

## **MINUTES OF 97<sup>th</sup> MEETING OF FORUM OF REGULATORS (FOR)**

**Venue** : Raipur, Chhattisgarh  
**Date /Day** : 11<sup>th</sup> / 12<sup>th</sup> September, 2025  
**Timings** : 10.30 A.M followed by lunch  
**List of Participants:** Appendix-I

### **BUSINESS SESSION – I**

Hon'ble Chief Minister & Power Minister of Chhattisgarh, Shri Vishnu Deo Sai, joined the interaction with the Forum of Regulators. In his address, Hon'ble Chief Minister highlighted the initiatives and goals of the good governance of the State Government regarding power generation and supply of electricity. He stated that Chhattisgarh generates more electricity than it requires, and thus is making a remarkable contribution to the nation's progress. In line with the Central Government's goal of achieving 'Net Zero' emissions by 2070, the State government is continuously advancing towards green energy by setting an ambitious target under the PM Surya Ghar Free Electricity Scheme. Apart from the Central Government subsidy provided under the PM Surya Ghar: Muft Bijli Yojana, the Chhattisgarh State government is also offering additional subsidies to promote rooftop solar installations. The Hon'ble Chief Minister appreciated the commendable efforts and contributions of the Forum of Regulators in fostering harmonisation of Regulations among all the State and Joint Electricity Regulators in the country so as to ensure reliable power supply, promote renewable energy, enhance consumer services, and foster transparency and efficiency in the electricity sector.

### **BUSINESS SESSION – II**

Chairperson, CSERC, warmly welcomed all Forum members and provided a brief overview of the power sector in Chhattisgarh. He highlighted the State's remarkable growth, from a modest 1,400 MW capacity to its current installed capacity of 30,000 MW. While coal-based generation continues to dominate, renewable energy, particularly solar, has started to make a significant impact, contributing at least 1,000 MW. In fact, in 2025, Chhattisgarh achieved a major milestone by meeting a record peak demand of 7,000 MW, demonstrating the resilience of its generation, transmission, and energy systems. Wishing the Forum a fruitful and meaningful dialogue, the Chairperson concluded his opening remarks.

2. Chairperson, FOR/ CERC, in his remarks, also warmly welcomed all members to the 97th meeting of the FOR and extended a special welcome to Shri Navneet Kumar, Chairperson of Jharkhand ERC, who was attending his 1<sup>st</sup> FOR meeting after taking charge and looked forward to his expertise in legal matters. The Chairperson also informed that the Forum will bid a fond farewell to Shri Sanjay Krishna, Chairperson of Assam, and Shri K. B. Kunwar, Chairperson of Sikkim who are attending their last FOR meeting as they would be demitting office in October 2025 and thanked them for their valuable contributions to the Forum through the various meetings of the Forum and also in the Working Groups of which they have been a part. Thereafter, the agenda items were taken up for discussion.

**AGENDA ITEM 1 :-**

**a) CONFIRMATION OF MINUTES OF THE 96<sup>TH</sup> FOR MEETING HELD ON 14<sup>TH</sup> JULY 2025**

**b) CONFIRMATION OF MINUTES OF SPECIAL FOR MEETING HELD ON 22<sup>ND</sup> AUGUST 2025**

3. Joint Chief (RA), CERC, apprised the Forum of the key decisions and actions taken following the 96th FOR meeting held on 14th July 2025. A major point of discussion was the harmonisation of the State Grid Code with the Indian Electricity Grid Code (IEGC), included as one of the agenda items for this meeting.

4. Since the Chair of the Working Group on Harmonisation of Rules & Regulations (Chairperson of GERC) had demitted office, it was decided that Shri Hemant Kumar Verma, current Chairperson of CSERC and set to assume charge as Chairperson of Tripura ERC, shall take charge as Chairperson of the said WG.

5. Regarding the FOR Working Group on Discom Viability, currently chaired by the Chairperson, Assam ERC, the Forum agreed that the Chairperson, Punjab ERC, shall take charge as Chair of the said WG on the Chairperson, Assam ERC demitting office.

6. With reference to the minutes of the Special FOR meeting held in Bengaluru on 22nd August 2025, which focused solely on the Digital Energy Grid, an action point emerged to

constitute a dedicated Working Group to take the initiative forward. The Forum was informed that the FOR Secretariat will be circulating the Terms of Reference of the Working Group separately.

7. After detailed deliberation, the Forum confirmed the minutes of both the FOR meetings.

## **AGENDA ITEM 2: - REFERENCES FROM SERCs.**

### **a) NATIONAL LEVEL INTERVENTION ON EV CHARGER LOAD STANDARDS**

8. Chairperson, KSERC, informed the Forum of the discrepancies between the EV charger specifications provided by manufacturers and those of regulatory standards. According to KSERC, the current Supply Code mandates that EV chargers with a capacity of around 3.3 kW must be connected through a three-phase connection. However, most EVs sold in the market operate on a single-phase system. As a result, consumers are compelled to install additional devices to comply with regulations. EV manufacturers have indicated that using external chargers, other than those supplied with the vehicle, could void the product warranty, leading to confusion among consumers.

9. After detailed deliberation, the Forum recommended that, to support uniformity and promote the growth of electric vehicles, a single-phase connection should be permitted for EV chargers up to 5 kW, while a three-phase connection should be mandated for chargers exceeding 5 kW. The FOR Secretariat may communicate this recommendation to the Ministry of Power (MoP) and the Central Electricity Authority (CEA) for consideration.

### **b) BEHIND THE METER MECHANISM IN THE MODEL REGULATION FOR GRID INTERACTIVE DISTRIBUTED RE, 2024**

10. Member, OERC, informed the Forum of the concerns regarding the implementation of the Behind-the-Meter (BTM) mechanism under the RESCO and DRE model regulations. OERC proposed introducing a tripartite agreement among the DISCOM, the consumer, and the RESCO, following a case raised by private DISCOMs involving an HT consumer with a 400 MVA contract demand at the 33kV level. In this case, a RESCO 2 MW solar power generator located 3 km away is supplying power directly to a consumer. Since the DISCOM is not involved in this power transaction during the day, and the consumer draws power from the grid at night, it is effectively bypassing payment of cross-subsidy and wheeling charges. Member, OERC emphasised the need for appropriate provisions in the DRE regulations to address such scenarios.

11. After detailed deliberation, the Forum decided to take up this issue as an agenda item for discussion in the next meeting of the FOR Working Group on RE-related Policy.

**c) AMENDMENT TO SEC. 94 OF ELECTRICITY ACT 2003- KERC**

12. Chairperson, KERC, in his reference stated that under section 142 of the Electricity Act 2003, while there is only a provision of punishment for non-compliance with Orders, there is no provision for execution of the Orders of the Commission. He further added that, while under the previous State Reforms Act, SERCs such as those of Odisha, Haryana, Karnataka, Uttar Pradesh, and Andhra Pradesh had a provision for execution of their Orders, the said provision has been removed in the Electricity Act. He added that other Regulators, such as PFRDA, SEBI, RERA and CCI, have the powers of executives. Therefore, he recommended that FOR propose to the Ministry of Power (MOP) to amend section 94 of the Electricity Act 2003 to include the powers of execution to the SERCs.

13. After detailed deliberations, the Forum decided that a Committee comprising Member (Legal), CERC; Chairperson, Telangana ERC; Chairperson, Karnataka ERC; Chairperson, Uttar Pradesh ERC; and Chairperson, Jharkhand ERC will deliberate on this particular issue and give their recommendations to the Forum.

**AGENDA ITEM 3 :- REFERENCES FROM MOP**

**a) GUIDELINES FOR BENCHMARKING OF O&M NORMS FOR DISTRIBUTION UTILITIES UNDER RULE 20(6) OF THE ELECTRICITY (SECOND AMENDMENT) RULE, 2023- ADOPTION BY SERCs**

14. Joint Chief (RA), CERC apprised the Forum that one of the recommendations made during a meeting chaired by the Minister of State for Power regarding adhering to CEA guidelines for benchmarking of O& M norms for distribution utilities under Rule 20(6) of the Electricity (second amendment) Rule 2023. The Rule emphasised that the O&M norms for SERCs should be in line with the CEA guidelines. The Forum was also apprised of the decision of the FOR with respect to the FOR Model MYT Regulations, wherein it was decided that State Commissions may look into the CEA guidelines while framing the O&M norms in their MYT Regulations.

**15.** After detailed deliberations, the Forum decided that CEA guidelines on O&M will be one of the guiding factors for the SERCs for determining the O&M norms.

**b) RCO COMPLIANCE ALONG WITH COST REFLECTIVE TARIFF**

**16.** Sr. Advisor (RE), CERC apprised the Forum on the compilation of RPO compliance for the FY 2024-25 based on the information received from the SERCs in accordance with the FOR (Amendment) Rules, 2022, notified by the Ministry of Power (MoP). It was highlighted that most States have submitted RPO compliance data for distribution companies, while some States have submitted RPO compliance data for Captive and Open-Access Consumers. It was also highlighted that most of the States have aligned their State RPO target in line with the MoP target. For those states that have yet to align their RPO targets with the MoP targets, it was decided that the RPO study conducted by the FOR Working Group on RE Policy would be beneficial, and it was requested that this process be expedited. The Secretariat presented (**Annexure-I**) the compilation of the RPO compliance data received for FY 2024-25 vis-à-vis the MoP target. It was highlighted that the Bureau of Energy Efficiency (BEE) has been entrusted with monitoring RCO compliance, which will be updated for the respective State Regulatory Commission. It was highlighted that, as per the Renewable Consumption Obligation (RCO) notification by the Ministry of Power, any shortfall in specified non-fossil energy consumption targets shall be treated as non-compliance, and the penalty should be imposed at such a rate as specified under sub-section (3) of Section 26 of the Energy Conservation Act. It was also highlighted that the MoP, vide dated 05.08.2025, has issued draft amendments to the Gazette Notification on RCO for stakeholder consultation for further clarifications on RCO under the Energy Conservation Act.

**17.** After detailed deliberation, it was decided that the States may expedite the submission of required data for compilation of RPO compliance by obligated entities for FY 2024-25. It was also requested that SERCs may continue to provide data to the FOR Secretariat in furtherance of the functions as per the FOR (Amendment) Rules. The Forum also suggested that the FOR Secretariat may seek clarification from the MoP whether the data compilation be continued for the next financial year and beyond, as the responsibility for monitoring RPO/RCO compliance now lies with the BEE under the Energy Conservation Act. The Forum also highlighted the need to expedite

the RPO study undertaken by the FOR WG on RE Policy to facilitate the States ' RPO trajectory to align with the MoP Targets, wherever possible.

**c) PERIODIC REVIEW OF REGULATIONS – IMPLEMENTATION OF FIXED REGULATORY UPDATE CYCLES**

**18.** Joint Chief (RA), CERC apprised the Forum about the reference from DPIIT and the Ministry of Power, wherein they have reviewed regulatory practices across Ministries to improve predictability, reduce compliance burden, and enhance ease of doing business. In this context, all Electricity Regulatory Commissions have been advised to conduct structured, periodic reviews of regulations and share the best practices.

**19.** The Forum noted the same for suitable action.

**d) MODEL REGULATIONS AND OTHER ISSUES- SUPPORT OF FOR**

**20.** The Forum was apprised that the Ministry of Power expects the FOR to play a larger role in taking up various reform measures such as various Model Regulations and research activities and other issues such as simplification of tariff schedules and consumer categories, model regulations on net metering, ease of doing business (especially, the areas that could be deregulated), alignment of State Grid Code with IEGC etc.

**21.** After detailed deliberation, the Forum decided that the following issues will be taken up in various Working Group meetings: -

**a)** Standardisation of Regulations with respect to:

**i)** Tariff schedules, tariff slabs, tariff categorisation - WG on Harmonisation of Rules & Regulations;

**ii)** Simplification of consumer categories and tariff thereof - WG on Harmonisation of Rules & Regulations;

**iii)** Tariff Order format - WG on Harmonisation of Rules & Regulations;

**b)** Model Regulations on net metering: FOR WG on RE;

**c)** Loss reduction trajectories as per RDSS: FOR WG on Discom viability;

**d)** Model Regulations on TOD tariff: FOR WG on Harmonisation of Rules & Regulations;

**e)** Alignment of State Grid Code with IEGC: FOR Standing Technical Committee;

- f) Ease of doing business: Areas that could be deregulated: FOR WG on Harmonisation of Rules & Regulations;

In order to undertake the above-mentioned activities, the FOR Secretariat may engage a retainer firm and take up the same in subsequent meetings.

**e) COLLABORATION WITH CER, IIT KANPUR FOR UNDERTAKING STUDIES AND REGULATORY AND POLICY RESEARCH FELLOWSHIP PROGRAMS**

22. Joint Chief (RA), CERC apprised the Forum regarding a reference received from the Ministry of Power, suggesting collaboration with CER, IIT Kanpur, to take up various research studies and fellowship programs. The Forum was also informed that FOR currently has an MOU with IIT Kanpur, which only covers capacity-building programs.

23. After detailed deliberations, the Forum decided that the existing MoU may be modified suitably to factor in activities such as research/studies/fellowship programs.

**AGENDA ITEM 4:- UPDATE FROM THE FOR STANDING TECHNICAL COMMITTEE**

24. Chief (Engg), CERC apprised the Forum about the meeting of the Standing Technical Committee (STC), headed by Member (Technical), CERC, held on 6th September 2025 at Bhubaneswar and the terms of reference of the STC which cover technical aspects of RE integration, such as forecasting, scheduling, deviation settlement for wind and solar power stations at the State level, as well as developing frameworks for ancillary services, automatic generation control (AGC), primary control, and implementation of the Availability Based Tariff (ABT) framework at the State level.

25. In continuation, he presented (**Annexure-II**) the salient features of the Indian Electricity Grid Code (IEGC) notified by the Central Commission. It was highlighted that the IEGC contains the Resource Planning Code, Connection Code, Protection Code, Commissioning and Commercial Operating Code, Scheduling and Dispatch Code, which includes Security Constrained Economic Dispatch (SCED) and Security Constrained Unit Commitment (SCUC), as well as the Cyber Security Code. The IEGC has provided a minimum turndown level of 55% of the MCR or such

other minimum power level as specified in the CEA (Flexible Operation of coal-based Thermal Generating Units) Regulations, 2023, as amended from time to time, whichever is lower and commensurate compensation in its IEGC/Tariff Regulations. It was emphasised that there is a need to bring consensus among State Regulators for adopting similar norms for the Technical Minimum for thermal generators embedded in the State System.

**26.** The presentation highlighted the importance of reserves at the State level. A detailed discussion with the SLDCs and other Stakeholders revealed that the system lacks adequate reserves for ensuring grid operations. Therefore, all States need to maintain reserves within their control areas. It was also emphasised that the State needs to plan the system beyond the energy requirement to manage the intermittency of wind and solar generators in the future. The Grid Code also stipulates that in the event of a shortfall in services by any State entity, the shortfall will be procured by the system operators and compensated by the State entity. The presentation also highlighted the shortage of manpower in SLDCs and emphasised the need to empower them for effective and smooth grid operations.

**27.** After discussion, the following action points emerged:-

(i) The need for alignment of State Grid Code with the provisions of IEGC, especially with reference to the MTL for thermal generation and commensurate compensation, maintenance of reserves at the State level, the provision of SCUC and SCED at the intra-State level, resource adequacy framework and operational planning.

(ii) Mandating the generating stations to have the AGC capability and allowing the associated cost (which is not substantial) as a pass-through.

(iii) Enabling the State Genco's/entities to participate in the national Ancillary Services market.

(iv) Ringfencing and strengthening the SLDCs.

**28.** The members noted the findings and action points for appropriate action with due regard to the need for ensuring smooth and secure operation of the grid. The Forum suggested that the STC explore a Model Grid Code for the States.

**CONCLUSION :-**

**29.** The Forum decided that the next meeting of FOR is to be held in November 2025 at CERC, New Delhi. Chairperson, KEREC, also offered to host the FOR meeting thereafter in January 2026 in Karnataka, which the Forum accepted.

**30.** Thereafter, as part of the traditional farewell, Chairperson, CERC/FOR honoured Chairperson, Sikkim ERC, Shri K. B. Kunwar and Chairperson, Assam ERC, Shri Kumar Sanjay Krishna, who were demitting office in October 2025 and Mr Hemant Verma, Chairperson, CSERC, who was demitting office shortly and taking charge as Chairperson, Tripura ERC. In their address, the outgoing Chairpersons thanked all the members of FOR for facilitating an enriching experience in various meetings of the Forum.

**31.** The meeting ended with a vote of thanks to the Chair by the Secretary, FOR/CERC.

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**LIST OF PARTICIPANTS OF 97<sup>TH</sup> MEETING OF FORUM OF  
REGULATORS (FOR) HELD ON 11<sup>TH</sup> /12<sup>TH</sup> SEPTEMBER, 2025  
AT RAIPUR (CHHATTISGARH)**

<b>S. No.</b>	<b>NAME</b>	<b>ERC</b>
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 Nand Lal Sharma Chairperson	HERC
06.	Shri (Justice) Navneet Kumar Chairperson	JSERC
07.	Shri P. Ravi Kumar Chairperson	KERC
08.	Shri T.K. Jose Chairperson	KSERC
09.	Shri Sanjay Kumar Chairperson	MERC
10.	Shri Chandan Kumar Mondal Chairperson	MSERC
11.	Shri Viswajeet Khanna Chairperson	PSERC
12.	Dr. Rajesh Sharma Chairperson	RERC
13.	Shri K.B. Kunwar Chairperson	SSERC
14.	Shri R. Manivannan Chairperson	TNERC
15.	Dr. (Justice) Devaraju Nagarjun Chairperson	TGERC
16.	Shri Arvind Kumar Chairperson	UPERC
17.	Shri Madan Lal Prasad Chairperson	UERC
18.	Dr. M.V. Rao Chairperson	WBERC

19.	Shri Mehul M. Gandhi Member (Law) & I/c. Chairperson	GERC
20.	Shri Yashwant Singh Chogal Member (Law)-cum-Chairperson	HPERC
21.	Shri Gopal Srivastava Member (Law) / Acting Chairperson	MPERC
22.	Shri Surender Babbar Member	DERC
23.	Ms. Jyoti Prasad Member (Law)	JERC for State of Goa & UTs
24.	Shri Sushanta Kumar Ray Mohapatra Member (Tech.)	OERC
25.	Ms. Puspita Chakraborty Member (Law)	TERC
26.	Shri Harpreet Singh Pruthi Secretary	FOR/CERC
27.	Dr. Sushanta Kumar Chatterjee Chief (Regulatory Affairs)	CERC
<b>SPECIAL INVITEES</b>		
28.	Shri Ramesh Babu V Member (Tech.)	CERC
29.	Shri Harish Dudani Member (Law)	CERC
30.	Shri Ravinder Singh Dhillon Member (Fin.)	CERC
31.	Shri Vivek Ganodwale Member (Law)	CSERC
32.	Shri Ajay Kumar Singh Member (Tech.)	CSERC
33.	Shri Awdhesh Kumar Yadav Chief (Engg.)	CERC
<b>FOR SECRETARIAT</b>		
34.	Ms. Rashmi Somasekharan Nair Joint Chief (RA)	CERC
35.	Shri Ravindra Kadam Sr. Advisor (RE)	CERC

# **RPO Compliance along with Cost Reflective Tariff**

**97<sup>th</sup> Meeting of the Forum of Regulators (FOR)**

**Date: 12-09-2025**

**Venue:- Raipur**

# FOR Amendment Rules 2022

- As per the Forum of Regulators (Amendment) Rule, 2022, the FOR has been tasked with submitting an annual report on Renewable Purchase Obligation (RPO) compliance:

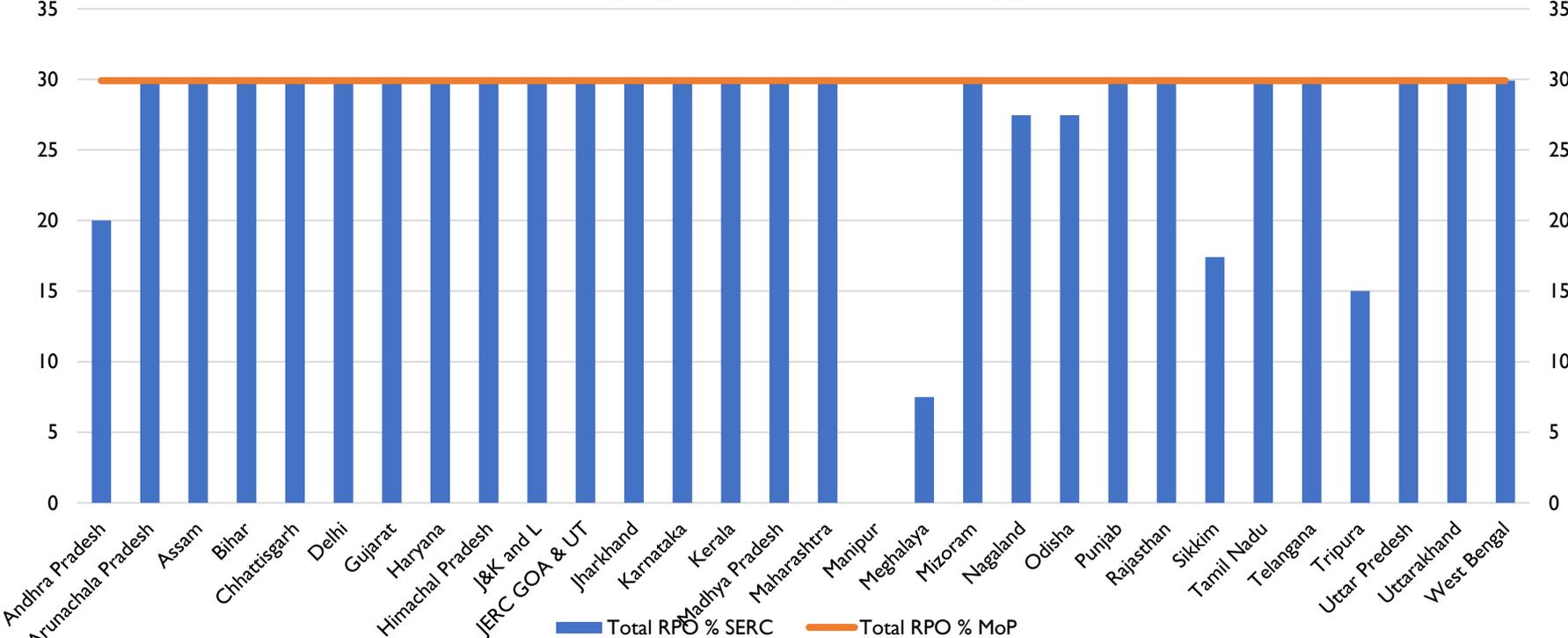
*“ (c) Monitoring of renewable purchase compliance- (i) The compliance of targets, by each of the distribution licensees, captive consumption and consumers procuring power through open access, for purchase of electricity from renewable sources as determined by the Central Government or by State Commission, whichever is higher, in accordance with the provisions of the Act and rules, regulations, guidelines made thereunder.*

*(ii) An annual report comprising data and analysis thereof for compliance of the targets for purchase from renewables shall be submitted to the Central Government by 31st May of next financial year”*

- APTEL in reference to **Case No. OP-5 of 2023** has impleaded Forum as one of the respondents and directed to consolidate the RPO data for the FY 2024-25 on behalf of all SERCs as its additional responsibilities vide FOR amendment Rule 2022
- All ERCs except Manipur have submitted the annual RPO compliance data.

