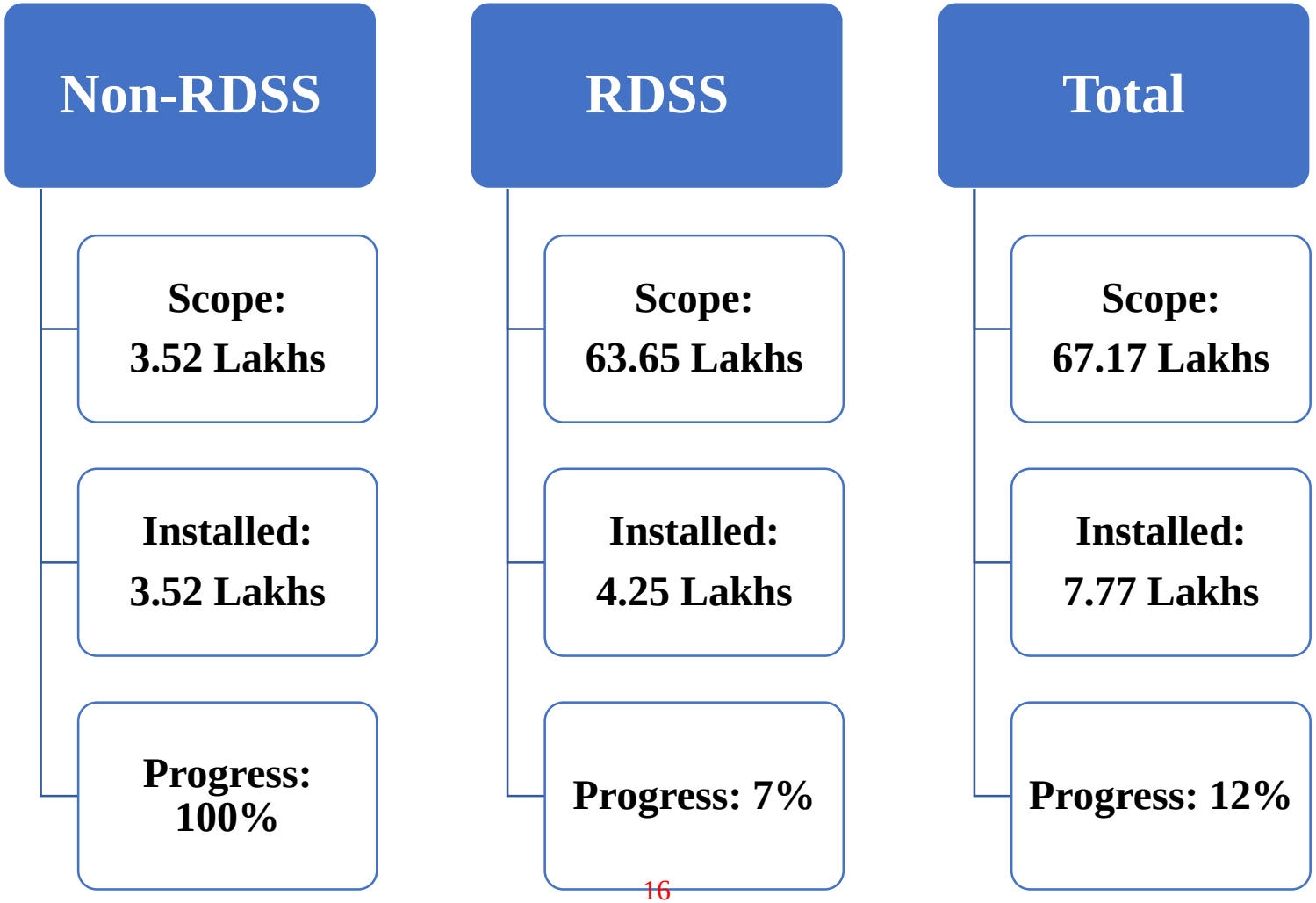
Background

- Smart meter is a key game changer in transforming the Discoms into Digital Utilities.
- Smart meter is an intervention to reduce the technical and commercial losses of the Discoms.
- Reduction of technical and commercial losses of DISCOM will benefit its consumers
- No manual intervention in the meter reading and billing process. Consumer benefit from controlled consumption
- Consumer do not have to wait for the meter readers or bill dispatchers to get their bills.

Mandate of government

- Electricity (Rights of Consumers) Rules, 2020 notified by MoP, GoI on 31.12.2020, mandates that **all electricity service connection shall be given with smart pre- payment meter or pre-payment meter**.
- GoI has notified **31.03.2025 as the targeted timeline for the replacement of existing meters with smart meters with prepayment feature** vide **gazette notification** no. F. No. 23/35/2019-R&R dtd. 17.08.2021.
- CEA (**Installation and Operation of Meters**) (Amendment) **Regulations**, 2022, stipulates that all consumers in areas with communication network, **shall be supplied electricity** with **Smart Meters working in prepayment mode,** conforming to relevant IS, within the timelines as specified by the Central Government.
- MoP vide their O.M. dated 08.05.2023 has mentioned that no question can arise of opting between pre-payment and post payment modes of Smart Metering.
- MoP further directed that any deviation in this regard will be considered as non-compliance on the part of DISCOMs to the CEA regulations as well as to RDSS scheme guidelines.

Status of Consumer Smart Metering (10.10.2023)



STATUS OF SMART METERS IN APDCL– Non-RDSS

Scheme	Total Installed	Progress (%)	Mode of operation	Areas covered	Mode of finance
National Smart Grid Mission (Pilot Project)	14,519	100% LoA: Mar'15 Completion: Dec'20	Postpaid	Ulubari, Paltan Bazar and Narengi ESD of Guwahati	Capex
UDAY-I	70,000	100% LoA: Sep'19 Completion: Apr'21	Originally Postpaid (Now prepaid)	Dibrugarh town and Jalukbari & Azara ESD	Capex
UDAY-II (PKG-1)	1,34,000	100% LoA: Dec'20 Completion: Sep'22	Originally Postpaid (Now prepaid)	Town areas of Jorhat, Silchar and Capital and Zoo Road ESD of Guwahati	Capex
UDAY-II (PKG-2)	1,34,000	100% LoA: Dec'20 Completion: Sep'22	Originally Postpaid (Now prepaid)	Town areas of Kokrajhar, Goalpara, Nalbari and Uzanbazar, Fancybazar, Fatasil, Ulubari, Basistha and Narengi ESD	Capex
Total	**3,52,519**				

PROGRESS OF SMART METERS – RDSS

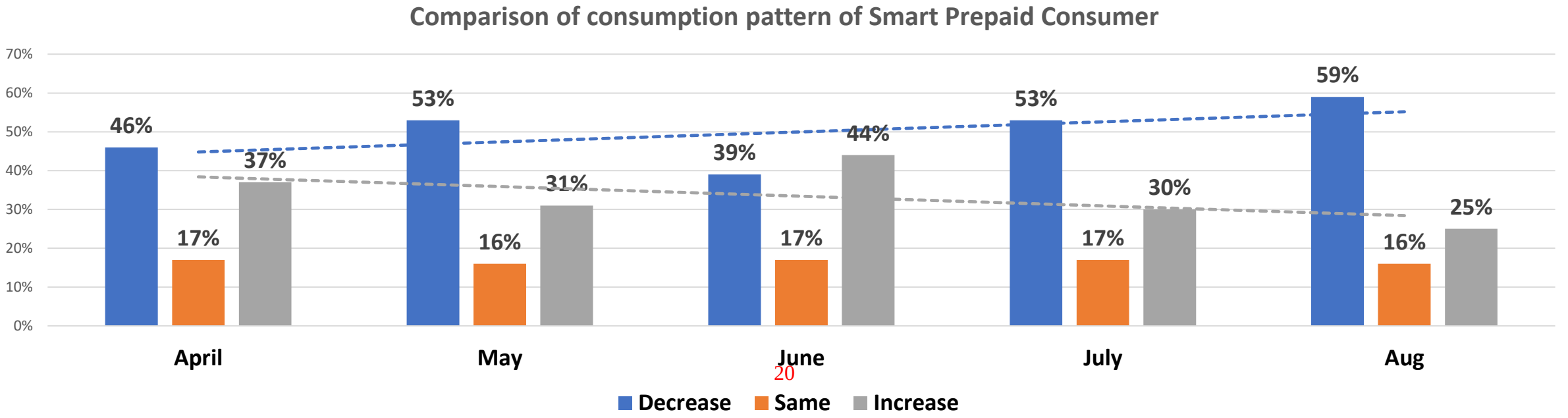
Scheme	Total Installed (10.10.2023)	Progress (%)	Mode of operation	Areas covered	Mode of finance
DBFOOT (PKG-1)	2,12,620	58% (363500) LoA: Nov'21 Completion Target: May'24	Prepaid	Town areas of 36 ESDs	DBFOOT (Hybrid) Capex + Opex
DBFOOT (PKG-2)	1,64,681	64% (256600) LoA: Nov'21 Completion Target: May'24	Prepaid	Town areas of 32 ESDs	DBFOOT (Hybrid) Capex + Opex
RDSS (PKG-1)	48353	7 % (690377) Contract: Mar'23 Target: Jun'25	Prepaid	Rural areas of Bongaigaon, Kokrajhar Circles (14 ESDs)	DBFOOT (Hybrid) Capex + Opex
Total	**4,25,654**				

Benefits of smart meters

- Accurate and timely billing
- Real time monitoring of power consumption
- Controlled consumption by consumers
- Savings in power purchase cost of Utility
- Relief to the consumers in the form of reduced tariff
- Billing related complaints of Utility are reduced.
- Reduced manpower cost
- Advanced recovery of dues

