



January 2025

Shweta Kulkarni, Prayas (Energy Group)

Metering the Progress

Insights from CEA report on Status of Metering

The Central Electricity Authority (CEA) released a landmark report titled "Status of Metering in the Country,". This report presents a comprehensive picture of the state of metering across feeders, distribution transformers (DTs), and consumers within 85 distribution companies (discoms). We find that the CEA report has not only consolidated metering data across discoms but also presented it well, which can certainly enable, more informed decision-making and strategic planning of distribution networks. We commend the CEA for this timely initiative and urge them to update this report annually, ensuring access to metering status within the country for all.

Key insights from the report suggest that the status of feeder and consumer metering is nearing 100% in most discoms barring a few, but DT metering is lagging in all states. Several discoms report 100% agricultural consumer metering, but rural DT metering in these discoms is less than 50%. Another important insight captured by this data is that the status of urban DT metering is also low in many discoms. This article presents a detailed analysis of the metering data presented in the report.

Introduction

The Central Electricity Authority (CEA) recently published a report¹ titled 'Status of Metering in the Country'. The report is a first of its kind which provides a comprehensive overview of status of metering of feeders, distribution transformers (DT) and consumers in distribution companies (Discoms) across the country as on March 2024. Over the past decades several distribution sector schemes have focused on improving metering within the distribution network. Metering at various junctions in the distribution network is critical for accurate energy auditing and reducing the aggregate technical and commercial losses in the network. However, data on the progress of metering post implementation of the schemes is often not available in the public domain except for the recent revamped distribution sector scheme (RDSS). Some discoms submit the data in their

¹ https://cea.nic.in/wp-content/uploads/notification/2024/09/Report_on_Metering_status_of_Feeders_DT_s_and_Consumers__as_on_31st_March_2024-1.pdf

respective regulatory submissions. The data presented in this report provides the first such publicly available data to record the progress of metering. We hope CEA publishes this report annually.

Discoms have been publishing data on the status of metering of feeders, DT's and consumer as mandated by different regulatory processes, however this data is scattered and intermittent. The progress of Smart Meters to be installed through RDSS is being tracked through the National Smart Grid Mission Portal², however this data is limited to smart meter installations. The other publicly available source on status of metering is through the accounting and audit reports submitted to the Bureau of Energy Efficiency (BEE) as per the Regulations on Manner and Intervals for Conduct of Energy Audit (Accounting) in Electricity Distribution Companies ,2021. However, recent accounting and audit reports for FY 2023-2024 have not yet been published on the BEE website³.

On this background, the report published by CEA is very timely and useful in providing a good overview of the status of metering across discoms. Through this article we document the insights and findings from our analysis of data presented in this report.

Overview of the report

There are 56 public discoms, 15 private discoms and 38 deemed licensees in India. CEA in its report has compiled 66 kV and 11 kV feeder, DT & consumer metering status for 85 discoms. The data tables include total number of feeders, DTs and consumers classified as urban or rural and the status of metering for each of these network elements. It also provides data on number of 11 kV feeders registered on the National Power Portal (NPP) in each discom. The report states that this data is as received from discoms, and as per data furnished by states under RDSS & details of the feeders registered on the National Power Portal (NPP)⁴.

All state and private discoms, and a quarter of the deemed licensees have submitted the metering status data.

Table 1 : Number of discoms covered in the CEA Status of Metering Report

Type of Discom	Total number of Discoms	CEA report coverage
Public	56	56
Private	15	15
Deemed	38	14
Total	109	85

² <https://www.nsgm.gov.in/en/sm-stats-all>

³ <https://beeindia.gov.in/en/energy-audit-in-discoms>

⁴ Page 5, https://cea.nic.in/wp-content/uploads/notification/2024/09/Report_on_Metering_status_of_Feeders_DT_s_and_Consumers__as_on_31st_March_2024-1.pdf

The report covers metering status for 2.5 lakh 11kV feeders, 1.51 crore DT's and 34 crore consumers. We present our observations and analysis on the progress of feeder, DT and consumer metering in the sections below.