# RPO Trajectory Vs RCO for FY 024-25

## RPO of different ERCs



# FOR Compilation of RPO Targets for FY 2024-25

ERCs that have submitted RPO in accordance with MoP and respective ERC Target for FY 2024-25							
S No.	Commission Name	MOP Target Data			SERC Target Data		
		DISCOM	Captive Users	OA Consumers	DISCOM	Captive Users	OA Consumers
1	Andhra Pradesh	YES	YES	YES	YES	YES	YES
2	Assam	YES	YES	YES	YES	YES	YES
3	Chhattisgarh	YES	YES	YES	YES	YES	YES
4	Kerala	YES	YES	YES	YES	YES	YES
5	Madhya Pradesh	YES	YES	YES	YES	YES	YES
6	Maharashtra	YES	YES	YES	YES	YES	YES
7	Meghalaya	YES	YES	YES	YES	YES	YES
8	Rajasthan	YES	YES	YES	YES	YES	YES
9	Sikkim	YES	YES	YES	YES	YES	YES
10	Tamil Nadu	YES	YES	YES	YES	YES	YES
11	Telangana	YES	YES	YES	YES	YES	YES
12	Uttarakhand	YES	YES	YES	YES	YES	YES

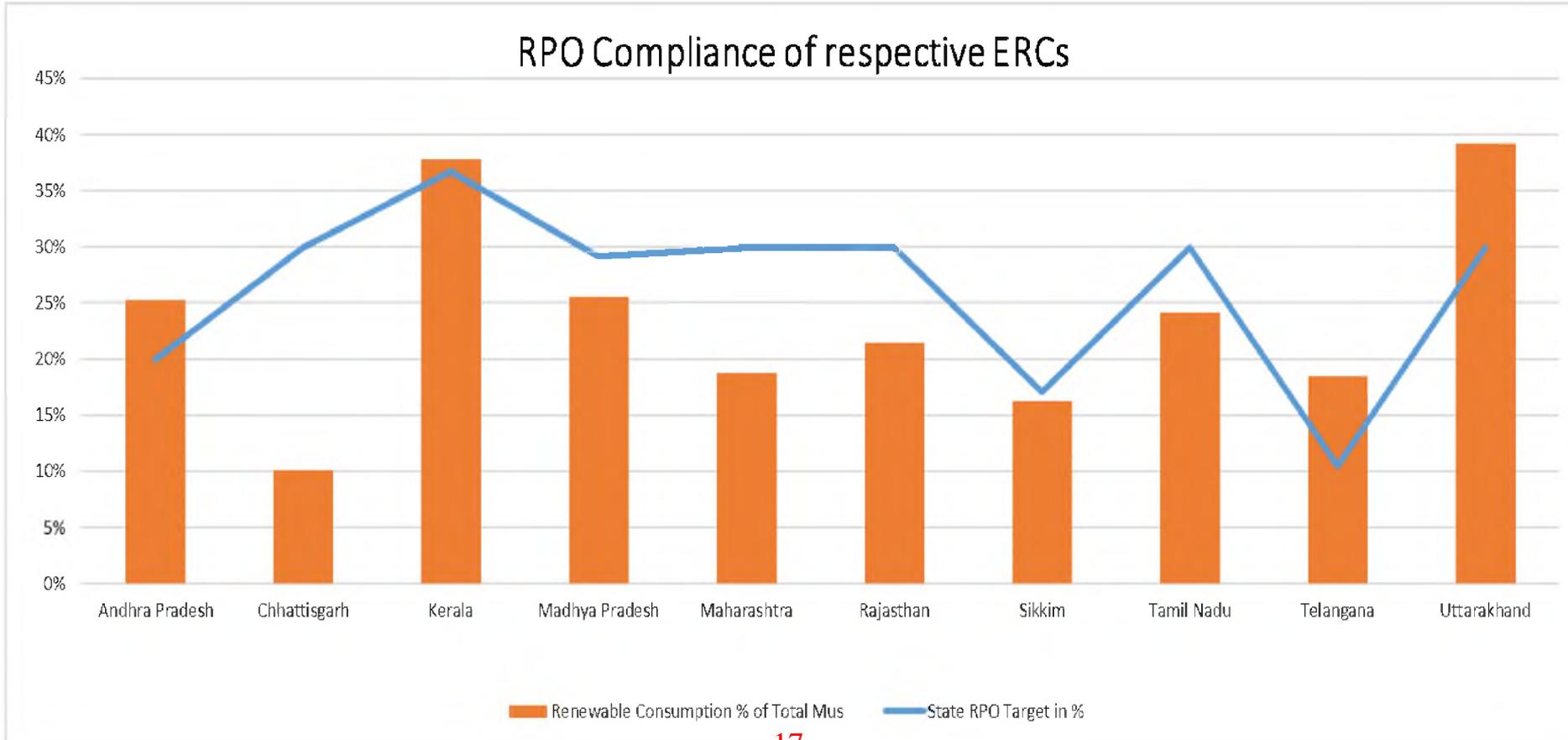
# FOR Compilation of RPO Target for FY 2024-25

S No.	Commission Name	MOP Target Data			SERC Target Data			Remarks
		DISCOM	Captive Users	OA Consumers	DISCOM	Captive Users	OA Consumers	
1	Arunachala Pradesh	Format as per MOP Target not submitted. However, the State Targets are same as MoP Target and in totality Arunachal meets the MOP Target specified.*			YES*			Arunachal RPO Regulation is in Line with MoP PRO/RCO Regulation. *Arunachal has verbally confirmed that no Capitive and OA consumer that are obligated existed during the period.
2	Bihar	Format as per MOP Target not submitted - However as per RPO data submitted for the State, the total RPO met is in excess of 29.91% suggesting compliance to MoP Target			YES	YES	YES	MOP Format not provided. Compliance checked on total RPO basis (29.91%)
3	Haryana	Format as per MOP Target not submitted - However as per RPO data submitted for the State, the total RPO met is in excess of 29.91% suggesting compliance to MoP Target			YES	YES	YES	MOP Format not provided. Compliance checked on total RPO basis (29.91%)
4	Himachal Pradesh	Format as per MOP Target not submitted - However as per RPO data submitted for the State, the total RPO met is in excess of 29.91% suggesting compliance to MoP Target			YES	YES		MOP Format not provided. Compliance checked on total RPO basis (29.91%)
5	Punjab	Format as per MOP Target not submitted - However as per RPO data submitted for the State, the total RPO met is in excess of 29.91% suggesting compliance to MoP Target			YES	YES	YES	
6	Delhi	YES	YES	YES	YES	Partial*	Partial*	1. BRPL Data tentative as SNA certification awaited. 2. *For Captive and OA Consumer HPO compliance format not submitted.
7	J&K and Ladakh	YES	*	*	Separate format not provided however, MOP data applies due to identical targets.			JK Regulation is in Line with MoP PRO/RCO Regulation. *JK has verbally confirmed that no Capitive and OA consumer that are obligated
8	JERC GOA & UT	YES	Data not provided		Format as per SERC Target not provided			
9	Mizoram	YES	Data not provided		Format as per SERC Target not provided			
10	Nagaland	Format as per MOP Target not submitted			YES	YES	YES	
11	Odisha	Format as per MOP Target not submitted			YES	YES	YES	
12	Tripura	Format as per MOP Target not submitted			YES	CU and OA consumers are not Present		Verbally confirmed no OA and Capitive consumers

10/21/2025

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# FOR Compilation of RPO compliance for FY 2024-25



# FOR Compilation of RPO compliance for FY 2024-25

DISCOM							
S. no.	ERC	Total Mus Consumed by DISCOMs	MOP Target %	State RPO Target in %	State RPO Target in Mus	Renewable Consumption of Total MUs	Renewable Consumption % of Total Mus
1	Andhra Pradesh	75064	29.91%	20%	15013	18978	25.28%
2	Chattisgarh	38563	29.91%	29.91%	11534	3887	10.08%
3	Kerala	28136	29.91%	36.70%	10326	10628	37.77%
4	Madhya Pradesh	97318	29.91%	29.17%	28388	24888	25.57%
5	Maharashtra	190763	29.91%	29.91%	57057	35896	18.82%
6	Rajasthan	117683	29.91%	29.91%	35199	25258	21.46%
7	Sikkim	434	29.91%	17.04%	74	70	16.23%
8	Tamil Nadu	140015	29.91%	29.91%	41878	33812	24.15%
9	Telangana	68284	29.91%	10.50%	7170	12587	18.43%
10	Uttarakhand	17286	29.91%	29.91%	5170	6778	39.21%

# FOR Compilation of RPO Targets for FY 2024-25

S No.	Commission Name	MOP RPO Target	SERC RPO Target		Latest Update from ERC
		Status	Status	Remark	
1	Gujarat	Format as per MOP Target not submitted	RPO compliance data submitted only for DISCOM - OA and Capiltve not provided	-	ERC has asked GREDA to submit the Captive and Open Access Data
2	Jharkhand	Format as per MOP Target not submitted	Format as per SERCTTarget not submitted	Partial data with regard to OA and Capitive consumer for Q1, Q2, Q3 and Q4 was provided.	Communicated on the Phone as well as on Mail - ERC agreed to reply accordingly
3	Karnataka	Format as per MOP Target not submitted	Compliance Data only for DISCOM provided. Captive and Open Access Data Pending for the submission	-	Communicated on the Phone as well as on Mail - ERC agreed to reply accordingly
4	Uttar Predesh	Format as per MOP Target not submitted	Compliance Data only for captive and OA provided. Data Pending for Discom	-	In the process of submission of Pending data
5	West Bengal	Format as per MOP Target not submitted	Compliance Data only for DISCOM provided. Captive and Open Access Data Pending for the submission	-	Regulation is changed and is in subjudice

- No data with respect to Manipur has been received

## Comparison of RPO and Minimum share of RCO Target (1/2)

Sr. No.	Particular	RPO Trajectory by SERCs	Minimum Share of consumption from Non-Fossil Fuel (RE) Sources
1.	Notification Date	SERCs Regulations under 86 (1) (e) of the Electricity Act 2003	MoP Notification on 20 October 2023
4.	Issuance under	<p><b><u>Electricity Act, 2003</u></b></p> <p><i>Section 86. (Functions of State Commission): – (1) The State Commission shall discharge the following functions, namely: -</i></p> <p><i>(e) <b>promote co-generation and generation of electricity from renewable sources</b> of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for <b>purchase of electricity from such sources, a percentage of the total consumption of electricity</b> in the area of a distribution licensee;</i></p>	<p><b><u>Energy Conservation Act, 2001</u></b></p> <p><i>In exercise of the powers conferred by clauses (n) and (x) of <b>section 14 of the Energy Conservation Act, 2001 (52 of 2001)</b>, the Central Government in consultation with the Bureau of Energy Efficiency, hereby specifies the <b>minimum share of consumption of non-fossil sources</b> (renewable energy) by <b>designated consumers</b> as <b>energy or feedstock</b> and different share of consumption for different types of <b>non-fossil sources</b> for different <b>designated consumers</b> in respect of <b>electricity distribution licensee</b> and other designated consumers who are <b>open access consumers</b> or <b>captive users</b> to the extent of consumption of electricity from sources other than distribution licensee <b>as a percentage of their total share of energy consumption</b> indicated in the Table below.....</i></p> <p><i>(Section 14 of EC Act: Power of Central Government to enforce efficient use of energy and its conservation)</i></p>
5.	Nodal Agency	Grid India and State Nodal Agencies	Bureau of Energy Efficiency (BEE), State Designated Agencies (SDA)
6.	Obligated Entities	<ul style="list-style-type: none"> <li>• Distribution Licensees</li> <li>• Open Access Consumers</li> <li>• Captive Users</li> </ul>	<ul style="list-style-type: none"> <li>• Designated Consumers and other Designated Consumers who are captive or open access consumers.</li> </ul>

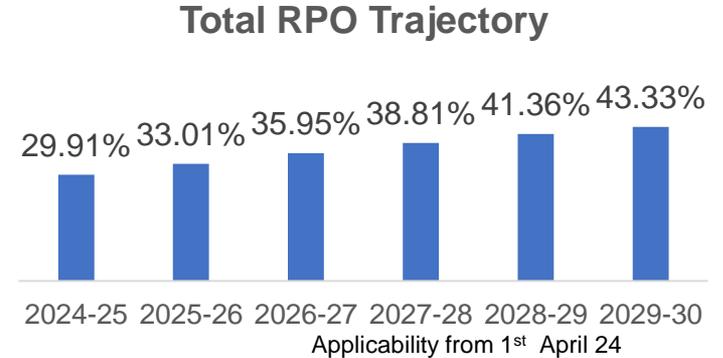
## Comparison of RPO and RCO Target (2/2)

Sr. No.	Particular	RPO Trajectory by SERCs	RCO Notification
7.	RPO Targets categories	<ul style="list-style-type: none"> <li>RPO-Wind</li> <li>HPO</li> <li>RPO-Other</li> <li>ESO</li> </ul>	<ul style="list-style-type: none"> <li>Wind RE</li> <li>Hydro RE</li> <li>Distributed RE</li> <li>Other RE</li> </ul>
8.	Role of SERCs	<ul style="list-style-type: none"> <li>Under EA 2003, all the functions are given of framing the regulations to SERCs</li> </ul>	<p>Under EC (Amendment) act, 2022, SERCs shall make regulations for discharging the functions given in the EC act.</p> <p><i>(Section 27(A) on Power of State Commission to make regulations newly inserted)</i></p>
9.	Enforcement, monitoring & reporting	<ul style="list-style-type: none"> <li>FOR to collect and the data related to compliance of RPO.</li> <li>SERCs to come up with RPO targets in every control period and SLDCs/SDAs operates as nodal agency to monitor RPO compliance of obligated entities.</li> </ul>	<ul style="list-style-type: none"> <li>BEE shall maintain data related to compliance of renewable <b>energy utilization</b> by the designated consumer(s) and submit report to the Central Government. <i>(Clause 7 of MoP Notification)</i></li> <li><b>Central Govt. in consultation with BEE</b> directs every designated consumer to comply with energy consumption norms and standards; <i>(Section 14 of EC Act)</i></li> <li><b>State govt.</b> designates any agency as designated agency to coordinate, regulate &amp; enforce provisions of EC Act within the State. <i>(Section 15 (d) of EC Act 2001)</i></li> </ul>
10.	Penalty	As decided by SERCs	<p><b><u>Penalty</u></b></p> <p>Shortfall in specified RE targets leads to non-compliance and incurs penalties as per section 26(3) of the <b>EC Act Amendment, 2022</b></p> <ul style="list-style-type: none"> <li>Max of INR 10 lakhs for each failure.</li> <li>Additional penalty which shall not exceed twice the price of every MToE prescribed under this Act, which is in excess of the prescribed norms.</li> </ul>

# RCO Notification

Notification is issued as per Energy Conservation (Amendment) Act, 2022 notified in December 2022.  
Trajectory is prepared on similar lines of RPO order issued earlier by MoP in July 2022

Year	Wind RE	Hydro RE	Distributed RE	Other RE
2024-25	0.67%	0.38%	1.50%	27.35%
2025-26	1.45%	1.22%	2.10%	28.24%
2026-27	1.97%	1.34%	2.70%	29.94%
2027-28	2.45%	1.42%	3.30%	31.64%
2028-29	2.95%	1.42%	3.90%	33.10%
2029-30	3.48%	1.33%	4.50%	34.02%



- Distributed RE is introduced as a new category.
- Higher flexibility in meeting the RPO compliance - Any shortfall in prescribed consumption of wind RE in a year, can be compensated with excess hydro RE for the year, and vice versa.
- DCs who are open access consumers or consumers with Captive Power Plants shall fulfil their RPO as per the specified total renewable energy target irrespective of the non-fossil fuel source.

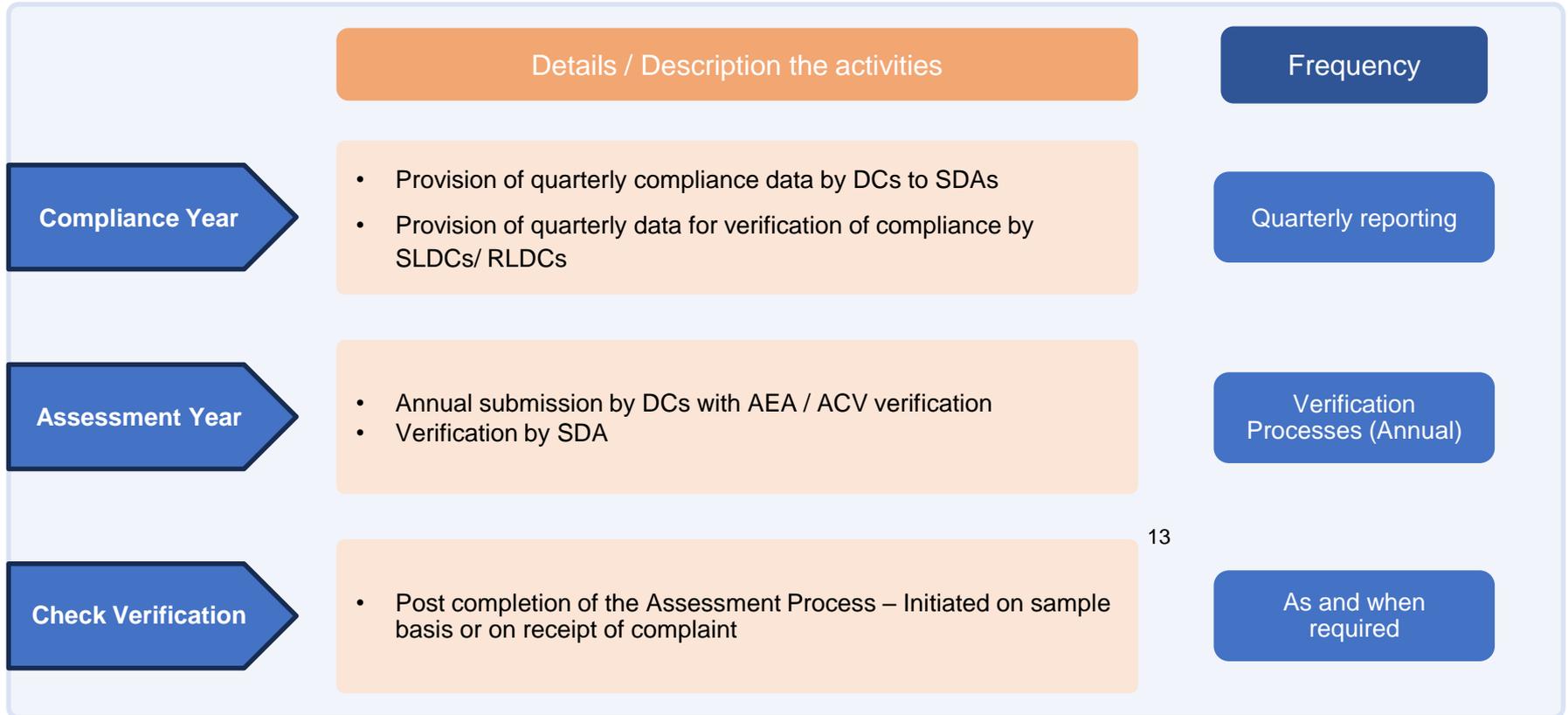
Specifies share of consumption for different types of non-fossil sources for different DCs in respect of:

- Electricity distribution licensee
- Other designated consumers; who are open access consumers or captive users to the extent of consumption of electricity from sources other than distribution licensee.