Behavioural change of smart prepaid consumers

Months (2023 vs 2022	No. of smart prepaid meters considered (in lakhs)	% of consumers whose consumption has decreased	% of consumers whose consumption has remained same (0 to 15%)	% of consumers whose consumption has increased (> 15%)
April	4.21	**46%**	17%	37%
May	4.66	**53%**	16%	31%
June	4.75	**39%**	17%	44%
July	4.75	**53%**	17%	30%
Aug	4.75	**59%**	16%	25%

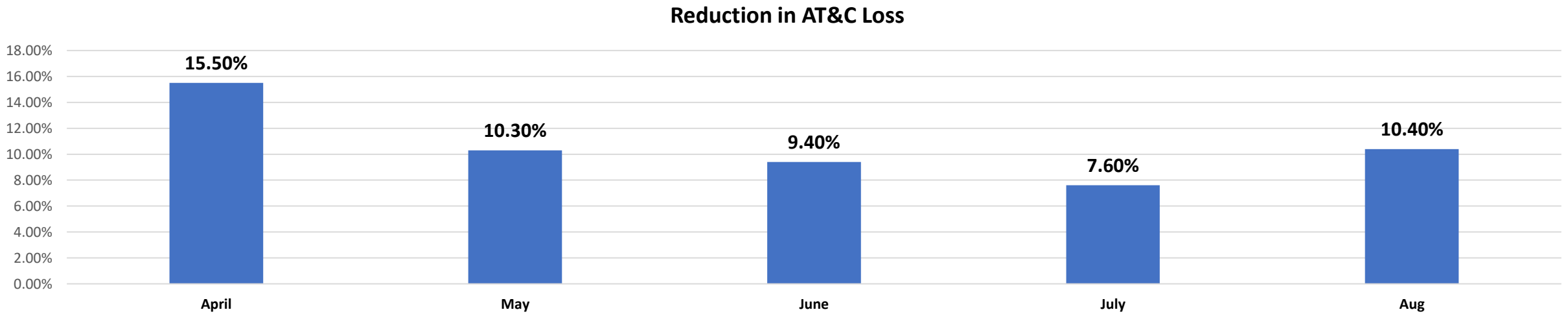


Behavioural change of smart prepaid consumers – Decrease in electricity consumption

- Reasons for decrease in electricity consumption after installation of smart prepaid meters
  - **Consciousness**:
    - Consumers can monitor their day-to-day electricity consumption through various provisions provided through mobile apps and online portals, and thus are able to use electricity rationally.
  - **Improvement in accuracy of meter reading and billing**:
    - Proper billing due to installation of smart meters, wherein, daily billing is caried out automatically based on the reading fetched from the meters directly, without any manual intervention.
  - **Replacement of defective meters**:
    - Defective meters, are being replaced with smart meters, thereby reducing instances of average billing.

Performance analysis post installation of smart meters
(Efficiency Parameters)

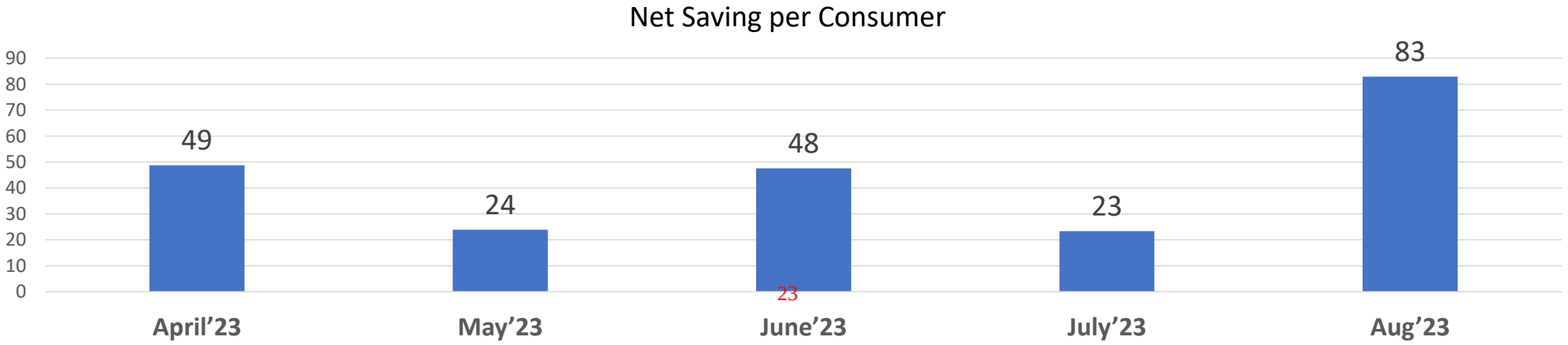
Month	Billing Efficiency		Collection Efficiency		AT&C Loss		
	2022	2023	2022	2023	2022	2023	Reduction in AT&C Loss
April	86.8%	93.6%	90%	100%	**21.88%**	**6.39%**	**15.5%**
May	85.0%	93.6%	98%	100%	**16.69%**	**6.41%**	**10.3%**
June	89.5%	92.7%	93%	100%	**16.76%**	**7.3%**	**9.4%**
July	84.9%	90.2%	97%	100%	**17.4%**	**9.8%**	**7.6%**
Aug	82.8%	91.6%	98%	100%	**18.81%**	**8.4%**	**10.4%**



- **AT&C loss has reduced in most of the feeders after installation of smart prepaid meters compared to corresponding month in previous year when smart meters were not installed, due to increase in energy realised owing to decrease in AT&C losses and savings in A&G expenses against meter reading, billing and collection for the earlier postpaid meters. Feeders with 70% smart meters have been considered. Performance expected to improve with 100% saturation.**

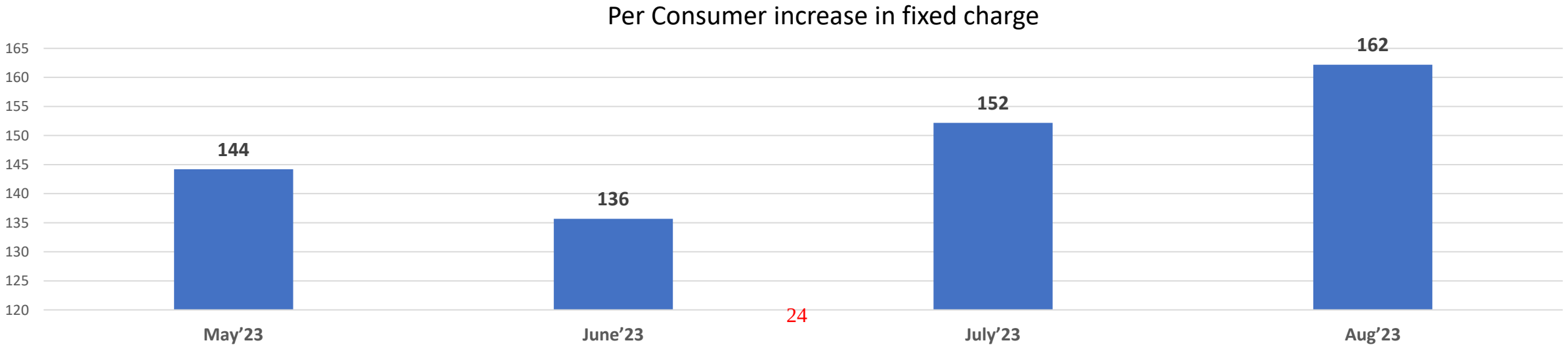
Performance analysis post installation of smart meters

Month	Increase in revenue compared to corresponding month in last year (*in Rs. lakhs*)	Expenditure to AMISP for PMPM Charges (*in Rs. Lakhs*)	Net savings (*in Rs. Lakhs*)	Net Savings per consumer (in Rs)
April'23	43.56	19.39	**24.17**	**49**
May'23	23.55	11.69	**11.85**	**24**
June'23	46.43	22.86	**23.57**	**48**
July'23	22.16	10.61	**11.55**	**23**
Aug'23	70.50	29.37	**41.12**	**86**
Total	**206.2**	**93.92**	**112.26**	**45**



Financial Gain due to load enhancement

Months	No. of consumers where excess load detected after installation of smart prepaid meters (Nos.)	Financial gain in terms enhanced fixed charge (in lakh Rs.)	Fixed Charge Gain per consumer (in Rs)
May'23	2233	3.22	144
June'23	3906	5.30	136
July'23	4856	7.39	152
Aug'23	4409	7.15	162
Total	**15404**	**23.06**	**150**



Factors contributing financial gains

- Reduced interest on working capitals: Advance recovery of dues will reduce the working capital requirement.
- Enhanced rebate on timely payment of power purchase dues: With advance recovery, DISCOM may enhance the scope of earning rebate with early payment of GENCO/TRANSCO dues.
- Reduction in metering and billing activities: There will be savings on account of meter reading and bill printing & dispatch activities.

Consumer Engagement

- Public meetings to educate consumers about benefits of smart meters and the process for recharge etc.
- Use of Public Announcement System (PAS) at marketplaces and residential areas to educate consumers
- Placing of hoardings at public places and APDCL sub-divisional offices
- Distribution of leaflets to the consumers by field offices.
- Demonstrating how to use myBijulee app, do online recharge, check balance, monitor daily consumption, access monthly statements etc.
- SMS intimation to all consumers before installation of smart meters
- Awareness campaign in radio and TV Channels, newspaper advertisements, social media etc.

Consumer awareness steps taken by APDCL

- The installation personnel distribute leaflets and authorized letters from APDCL before installation of smart meters.
- SMS intimation to all consumers before installation of smart meters
- Benefits of smart prepaid meters are also informed regularly through newspaper advertisements and social media.
- SMS intimation to all consumers before prepaid conversion as well as after conversion intimating about their outstanding dues, daily installment amount etc.
- Consumers were also informed about their prepaid balances through SMS when it becomes very low and when it becomes negative.
- Awareness campaign on smart meters and recharge process in FM radio.