Observations

11 kV Feeder Metering

As per the CEA report 99% of 11 kV feeders are metered. The rate of feeder metering in urban areas is 99.4% and 98% in rural areas. 63 discoms report 100% feeder metering of both urban and rural feeders. Only 10 discoms have less than 100% feeder metering of both urban and rural feeders.

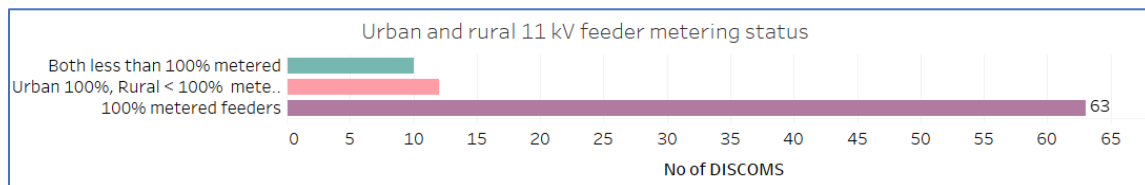


Figure 1 : Status of metering in discoms

The report only provides information whether feeder is metered or not, details about operational status of meters, type of meters (AMI/AMR) have not been included. However, it does include information on how many of these feeders are registered on the NPP. This could be considered as a proxy for feeder meters enabled with automatic data recording/ communication. Of the 85 discoms, only one discom has 100% of all feeders registered on NPP and 24 discoms (28%) report that none of their feeders are registered on NPP. On an average 55 % of urban feeders and only 34% of rural feeders are registered on NPP as per the CEA report. A quick check of the NPP dashboard⁵ (on 12th December 2024) shows that a total of 62,613 urban feeders are onboarded of which 16,090 (25%) are communicating, and 1,31,335 rural feeders are onboarded of which 7,108 (5%) are communicating.

Interestingly, as per the CEA report, BESCO, TSECL, PuVVNL report 100% rural feeders registered on NPP but as per the portal, only 68%, 33% and 66% urban feeders respectively are registered.

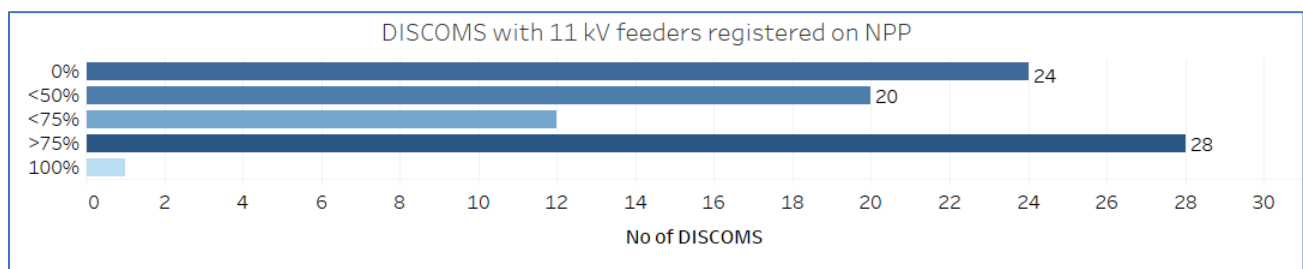


Figure 2 : Status of 11kV Feeder Meter registered on NPP

The average rate of metering for urban feeders is 99% which is indeed notable, barring four discoms whose urban feeder metering is in the range of 79% - 88%. The average rate of rural feeder metering

⁵ <https://npp.gov.in/dashBoard/cp-map-dashboard>

is also high at 96%. Low rates of rural feeder metering are typically observed in discoms with high number of agricultural feeders. Interestingly, 37 out of 43 discoms that have rural feeders with more than 30% agricultural load, report 100% feeder metering for all rural feeders.