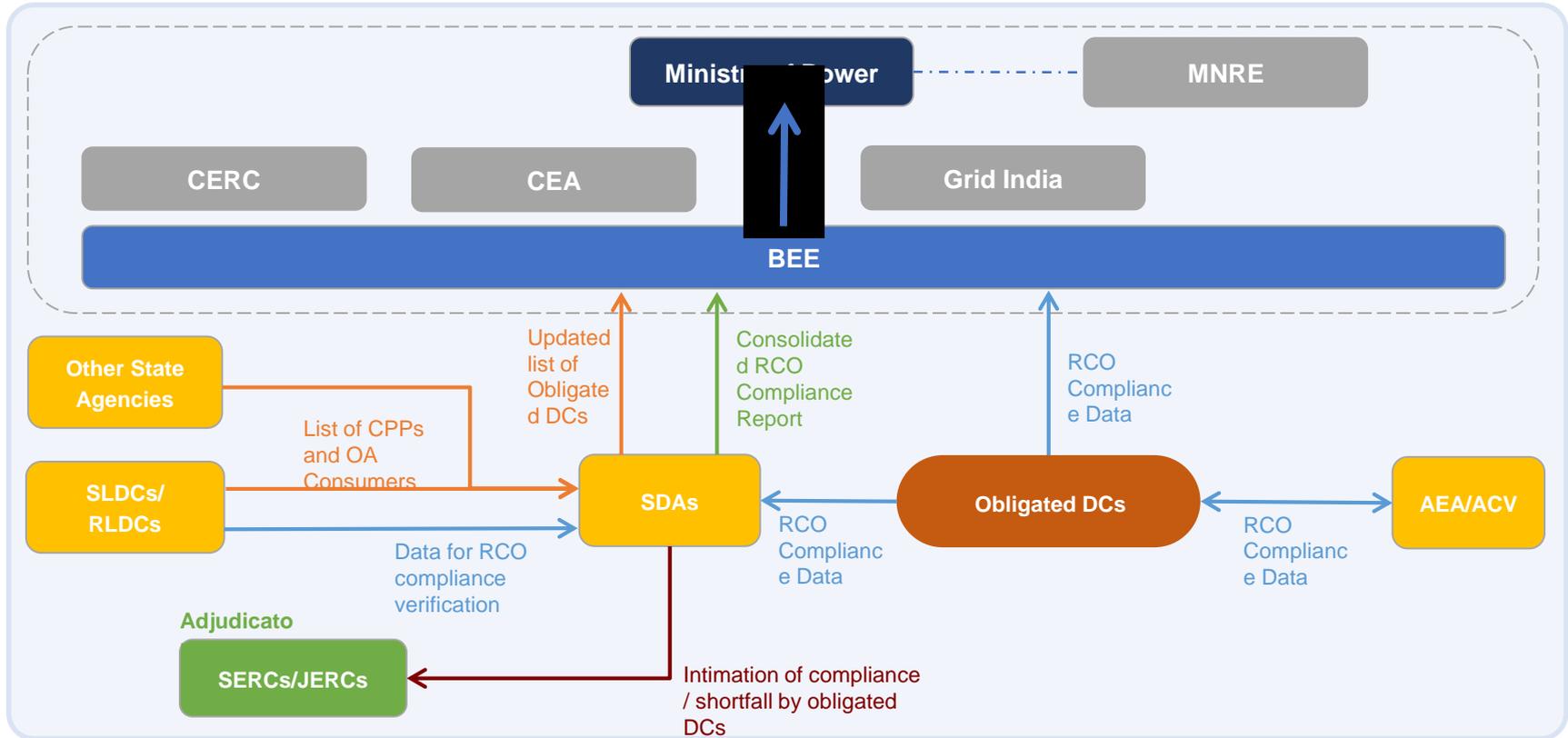
# Updates on RCO

-  All the States/UTs have been informed about the RPO trajectory and penalties under EC Act vide letter dated 28/11/2023 and 01/02/2024.
-  MNRE requested all States/UTs to take advance action for procurement of RE to meet RPO requirement and avoid penalties.
-  BEE have developed compliance monitoring processes and formats for RPO data reporting by DCs.
-  BEE is developing Web-based RPO monitoring Tool and issued the scope of work for empanelled Agency for RPO verification audit

# RCO Compliance Reporting and Assessment



# BEE Institutional Mechanism – RCO Rules



# Roles and Responsibilities of SERCs/ JERCs under EC Act

The adjudication process would be initiated on occurrence of a Non-compliance of the RCO Rules by an obligated entity.

The respective SERCs on receipt of the petition shall examine the said petition to ensure that the same is complete in all aspects and thereafter admit the petition.

At the directions of the BEE, the SDA through its inspecting officer, shall prepare a petition bringing all relevant material on record and file it before the concerned SERC, in the format and manner, as per the said SERC's Conduct of Business Regulations.

Thereafter, the respective SERC shall appoint an Adjudicating Officer to conduct an inquiry as per Section 27 of the Act and adjudicate the non-compliance in accordance with the RCO Rules.

On completion of the said inquiry the Adjudicating Officer shall record his/her findings and if satisfied regarding existence of a Non-compliance with the RCO Rules, a penalty shall be imposed as per Section 27(2) of the Act, while keeping in mind the factors mentioned in Section 28 of the Act

Issue	RE Working Group Recommendations
Applicable Act and Legal Status	(a) Both RPO target provisions under EA 2003 and RCO provisions under EC Act 2001 can co-exist.
Types of Technologies Covered Under RPO Vs RCO Targets	<p>(a) State can fix RPO targets duly considering RCO trajectory notified by the MoP under the EC Act 2001 for the designated consumers including distribution licensees.</p> <p>(b) States (SERCs) can be allowed to set their state specific RE technology wise RPO targets while duly factoring the RCO targets specified by MOP for designated consumers, wherever applicable, so that the duplication or duality of target setting can be avoided.</p>
Compliance Monitoring and Enforcement Framework	<p>(a) Provisions of the compliance monitoring, reporting and enforcement would follow from respective Acts.</p> <p>(b) There would not be any conflict in its implementation if the cogent reading and congruent interpretation of the provisions of both Acts is undertaken with the clear understanding that intent/purpose of both Acts, being different, its monitoring, reporting and enforcement will also have to be governed as per respective provisions under concerned Acts.</p>

## **Way forward for deliberation : RPO Vs RCO Targets**

- Regulatory framework for RPO under EC Act 2001 :**
- Mechanism for imposition of Penalties**
- Role of SERCs under RCO**
- Enforcement and compliance penalties**
- FOR Secretariat Compilation of RPO**

THANK YOU

# RPO /RCO

## Under Electricity Act 2003

- RPOs are mandated as per Section 86(1) (e) of the Electricity Act 2003 ('EA 2003') and Para 6.4(1) of the National Tariff Policy, 2006
- Long term RPO trajectory was notified by MoP in consultation with MNRE from time to time.
- **State wise RPO targets were notified by the concerned SERCs**

## The Energy Conservation Act ,Amendment 2022

- A new clause 14(x) was added to EC Act. Clause 14(x) provides as follows:  
*“14. Power of Central Government to enforce efficient use of energy and its conservation.—The Central Government may, by notification, in consultation with the Bureau,— ...*  
*(x) specify minimum share of consumption of non-fossil sources by designated consumers as energy or feedstock, provided different share of consumption may be specified for different types of non-fossil sources for different designated consumers:”*
- MoP Notification S.O. 4617(E) dated 20th October, 2023 Clause 8 : *“This notification shall come into force on the **1st day of April, 2024** and till such time, the RPO trajectory specified in paragraphs 5 to 14 vide the Ministry of Power Order No. 9/13/2021-RCM, dated 22<sup>nd</sup> July, 2022 read with Corrigendum, dated the 19th September, 2022, shall remain in force”*
- Thus, the **cutoff date** for enforcement of the new RPO Trajectory by MoP under EC Act is **01 April 2024**

# Key Findings and Points for Discussion (1/3)

## Key Issues/ Findings

### Issue-1: Applicability of RPO or RCO Framework

- As per **MoP notification dated 20 October 2023**, Minimum RE/Non-fossil fuel consumption target are notified in pursuance of **EC Act 2001** from **FY 2024-25 to FY 2029-30**.
- Various SERCs have specified RPO Regulations providing trajectory

### Issue-2: Applicable Act/ legal status:

- Under Section 86 (1)(e) of EA 2003, SERCs have been assigned responsibility to define RPO targets.
- Under Section 27 of EC Act 2001, SERC has been assigned a responsibility to appoint any of its members as an **“Adjudicating Officer”**.
- As per EC Act (Amendment), 2022, Section 27A, **SERCs shall make regulations** for discharging the functions given in the EC Act 2001.

# Key Findings and Points for discussion (3/3)

## Key Issues/ Findings

### Issue-5: Obligated Entities

- Under RPO, DISCOMs, OA Consumers and Captive consumers are the obligated entities. Whereas under minimum RE consumption targets, *different designated consumers in respect of electricity distribution licensee and other designated consumers who are open access consumers or captive users* are the obligated entities.

*In exercise of the powers conferred by clauses (n) and (x) of section 14 of the Energy Conservation Act, 2001 (52 of 2001), the Central Government in consultation with the Bureau of Energy Efficiency, hereby specifies the **minimum share of consumption of non-fossil sources (renewable energy) by designated consumers as energy or feedstock** and different share of consumption for different types of **non-fossil sources** for different **designated consumers** in respect of **electricity distribution licensee** and other designated consumers who are **open access consumers** or **captive users** to the extent of consumption of electricity from sources other than distribution licensee **as a percentage of their total share of energy consumption** indicated in the Table below.....*

- At present, total **13 energy intensive sectors are under PAT Scheme** such as Aluminium, Cement, Iron & Steel, Chlor-Alkali, DISCOM, Fertilizer, Pulp & Paper, Textile, Building (Hotels), Thermal Power Plants, Petrochemical, Petroleum Refinery and Railways. It covers around 1196 **designated consumers (as on PAT Cycle VII)**.
- Further, open access consumers: 5,628 (4967 & 661 under IEX & PXIL in FY 2021-22)
- No. of industries under captive: 8,556 (FY 2020-21 as per CEA General Review Report)

### Issue-6: Compliance Monitoring & Enforcement of RPO for designated consumers:

- As per MoP Notification dated 20 October 2023, Minimum RE Consumption target are applicable for designated consumers and other designated consumers who are Open Access and Captive Consumers.
- It is important to set effective monitoring & compliance framework.



## Annexure-II

Update from the FOR Standing Technical Committee: 3<sup>rd</sup> Mtg held on 06.09.2025 at Bhubaneswar

12<sup>th</sup> September 2025

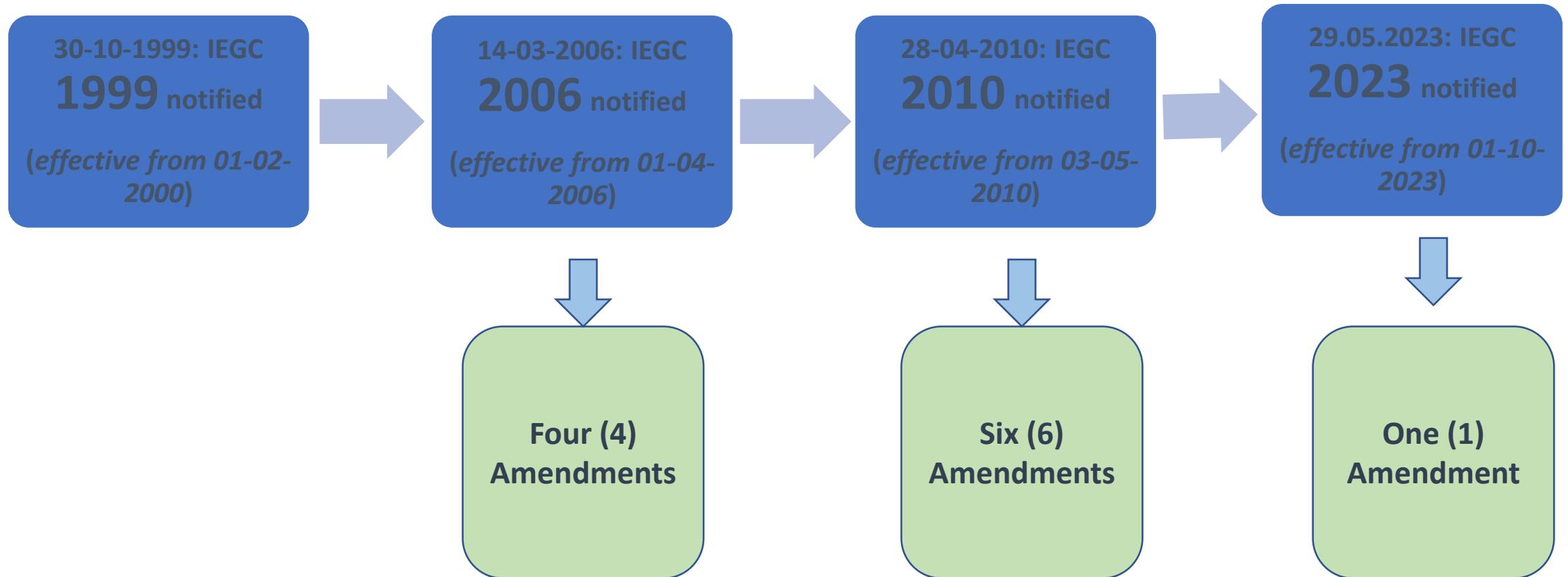
# Points for Deliberation

- ✓ **Harmonisation of State Grid Code with IEGC 2023 for safe and secure operation of Indian Grid**
  
- ✓ **Status of the Implementation of**
  - State framework for Minimum Turn Down level of State thermal Generators and Compensation
  - Status update on SCED implementation at State Level
  - Status Update on Participation of Intra-State Generating Station for providing Secondary Reserve Ancillary Services (SRAS)
  - Regulations on Forecasting, Scheduling and Deviation Settlement
  - SAMAST , ABT Mechanism
  
- ✓ **Workforce adequacy of SLDCs based on workshop conducted during May and August 2025**



# Harmonisation of State Grid Code with IEGC 2023 for safe and secure operation of Indian Grid

# Indian Electricity Grid Code – Progress so far



# Provisions reviewed under IEGC 2023

## Provision Reviewed

- Role of Various Organizations and their Linkages
- Planning Code for inter-State transmission
- Connection Code
- Protection and Commissioning Code
- Operating Code
- Scheduling and Despatch Code
- Miscellaneous

## New Structure

- Role of Various Organizations and their Linkages
- **Resource Adequacy Code**
- Connection Code
- **Protection Code**
- **Commissioning and Commercial operation Code**
- Operating Code
- Scheduling and Despatch Code
- **Cyber Security**
- **Monitoring and Compliance Oversight**
- Miscellaneous



# Salient points for harmonisation of Grid Codes



- Minimum turndown level - 55% or lower level as per CEA Regulations ( which provides level of 40%). This will help achieve grid management with enhancing RE.
  - **Part Load Compensation – Heat Rate, APC, Secondary Oil**
- Framework for SCUC and SCED
- Reserves Estimation and maintaining the reserves for the State.
- Monitor Primary Response of individual generating stations
- Secondary Control through AGC- mandate under Grid Code and compensation for performance
- Compensation for reactive power support and charges for deteriorating reactive power – for generators. The management of voltage is one 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.
- 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.

# Security Constrained Unit Commitment (SCUC)

**Aim:** To commit generating station or unit (scheduled below min. turndown level) for reserve maximization in interest of grid security on D-1 basis. If needed NLDC can carry out SCUC in D-3 basis.

**Eligibility:**  
Sec 62 generators  
and other  
generator (may  
opt)  
Cl.46.4.j

NLDC schedules  
incremental  
energy at 15:00hrs  
from generators  
below min.  
turndown level to  
bring schedule till  
the same level

Cl.46.4.d

NLDC shall reduce  
other SCED  
generators till min.  
turndown level  
starting from  
highest VC

Cl.46.4.f

NLDC reserves  
URS power in  
generation unit  
brought under  
SCUC, which not  
be scheduled by  
the beneficiary or  
sold through the  
energy market.

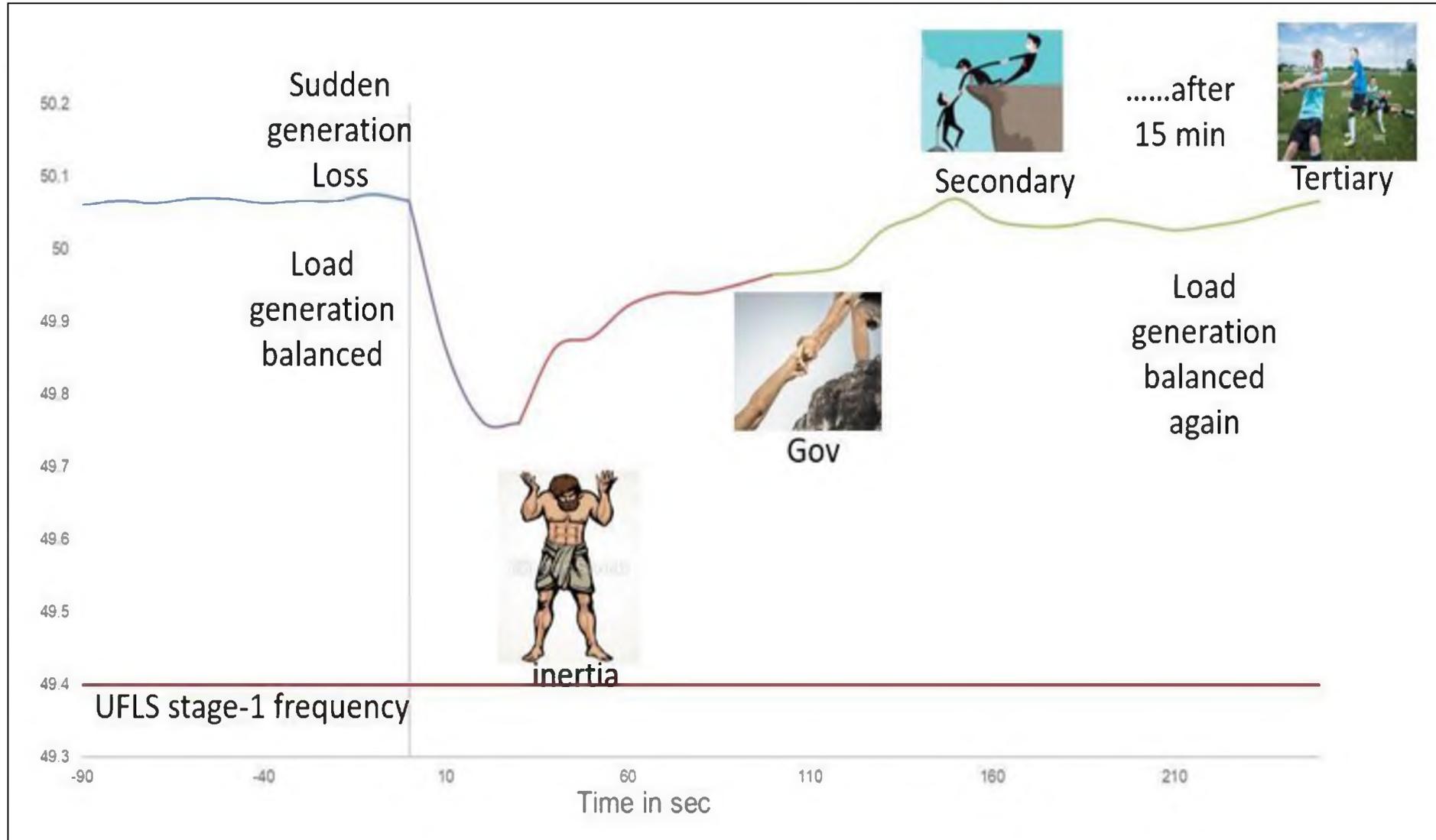
Cl.46.4.e

Downward  
revision NOT  
allowed for  
Generators  
brought upto  
min. turndown  
level under  
SCUC  
Cl.46.4.d

# SCED Regulatory Framework – IEGC

- Key aspects and processes involved in the implementation of SCED as provided in the Grid Code, 2023
  - to optimize generation dispatch after gate closure in the real-time market
  - increasing generation from lower-cost generating stations and decreasing generation from higher-cost ones
  - subject to operational and technical constraints
  - Voluntary participation
  - generating stations to declare their energy charges or SCED Compensation Charges on a weekly basis
  - buyers or beneficiaries shall continue to pay charges for the scheduled energy directly to the generating stations participating in SCED

# Reserves Framework



## Reserves

- Adequate reserves are required to be maintained in a distributed manner with both the regional entities at the regional level and at the state level for each state control area.
- Reserves are required
  - To maintain Grid frequency close to 50 Hz,
  - For Quick restoration of the grid frequency after an event within the IEGC band of 49.9 Hz to 50.05 Hz,
  - For relieving congestion in the transmission network, to ensure smooth operation of the power system, and safety and security of the grid.

# Regulatory framework for Reserves

Type of Service	Outline	Response Time	Current Status
Primary response (Frequency Containment)	Automatic response delivering reserve power in negative proportion to grid frequency change	Start immediately (able to sustain up to 5 min)	Mandated through Indian Electricity Grid Code (IEGC)
Secondary response (Frequency Restoration)	Supplementary corrective action needed to bring frequency back to 50 Hz.	Start within 30 s (able to sustain up to 30 min)	CERC (Ancillary Service) Regulations, 2022
Tertiary response	All ISGS having URS availability on day ahead basis, are to be mandated	Within 15 minutes (able to sustain up to 60 min)	Market based procurement of TRAS through DAM and RTM under CERC (Ancillary Service) Regulations, 2022

## Reserve requirement for All India

- Reference contingency - 7000 MW (Solar hours), 4500 MW (Non-Solar hours): for Primary Reserve
- Secondary Reserve and Tertiary Reserve

	Up Reserve (MW)		Down Reserve (MW)	
	Requirement	Actual	Requirement	Actual
<b>Secondary Reserves</b>	11630	1500-2000	12926	1500-2000
<b>Tertiary Reserves</b>	17310	4000-5000	18606	4000-5000

# Reserves: Secondary and Tertiary

- No state is actually maintaining reserves, and even in cases where states claim to have reserves, these are scheduled during peak hours, defeating the purpose.
- From 1st April 2026, NLDC will begin maintaining reserves on a state-wise basis; however, this could prove costly for states, as NLDC may need to maintain reserves in costlier gas-based plants. Hence, states were urged to maintain their own reserves.
- States are required to meet the expected demand as well as keep the necessary reserve so that any load loss may not occur in case of any contingency.