Consumer awareness steps taken by APDCL

- Public meeting at various places to educate the consumers on benefits of smart meters and the process for recharge etc.
- Public miking at marketplaces and residential areas to educate consumers about smart prepaid meters.
- Placing of hoardings at public places and APDCL sub-divisional offices for consumer awareness.
- Distribution of leaflets to the consumers by field offices.
- Demonstrating how to download myBijulee app, online recharge, check balance, monitor daily consumption, access monthly statements etc. in sub-divisional offices.

Consumer Engagement

Public Hoardings

Distribution of leaflets

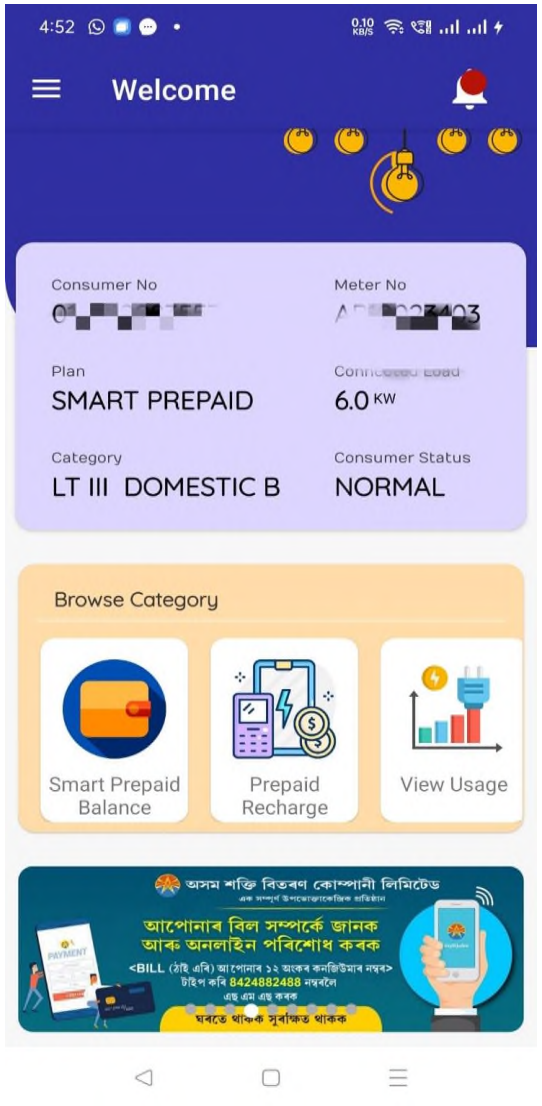
Use of Public
Announcement System

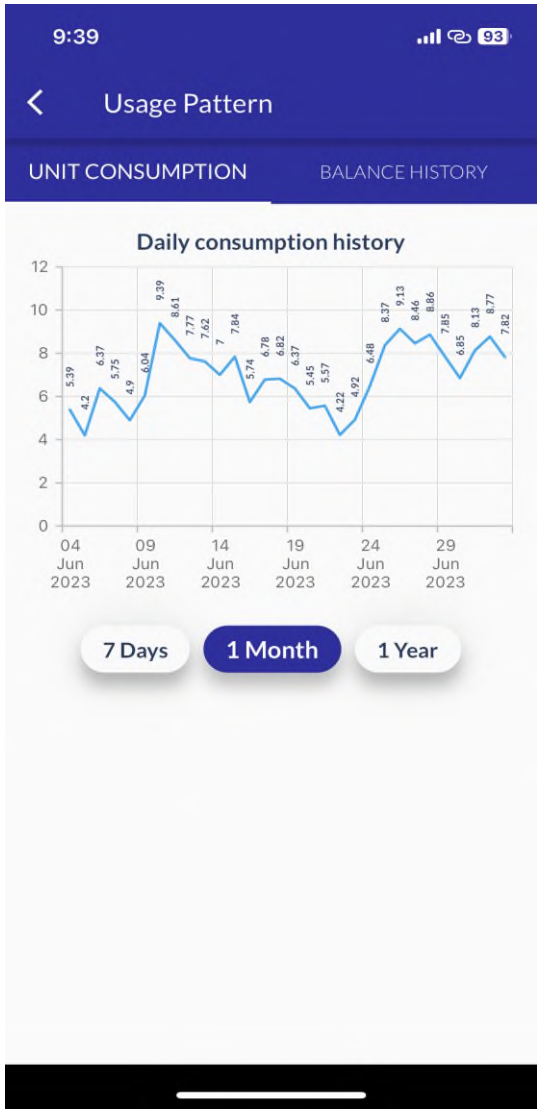
Consumer Engagement

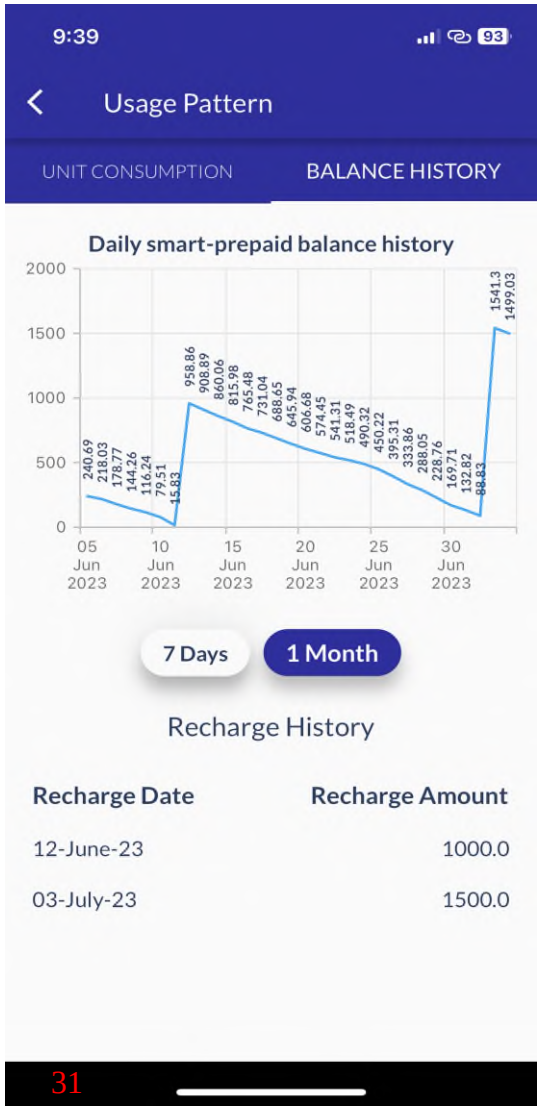
Public Meetings with help of district administration

Demonstration of mobile apps to public

Solutions provided to consumers



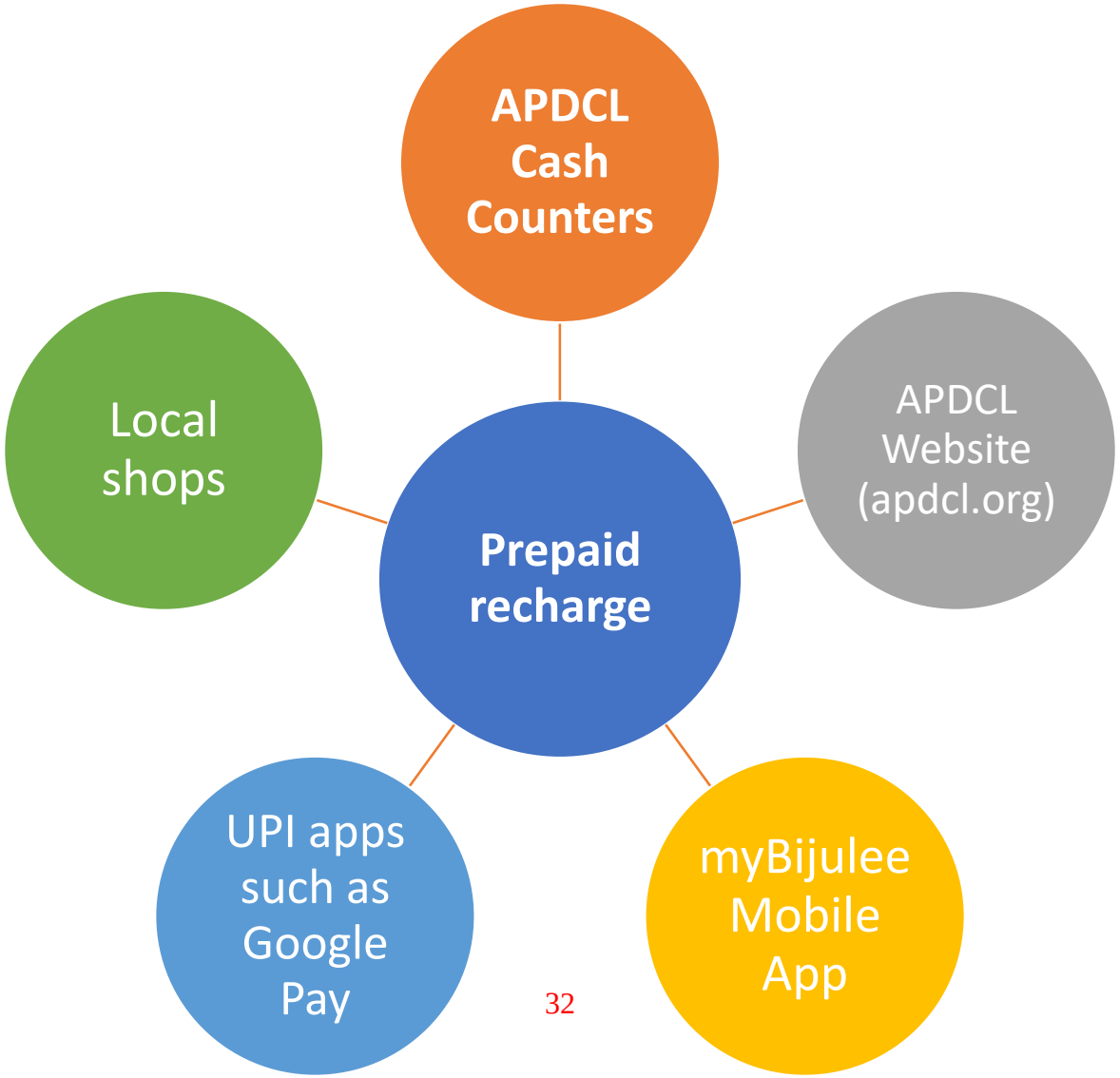




Mobile apps & web portals

- The mobile app of APDCL ('myBijulee') has been modified to display daily consumption of smart prepaid meters.
- It helps consumers to keep track of his consumption and use electricity judiciously.
- Helps utility to maintain transparency on consumption recorded by smart prepaid meters.