11 discoms across Maharashtra, Gujarat, Punjab, Rajasthan, Madhya Pradesh, Andhra Pradesh, Telangana have more than 5000 rural feeders each. All of these discoms report 100 % rural feeder metering. The chart below depicts the number of feeders (non-agri and >30% Agri) and status of metering for discoms with more than 3000 11 kV rural feeders. It shows that the rate of metering in both categories is high.

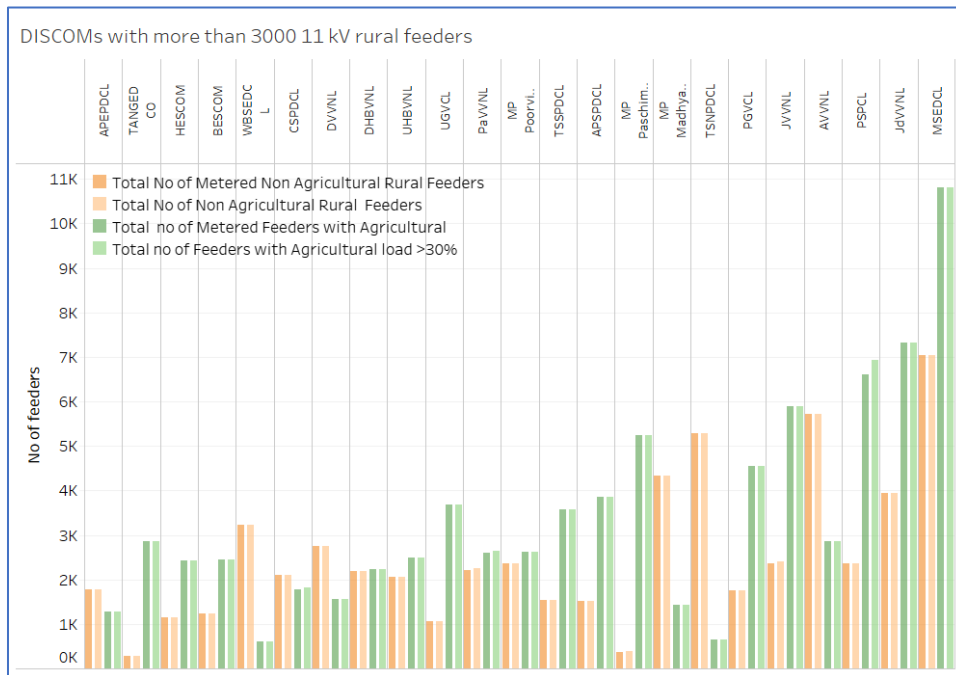


Figure 3 : Feeder metering status in discoms with more than 3000 11 kV rural feeders

As per the CEA report, meter installation is pending only for 2000 feeders. The RDSS scheme on the other hand has sanctioned feeder metering for close to 2 lakh feeders, i.e., nearly 80%⁶ of all feeders.

Distribution Transformer Metering

Distribution transformers (DT) are crucial to ensure a safe and efficient distribution network. At the same time, efficiency in the operation of these transformers can help in reduction of network losses. Hence metering of DT's can help in improvement of overall technical losses in the distribution network. The CEA metering report suggest that the overall rate of distribution transformer metering in India is still low at 42%. The rate of urban transformer metering is 69% and 32% in rural transformers.

The total number of rural distribution transformers is five times more than urban distribution transformers. 56 (64%) discoms have a higher number of rural DTs in comparison to urban DT's, 10

⁶ There are about 2.50 Lakh feeders in the country.

of these discoms report higher percentage of rural DT metering than urban DT metering. 12 discoms (14%) discoms report 100 % rural DT metering.