# Status of the Implementation : MTL



# MTL & Compensation Mechanism at Intra-state level



State	MTL guideline	Source	Remarks
Uttar Pradesh	55%	UPERC MOD Regulations, 2021	
Haryana	55%	HERC TCT Regulations, 2024	Includes compensation mechanism for part load operation and additional start/stop
Rajasthan	55%	Rajasthan Electricity Grid Code, 2024	
Maharashtra	55%	MERC Grid Code, 2020	Includes compensation mechanism for part load operation and additional start/stop. Compensation mechanism till 40% as part of Draft State Grid Code amendment.
Madhya Pradesh	55%	MPERC Grid Code, 2024	Includes compensation mechanism for part load operation and additional start/stop
Karnataka	55%	Karnataka Electricity Grid Code, 2025	Includes compensation mechanism for part load operation linked to CERC TCT Reg 2024
Telangana	In line with IEGC	TSERC Grid Code, 2018	
Andhra Pradesh	In line with IEGC	APERC RSD Procedure 2023	
Tamil Nadu	60-80%	Minutes of 210 <sup>th</sup> OCC meeting of SR	55% as per draft state grid code. Compensation mechanism till 40% notified as part of Tariff Regulations
West Bengal	70%	Minutes of 214 <sup>th</sup> OCC meeting of ER	
Odisha	55-60%		

## Status of the State framework for Minimum Turn Down level of State thermal Generators and Compensation

- In the 2<sup>nd</sup> meeting of Standing Technical Committee of FOR on 20<sup>th</sup> Sep 2024 constituted subgroup
- Terms of Reference:
  - Assessing feasibility of lowering MTL in state thermal generating stations
  - Suggesting technical upgrades & operational improvements required for flexing such generating stations
  - Making recommendations on implementation pathway (both technical & commercial) for MTL for state thermal generating stations
- Chaired by Director (SO), Grid-India and with representation from SERCs (UP, Haryana, Maharashtra, MP & Karnataka), SLDCs( UP, Haryana, Maharashtra, MP & Karnataka) and NTPC
- Two meetings of subgroup held on 21.04.2025 and 20.06.2025
- Subgroup report under preparation



# Minimum Turndown Level - Way Forward

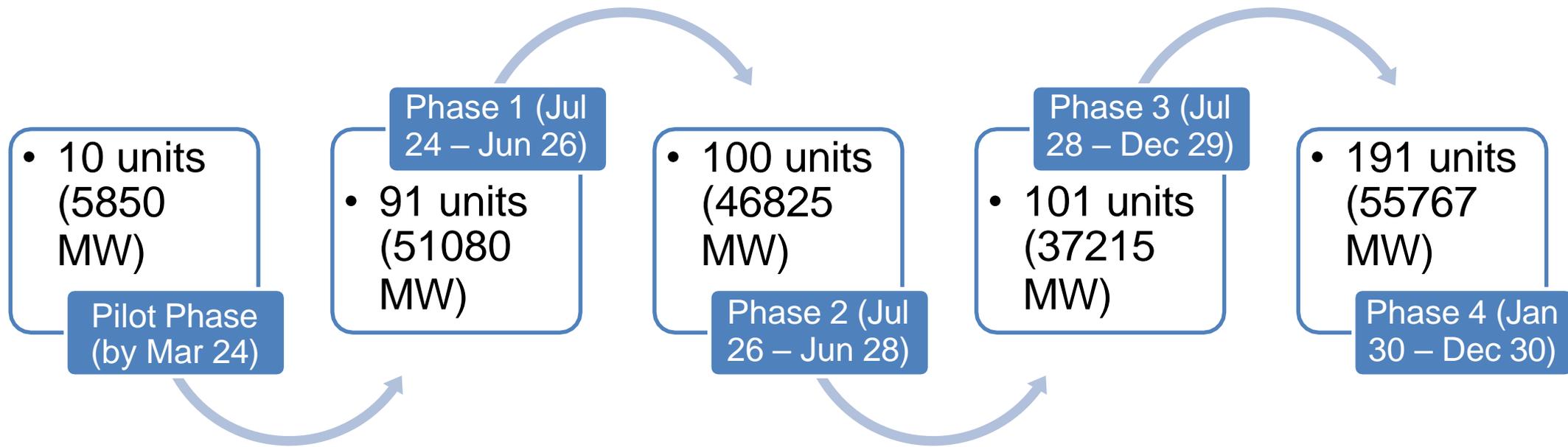
- **Need for alignment of state grid codes with IEGC 2023**
- Implementation of 55% minimum turndown level for all state thermal generating stations
  - Including compensation mechanism for degradation in station heat rate and auxiliary energy consumption
- Implementation plan for 40% MTL as per CEA Phasing Plan
  - Regulatory order for pilot implementation for selected units followed by full scale implementation
  - Extension of part load compensation provisions till 40%
  - Additional capital/R&M expenditure for required retrofit
  - Incremental O&M costs due to higher wear & tear



# Need for Flexibilization of thermal fleet

MTL as 40% of MCR

CEA Phasing plan (15 Dec 23) for 40% MTL Target



	Sum of Capacity (MW)
<b>Phase 1</b>	51080
Central	17510
Private	17660
State	15910
<b>Phase 2</b>	46825
Central	8860
Private	30305
State	7660
<b>Phase 3</b>	37215
Central	7720
Private	16085
State	13410
<b>Phase 4</b>	55767
Central	26760
Private	7282
State	21725
<b>Total</b>	<b>190887</b>

**30150 MW** thermal capacity was targeted for 40% MTL by March 2025

CERC Tariff Regulations (1<sup>st</sup> amendment) and approved Compensation for part load operation till 40% of MCR  
 Further W.I.P. through several committees (under CEA and FOR) to facilitate thermal flexibilization – lowering MTL with adequate compensation



# Status of the Implementation : SCED

# 2021-22: SCED Pilots for Gujarat and UP



## Gujarat

- 43 Plants (SGS+ISGS)
- GAMS based SCED Engine for GJ state hosted at WRLDC
- Remote log-in to SLDC GJ
- Hourly intra-day SCED run since Oct 2021
- Assumed Tech min, Ramp rate
- Saving potential: 5-10 lakh per day

## Uttar Pradesh

- 57 plants (SGS+ISGS)
- SCED engine (developed by Idam/WB) hosted at NRLDC
- Log-in to UP-SLDC
- 4 hourly SCED run since Dec 2021
- Assumed Tech min, Ramp limit
- Saving potential: 5-10 lakh per day



# Intra-state SCED – Progress during 2024



- Workshop conducted at GETRI Vadodara on Intra-state SCED for SLDC Executives – 24 June 2024
- Workshop at Maharashtra SLDC on Intra-state SCED – 2-3 September 2024
- Formation of internal core teams for implementation of intra-state SCED
  - In SLDC Gujarat – with IIT Gandhinagar
  - In SLDC Maharashtra – with IIT Bombay
- FOLD Discussion on action points for states on intra-state SCED – 21 Aug 2024
  - “My-SCED” Project to encourage states to develop SCED solutions in-house
  - Pilot projects started by Gujarat & Maharashtra; UP working towards intra-state SCED
  - States to nominate officers from different backgrounds for intra-state SCED initiative; completion aimed by 2025



# Intra-state SCED – Progress during 2025



- Maharashtra
  - Report by SLDC & IIT-B in Oct 2024 on optimizing power despatch - ₹28 Cr savings for 1 month study period
  - MERC order in April 2025 for six month online SCED pilot by SLDC
  - SCED & SCUC defined in Draft State Grid Code Amendment
- Karnataka
  - SCED & SCUC included in role of SLDC under Karnataka Electricity Grid Code, 2025
- Madhya Pradesh
  - In-house teams constituted by MP SLDC for implementation of intra-state SCED
- Gujarat
  - SLDC & IIT-Gandhinagar working towards intra-state SCED pilot
- Delhi
  - Committee formed for intra-state SCED study with support from IIT Bombay
- Uttar Pradesh
  - Work ongoing with support from IIT Kanpur
- Telangana
  - Work ongoing with support from IIT-Hyderabad



# Status of the Implementation : SRAS (AGC)

## Cost components in SRAS implementation

Sno	Cost component	Approximate Cost in (Rs.)	Type of cost
1	LDC infrastructure	0.58 Cr / LDC	One-time SCADA/EMS upgrade, incl services
2	Dedicated RTU, Switches, communication equipment	1.2 Cr/plant	One-time purchase, incl services
3	Wide band communication, terminal equipment	Subsumed in OPGW	Subsumed in transmission planning by CTUIL / STU. e.g. <a href="https://cercind.gov.in/2023/orders/37-TT-2021.pdf">https://cercind.gov.in/2023/orders/37-TT-2021.pdf</a>
4	Incentive for the plant under SRAS (based on historical performance statistics/records)	5 Cr. per plant per annum	Weekly performance based incentive. 40-50 paise/kWh CERC (AS) Regulations, 2022.

Multi vendor integration is also a major highlight in SRAS – generic specifications on website

Typical recovery of AGC investment by the plants through incentive in 6-12 months



# Intra-state plants under SRAS



- 20 MW/40 MWh BESS at BRPL Kilokari-1 (Delhi) integrated under AGC in May 2025
- DVC plants with total 3000 MW installed capacity operating continuously under AGC
  - Meja (2x500 MW) -- 12<sup>th</sup> June 2025
  - Durgapur Steel (2x500 MW) – 4<sup>th</sup> July 2025
  - Koderma (2x500 MW) -- 29<sup>th</sup> July 2025
- Unit #1 (660 MW) of Khurja STPP in continuous operation under AGC since 30<sup>th</sup> July 2025.
  - Real-time AGC data is being sent through ICCP to UPSLDC via NRLDC.
  - Weekly accounting of Khurja under AGC being carried out
  - Drawal schedule of UP is being moderated every week through WBES, factoring AGC DeltaP.
- Expected to join SRAS shortly –
  - PPGCL Bara (3x660 MW) – UP – under advanced stages of integration
  - Barauni (2x250 MW) – Bihar – communication completed
  - Partatu (3x800 MW) – Jharkhand
  - Meja (2x660 MW) – UP
  - CLP Jhajjar (2x660 MW) – Haryana



# Status of the Implementation : SAMAST



सत्यमेव जयते



# Summary of status of SAMAST

States	SAMAST Implementation Status			Remark
Region	SAMAST in operation	Under implementation	Yet to Start	
North	4 UK, DL, UP, HR	2 HP, PB		<a href="#">State-specific details</a>
West	2 MH, MP, CG	2 GJ, Goa		<a href="#">State-specific details</a>
South	2 TN, KR,	3 AP, KR, TS		<a href="#">State-specific details</a> PSDF funds reversed for AP
East	1 WB	4 BR, OR, JH, SK		<a href="#">State-specific details</a>
North-East	3 AS, ML, NL			<a href="#">State-specific details</a>
UT			6 CH, PY, DD, DNH, LD, AN, J&K	Yet to be initiated
<b>TOTAL</b>	<b>12</b>	<b>1</b>	<b>17</b>	<b>1 State + 6 UT</b>



# Status of the Implementation : F&S, DSM

# Summary of status of F&S and DSM Regulations

States	F&S Regulations			DSM Regulations		
Region	Notified	Draft Published	WIP or Yet to initiate	Notified	Draft Published	WIP or Yet to initiate
North	6 RJ, UP, UK, HR, PB, HP		2 DL, J&K	6 HP, DL,RJ, UK,HR, PB		2 J&K, UP,
West	4 CG, MP, MH, GJ		1 Goa	4 GJ, CG, MP, MH		1 Goa
South	4 AP, KR, TS, TN		1 KL	4 TN, TS, AP, KR		1 KL
East	3 JH, SK, BR	1 OR	2 WB	3 JH,SK,WB	2 OR, BR	-
North-East	5 AS, MN, ML, MZ,TR		2 AR,NL	5 ML,AS,MN,MZ,TR		2 AR, NL
UT			6 CH, PY, DD, DNH, LD, AN	1 DD		5 CH, PY, DNH, LD, AN
<b>TOTAL</b>	<b>22</b>	<b>1</b>	<b>14</b>	<b>23</b>	<b>2</b>	<b>11</b>



# Workforce adequacy of SLDCs based on workshop conducted during May and August 2025



Planning for safe, secure, and reliable integrated operation of the power system during critical periods arising on account of seasonal variations -specific measures to mitigate the risks on the power system

10<sup>th</sup> September 2025

# Regional workshops

To deliberate on planning for safe, secure, and reliable integrated operation of the power system during critical demand periods, wherein discussions were held by Chairperson, CERC and Member (Technical), CERC with Senior officials of respective State Government, State Electricity Regulatory Commissions, Discoms, Transcos, RLDCs and respective State Load dispatch Centers

Sl. No.	Region	Venue of Workshop	Date
1	North Eastern	Guwahati	24.05.2025
2	Eastern	Kolkata	01.08.2025
3	Northern	Lucknow	11.08.2025
4	Southern	Bengaluru	21.08.2025
5	Western	Mumbai	29.08.2025

## Issues discussed during the workshop:

- Workforce shortages and their training and certification
- Enablement of AGC in intra-state generating stations
- Submission of Resource Adequacy data
- Alignment of State Grid Code with CERC Grid Code 2023,
- Preparedness for Cyber Security threats
- Backing down of intra-state thermal generating stations till MTL of 55%
- Strengthening of intra-state transmission network
- Maintaining adequate reserves by States



# Workforce Adequacy for SLDCs-MOP OM dated 30.10.2024



S. No.	Large SLDCs	Medium SLDCs	Emerging SLDCs
1	Andhra Pradesh	Assam	Arunachal Pradesh
2	Gujarat	Bihar	Chandigarh
3	Haryana	Chhattisgarh	Dadra and Nagar Haveli /Daman & Diu
4	Karnataka	Damodar Valley Corporation	Goa
5	Maharashtra	Delhi	Manipur
6	Madhya Pradesh	Himachal Pradesh	Meghalaya
7	Punjab	Jammu & Kashmir and Ladakh	Mizoram
8	Rajasthan	Jharkhand	Nagaland
9	Tamil Nadu	Kerala	Puducherry
10	Telangana	Odisha	Sikkim
11	Uttar Pradesh	Uttarakhand	Tripura
12	West Bengal		Andaman & Nicobar*
13			Lakshadweep**

	Large SLDC	Medium SLDC	Emerging SLDC
<b>Required workforce</b>	<b>144</b>	<b>103</b>	<b>62</b>

# Why adequate manpower?

## Emerging Areas for LDCs



**Reliability**  
Operations Planning, Transfer  
Capability, Reserves



**Security**  
Forecasting, Scheduling,  
Imbalances, Optimization,  
Ancillary Services



**Wholesale Electricity Markets**  
OTC markets, Power Exchanges,  
Transmission Pricing  
GDAM, GTAM



**Data Analytics**  
Operational Feedback, Policy  
Advocacy, Big Data Analytics



**New Technologies**  
New SCADA/EMS upgrades,  
Synchro-phasor technologies, Real  
time Applications, Off-line  
applications



**Capacity Building**  
System Operators basic and specialist  
level certification  
Culture and Climate  
Building an engaged workforce

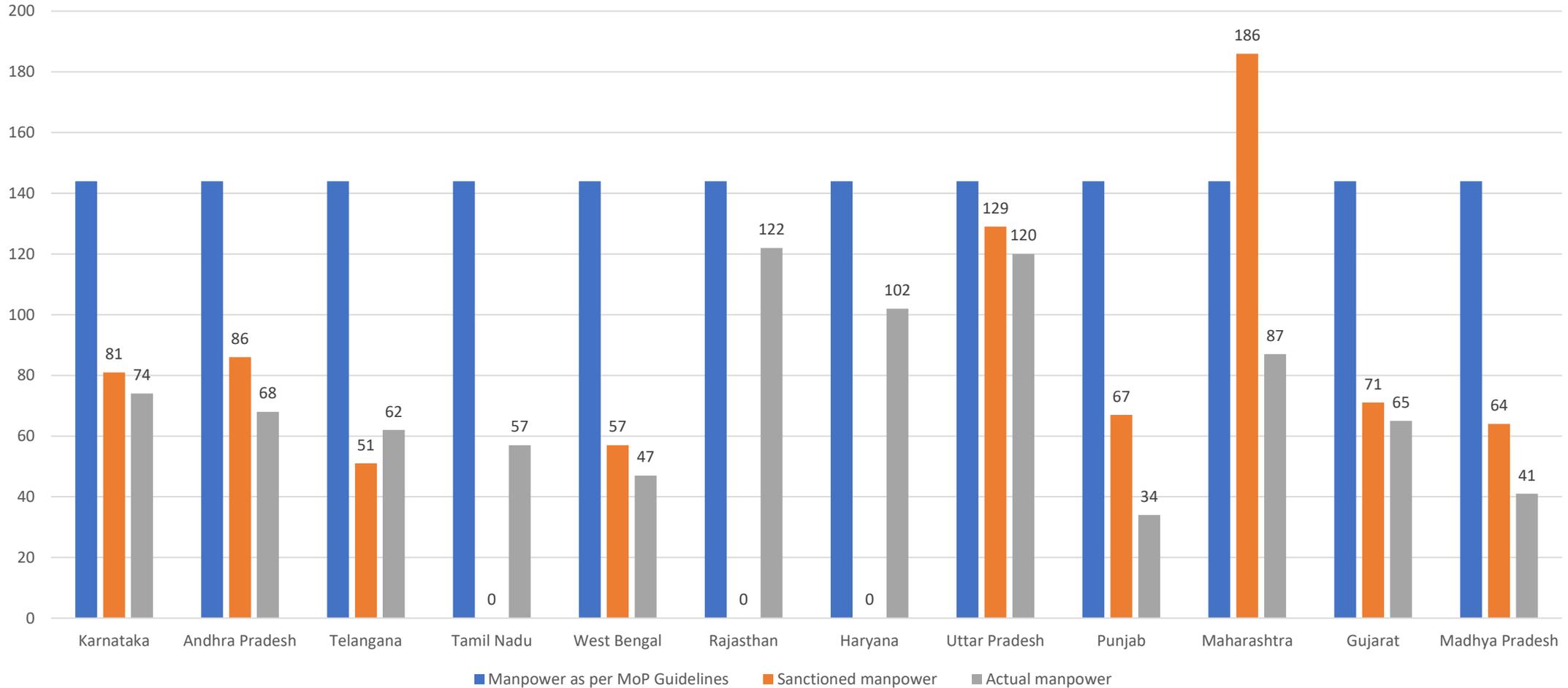


**Cyber Security**  
Real-Time Cyber Security  
Policies and Frame-work



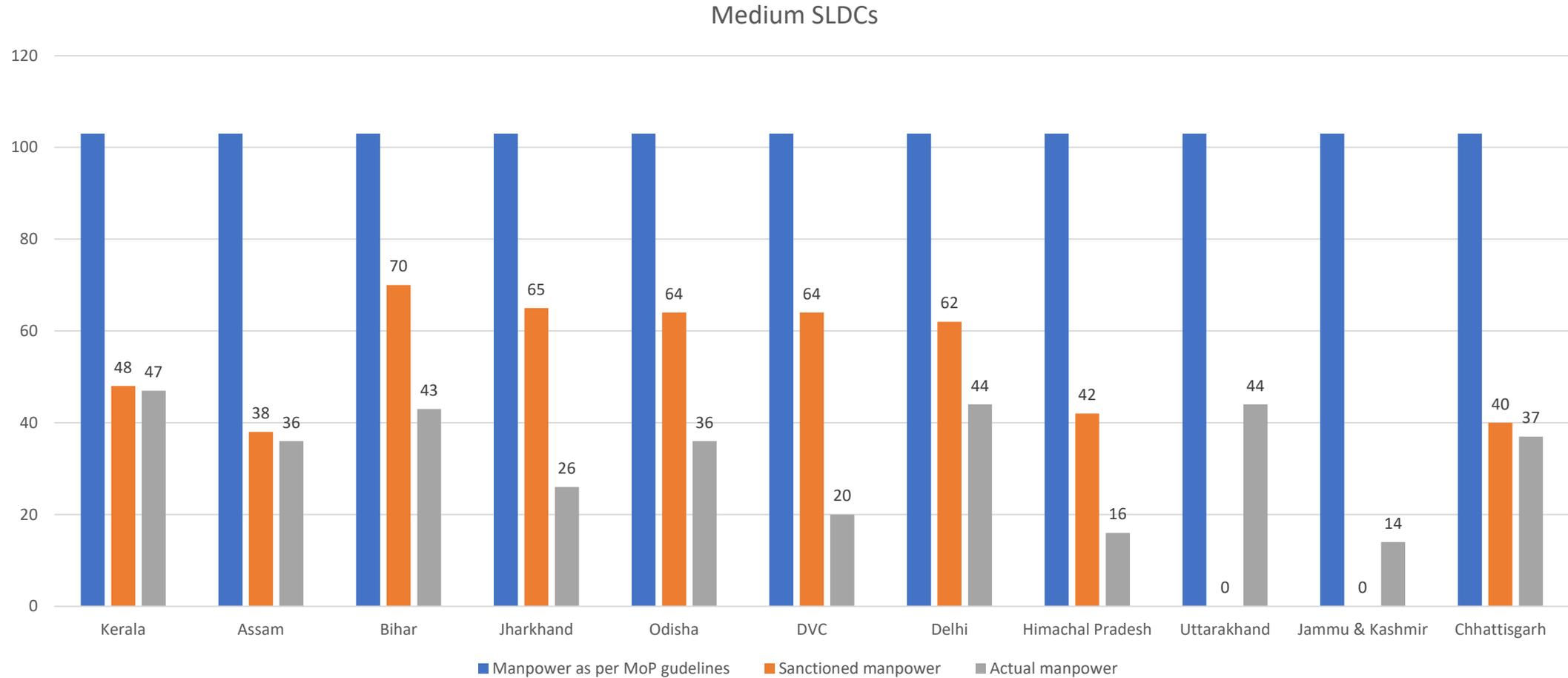
**Renewable Energy**  
REMCs  
Forecasting, integration, Data  
Analytics