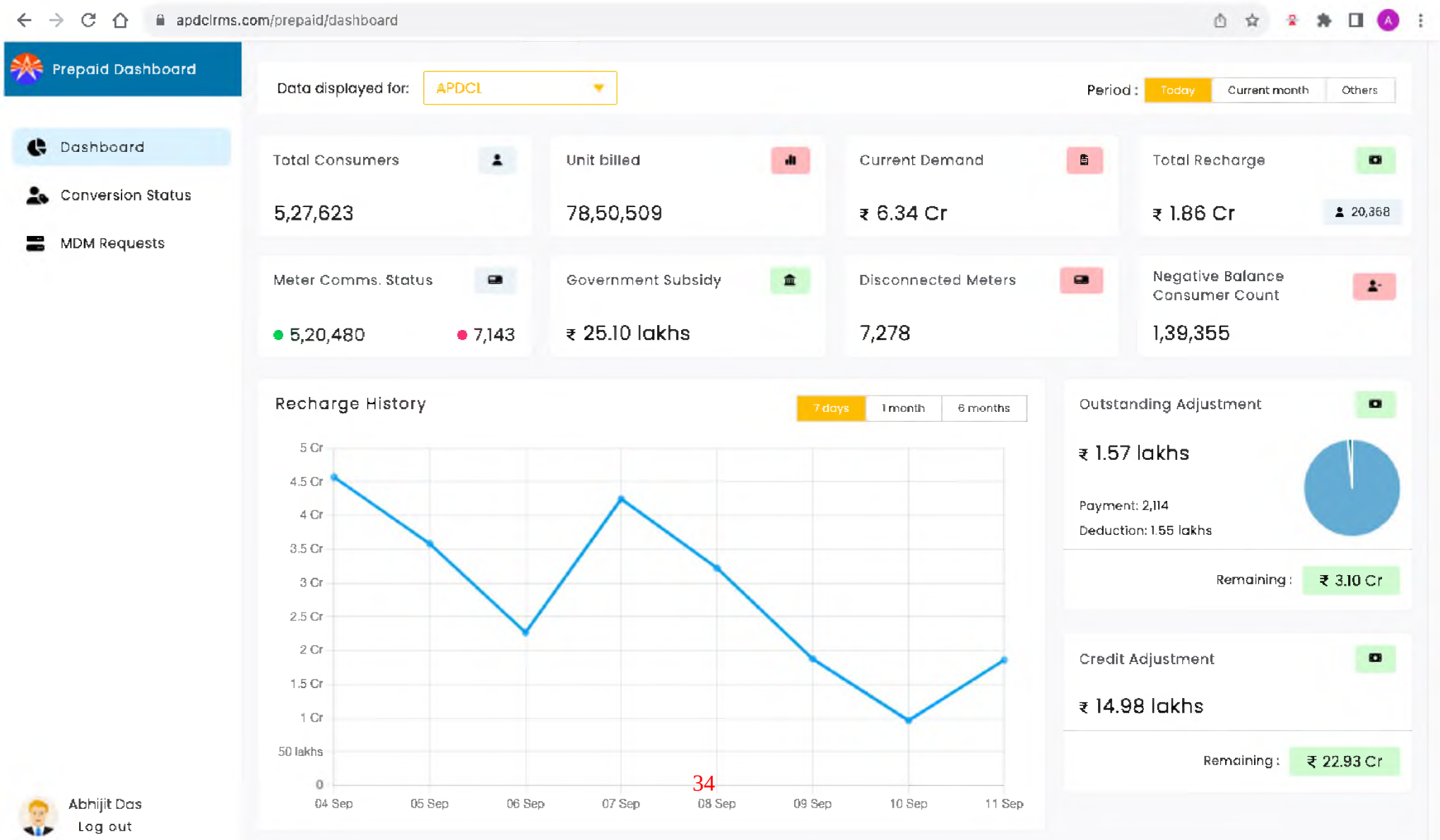
Prepaid Recharge channels



Centralized Monitoring of smart prepaid meters

- A Centralized IT system has been deployed at HQ level to monitor the performance of the smart metering system.
- Major parameters:
  - Daily billing status
  - Daily/Monthly recharge status
  - Disconnection / Reconnection statistics
  - Energy billed
  - Arrear recovery status

Snapshot of centralized dashboard



Our observations

- Due to installation of smart meters, accurate meter readings are collected which results in elimination of any commercial loss that was happening due to erroneous meter reading, under recording, estimated billing etc.
- As the smart metering works has only started recently, APDCL has considered a very small sample size compared to the total consumer base (0.49 lakhs out of 67 lakhs) to analyse the benefits arising out of it.
- APDCL observed significant reduction in AT&C losses in many of the feeders which were considered under this sample lot due to accurate billing and 100% collection efficiency due to prepaid mode.
- However, in some feeders, the losses may be increased due to the fact that high amount estimated bills were served to some consumers before installation of smart meters resulting in higher billing efficiency, which might have decreased now due to accurate billing.
- With further saturation of smart prepaid meters in the next 3 years, a better and more accurate picture will emerge in terms of self-sustainability model of the smart meters installed in DBFOOT model.

Thank You

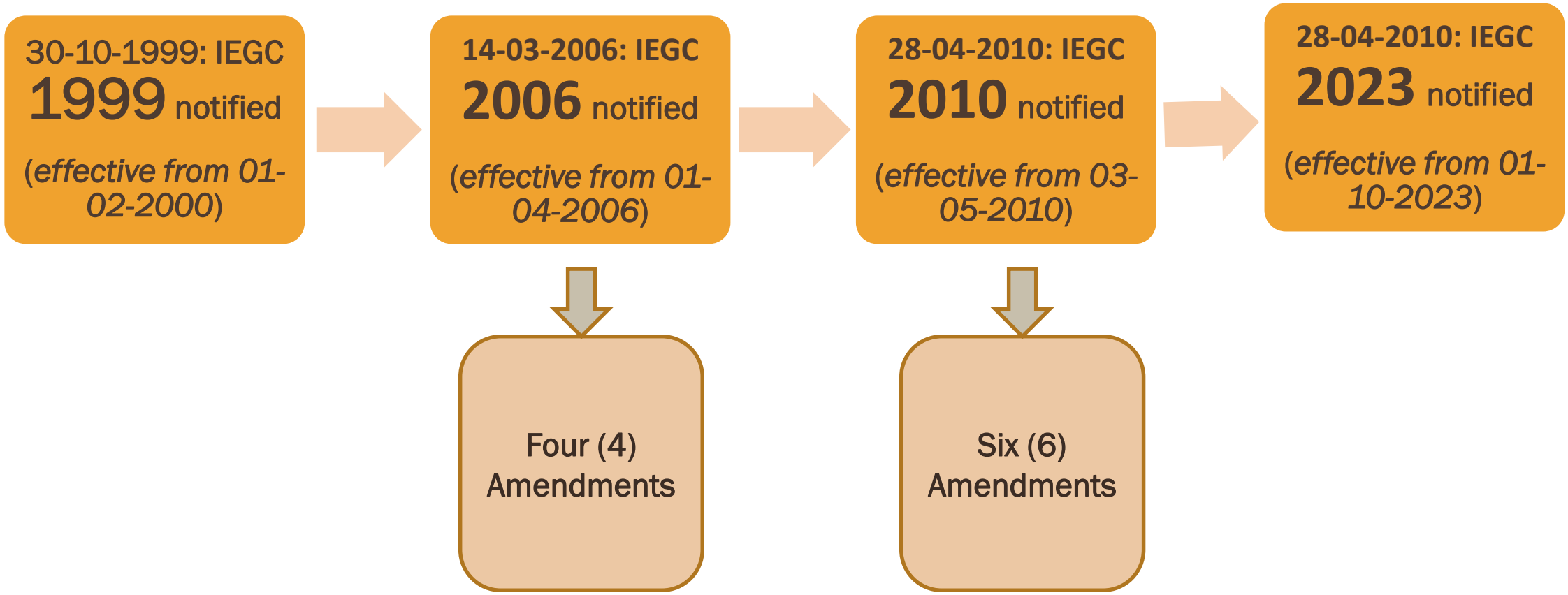
PRESENTATION ON

INDIAN ELECTRICITY GRID CODE 2023

ISSUED ON -29.5.2023

EFFECTIVE FROM 1.10.2023

INDIAN ELECTRICITY GRID CODE – PROGRESS SO FAR



Indian Electricity Grid Code – *Objective*

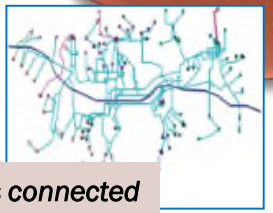
IEGG


भारत का राजपत्र
The Gazette of India
EXTRAORDINARY
PART III—SECTION 4
PUBLISHED BY AUTHORITY
No. 115 NEW DELHI, WEDNESDAY, APRIL 28, 2010
CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI
PREAMBLE
NOTIFICATION