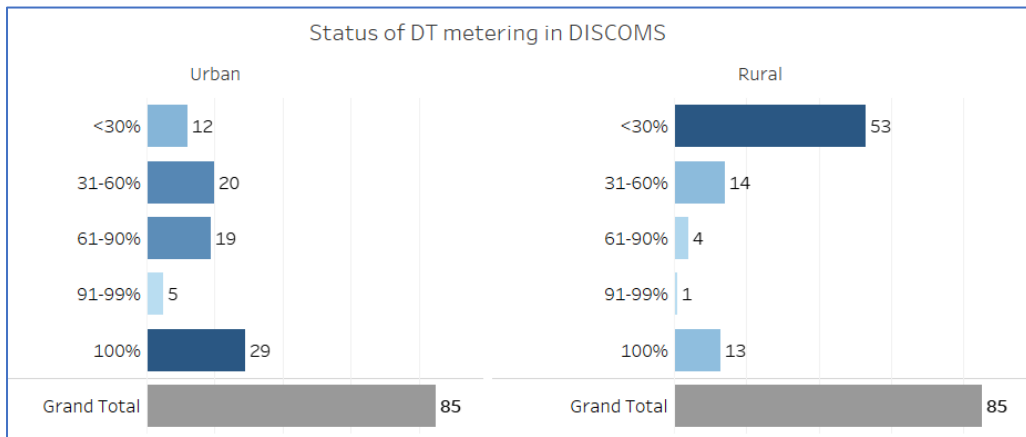


Figure 4 : Status of urban and rural DT metering in discoms

Nearly half (35) discoms of the total have more than one lac distribution transformers, all of these discoms also have a significant proportion of rural distribution transformers. On an average only 44% of DTs in these discoms are metered.

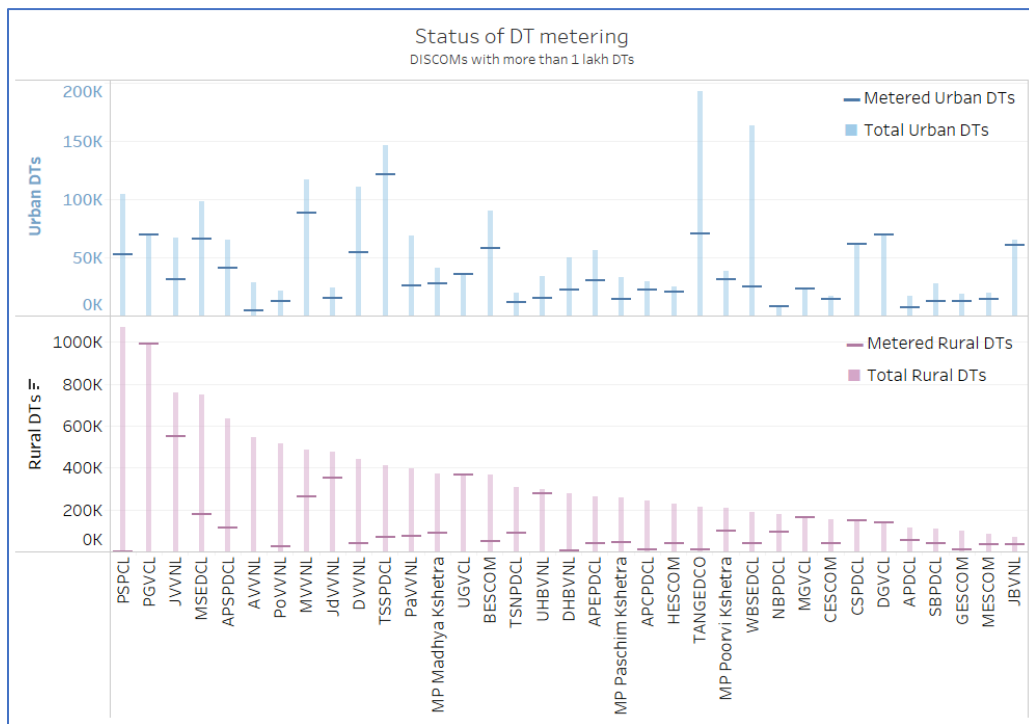


Figure 5: Status of DT metering in discoms with more than 1 lakh DT's

The CEA draft distribution perspective plan 2030⁷ proposes a 32% increase in distribution transformers from 2022 until 2030 in order to strengthen the distribution networks. A focused approach to increase distribution transformer metering will be necessary to improve existing and new DT metering.