# Large SLDC



Sanctioned manpower is between 0 to 186 against which the actual deployment of manpower is 34 to 122

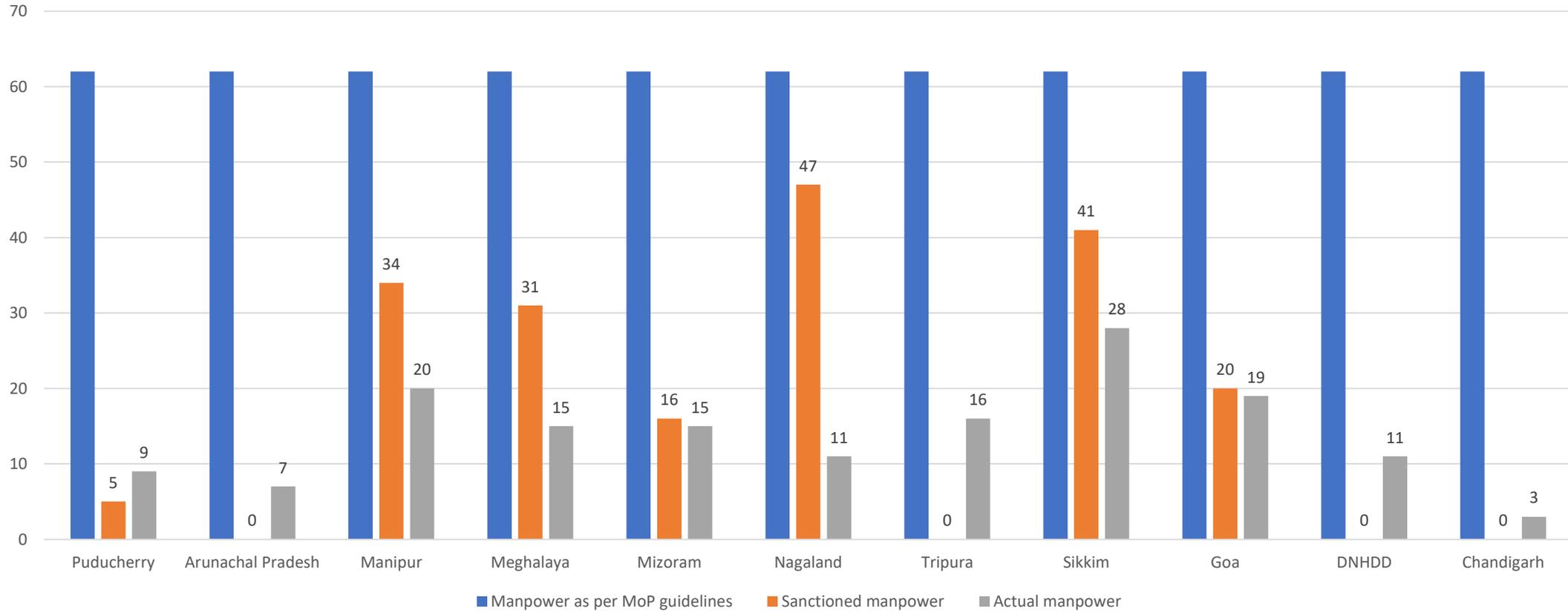
# Medium SLDC



Sanctioned manpower is between 0 to 70 against which the actual deployment of manpower is 14 to 47.

# Emerging SLDC

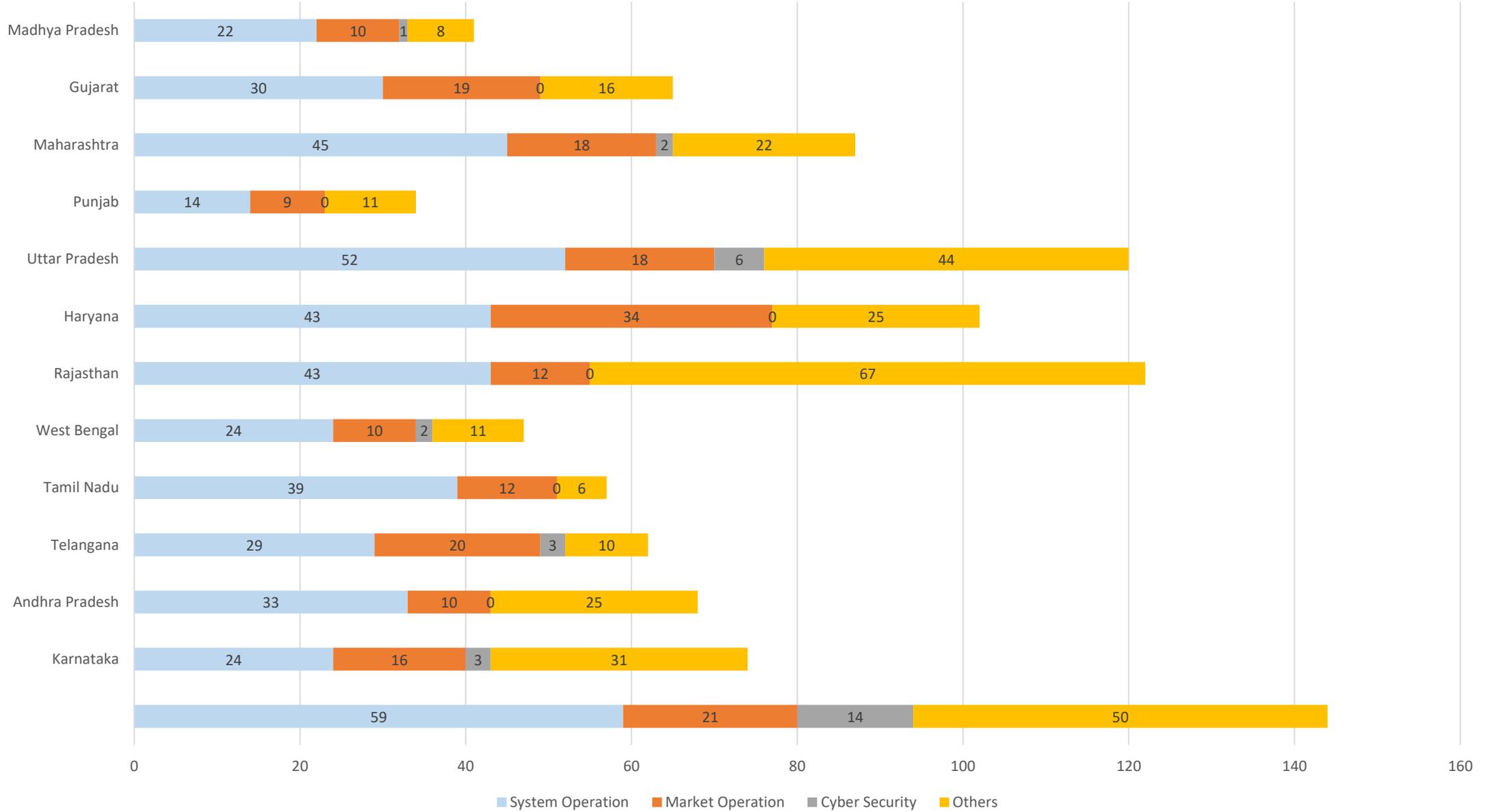
Emerging SLDCs



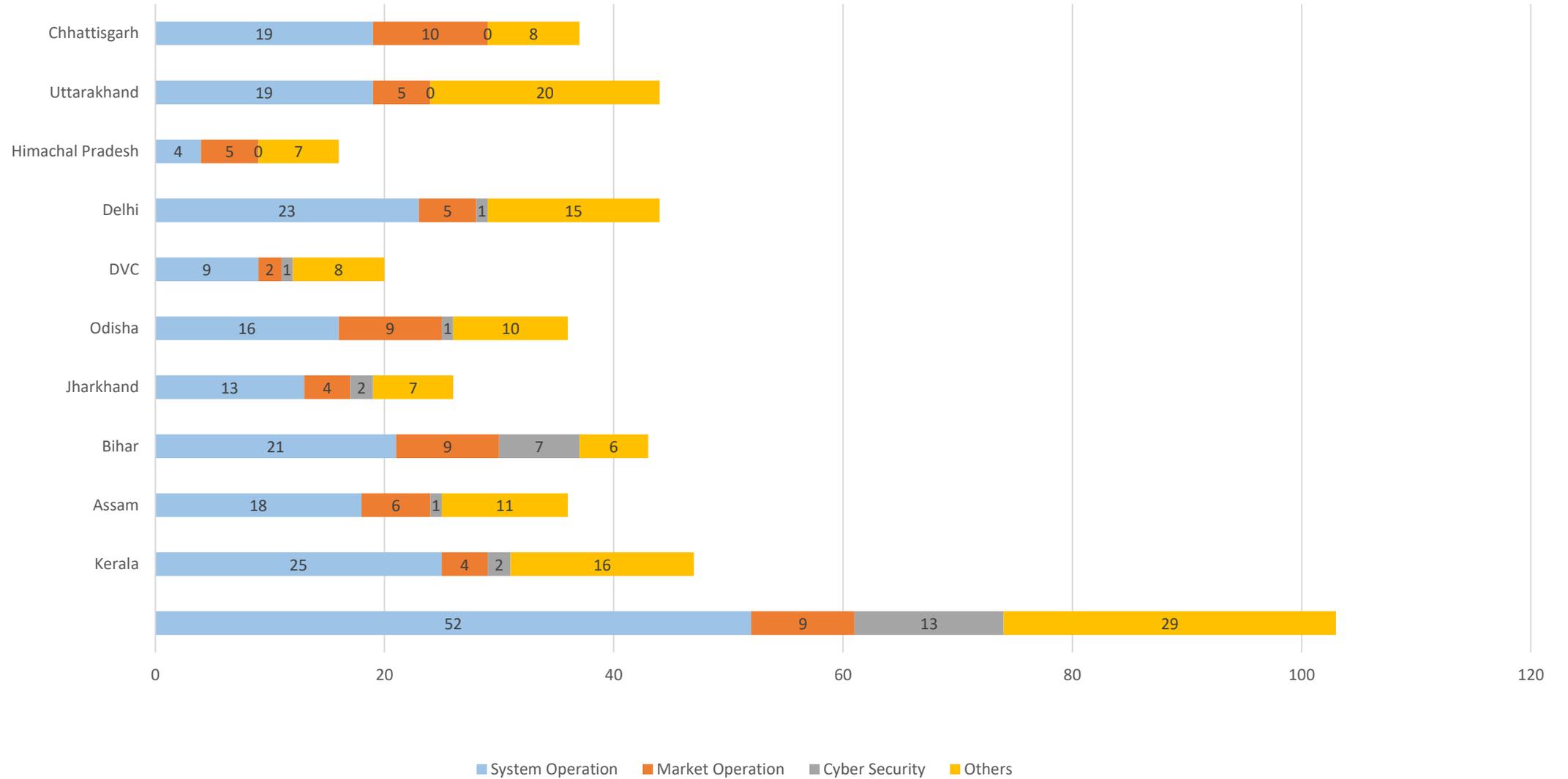
Sanctioned manpower is between 0 to 47 against which the actual deployment of manpower is 3 to 28



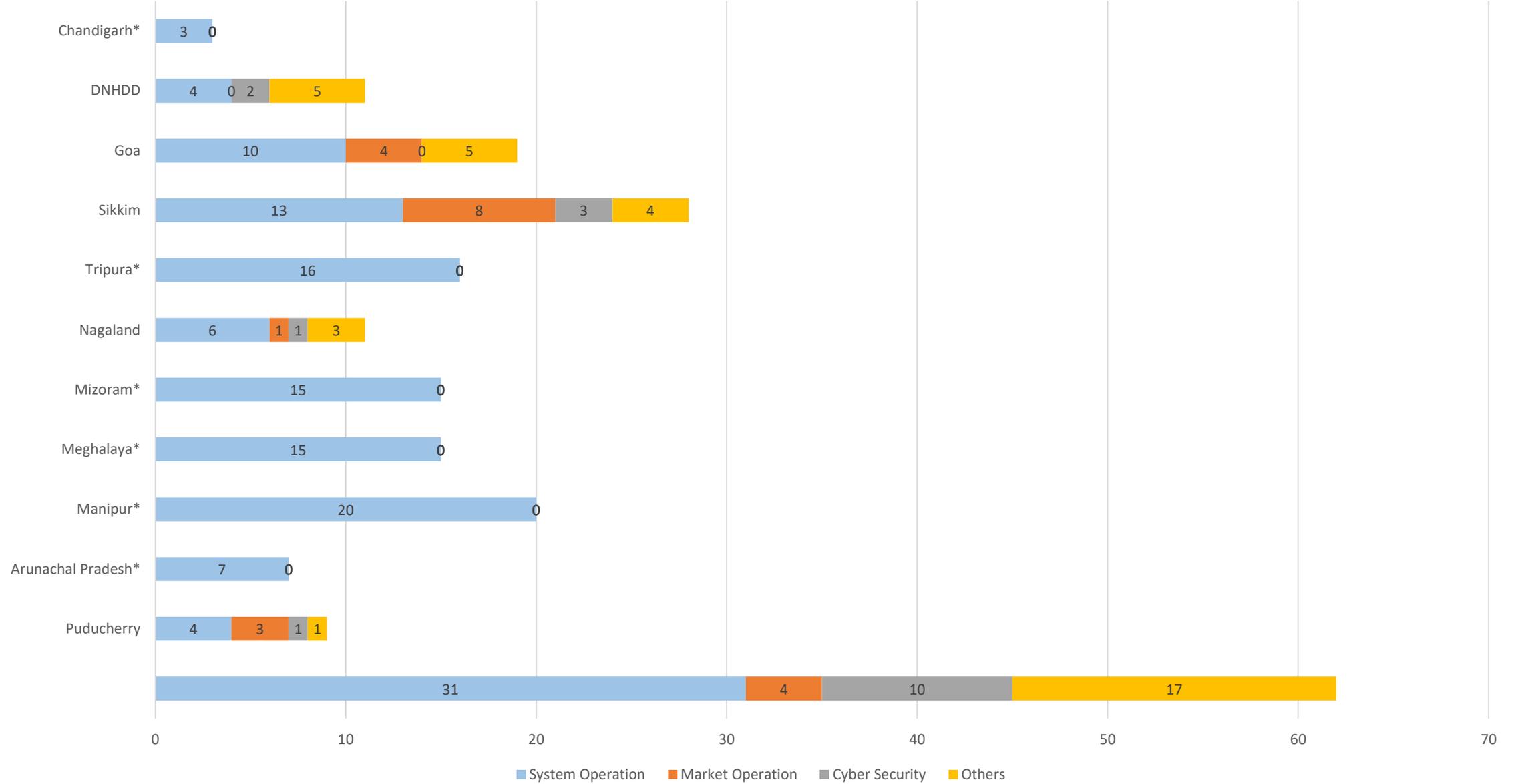
# Workforce Distribution: Large SLDC

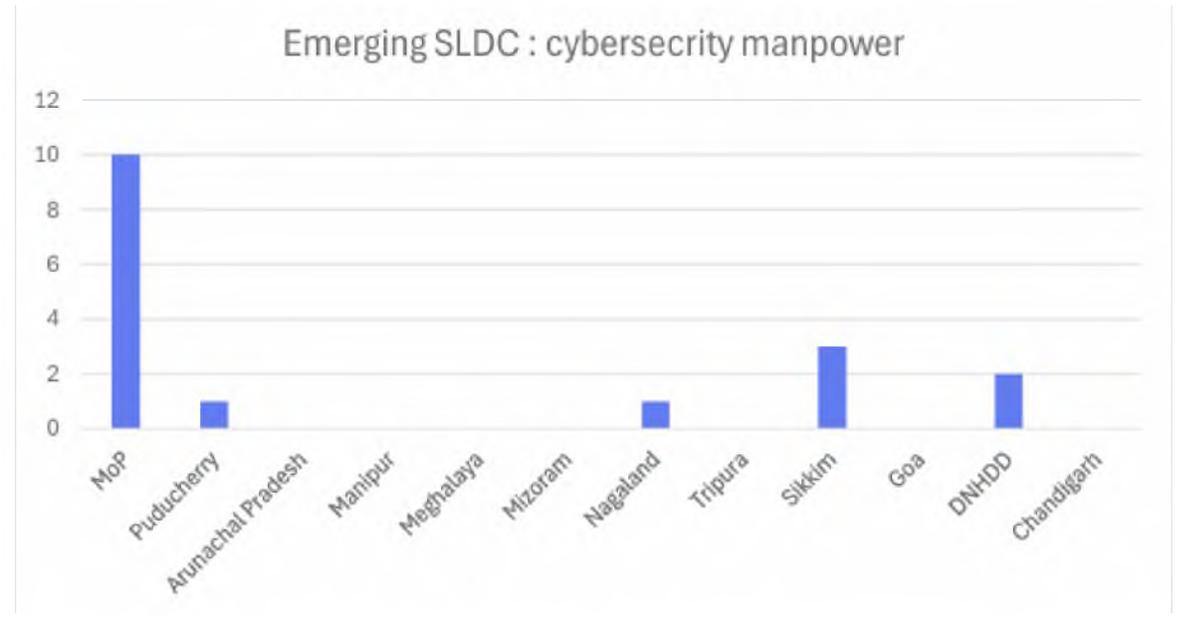
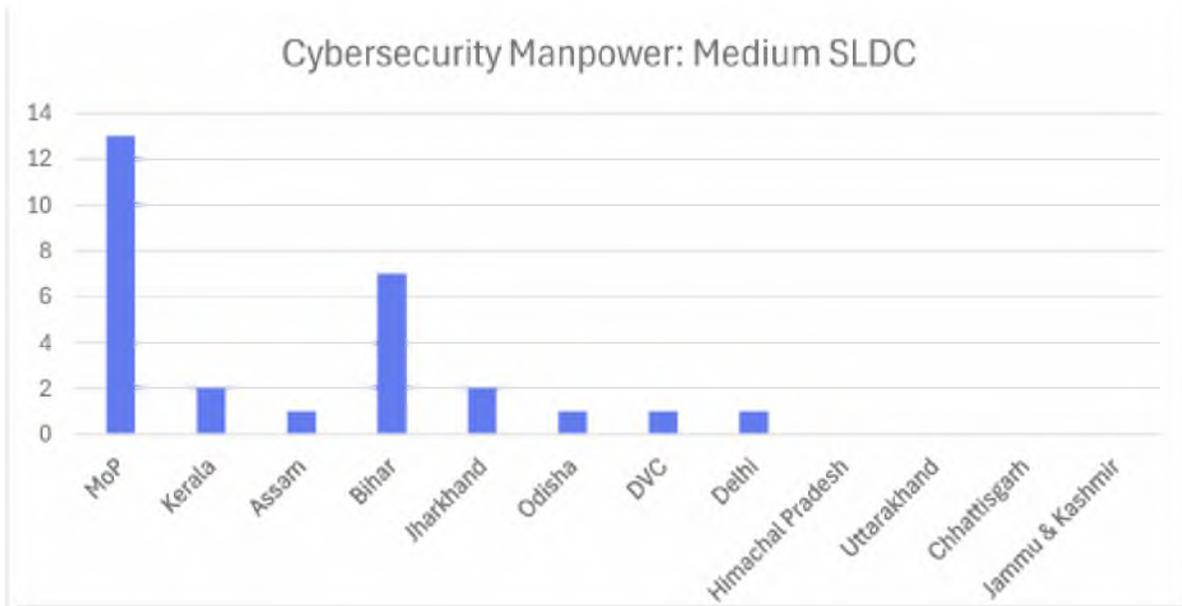
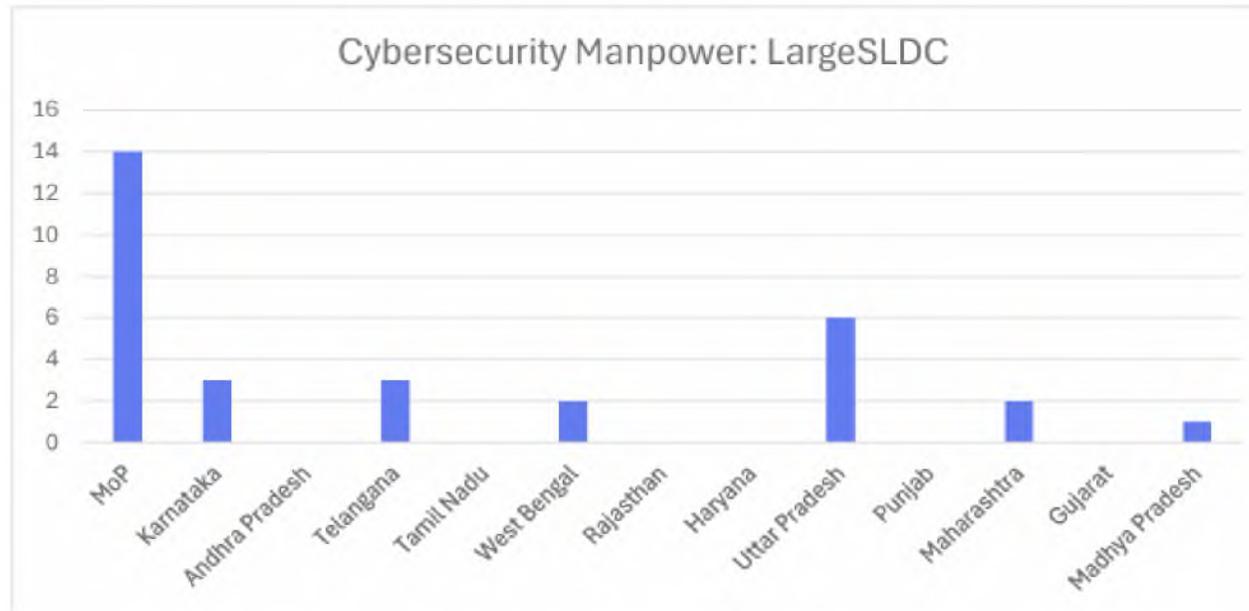