Technical Rules

Commercial Mechanism

Applicable to all entities connected or using ISTS

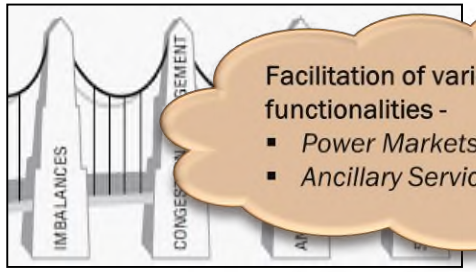


Entities connected to ISTS (or using it)

Facilitates

Documentation of principles and procedures to define relationship between –
- *Users of ISTS*
- *NLDC*
- *RLDCs*
- *SLDCs*

Facilitation of various aspects of grid –
- *Optimal operation*
- *Coordinated and optimal maintenance planning of gen./trans. facilities*
- *Development/Planning of economic and reliable grid*



Facilitation of various functionalities -
- *Power Markets*
- *Ancillary Services*

Facilitation of RE sources by specifying following for integration in grid -
- *Technical aspects*
- *Commercial aspects*

Indian Electricity Grid Code 2010 – *Structure*

- Part 2: Role of Various Organizations and their linkages
- Part 3: Planning Code for Inter-State Transmission
- Part 4: Connection Code
- Part 5: Operating Code
  - Operating Philosophy
  - System Security Aspects
  - Demand Estimation for Operational purposes
  - Demand Management
  - Periodic Reports
  - Operational Liaison
  - Outage Planning
  - Recovery Procedures
  - Event Information
- Part 6: Scheduling and Despatch Code
- Part 7: Miscellaneous

07 parts

PROVISIONS REVIEWED UNDER IEGC

Provision Reviewed	New Structure
▪ Role of Various Organizations and their Linkages	▪ Role of Various Organizations and their Linkages
▪ Planning Code for inter-State transmission	▪ ***Resource Adequacy Code***
▪ Connection Code	▪ Connection Code
▪ Protection and Commissioning Code	▪ ***Protection Code***
▪ Operating Code	▪ ***Commissioning and Commercial operation Code***
▪ Scheduling and Despatch Code	▪ Operating Code
▪ Miscellaneous	▪ Scheduling and Despatch Code
	▪ ***Cyber Security***
	▪ ***Monitoring and Compliance Oversight***
	▪ Miscellaneous

RESOURCE PLANNING CODE

- The Planning Code has been renamed as Resource Planning Code. It covers the integrated resource planning including demand forecasting, generation resource adequacy planning and transmission resource adequacy assessment, required for secure grid operation.

- Each distribution licensee within a State shall estimate the demand in its control area in different time horizons, namely long-term, medium term and short-term .STU shall estimate the demand for the State considering diversity in different time horizons.

- **Forum of Regulators** may develop guidelines for demand estimation by the distribution licensees for achieving consistency and statistical accuracy by taking into consideration the factors such as economic parameters, historical data and sensitivity and probability analysis.

- Each distribution licensee shall assess the existing generation resources and identify the additional generation resource requirement to meet the estimated demand in different time horizons, and prepare generation resource procurement plan (considering planning reserve margin (PRM) taking into account loss of load probability and energy not served as specified by CEA.

- NLDC shall carry out a simulation of overall resource adequacy as an aid to States.

- **FOR** may develop a model Regulation stipulating inter alia the methodology for generation resource adequacy assessment, generation resource procurement planning and compliance of resource adequacy target by the distribution licensees.

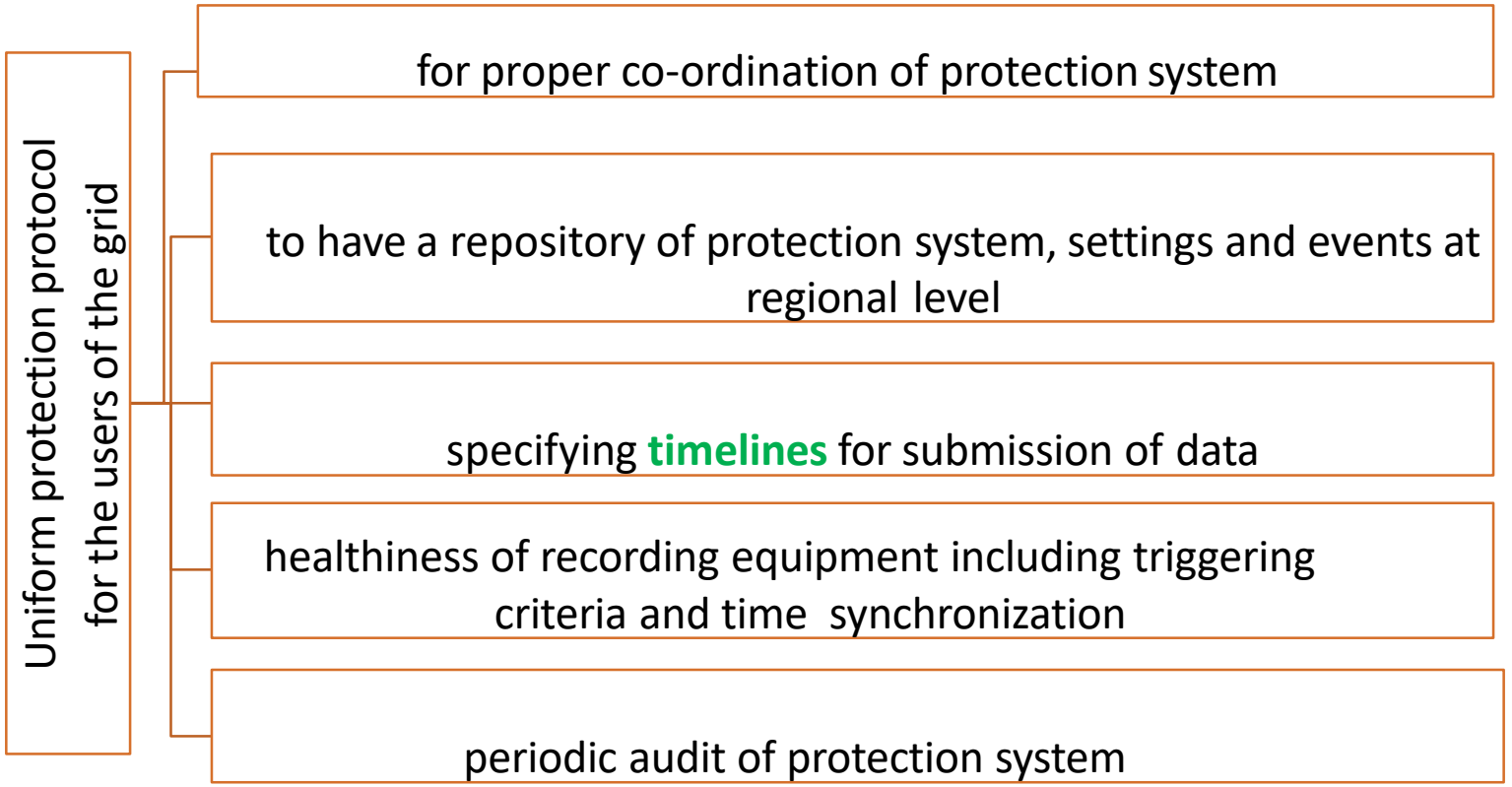
- CTU and STU shall undertake transmission planning as per the Act for the ISTS and intra-State transmission system respectively.

CONNECTION CODE

- It covers the technical and design criteria for connectivity, procedure and requirements for physical connection and integration of grid elements.
- Grant of connectivity to ISTS shall be governed by GNA regulations.
- Users (including transmission licensees) seeking to get connected to the ISTS for the first time through a new or modified power system element shall fulfill the requirements and follow the procedures specified under this Code prior to obtaining the permission of the NLDC or RLDC or SLDC
- NLDC shall prepare detailed procedure for first time energization and integration of new or modified power system element and SLDC shall prepare the same at intra-State level.
- NLDC or RLDC, in consultation with CTU, STU or SLDC, shall carry out a joint system study six (6) months before the expected date of first energization of a new power system element to identify operational constraints, if any. Similar exercise shall be done by SLDC in consultation with STU for the intra-state system, and specifically for elements of 220 kV and above (132 kV and above in case of North Eastern region).

PROTECTION CODE

- New Code covering protection protocol, protection settings and protection audit plan of electrical systems.



- RPCs shall review protection setting atleast once a year
- Internal audit annually by users and third party audit in five years

COMMISSIONING AND COMMERCIAL OPERATION CODE:

- It covers
  - drawl of startup power and injection of infirm power
  - trial run operation
  - documents and tests required to be furnished before declaration of COD
  - requirements for declaration of COD.

  - Provisions related to trial run and declaration of commercial operation of wind, solar, hybrid, pumped storage and ESS stations included in 2023 Grid Code.