As per the CEA report, 88 lakh DTs are yet to be metered. RDSS⁸ has sanctioned metering for close to 51 lakh DT's only and hence a dedicated program for the metering of remaining 37 lakh DTs needs to be developed.

Consumer Metering

The report provides status of metering for seven different consumer types namely, domestic, agricultural, commercial, industrial, streetlighting, traction, public water works and others. The percentage of metered Industrial, Commercial, Traction and public works (water, streetlights, sewage) is almost 100% in all discoms except a few which include some UTs and north eastern states. The metering for domestic and agricultural is 98% and 48% respectively.

68 out of 85 discoms have agricultural consumers, the average metering percentage across these discoms is 70%. 20 discoms have less than 60% metering and 31 discoms report 100% agricultural consumer metering. MSEDCL has the highest number of agricultural consumers as per the report (44 lac) and reports 100% agricultural consumer metering followed by TANGEDCO with 23 lac agricultural consumers, which reports only 18% metering for agricultural consumers.

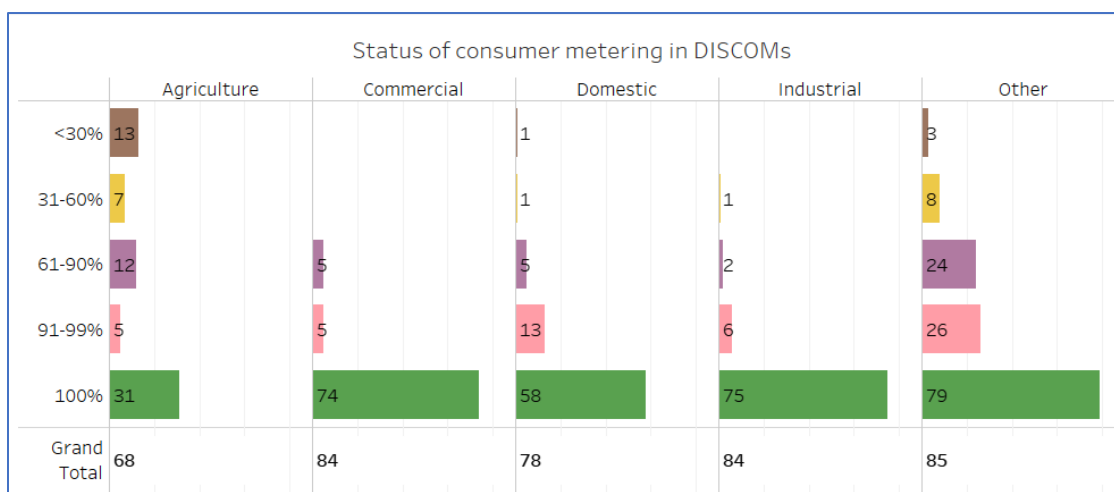


Figure 6 : Status of Consumer metering

On the other hand, average rate of metering for all domestic consumers is 98%, the percentage of metered urban consumers is 98% and 97% for rural consumers. 60 discoms of 85 have rural

⁷Table 4.13 https://cea.nic.in/wp-content/uploads/notification/2024/02/Public_Notice_for_comments__DIstribution_Pers_Plan_2030.pdf

⁸ As per November 2024 data <https://www.nsgm.gov.in/en/sm-stats-all>

consumers, of which 51 discoms report more than 90% metering of rural consumers. 31 discoms report 100% metering for both urban and rural consumers.

34 discoms report 100% rural consumer metering, however only 6 of these discoms have 100% rural DT metering and only 8 have greater than 90% rural feeder metering.