## Workforce Distribution: Medium SLDC



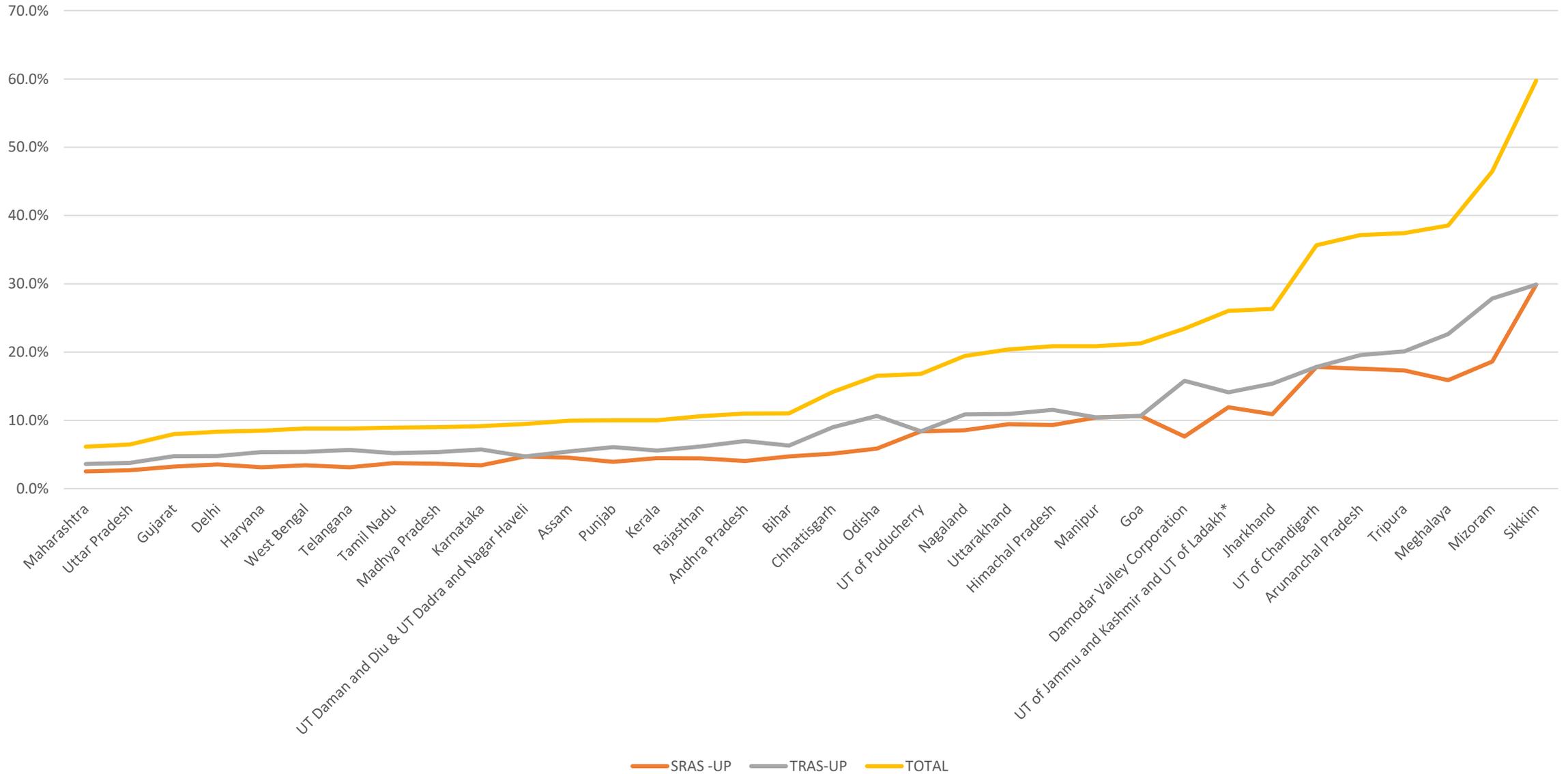
### Workforce Distribution : Emerging SLDC





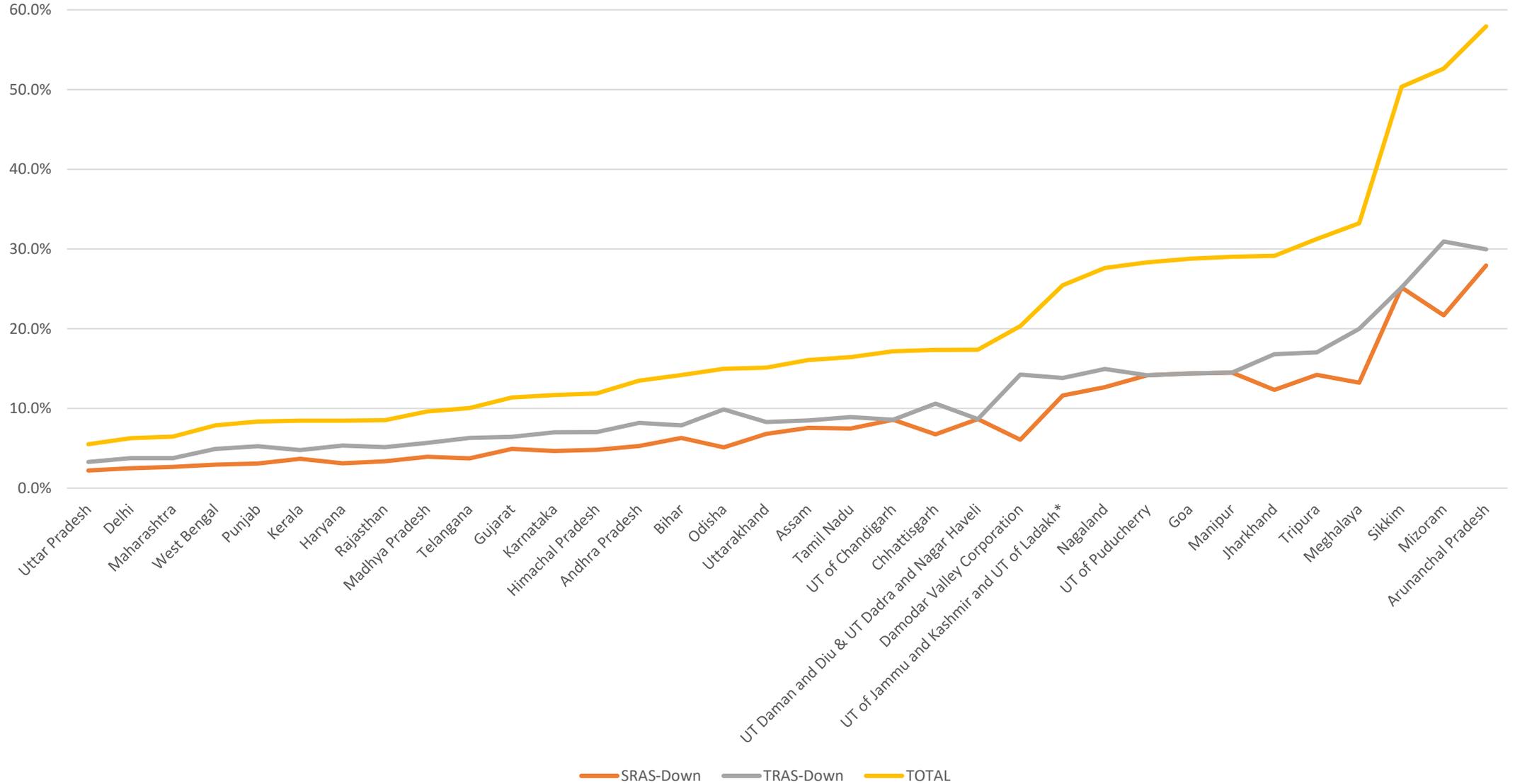
# Reserves: Secondary and Tertiary

Up Reserve requirement as % of Demand 2025-26



# Reserves: Secondary and Tertiary

Down Reserve requirement as % of Demand 2025-26



# Gist of the workshop

## Adequacy of Workforce

- Almost all the SLDCs have reported shortage of manpower. During the discussion the need for adequate manpower in SLDCs was highlighted. While some of the states such as Bihar, Odisha, and Jharkhand outlined steps taken for recruiting additional staff, others have reported that approval for additional staff is under process.
- It was recommended that sanctioned manpower strength in SLDCs should be revised and actual manpower should also be in line with Ministry of Power (MoP) guidelines.
- It was also suggested that a separate HR and transfer policy can be developed in other states as per the policy framed by UPSLDC.
- Power system is a critical infrastructure that must be safeguarded against **cyber-attacks**. State SLDCs are not having adequate manpower in the area of cyber Security. With the growing concern of cyber threats, adequate number of staff needs to be deployed. Further, the training on cyber security is a critical area and the staff should be mandatorily trained in this area.
- SLDC fees and Charges regulation in line with RLDC fees and charges could be formulated by the SERCs

# Training and certification of SLDC Manpower

## Provisions

As per the CEA's framework for Training and Certification, 2024, Load Despatch Centres are required to arrange Basic level training and Certification by Certification Agency of existing employees engaged in operation at Control Room of **SLDCs before 11.06.2025.**

## Issues

- Sparring of manpower for training is difficult as they are having less manpower.
- Delay in getting advanced level training due to unavailability of slots.
- Retaining of trained staff at SLDCs
- Cyber security is a critical area and the staff should be trained in this area
- Limited availability of slots for taking up the certification exams.
- Requirement of posting in SLDC for imparting of training by NPTI

## Solution :

- Grid-India shall take up the issues with the NPTI and work towards increasing the number of seats available and other issues.
- To attract the staff for working in SLDCs incentive provisions can be incorporated under the Fee and Charges of the SLDCs.
- Posting criteria/ tenure in SLDC should also be increased and Separate HR and transfer policy needs to be in place. **(UPSLDC has framed a HR Management and Development Policy)**
- Grid-India is also arranging knowledge sharing programmes to enhance the skills and capabilities of SLDC manpower

# UPSLDC HR Management and Development Policy

The UPSLDC HR Management and Development Policy aimed to structure the movement of officers in specialized functions without disrupting operations and to identify and place suitable common cadre personnel from UPPCL and UPPTCL for continuous staffing while implementing job rotation. It has following key provisions:

- **Approximately one-third (33%) of the personnel working in UPSLDC Ltd. will need to be trained and certified every year.**
- The posting of personnel to UPSLDC will be based on the utility, technical proficiency, training and certification of the personnel.
- All technical staff transferred to UPSLDC Ltd. will need to undergo power system operator training within 6 months and participate in the earliest occurring certification exams.
- The pool of skilled load dispatch operators is sought to be developed by inducting an adequate number of Assistant Engineers (AEs) into UPSLDC regularly.
- **New Personnel posted in UPSLDC will have to get Certification within 01 year, failing which they shall be shifted out.**
- Personnel having less than 5 years of service remaining, will not be posted in UPSLDC Ltd. if they did not have basic level PSO training or other relevant technical training in the past.
- **Personnel posted to UPSLDC Ltd. will be exempted from restrictions related to their posting in home district or circle.**
- **Transfers outside of SLDC will ordinarily be approved when adequately trained and certified personnel are available except in case of transfer on administrative ground.**
- Technical personnel who fail to obtain certification even after two opportunities will be transferred out of UPSLDC and their cadre controlling authorities will be advised to initiate IDP against them.
- Non-technical personnel who complete 5-year tenure at UPSLDC will be transferred out of UPSLDC Ltd. The maximum tenure for these personnel will remain 5 years which will not be increased under any circumstances, whatsoever.
- The UPSLDC HR Management and Development Policy ensures smooth staffing, structured job rotation, and continuous skill development of personnel.

# What is Resource Adequacy ?

- Tying up sufficient capacity to reliably serve expected demand in cost effective manner.
- Resource Adequacy involves:
  - (a) Demand forecasting
  - (b) Generation resource adequacy planning to meet the projected demand
    - includes planning reserve margin (PRM) taking into account loss of load probability and energy not served as specified by CEA
  - (c) Transmission resource planning

# Measures proposed by the states to meet the expected power deficit from March 2025 to May 2025

## Measures taken by States to meet the forecasted power deficit

- Banking arrangement
- Long Duration contracts
- Procurement through DEEP Portal
- Requested allocation of power from unallocated pool
- Procurement of power from DAM & RTM
- Bilateral Agreement

### Short-term purchases through DAM for the month of January 2025 to June 2025: sample data

- Only about 6–7% of the total electricity generated is currently being traded on power exchanges.
- **The percentage of the volume cleared (energy) in DAM is 50% (average) of the total buy bid placed**

### Short-term purchases through RTM for the month of January 2025 to June 2025: sample data

- **The percentage of the volume cleared (energy) in RTM is 66% (average) of the total buy bid placed.**



## Steps to achieve secure Grid through adequate and skilled Manpower

- Ring fencing for SLDCs – should have administrative and financial autonomy
- Adequacy of Manpower for SLDC should be assessed by State Electricity Regulatory Commission
- Separate fees and charges for SLDC may be determined by State Electricity Regulatory Commission.
- Provide regular training and certification to keep SLDC up to date with latest challenges.
- CERC is assessing manpower as well as doing fees and charges for Grid India.



# Way forward



- ❑ SLDCs to plan power procurement in advance
  - DAM and RTM may not guarantee power availability.
- ❑ SLDCs –Sanctioned strength needs to be revised considering the MoP Workforce Adequacy Guidelines for Load Despatch Centres and recruitment of additional manpower in phased manner.
- ❑ RLDCs – Conduct structured capacity-building programs to equip SLDC personnel with the required technical skills.
- ❑ SLDCs – Maintain the reserves as allocated as per the provisions of the Grid Code.
- ❑ AGC implementation in state generators
  - SERC : incentive for AGC
- ❑ Minimum Turndown level implementation in state generators
  - SERC regulation for part load compensation mechanism.
- ❑ Two shift operation may be worked out in state generators.



# Status of part load compensation mechanism, AGC, SLDC fee & charges and Adequate manpower in States



Region	Name of State/UT	Part Load Compensation Mechanism	AGC Provision under State Regulations	SLDC Fees & Charges Regulation	Actual Manpower % w.r.t Manpower as per MoP Guideline	Intra-state SCED Regulation
NR	Rajasthan	x	✓	✓	85%	x
	Haryana	MYT Regulation	x	MYT Regulation	71%	x
	Delhi	x	x	✓	45%	x
	Uttar Pradesh	x	x	✓	83%	x
	Punjab	x	x	MYT Regulation	24%	x
	Himachal Pradesh	x	x	✓	16%	x
	Uttarakhand	x	x	✓	43%	x
	Jammu & Kashmir	x	x	MYT Regulation	14%	x
	Chandigarh	x	x	x	5%	x
WR	Maharashtra	✓	x	MYT Regulation	60%	x
	Gujarat	MYT Regulation	x	MYT Regulation	45%	x
	Madhya Pradesh	✓	✓	✓	29%	x
	Chhattisgarh	x	x	MYT Regulation	36%	x
	Goa	x	x	x	31%	x
	DNHDD	x	x	x	18%	x
SR	Karnataka	✓	✓	Tariff order	51%	x
	Andhra Pradesh	x	x	MYT Order	47%	x
	Telangana	x	AGC is under process at State level Thermal generators*	MYT Regulation	43%	x
	Tamil Nadu	✓	x	Tariff order	40%	x
	Kerala	x	x	x	46%	x
	Puducherry	x	x	x	15%	x



# Status of part load compensation mechanism, AGC, SLDC fee & charges and Adequate manpower in States



Region	Name of State/UT	Part Load Compensation Mechanism	AGC Provision under State Regulations	SLDC Fees & Charges Regulation	Actual Manpower % w.r.t Manpower as per MoP Guideline	Intra-state SCED Regulation
ER	Bihar	x	x	✓	42%	x
	Jharkhand	Draft Terms and Conditions for Determination of Generation Tariff Regulations	x	✓	25%	x
	Odisha	x	x	✓	35%	x
	West Bengal	x	✓	x	33%	x
	DVC	✓	✓	--	19%	x
	Sikkim	x	x	✓	45%	x
	NER	Assam	x	x	MYT Regulation	35%
Arunachal Pradesh		Draft State Grid Code	x	MYT Regulation	11%	x
Manipur		x	x	✓	32%	x
Meghalaya		x	x	✓	24%	x
Mizoram		x	x	✓	24%	x
Nagaland		x	x	✓	18%	x
Tripura		x	x	x	26%	x

\* Telangana do not have Ancillary services regulation or provision in intra-state regulation



**THANK YOU**



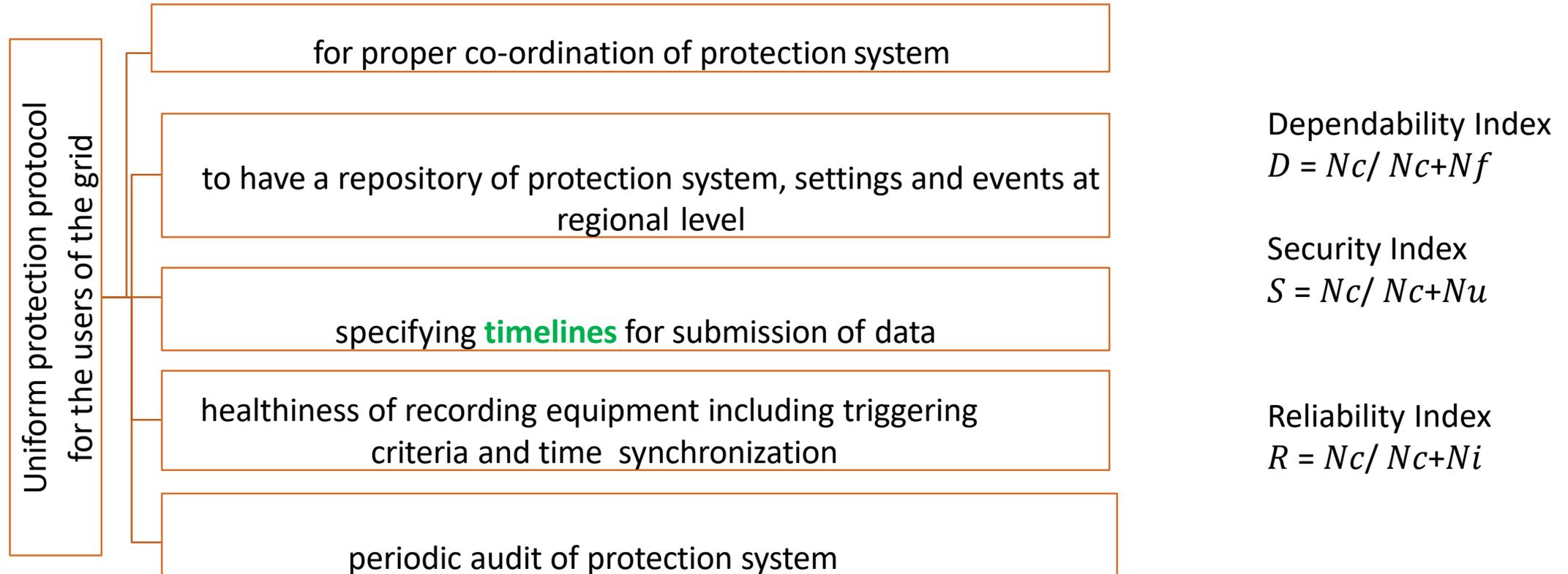
# Resource Planning Code



- 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.