TRIAL RUN OF GENERATING STATION-BROAD PRINCIPLE

1. thermal generating unit shall be in continuous operation at MCR for 72 hours on designated fuel:
   - short interruption or load reduction shall be permissible with the corresponding increase in duration of the test
2. A hydro generating unit shall be in continuous operation at MCR for twelve (12) hours:
3. Trial run of the solar inverter unit(s) shall be performed for a minimum capacity aggregating to 50 MW:
   - in the case of a project having a capacity of more than 50 MW, the trial run for the balance capacity shall be performed in a maximum of four instalments with a minimum capacity of 5 MW:
   - Successful trial run of a solar inverter unit(s) covered under sub-clause (a) of this clause shall mean the flow of power and communication signal for not less than four (4) hours on a cumulative basis between sunrise and sunset in a single day

DOCUMENTS AND TESTS REQUIRED FOR THERMAL (COAL/LIGNITE) GENERATING STATIONS

- OEM documents
  - Startup curve for boiler and turbine including starting time of unit in cold, warm and hot conditions
  - capability curve of generator
  - design ramp rate of boiler and turbine.
- Tests
  - Operation at a load of fifty five (55) percent of MCR as per the CEA Technical Standards for Construction for a sustained period of four (4) hours.
  - Ramp-up from fifty five (55) percent of MCR to MCR at a ramp rate of at least one (1) percent of MCR per minute, in one step or two steps (with stabilization 54 period of 30 minutes between two steps), and sustained operation at MCR for one (1) hour.
  - Demonstrate overload capability with the valve wide open as per the CEA Technical Standards for Construction and sustained operation at that level for at least five (5) minutes.
  - Ramp-down from MCR to fifty five(55) percent of MCR at a ramp rate of at least one (1) percent of MCR per minute, in one or two steps (with stabilization period of 30 minutes between two steps).
  - Primary response through injecting a frequency test signal with a step change of ± 0.1 Hz at 55%, 60%, 75% and 100% load.
  - Reactive power capability as per the generator capability curve as provided by OEM considering over-excitation and under-excitation limiter settings and prevailing grid condition

OPERATING CODE:

- It covers operating philosophy, system security, reserves, control hierarchy, operational planning, outage planning, system restoration, real time operation, demand & load management, post despatch analysis, reactive power management and field testing.
  - framework for reserves comprising of primary, secondary and tertiary reserves
  - Reactive power compensation for all regional entities including the generating stations
  - Compensation for black start service
  - States have been obligated to ensure availability of the quantum of secondary and tertiary reserves within their control area as published by NLDC. In case of shortfall, NLDC shall procure on behalf of state with cost liability to the erring state.
  - System state to be categorized as Normal, Alert, Emergency, Extreme Emergency and Restorative state.
  - Periodic field tests to be carried out for generators and HVDC for ascertaining correctness and desired performance during an event in the system.

SCHEDULING AND DESPATCH CODE:

- It covers control area jurisdiction & responsibilities of LDCs, SCUC, SCED, procedure for scheduling & despatch.
  - Control area jurisdiction based on quantum of connectivity with ISTS or InSTS.
  - DC of a generating station to be restricted to its MCR.
  - Minimum turndown level of thermal generating station 55% or lower as per CEA Regulations.
  - Security Constrained Unit Commitment introduced to ensure adequacy of reserves.
  - SCED has been included
  - In case a generating station or unit thereof, opts to go under unit shut down, such generating station or unit thereof needs to fulfil its obligation to supply electricity to its beneficiaries.
  - The scheduling procedure has been modified to align with the GNA regulations.

Scheduling

Timeline	Activity	Product
6:00 a.m.	ISGS to Declare Capacity (DC)	GNA
7:00 a.m.	Entitlement of Beneficiaries by RLDCs	GNA
8:00 a.m.	Requisition by Beneficiaries	GNA
8:00 a.m.	SLDC to intimate Secondary & Tertiary reserves	AS
8:15 a.m.	Congestion Check by RLDCs	GNA
8:30 a.m.	Revised Schedule by Beneficiaries	GNA
9:00 a.m.	Final GNA Schedule.	GNA
9:00 a.m.	T-GNA Schedule requisition by Regional Entity	T-GNA
9:15 a.m.	T-GNA Schedule requisition by SLDC on behalf of Intra-State Entities	T-GNA
9:15 a.m.	Intimation of replacement of power by REGS	GNA
9:45 a.m.	Final T-GNA Schedule	T-GNA
9:45 a.m.	RLDC to incorporate replacement schedules	GNA

10:00 a.m.	DAM /TRAS Start	DAM
11:00 a.m.	DAM /TRAS Close	DAM
11:45 a.m.	Provisional DAM Result	DAM
12:15 p.m.	NLDC Exception	DAM
01:00 p.m.	Final DAM Schedule	DAM
02:00 p.m.	RLDC to process Exigency Application received upto 1 pm	T-GNA
02:00 p.m.	SCUC STEP 1- NLDC to publish List of Genco likely to be below Tech Min. considering unconstrained DAM results	SCUC
02:30 p.m.	SCUC STEP 2- Beneficiaries can revise schedule of Genco below Tech Min.- Final & binding schedules of identified Gencos	SCUC
03:00 p.m.	SCUC STEP 3- NLDC to commit identified Genco based on requirement. Bringing units upto Tech min. & also indicate URS in these GENCO to be kept as reserve.	SCUC
	Revision of Schedule & Exigency Applications	
22:45 p.m.	RTM Session open for 00.00 hrs. to 00.30 hrs.	RTM
23:00 p.m.	RTM Session close for 00.00 hrs. to 00.30 hrs.	RTM
23:15 p.m.	RTM Clearance & Scheduling	RTM
23:30 p.m.	NLDC to finalise schedules under RTM,SCED & Ancillary Services	RTM/SCED/AS
23:35 p.m.	RLDC shall publish the final schedules for despatch	RTM/SCED/AS

CYBER SECURITY CODE:

- It deals with measures to be taken to safeguard the national grid from spyware, malware, cyber attacks, network hacking etc.

- This is a newly added code wherein all users shall conduct Cyber Security Audit and also submit report in case of any cyber attack.

- All users, NLDC, RLDCs, SLDCs, CTU and STUs, power exchanges, QCAs, SNAs, shall have in place, a cyber security framework in accordance with Information Technology Act, 2000; CEA (Technical Standards for Connectivity) Regulations, 2007; CEA (Cyber Security in Power Sector) Guidelines, 2021

- Sectoral CERT (Computer Emergency Response Team) for wings of power sector, as notified by Government of India, from time to time, shall form a Cyber Security Coordination Forum with members from all concerned utilities and other statutory agencies to coordinate and deliberate on the cyber security challenges and gaps at appropriate level. A sub-committee of the same shall be formed at the regional level.

MONITORING AND COMPLIANCE CODE:

- monitoring of compliance of the GRID Code by various entities in the grid
- manner of reporting the instances of violations and taking remedial steps or initiating appropriate action. Two methodologies have been followed to ensure compliance: self audit and compliance audit.
- The self-audit reports by users, QCAs, SNAs shall be submitted to the concerned RLDC or SLDC, as the case may be.
- The self-audit reports by power exchanges shall also be submitted to the NLDC.
- The self-audit reports of NLDC, RLDCs, CTU, and RPCs shall be submitted to the Commission. The self-audit report of SLDC and STUs shall be submitted to the concerned SERC.
- Independent Third-Party Compliance Audit:

  The Commission may order independent third-party compliance audit for any user, power exchange, QCA, SNA, CTU, NLDC, RLDC and RPC as deemed necessary based on the facts brought to the knowledge of the Commission.

SALIENT TAKEAWAYS

- Compensation for reactive power support and charges for deteriorating reactive power – for generators. The management of voltage is pne of the most critical requirement with RE integration when in non-generation hours of RE, the evacuation lines due to being lightly loaded leads to high voltage. The framework of compensation to RE generator which may have inherent reactive power capability would help in managing voltage without requirement of costly STATCOMS.
- 5 paise/kVArh with escalation of 0.5 paise every year
- Trial run and COD for RE generating stations included with COD allowed for minimum 50 MW and further in batch sizes of 5 MW.
- Multiple RE generating stations can appoint a QCA for coordinated scheduling.
- Minimum turndown level revised as 55% or lower level as per CEA Regulations (which provides level of 40%). This will help achieve grid management with enhancing RE. Due compensation shall be included in meantime through regulations or order.
- Drawl of power during non-generation hours allowed under DSM in case generator is not able to schedule the power.
- Revision of schedule allowed from 7^{th} /8^{th} time block to RE generating station due to forecasting error or forced outage.
- RE generating stations are to be scheduled first followed by other generating station in merit Order. RE generating stations are not subject to merit order despatch.
- Black start charges: for actual injection @ 110 % of the normal rate of charges for deviation in accordance with DSM Regulations for the last block in which the grid was available

CENTRAL ELECTRICITY REGULATORY COMMISSION (CONNECTIVITY AND GENERAL NETWORK ACCESS TO THE INTER-STATE TRANSMISSION SYSTEM) REGULATIONS, 2022 INCLUDING FIRST AMENDMENT

ISSUED ON :7.6.2022
EFFECTIVE FROM:5.4.2023

TRANSMISSION ACCESS- PREVAILING REGIME

- Transmission system booking
  - Long term Access (LTA)- 7 years and above
  - Medium term Open Access (MTOA)– 3 months to 5 years
  - Short term Open Access (STOA) - 1 time block to 1 month (up to 3 months in advance)
  - Each Access comprise of booking of system from injection point till drawl point

- Availing of the booked transmission system by scheduling
  - Scheduling of power is under contract between buyer and seller
  - LTA – PPA for duration more than one year
  - MTOA and STOA- PPA for the duration of Access to be furnished along with the application

GNA FOR STATES:

- Each State shall have a General Network Access (GNA) to ISTS.
- To start with GNA for States shall be specified based on ISTS drawal for last 3 years.
- States shall be able to schedule power under long term or medium term or short term contracts based on its own assessment of merit order on day ahead basis within GNA quantum. This flexibility will help them optimise their overall procurement cost.
- Additional GNA may be sought by State as per their requirement.
- States shall pay transmission charges for GNA quantum in accordance with CERC(Sharing of inter-state transmission charges and losses) Regulations 2020.
- Any drawal beyond GNA shall be with additional charges.
- GNA once granted shall remain valid until relinquished.
- GNA granted to a State may be utilized by another State.
- GNA can be applied for by
  - STU on behalf of intra-state entities or
  - intra-state entity

GRANT OF GNA

- For the first year GNA for states shall be considered based on historical data of last 3 years for yearly maximum ISTS drawl and daily maximum ISTS drawal.