Interestingly, 21 discoms report 100% agriculture consumer metering, only 1 of these discoms report 100% rural DT metering and none of them report 100% rural feeder metering. Discoms report high percentage of agricultural consumer metering but low DT /feeder metering.

Conclusion and Way Forward

The Central Electricity Authority's report on the Status of Metering provides a significant and comprehensive snapshot of the metering landscape across Indian distribution network. While substantial progress has been made, especially in urban areas, the findings highlight areas that need further attention and targeted intervention.

The status of 11 kV feeder metering reported is indeed impressive, with over 97% metering reported for urban feeders and 96% for rural feeders. However, the quality and functionality of these meters, especially in terms of type of meters installed, and automatic communication systems, requires further focus. Rural feeder metering, especially in discoms with high number of agricultural feeders has been challenging in the past. The status of metering for such feeders also appears to have improved significantly as suggested by the report. Hopefully the improvements in feeder metering will result in improved access to reliability and supply quality data at the feeder level.

In terms of distribution transformer (DT) metering, the country still faces a significant shortfall. The report shows that only 42% of transformers are metered. Rural transformer metering particularly needs significant improvement. This gap must be addressed to enhance technical loss reduction and improve operational reliability of the distribution network.

The status of consumer metering is commendable in most sectors. Most discoms report high urban and rural consumer metering, agricultural consumer metering is at 48%.

Metering is a crucial step in improving the transparency, accountability and robustness of the distribution system. Some suggestions which can be considered by CEA and the Ministry of Power are presented below:

- Annual Status of Metering Report: This report provides very important data essential for tracking the progress of metering. CEA can consider publication of such a report every year. This would provide clear insights into progress of metering and highlight the areas which need attention.
- Meter Performance Information: The data on metering can include more parameters and make the report comprehensive. Additional data like meter operational status, type of meters (AMI/AMR/Electronic), number of net meters and number of meters replaced annually can also help evaluate the performance of meters at the feeder, DT and consumer end.

- **Data Integration and Standardization:** The CEA metering report is a good starting point for creating a more unified, accessible, and annually updated metering status. This data can be used for better planning, auditing, and performance tracking of discoms. The data submitted to Ministry of Power through the Manner and Intervals for Conduct of Energy Audit (Accounting) in Electricity Distribution Companies ,2021 can be used to cross check the meter status submitted by states/discoms.
- **Inputs to States/Discoms based on analysis:** The report can present additional data focused on states/discoms that can be used for design and development of meter roll out plans. For example, the current report highlights the need for improving rural DT and rural AG feeder metering. Such information can help identify areas of improvements in states/discoms and shape their metering plans.
- **Inputs to Smart Metering:** A more systematic approach towards the installation of smart meters, particularly in discoms with low feeder and DT metering, through the revamped RDSS scheme, can be accelerated. The State/discom level smart meter roll out plans can be assessed using the Status of metering presented in the CEA report.
- **Inputs to regulatory processes:** Inclusion of additional data on meter operation and performance and the rate of replacement can provide necessary information for different regulatory processes. For example, incentivizing the timely replacement of faulty meters would ensure that metering data is consistently accurate.




The author(/s) thank Sreekumar Nhalur, Aditya Chunekar for their valuable inputs and review of this document. The author would also like to than Shreya Dhanwate, Abhiram Sahasrabudhe and Amruta Wanjale for analysis of data and its representation.

This article is part of an ongoing series called Power Perspectives which provides brief commentaries and analyses of important developments in the Indian power sector, in various states and at the national level.

The portal with all the articles can be accessed here: <https://energy.prayaspune.org/power-perspectives>.

Contact us:

Prayas (Energy Group)
Unit III A & B, Devgiri,
Kothrud Industrial Area,
Joshi Railway Museum
Lane, Kothrud,
Pune 411 038 Maharashtra

 020 – 2542 0720
 energy@prayaspune.org
 <https://energy.prayaspune.org/>