# 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.
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

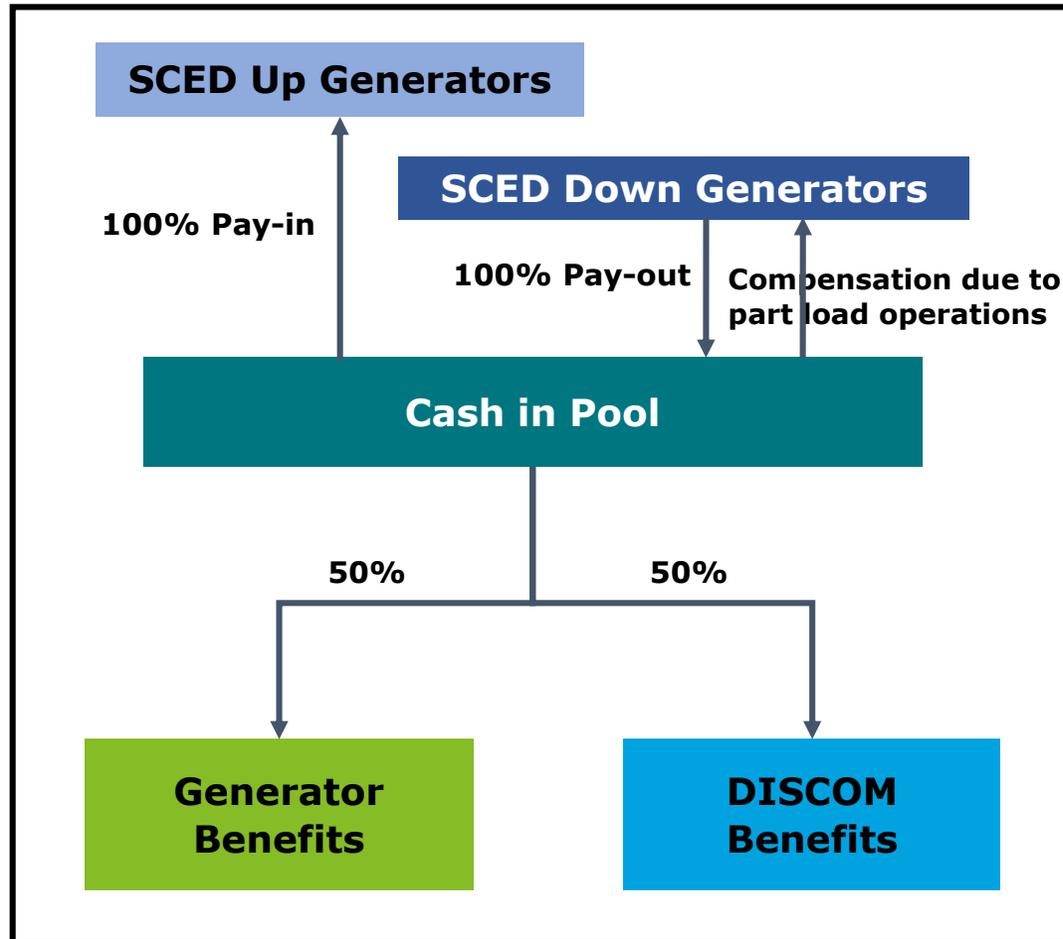
# Operating Code:

- 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.

# SCED Benefits sharing



- **SCED Up** generators to be **paid the variable charges from the pool** on the basis of SCED Up contribution ( $SCED\ Up\ Quantum \times VC$ )
- **SCED Down** generators to **pay to the pool requisite variable charges** on the basis of SCED Down contribution ( $SCED\ Down\ Quantum \times VC$ )
- **SCED Down** generators to also receive **part load compensation** from the pool
- Cash left in pool is the total benefits to be shared
- As per MoP scheme, **Cash in Pool is divided in 50:50 ratio (Generator benefits : DISCOM Benefits)**

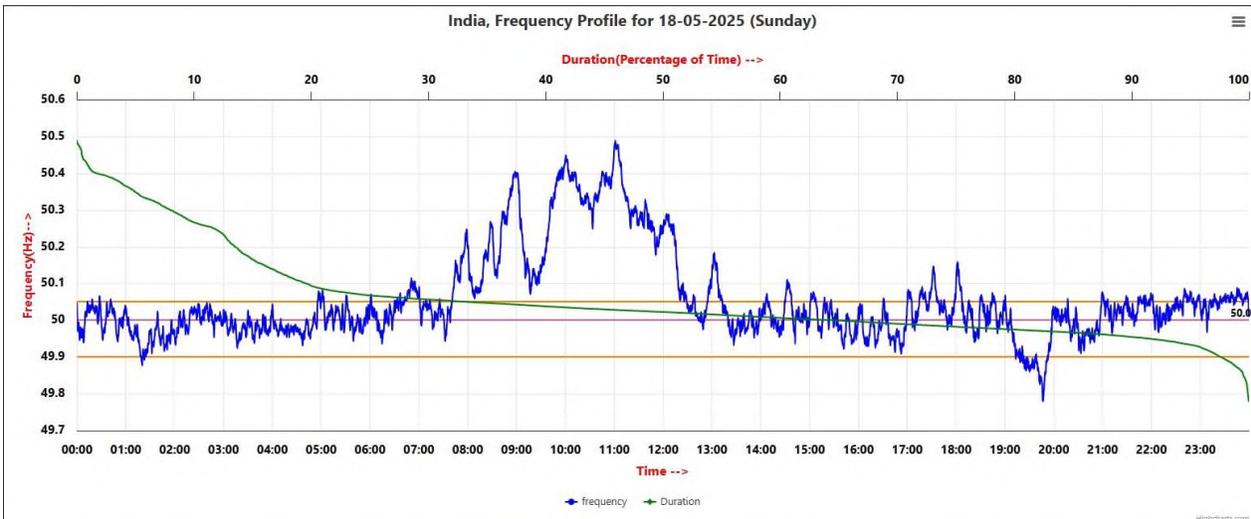
- Ration between SCED Up and SCED Down generators are 3:2
- Among Distribution utilities in proportion to their scheduled with ISGS stations

# Background - Frequency Profile

High Frequency observed on several days

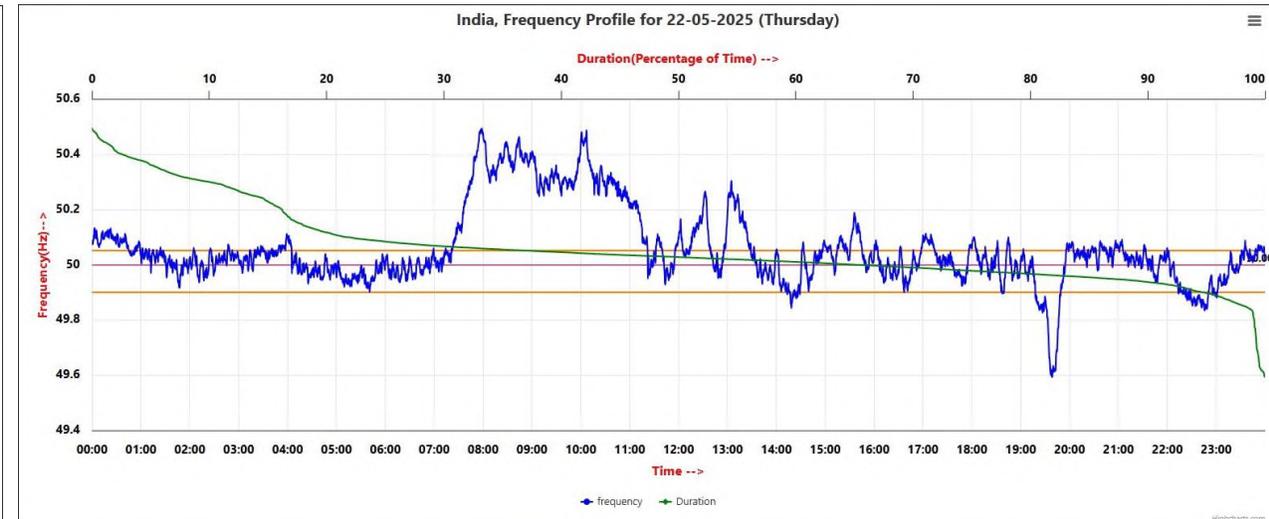
>50.05 Hz for about 33% of the time

18<sup>th</sup> May 2025



>50.05 Hz for about 37 % of the time

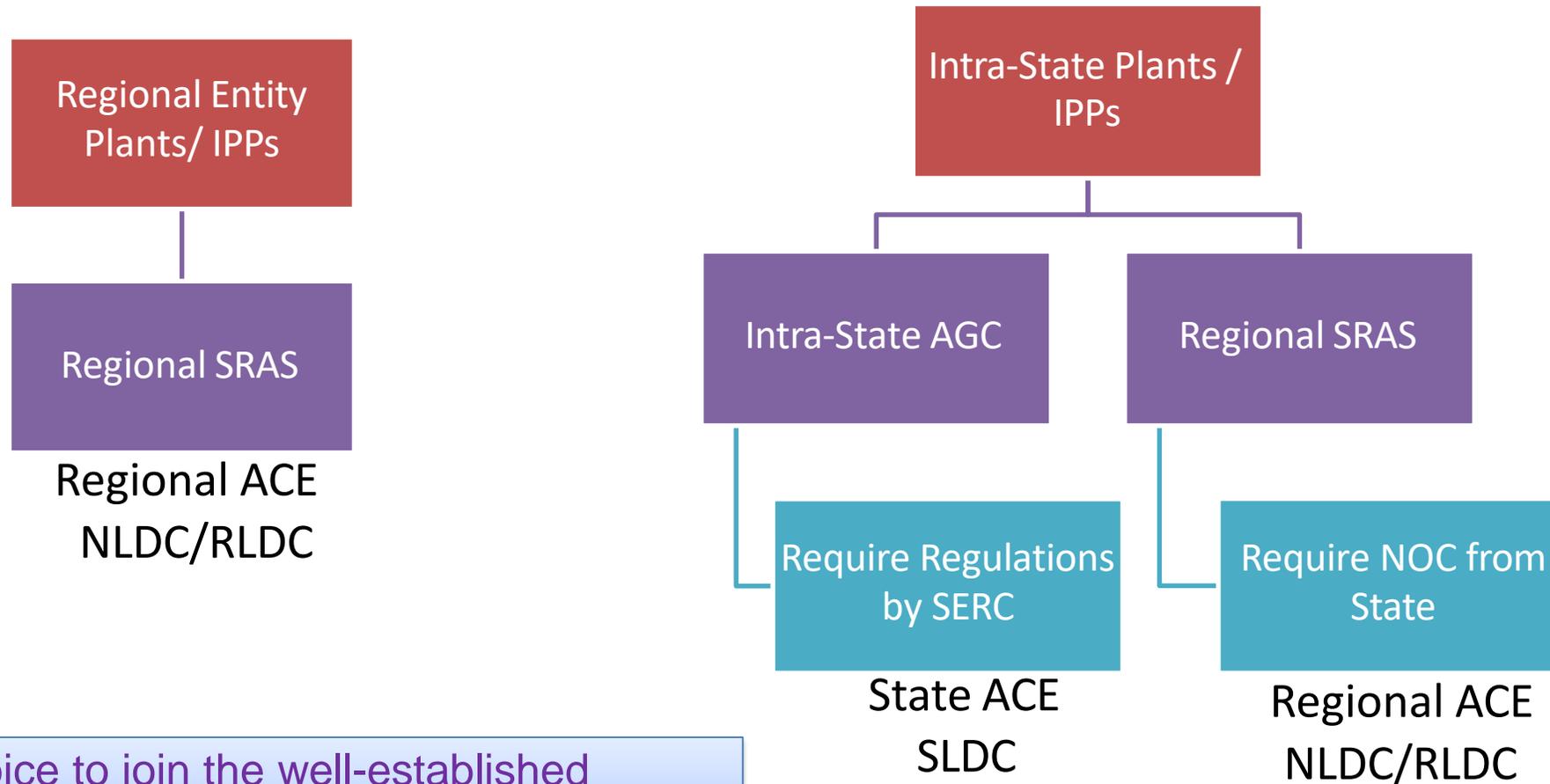
22<sup>nd</sup> May 2025



- A report on high frequency operation on 04<sup>th</sup>, 11<sup>th</sup> & 25<sup>th</sup> Aug 2024 by GRID-INDIA is available at link below  
<https://posoco.in/en/download/report-on-high-frequency-operation-for-4th-11th-and-25th-aug-2024/?wpdmdl=59532>
- Hon'ble CERC, through its Order in Suo-Motu Petition No. 2/SM/2025, has directed measures aimed at mitigating high grid frequency and ensuring secure and reliable power system operation (Link: <https://cercind.gov.in/2025/orders/2-SM-2025.pdf>)

Less than 55%		More than 55%					
Plant Name	% of DC	Plant Name	% of DC	Plant Name	% of DC	Plant Name	% of DC
UKAI	47%	BLTPS	100%	Barsingsar	71%	IEPL	64%
SLPP	55%	BHUSAWAL	92%	Bakreswar TPS	71%	MARWA TPS	64%
PARLI	46%	KORBA(W) CSETCL	92%	GGSTPS Ropar	70%	SANJAY GANDHI TPS	63%
NASIK	48%	AMARKANTAK	91%	Suratgarh	70%	Tuticorin	63%
TATA TROMBAY Th	51%	Kolaghat TPS	91%	Tenughat TPS	70%	KHAPARKHEDA	63%
JPL DHULE (SHIRPUR)	48%	JP BINA	89%	Santaldih TPS	67%	SWPGL	63%
APML TIRODA	55%	HALDIA TPS	86%	JAIGAD	67%	CHANDRAPUR	62%
		KLTPS	84%	Raj West	66%	SINGAJI	62%
		METTUR-Stg1&2	84%	SAGARDIGHI TPS	64%	Kota	62%
		VSLPP	83%	DCRTPP	57%	RGTPS (Khedar)	62%
		PARAS	83%	Anpara A&B	57%	VIJAYAWADA TPS	62%
		DPL TPS	80%	Kalisindh	57%	VADINAR	61%
		Bandel TPS	80%	Surat-SCTPS	57%	Raichur TPS	61%
		KORBA EAST EXT(DSPM)	77%	SATPURA II	56%	WANAKBORI	61%
		HIRANMAYEE TPS	75%	Meja	56%	KHURJA STPP	61%
		IB TPS Stg-1	73%	IB AMARAVATI	56%	KORADI	59%
		Panipat	72%	GHATAMPUR TPS	56%	Kawai	58%
		GANDHINAGAR(GTPS)	72%	DAHANU	56%	APL MUNDRA	58%
		STCMS	71%	Chhabra	57%	Anpara-D	57%
		Lehra MBBTTPS	71%				

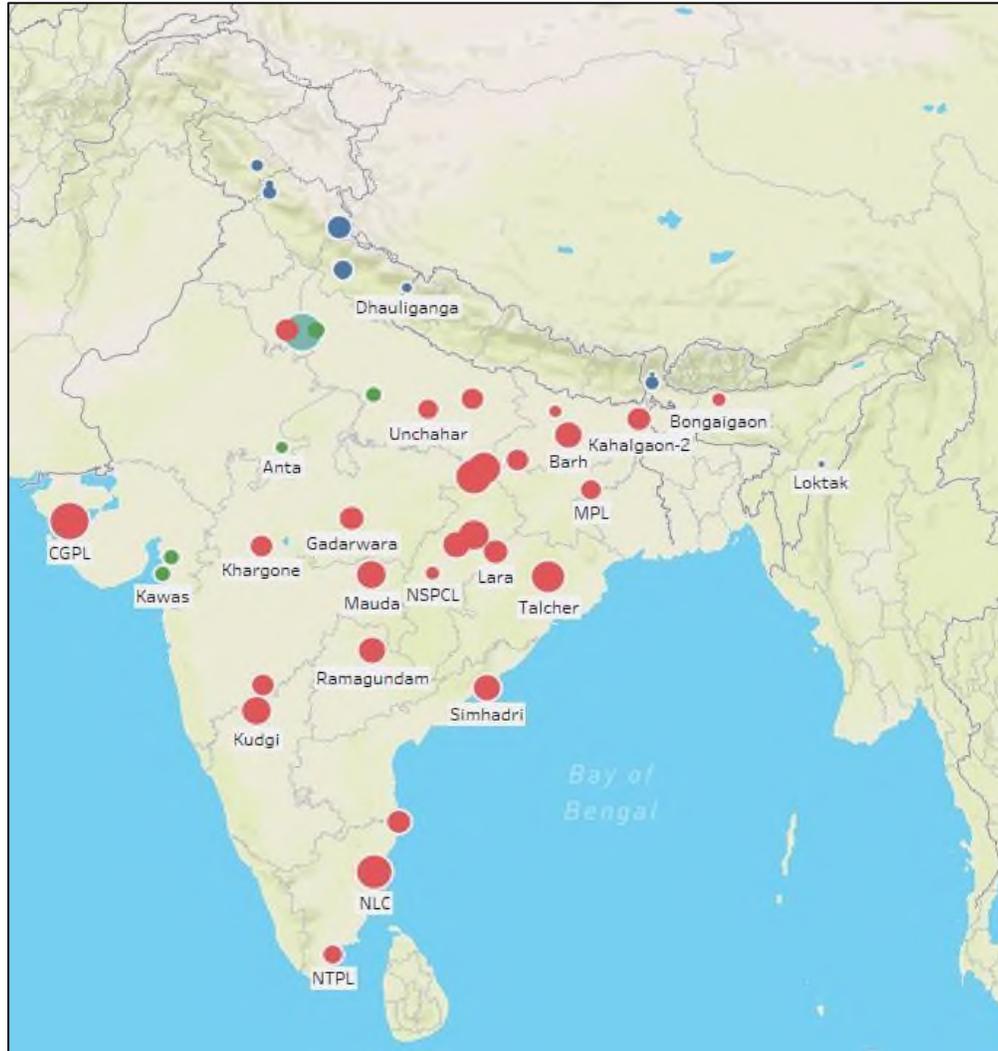
# Options for Participation under AGC



Choice to join the well-established SRAS mechanism at the Regional level

If basic infrastructure is created, switch/joint operation by LDCs can be explored too!

## AGC Project Status



- 82 power plants with 78650 MW capacity under AGC, 210 units
  - 68.6 GW coal-based, 6.6 GW is hydro and 3.2 GW is gas-based, 180 MW solar pilot, and 20 MW/40 MWh BESS pilot.
- Up & Down Regulation up to +/- 1500 MW-2000 MW pan-India
- Expanding the ambit of generators
  - Intra-state plants / IPPs pursued
  - Pilots with new technologies undertaken
    - Solar – Devikot (180 MW)
    - BESS – BRPL Kilokari-1 (20 MW/40 MWh)
    - Pumped Hydro – Tehri PSP (variable speed), Pinnapuram PSP (fixed speed)

# Way Forward

- Increasing the pool of AGC generators
  - Cover state sector power plants, IPPs
  - Choice to join the well-established SRAS mechanism at the Regional level to gain experience
- Ongoing initiatives for AGC of Solar, BESS, and PSP in India.
  - New technologies, demand response, hydrogen electrolyzers
  - Suggestions being provided for planners on technical issues
- SCADA/EMS upgradation ongoing in many states with AGC software
  - Support extended to all the states for technical specifications
  - Intra state AGC is an efficient way to manage deviations

# Inter-state SCED – Journey so far

- 31-Jan-19: CERC directed a pilot on SCED of central sector thermal generating stations pan India with effect from 1<sup>st</sup> Apr 2019
    - 138 thermal units with ~58 GW capacity part of SCED pilot
  - 2020-2023: Pilot extended by CERC. FOR sub-group for intra-state reserves (SANTULAN)
  - **1-Oct-23: SCED formalized in the IEGC-2023 as an integral part of scheduling**
- Key aspects and processes involved in the implementation of SCED as provided in the Grid Code, 2023
    - to optimize generation dispatch after gate closure in the real-time market
    - increasing generation from lower-cost generating stations and decreasing generation from higher-cost ones
    - subject to operational and technical constraints
    - Voluntary participation
    - generating stations to declare their energy charges or SCED Compensation Charges on a weekly basis
    - ~~buyers or beneficiaries shall continue to pay charges for the scheduled energy directly to the generating stations participating in SCED~~

# Intra-state SCED – Progress between 2019-2023

- **Pilot on intra-state SCED for MP, Gujarat & Maharashtra as part of FOR Report on Intra-State Reserves and Ancillary Services For Balancing (SANTULAN) 2019**
  - Identified the basic hygiene and modalities for roll out at intra-state level
  - Model Regulation and Road Map for intra-state Essential Reliability Services
- **Pilot on intra-state SCED for Gujarat, UP, Haryana undertaken under MOP working group on MOD – 2021-22**
  - Development of day-ahead and intra-day schedule optimization models
  - Web-based application developed for visualization of results
  - Successful SCED pilots for Gujarat (43 generators) and UP (57 generators)
  - Haryana: Bottlenecks - Lack of SAMAST, Non-availability of scheduling system

# Re-constitution of Standing Technical Committee of Forum of Regulators

- A Technical Committee was constituted under the chairmanship of Member CERC on 18.11.2015 for implementation of Framework on Renewables at State level.
- During 87th meeting, FOR decided to reconstitute the Standing Technical Committee as below:
  - a) Member, Technical, CERC - Chairperson of the Committee.
  - b) Member (Technical), Assam ERC - Member
  - c) Member (Technical), Gujarat ERC - Member
  - d) Member (Technical), Andhra Pradesh ERC - Member
  - e) Member (Technical). Madhya Pradesh ERC Member
  - f) Member (Technical). Bihar ERC - Member
- **Terms of Reference of the Committee is as under:**
  - i. Deployment and implementation of framework on Forecasting, Scheduling and Deviation Settlement of Wind and Solar generating station at the State Level.
  - ii. Evolve a framework for Ancillary Service and Reserves at the State Level.
  - iii. Implementation of Automatic Generation Control(AGC) and Primary Control within the States.
  - iv. Introduction/ Implementation of the Availability Based Tariff (ABT) Framework at the State Level as mandated in the National Electricity Policy and Tariff Policy.
  - v. Any other matter related and incidental to the above.

# CYBERSECURITY : STAFFING

Power system is a critical infrastructure that must be safeguarded against cyber attacks. State SLDCs are not having adequate manpower in the area of cyber security. With the growing concerns of cyber threats, adequately trained staff needs to be deployed in the area of Cyber security for timely assessment of threats.

## Large SLDC

As per MoP	10%
Karnataka	4%
Andhra Pradesh	0%
Telangana	5%
Tamil Nadu	0%
West Bengal	4%
Rajasthan	0%
Haryana	0%
Uttar Pradesh	5%
Punjab	0%
Maharashtra	2%
Gujarat	0%
Madhya Pradesh	2%

## Medium SLDC

As per MoP	13%
Kerala	4%
Assam	3%
Bihar	16%
Jharkhand	8%
Odisha	3%
DVC	5%
Delhi	2%
Himachal Pradesh	0%
Uttarakhand	0%
Chhattisgarh	0%

## Emerging SLDC

As per MoP	16%
Puducherry	11%
Arunachal Pradesh	--
Manipur	--
Meghalaya	--
Mizoram	--
Nagaland	9%
Tripura	--
Sikkim	11%
Goa	0%
DNHDD	18%
Chandigarh	--

Inadequate to no dedicated manpower for Cybersecurity . SLDC need to be sensitized on the importance of this issue.