- GNA shall be the average of 'A' for the financial years 2018-19, 2019-20 and 2020-21:

where,

- 'A' = {0.5 X maximum ISTS drawal in a time block during the year} + {0.5 X [average of (maximum ISTS drawal in a time block in a day) during the year]}

- STU shall be the entity to whom GNA shall be deemed to be granted as per above on behalf of intra state entities. Transmission charges liability shall be with intra-state entities as per prevailing regime.
- STUs within 3 months of coming into force of these regulations, on behalf of intra-state entities, may apply for additional GNA over and above the GNA deemed
- States may apply for additional GNA to be added in next 3 years, every year in September.

ELIGIBILITY FOR GNA

- State Transmission Utility on behalf of distribution licensees connected to intra-State transmission system and other intra-State entities. No financial liability on STUs.
- A buying entity connected to intra-State transmission system
- A distribution licensee or a Bulk consumer, seeking to connect to ISTS, directly, (50 MW & above)
- Trading licensees (engaged in cross border trade) for drawal and injection into the Grid
- Transmission licensee connected to ISTS for drawal of auxiliary power.
- Added by first amendment
  - Intra-State injecting entity for purpose of injection into ISTS

GRANT OF ADDITIONAL GNA TO STUS

- Deemed GNA computed for a STU ‘A’ is 4000 MW.
- ‘A’ applies for additional GNA for 800 MW within next 3 months which is granted to ‘A’ by CTU,
  - GNA for ‘A’ will become 4800 MW (4000 MW + 800 MW).
- ‘A’ may apply once in every financial year by the month of September for additional GNA for the next 3 financial years indicating the start date for such quantum.

Financial Year	Additional GNA granted in each FY from a specified date	Total GNA after grant of additional GNA
2023-24	200 MW w.e.f. 22.6.2023	5000 MW w.e.f. 22.6.2023
2024-25	100 MW w.e.f. 18.5.2024	5100 MW w.e.f. 18.5.2024
2025-26	300 MW w.e.f. 14.9.2025	5400 MW w.e.f. 14.9.2025

USE OF GNA BY ANOTHER GNA GRANTEE

- Any entity having surplus GNA for a period due to reduction in load or seasonal variation, can authorize part of its granted GNA to others with prior approval of CTU. (for period not exceeding 3 year and on mutually agreed terms)

- Liability to pay GNA charges shall be with original GNA grantee

  For example, Punjab may buy GNA capacity for a specific quantum from Delhi/Haryana in case there is diversity in their ISTS drawal requirement and optimise their transmission charges.

- Suppose UP has 10000 MW GNA and in a season, it may not need to draw for 800 MW from ISTS. Punjab may have ISTS drawal requirement additional to its GNA of 8000 MW in that season. Punjab can use GNA of UP as per mutually agreed terms.

- Subject to availability of drawal capacity of the State.

- For the purpose of calculation of transmission deviation charges, GNA of Uttar Pradesh and Punjab shall be considered as 9,200 MW and 8,800 MW respectively for that period.

TEMPORARY GNA (T-GNA)

- Product akin to prevailing STOA.
- Can be availed over and above GNA.
- 1 time block to 11 months.
- Scheduling flexibility on day ahead basis.
- Priority to get corridor allocation after GNA grantees.
- Payment of transmission charges 1 month in advance.

T-GNA

- Applicants- buyers
  - Distribution licensee /bulk consumer/captive generating plant / ESS / generating station for auxiliary/startup
  - Trading license on behalf of buyers
  - Power exchanges

- Application fees- Rs 5000/application
- Bilateral transactions
  - Advance application for grant of T-GNA: For T-GNA starting on or after the (D+3) day- same month or next month starting
  - Exigency application for grant of T-GNA: Application made on (D) day for grant of T-GNA with scheduling for (S) day, which may be (D) day or (D+1) day or (D+2) day, with a minimum start time of 7 (seven) time blocks unless specified otherwise in the Grid Code:
    - Maximum for 1 day

REVISION OF T-GNA

- T-GNA granted under Exigency application category or under Advance application category for a period not exceeding one month cannot be revised.

- T-GNA granted under Advance application category for a period of more than one month may be reduced for the balance period with a prior notice of one (1) month by the T-GNA grantee:

- Provided that applicable T-GNA charges for the quantum of T-GNA granted shall be payable for the notice period of one (1) month.

SCHEDULING REQUEST FOR POWER UNDER T-GNA

- Advance application category:

Scheduling request by T-GNA grantees under Advance application category shall be made on day ahead basis before the opening of bidding window for collective transactions under day ahead market, as per provisions of the Grid Code.

- T-GNA granted under Exigency application category shall be considered as schedule, which cannot be revised.

ALLOCATION OF TRANSMISSION CORRIDOR

- State having GNA, can request scheduling from injection point of its choice as per its contract. The methodology of scheduling and priority of transmission corridor allocation shall be covered under the Grid Code.

- In case the scheduling request of the GNA Grantee cannot be accommodated by RLDC due to constrain in transmission corridor, RLDC shall allocate the available transmission corridor amongst the GNA grantees in proportion to their GNA within the region or from outside region and the GNA grantee shall be eligible to schedule power under any contract within such allocated transmission corridor. In case the revised schedule is not furnished by the GNA Grantee, RLDC shall finalise the schedule for such GNA Grantee by pro rata reduction of schedule under each contract for such constrained transmission corridor.

- Transmission corridor shall be allocated on day ahead basis to GNA grantees and TGNA grantees as per the priority and indicative time-line as indicated in following illustration:

CURTAILMENT

- For the reason of transmission constraints or in the interest of grid security, transactions already scheduled may be curtailed:
  - Transactions under T-GNA shall be curtailed first followed by transactions under GNA.
  - Within transactions under T-GNA, bilateral transactions shall be curtailed first followed by collective transactions under day ahead market followed by collective transactions under real time market.
  - Within bilateral transactions under T-GNA, curtailment shall be on pro rata basis based on T-GNA.
  - Within transactions under GNA, curtailment shall be on pro rata basis based on GNA.

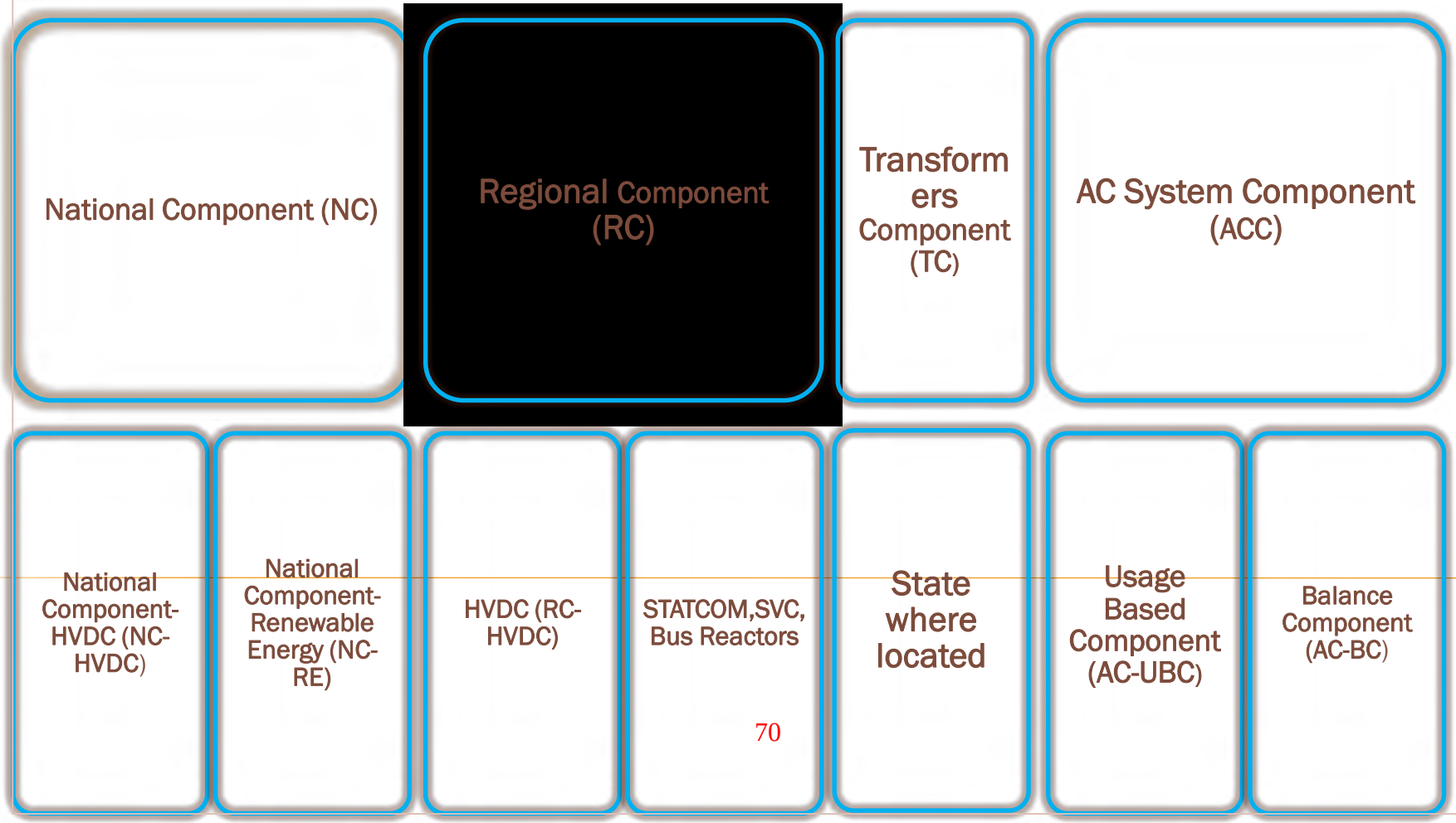
RELINQUISHMENT OF GNA

- STU may relinquish GNA on behalf of identified Intra-state entity and the concerned Intra-State entity shall pay relinquishment charges that shall be equal to 18 times the transmission charges paid by such intra-State entity for the last billing month, corresponding to the relinquished quantum.