# Framework for Training and Certification, 2024 (CEA)



Every Grid operator shall undergo training in real time digital simulator and a refresher course at least once in two years.

# Capacity Building of System Operators

## Short-Term Exposure Programme

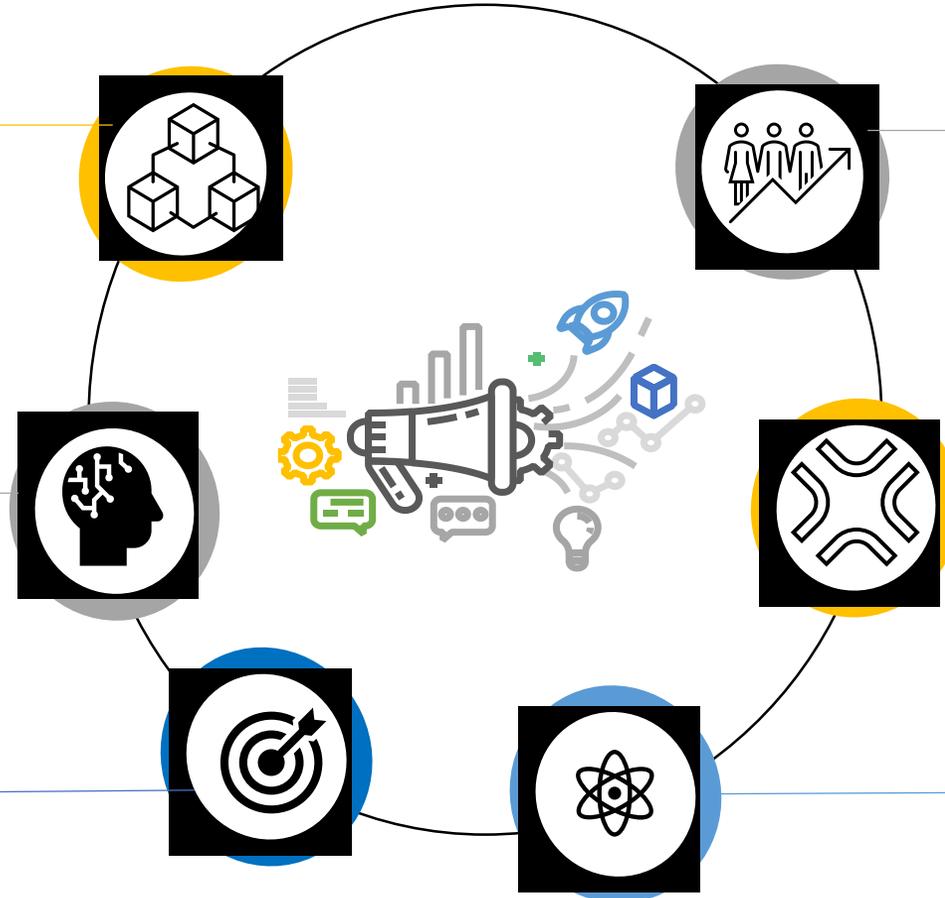
- 2-10 Days' rotational Assignment to other LDCs

## Mandatory Certification

- Conducted by NPTI
- Basic and Specialist Level
- Basic Level Certification Mandatory to work in Control Room Operation

## Tenure of Posting

- Minimum 3 years' posting
- Handing over of Tacit Knowledge
- Mentoring of new entrants



## Technical Training

- 2 Levels of Training
  - Basic (3 Weeks)
  - Advance Level (2 Weeks)
- Topics – Power Markets, Reliability, Logistics, Regulatory Framework, Renewable Energy, Cyber Security

## Subscription to Online Learning Platforms

- System Operators to have access to online platforms- edX, LinkedIn
- Especially curated
- Knowledge, skills and Behavioural

## Strengthening Collaborative Learning

- LDC Excellence Awards
- Encouraging self-paced learning
- Individualised learning
- Periodic Assessment
- Nationwide standardised learning process
- Strengthening e-Jigyasa Portal

# Resource Adequacy Framework

- Central Government has issued a resource adequacy framework under Rule 16 of the Electricity (Amendment) Rules, 2022 on 29.12.22
  - State Commission shall frame regulations on resource adequacy,
  - Distribution licensees shall formulate the resource adequacy plan in accordance with these Regulations and seek approval of the Commission.
  - State Load Despatch Centre shall carry out assessments of resource adequacy, for operational planning, at the state level on an annual basis, and on a daily, monthly and quarterly basis.
- Chapter-2 (Resource Planning Code) of CERC (Indian Electricity Grid Code) Regulations 2023
- Guidelines by MOP issued on 28.06.2023

# Submission of Demand Forecast & Resource Adequacy data by the SR SLDCs - under Regulation 31 of IEGC

<b>Status of Demand Forecast &amp; Resource Adequacy</b>				
<b>Name of State/UT</b>	<b>Day-Ahead</b>	<b>Week-Ahead</b>	<b>Month-Ahead</b>	<b>Year-Ahead</b>
Karnataka	Submitting	Submitting	Submitting	Submitting
Andhra Pradesh	Submitting	Submitting	Submitting	Submitting
Telangana	Submitting	Submitting	Submitting	Submitting
Tamil Nadu	Submitting	Submitting	Submitting	Submitting
Kerala	Submitting	Submitting	Submitting	Submitting
Puducherry	Submitting	Submitting	Submitting	Submitting

# Preparedness of the SLDCs to meet the deficit during power shortages conditions

Projected vs Actual Morning Peak Demand and Total Power Availability for the month of May 2025

Name of State/UT	Projected Morning Peak			Actual Morning Peak		
	Morning Peak Demand (MW)	Total Availability (MW)	Surplus (+)/Deficit (-) (MW)	Morning Peak Demand (MW)	Total Availability (MW)	Surplus (+)/Deficit (-) (MW)
Maharashtra	31299	30816	-483	28832	29032	200
Gujarat	20700	20892	192	25681	25715	34
Madhya Pradesh	14499	14671	172	13882	13892	10
Chhattisgarh	6233	6701	468	5518.75	5527	8
DNHDD	1323	1309	-14	1384	1386	2
Goa	693	678	-15	805.25	804	-1

# Resource Adequacy -Way forward

- States should plan procurement for power on long term, medium term and short term basis which is sustainable.
- Regulations on framework for Resource Adequacy - by State Electricity Regulatory Commission
  - Regulations already notified by: Karnataka & Tamil Nadu
  - Regulation Yet to formulate: Kerala, Puducherry, Andhra Pradesh\* & Telangana

\*APERC has approved Load Forecasts and Resource Plans (Distribution Plans, Power Procurement Plans & Transmission Plans) for the 5th Control Period (FY 2024-25 to FY 2028-29) & Indicative Forecasts and Plans for the 6th Control Period (FY 2029-30 to FY 2033-34)

## Backing down of intra-state thermal generating stations to MTL of 55%

- Some of the states have reported that some of their thermal generating units are old and not able to be backed down till MTL of 55% due to commercial as well as technical reasons.
- If Intra- state generators are able to go down till MTL of 55% additional 8-10 GW down reserves would be available.
- **Issues raised : no provision under the State Regulations for part load compensation and difficulty in operating old units at MTL of 55%**
- Older units NTPC of 210 MW are able to operate at MTL of 55%. State Generators may also visit the older generating stations of NTPC to have first hand experience. Handholding with NTPC can be done.
- SERCs should come up with part load compensation mechanism for intra-state thermal power plants and also explore the possibilities for the two-shift operation of the thermal generating stations keeping in view the large RE integration.
- Part load compensation regulation as well as the detailed procedure has already been approved by CERC for ISTS
- It should not happen that intra-state with high variable cost is operating above their MTL and inter-state generator having lower variable cost is operating at their MTL level. In the upcoming FOLD meetings this aspect needs to be discussed in details with SLDCs to share data in advance to facilitate a meaningful and constructive discussion during the meeting.

# Enablement of AGC in intra-state generating stations

- SLDCs to persuade generators to participate in SRAS through AGC. This would provide dual benefits: enabling generators to earn revenue from AGC operations and helping states maintain reserves within their boundaries.
- Incentive provisions as per CERC Ancillary Regulations can also be introduced in the States
- State generators can also participate in Central SRAS till enablement of AGC provisions in the State.
- Grid-India has been organizing workshops in the regions and further to handheld through organizing more workshops and interaction.

# Reserves: Primary

- For ISTS generators DC declaration restricted upto Installed capacity minus the auxiliary so that 5% of the capacity in case of thermal plants are always available to provide primary response. States also make similar provisions.
- Every control area in the country has a FRO assigned by NLDC.
- Grid code mandates that FRC calculation shall be carried out by each control area for any load or generation loss incident involving net change of more than 1000 MW of load or generation or a frequency change involving 0.1 Hz or more. The event shall be notified by the NLDC.
- For the regional generator and control area the FRC is calculated by the RLDC/NLDC, but the FRC of the intra-state generators needs to be carried out by the SLDC.
- For ISTS generators FRP is measured and are provide incentive in form of Beta factor.

## RE Integration : FTC procedures

- On the issue of RE Integration, it was observed that states are currently taking a relaxed approach in allowing FTC .
- Provisions under the CEA Grid Standards needs to be strictly followed.
- Grid-India to share the FTC checklist with SLDCs, which must be strictly followed without any relaxation.
- States to request the RLDC for audit of their FTC processes
- Issue will be raised in the upcoming Forum of Regulators meeting for wider deliberation.



# Status of part load compensation mechanism, AGC, SLDC fee & charges and Adequate manpower in States



Region	Name of State/UT	Part Load Compensation Mechanism	AGC Provision under State Regulations	SLDC Fees & Charges Regulation	Actual Manpower % w.r.t Manpower as per MoP Guideline	Intra-state SCED Regulation
NR	Rajasthan	x	✓	✓	85%	x
	Haryana	MYT Regulation	x	MYT Regulation	71%	x
	Delhi	x	x	✓	45%	x
	Uttar Pradesh	x	x	✓	83%	x
	Punjab	x	x	MYT Regulation	24%	x
	Himachal Pradesh	x	x	✓	16%	x
	Uttarakhand	x	x	✓	43%	x
	Jammu & Kashmir	x	x	MYT Regulation	14%	x
	Chandigarh	x	x	x	5%	x
WR	Maharashtra	✓	x	MYT Regulation	60%	x
	Gujarat	MYT Regulation	x	MYT Regulation	45%	x
	Madhya Pradesh	✓	✓	✓	29%	x
	Chhattisgarh	x	x	MYT Regulation	36%	x
	Goa	x	x	x	31%	x
	DNHDD	x	x	x	18%	x
SR	Karnataka	✓	✓	Tariff order	51%	x
	Andhra Pradesh	x	x	MYT Order	47%	x
	Telangana	x	AGC is under process at State level Thermal generators*	MYT Regulation	43%	x
	Tamil Nadu	✓	x	Tariff order	40%	x
	Kerala	x	x	x	46%	x
	Puducherry	x	x	x	15%	x



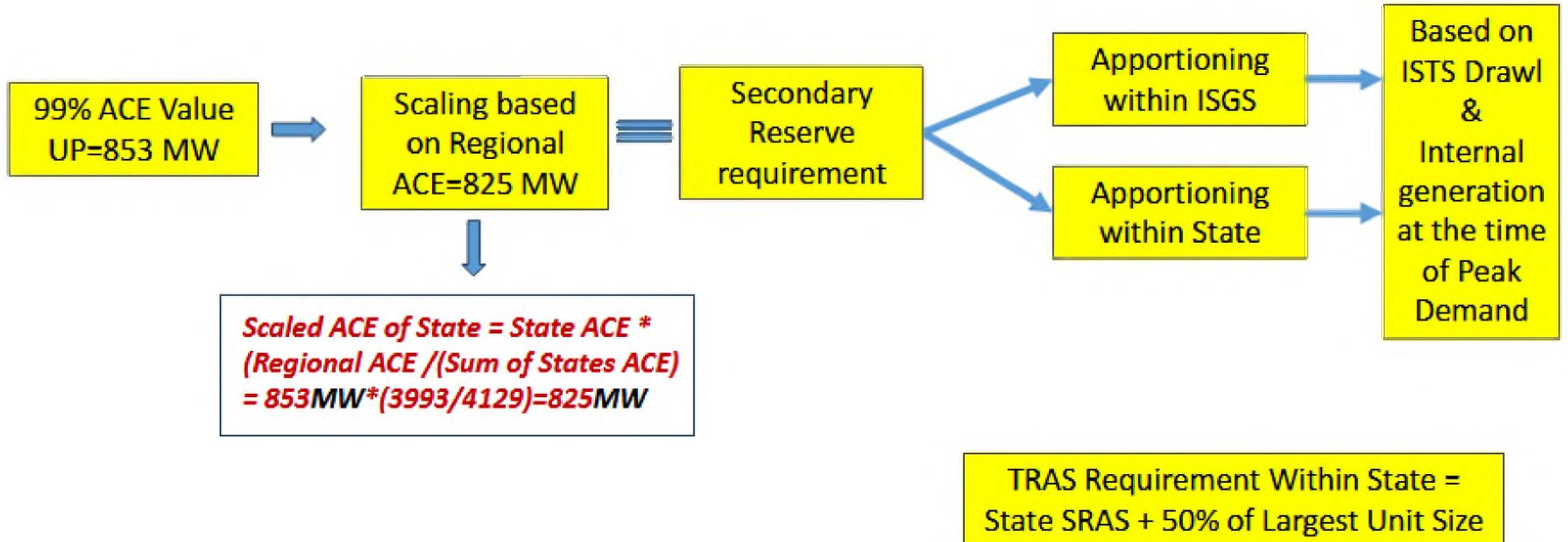
# Status of part load compensation mechanism, AGC, SLDC fee & charges and Adequate manpower in States



Region	Name of State/UT	Part Load Compensation Mechanism	AGC Provision under State Regulations	SLDC Fees & Charges Regulation	Actual Manpower % w.r.t Manpower as per MoP Guideline	Intra-state SCED Regulation
ER	Bihar	x	x	✓	42%	x
	Jharkhand	Draft Terms and Conditions for Determination of Generation Tariff Regulations	x	✓	25%	x
	Odisha	x	x	✓	35%	x
	West Bengal	x	✓	x	33%	x
	DVC	✓	✓	--	19%	x
	Sikkim	x	x	✓	45%	x
NER	Assam	x	x	MYT Regulation	35%	x
	Arunachal Pradesh	Draft State Grid Code	x	MYT Regulation	11%	x
	Manipur	x	x	✓	32%	x
	Meghalaya	x	x	✓	24%	x
	Mizoram	x	x	✓	24%	x
	Nagaland	x	x	✓	18%	x
	Tripura	x	x	x	26%	x

\* Telangana do not have Ancillary services regulation or provision in intra-state regulation

# Reserve Estimation Flow



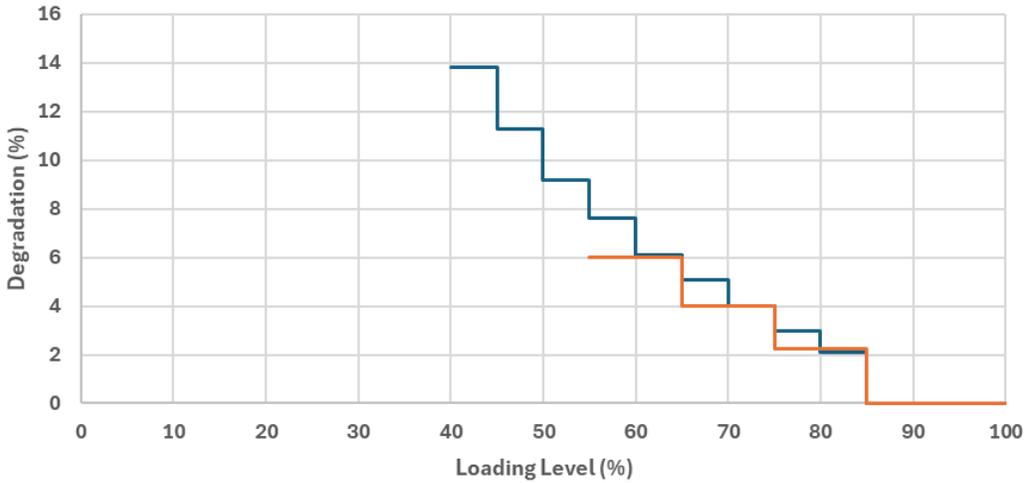
# Re-constitution of Standing Technical Committee of Forum of Regulators

- A Technical Committee was constituted under the chairmanship of Member CERC on 18.11.2015 for implementation of Framework on Renewables at State level.
- During 87th meeting, FOR decided to reconstitute the Standing Technical Committee as below:
  - a) Member, Technical, CERC - Chairperson of the Committee.
  - b) Member (Technical), Assam ERC - Member
  - c) Member (Technical), Gujarat ERC - Member
  - d) Member (Technical), Andhra Pradesh ERC - Member
  - e) Member (Technical). Madhya Pradesh ERC Member
  - f) Member (Technical). Bihar ERC - Member
- **Terms of Reference of the Committee is as under:**
  - i. Deployment and implementation of framework on Forecasting, Scheduling and Deviation Settlement of Wind and Solar generating station at the State Level.
  - ii. Evolve a framework for Ancillary Service and Reserves at the State Level.
  - iii. Implementation of Automatic Generation Control(AGC) and Primary Control within the States.
  - iv. Introduction/ Implementation of the Availability Based Tariff (ABT) Framework at the State Level as mandated in the National Electricity Policy and Tariff Policy.
  - v. Any other matter related and incidental to the above.

# Compensation mechanism – at Central & State levels

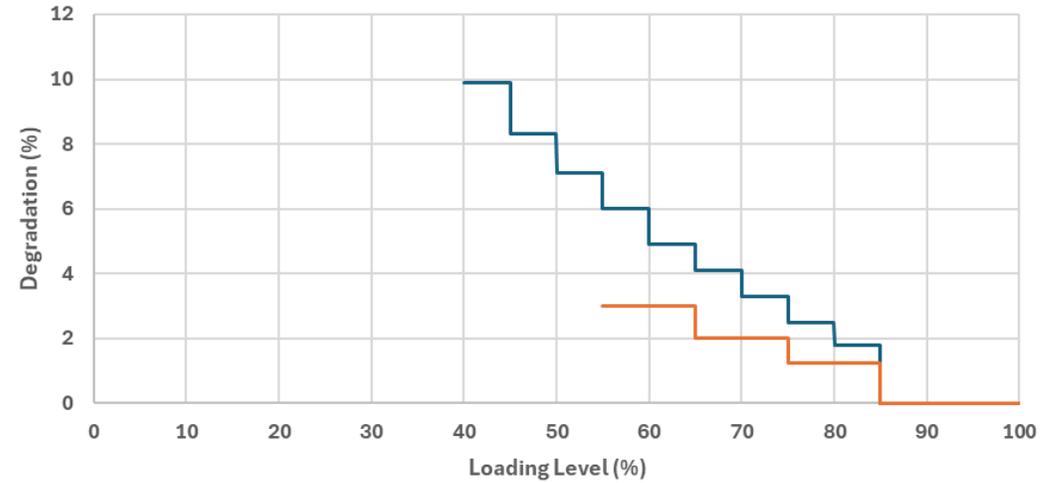
Increase in SHR - Subcritical units

— CERC TCT — States Framework



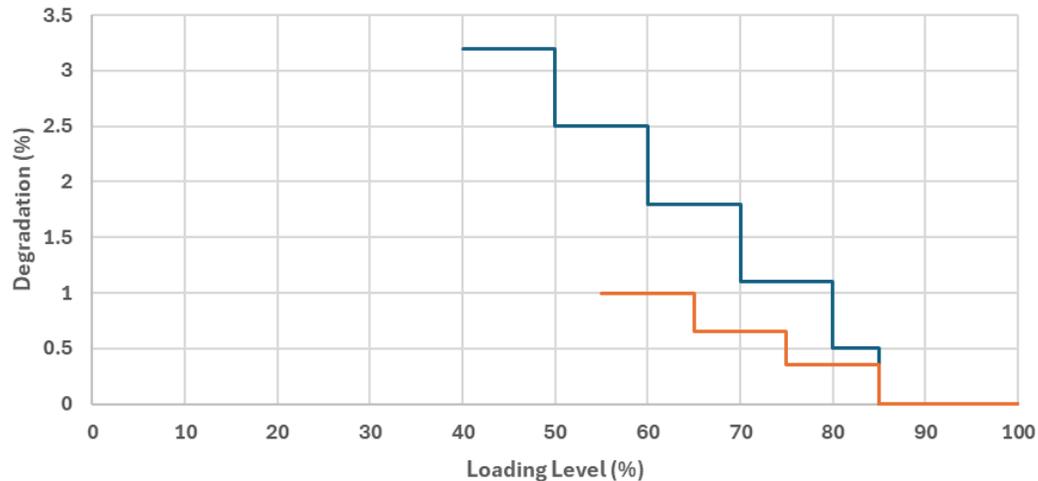
Increase in SHR - Supercritical units

— CERC TCT — States Framework



Degradation in AEC

— CERC TCT — States Framework



Ref:

CERC (Terms & Conditions of Tariff), 1<sup>st</sup> Amendment Regulations, 2024

HERC Terms & Conditions for determination of Tariff Regulations, 2024

MERC State Grid Code Regulations, 2020

MP Electricity Grid Code (Revision-III), 2024