- Intra-State entities granted GNA may relinquish full or part GNA and shall pay relinquishment charges corresponding to the relinquished quantum for 18 months or balance period of the GNA whichever is lower.

CERC(SHARING OF INTER-STATE TRANSMISSION CHARGES AND LOSSES) REGULATIONS 2020

Monthly Transmission Charges



National Component-Renewable Energy (NC-RE)

- Transmission system built for renewables which are covered under waiver of transmission charges to be separately billed as “National Component” in the ratio of GNA.

- Linewise YTC for such transmission system shall be taken at “zero cost”
  - no cost implication shall be there under usage component for such system.

National Component-HVDC (NC-HVDC)

- 30% transmission charges for HVDC bipole
- HVDC systems such as back to back are used for control function by system operator
- Biswanath Chariali-Agra HVDC system entire Yearly Transmission Charges and for Adani Mundra –Mohindergarh HVDC System, portion of Yearly Transmission Charges.
- To be shared by drawee DICs of all India in the ratio of GNA

Regional Component

- HVDC (RC-HVDC)- 70% of transmission charges of bipole HVDC Transmission System- to be shared by drawing DICs of receiving region

- Static Compensator (STATCOM), Static VAR Compensator (SVC), Bus Reactors, and any other transmission element(s) identified by Central Transmission Utility being critical for providing stability, reliability and resilience in the grid - to be shared by DICs in the region in which these devices are located in the ratio of GNA

Transformers Component (TC)

- The transformers are planned as ISTS to cater to the drawal requirement of the State by the CTU. CTU to provide list of such transformers.

  - where the actual tariff for such transformer is not available, CTU shall provide indicative cost in such cases for billing. This cost shall be excluded from Monthly transmission charges to determine AC component transmission charges.

- If 220kV substation feeders are connected to neighbouring state such that drawal transformer is actually catering to drawl requirement of state other than the state in which transformer is located, proportionate transmission charges shall be levied to such state.

AC System Component (ACC)

- Includes AC transmission lines, AC substation, line reactor and Inter-connecting transformers (excluding the drawl transformers which have been proposed to be shared by the State, SVCs, STATCOMs and such other devices which have been proposed to be shared by region in which they are located).

- Following parts:

(i) Usage Based Component (AC-UBC); and

(ii) Balance Component (AC-BC).

Usage Based Component

Actual data –

injection / drawl for the month.

Lines in use

“Peak block” for the month shall be considered as the block in which sum of ISTS drawl for all States is maximum to determine utilisation component of AC transmission charges. While identifying peak block, the injection into ISTS by a State shall be ignored .

Balance Component-AC-BC

The transmission charges under AC system component after allocating the charges under ”Usage based” component –AC-UBC shall be shared as balance component –AC-BC in the ratio of GNA.

Transmission charges for T-GNA

(1) T-GNA Rate (in Rs./MW/block) :

Transmission charges for GNA for entities located in the State, for the billing month, under first bill (in rupees) X 1.10 / (number of days in a month X 96 X GNA quantum, in MW, for all such entities located in the State considered for billing, for the corresponding billing period.)

TRANSMISSION DEVIATION

(2) Transmission Deviation Rate in Rs./MW, for a State or any other DIC located in the State, for a time block during a billing month shall be computed as under:

1.25 X (transmission charges for GNA of entities located in the State, under first bill for the billing month in Rs.)/ (GNA quantum in MW of such entities located in the State, considered for billing, for the corresponding billing period X number of days in a month X 96

Methodology of calculation of waiver of transmission charges

(1) Waiver of a drawee DIC other than a drawee DIC which has obtained "GNA_{RE}" shall be calculated based on the following formulae:

$$\text{Waiver (\%)} = 100 \text{ X } \frac{\sum_{n=1}^{T} \frac{SDRG}{SDTG}}{T}$$

Where,

"SDRG" is the drawl schedule (in MW) through ISTS under GNA from the sources eligible for waiver under Regulation 13 of these regulations in nth block;

"SDTG" is the total drawl schedule (in MW) under GNA through ISTS from all sources in nth block;

"n" is the nth time block

"T" is number of time blocks in a month = 96 X number of days in a month

Provided that in case the "SDTG" for a time block is less than 75% of the maximum schedule corresponding to GNA, the "SDTG" shall be taken as 75% of maximum schedule corresponding to GNA for a time block.

Methodology of calculation of waiver of transmission charges

(2) Waiver of a drawee DIC which has obtained "GNA_{RE}" shall be calculated based on the following formulae:

$$\text{Waiver (\%)} = 100 \text{ X } \frac{\text{sum of SDRG for all time blocks in the month}}{\text{total number of time blocks in the month X 0.3 X GNARE}}$$

Where,

"GNA_{RE}" is the GNA to procure power only from the sources eligible for waiver under Regulation 13 of these regulations;

"SDRG" is the drawl schedule (in MW) in a time block through ISTS under GNA_{RE} from the sources eligible for waiver under Regulation 13 of these regulations;

Provided that maximum waiver shall be limited to 100%

Trajectory for gradual increase in the transmission charges:

(1) Till 30.6.2025-100% schedule under waiver

(2) REGS or RHGS based on wind or solar sources or Hydro PSP ESS or BESS ESS:

Category	Period of COD	Number of years from COD	% of drawl Schedule from identified generating station or ESS
REGS or RHGS based on wind or solar sources or Hydro PSP ESS	1.7.2025 to 30.6.2026	25 years	75
	1.7.2026 to 30.6.2027	25 years	50
	1.7.2027 to 30.6.2028	25 years	25
	After 30.6.2028		0
Battery ESS	1.7.2025 to 30.6.2026	12 years	75
	1.7.2026 to 30.6.2027	12 years	50
	1.7.2027 to 30.6.2028	12 years	25
	After 30.6.2028		0

Trajectory for gradual increase in the transmission charges:

- Date of signing of PPA and award of construction work till 30.6.2025-100% schedule under waiver
- New Hydro projects:

Date of signing of PPA and award of construction work	Number of years from COD	% of drawl Schedule from identified generating station or ESS, to be considered under Step-1 under Annexure-III
1.7.2025 to 30.6.2026	18 years	75
1.7.2026 to 30.6.2027		50
1.7.2027 to 30.6.2028		25
After 30.6.2028		0

THANK YOU

TRANSMISSION CHARGES

- Transmission charges towards ISTS -to be paid by the entities drawing power from ISTS.
- Under the prevailing arrangement, the buying entities pay the transmission charges either explicitly or implicitly by way of transmission charge being embedded in the sale price of the seller.
- Payment of transmission charges shall be as per CERC(Sharing of inter-state transmission charges and losses)Regulations,2020 as amended from time to time.

CONNECTIVITY

- **Application fees : Rs 5 lakh + taxes / application**
- **Eligible Entities:**
  - Injecting entities who are seeking connectivity to the ISTS
  - Connectivity grantees shall be deemed to have been granted GNA, equal to the quantum of Connectivity from the start date of Connectivity.
  - Minimum quantum to connect to ISTS- Installed capacity of 50 MW individually or collectively through lead generator.

Additional points

- Entities having Connectivity may apply for enhancement of Connectivity of less than 50 MW subject to available capacity in transmission system.
- At a terminal bay already allocated to another Connectivity grantee with an agreement for sharing the terminal bay.
- Through electrical system of a generating station having Connectivity to ISTS with an agreement for sharing.
- Two or more Applicants may apply for grant of Connectivity at a common terminal bay with an agreement for sharing the dedicated transmission lines and the terminal bay.

GRANT OF CONNECTIVITY

- In-principle grant of Connectivity
  - Preliminary intimation seeking to submit Connectivity Bank Guarantees.
    - within 30/60 days (where ATS is required)

- Final Grant of Connectivity
  - On submission of required Connectivity Bank Guarantees

- Grant of Connectivity may have following situations
  - Neither the ISTS bay at which Connectivity is proposed is to be constructed under ISTS, nor any augmentation is required to ISTS-
  - Only terminal ISTS bay is constructed under ISTS or to be constructed under ISTS. No further augmentation of ISTS required
  - Augmentation of ISTS is required along with terminal bay or without terminal bay.

CONNECTIVITY BANK GUARANTEE (CONN-BGS):

- Three parts:
- Conn-BG1 amounting to Rs. 50 lakhs for all applicants.
  - Conn-BG2: Towards Terminal Bay as follows (where no ATS)

Voltage level of allocated terminal bay	Conn-BG2 (per terminal bay)
132 kV	Rs. 2 crore
220/230 kV	Rs. 3 crore
400 kV	Rs. 6 crore
765 kV	Rs. 12 crore

  - Conn-BG2: Not applicable In case entity (i) proposes to construct the terminal bay(s) on its own or (ii) seeks Connectivity at a terminal bay constructed or being constructed by another Connectivity grantee or (iii) seeks Connectivity through electrical system or switchyard of a generating station
  - Conn-BG3: Applicable if Connectivity granted on existing system @ Rs 2 lakhs/MW

TREATMENT OF CONN-BGS:

- Conn-BG1 i.e. Rs 50/Lakh shall be returned within 30 days of COD of full capacity.
    - In case part capacity is relinquished say 200 MW out of 500 MW is relinquished then Conn-BG1 shall be returned after COD of 300 MW.
- Conn-BG2 and Conn-BG3 shall be returned in five equal parts over five years corresponding to the generation capacity which has been declared under commercial operation.
- In case Connectivity is relinquished, subsisting Conn-BG2 shall be encashed corresponding to the ATS and terminal bay(s), construction of which has already been awarded for implementation.
- The proceeds of encashed Conn-BG2 shall be used for reducing Monthly Transmission Charges under the Sharing Regulations