Report of the FORUM OF REGULATORS on Analysis of Factors Affecting Viability of DISCOMs and Recommendations for its Improvement

January 2025

Assisted By
ABPS Infrastructure Advisory Pvt. Ltd.

The sustainability and financial viability of DISCOMs are critical for ensuring a reliable and financially stable power sector in India. Recognizing the importance of the issues faced by DISCOMs, the Forum of Regulators (FOR), during its 88th meeting held on October 13, 2023, focused on the issues faced by the DISCOMs and felt the need for exploring measures to make them financially stable in the long- term. It was further deliberated that certain distribution utilities have been able to successfully transform their businesses through proactive initiatives and therefore it was decided that these best practices can be compiled and presented for others to follow. Accordingly, the FOR constituted a Working Group to study factors impacting the DISCOMs sustainability.

Working group presented this report to FOR during the 94th meeting held on 10th January 2025. FOR approved this report with further observations given at page 18 of this Report.

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Date 31/12/2024

The Chairperson
Forum of Regulators (FOR)

Subject: Report of the Working Group on Viability of Discoms

The Forum of Regulators (FOR), in its 88th meeting held on 13.10.2023, discussed the critical issue of ensuring long-term financial sustainability of Distribution Utilities across the country. Following these discussions, the Forum constituted a Working Group (WG) aimed at examining the factors impacting viability of DISCOMs, and to suggest measures for mitigating these factors.

2. After a series of meetings with stakeholders, the Working Group has prepared a report, which provides an in-depth analysis of financial and operational challenges, highlights best practices, and outlines key initiatives to address several pressing issues faced by DISCOMs.The Report has been endorsed by the Working Group in its 5th meeting held virtually on 26th December, 2024.

3. Recommendations made by the Working Group focus on the following-

- Initiatives for AT&C Loss Reduction
- Optimisation of O&M Cost
- Ways to optimise Human Resource
- Regulatory support
- Platform for Sharing Best Practices by Distribution Licensees
- Subsidy Management, Recovery through Fixed Charges and Continued Government support.

4. On behalf of the Working Group, I am pleased to submit the report on "Analysis of factors affecting viability of Discoms and its recommendations for improvement" for consideration of the Forum of Regulators.

Yours sincerely,

(S. P. S. Parihar)
Chairperson, Madhya Pradesh ERC
and Chairperson of the Working Group

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List of Abbreviations

Abbreviation	Full Form
ABR	Average Billing Rate
ACoS/ACS	Average Cost of Supply
ADMS	Advanced Distribution Management Systems
ADR	Automated Demand Response
AE	Assistant Engineer
AI	Artificial Intelligence
AMR	Automated Meter Reading
APDCL	Assam Power Distribution Company Limited
APSERC	Andra Pradesh State Electricity Regulatory Commission
ARR	Average Revenue Realisation
ASAI	Average Service Availability Index
AT&C losses	Aggregate Technical and Commercial Losses
BESL	Bharatpur Electricity Services Limited
BEST	Brihanmumbai Electricity Supply and Transport
BkESL	Bikaner Electricity Supply Limited
CERC	Central Electricity Regulatory Commission
CGRF	Consumer Grievance Redressal Forum
CPC	Centralised Processing Centre
CRPU	Cash Realisation Per Unit
CSERC	Chhattisgarh State Electricity Regulatory Commission
CSPDCL	Chhattisgarh State Power Distribution Company Limited
CSR	Corporate Social Responsibility
DF	Distribution Franchisee
DGVCL	Dakshin Gujarat Vij Company Limited
DISCOM	Distribution Company
DRUM	Distribution Reform Upgrade and Management
DT/DTR	Distribution Transformer
DVB	Delhi Vidyut Board
DVVNL	Dakshinanchal Vidyut Vitaran Nigam Limited
EA	Electricity Act, 2003
EBITDA	Earnings Before Interest Tax Depreciation and Amortisation
EE	Executive Engineer
ERP	Enterprise Resource Planning
FY	Financial Year
FOR	Forum of Regulators
GETRI	Gujarat Energy Training and Research Institute
GIS	Geographical Information System
GUVNL	Gujarat Urja Vikas Nigam Limited
HPERC	Himachal Pradesh Electricity Regulatory Commission
HPSEBL	Himachal Pradesh State Electricity Board Limited
HVDS	High Voltage Distribution Systems
IIM	Indian Institute of Management
IIT	Indian Institute of Technology
IPCL	India Power Corporation Limited
IPDS	Integrated Power Development Scheme
IT	Information Technology

Abbreviation	Full Form
JBVNL	Jharkhand Bijli Vitaran Nigam Limited
JDVVNL	Jodhpur Vidyut Vitaran Nigam Limited
JE	Junior Engineer
JERC	Joint Electricity Regulatory Commission
JGY	Jyoti Gram Yojana
JVVNL	Jaipur Vidyut Vitaran Nigam Limited
KEDL	Kota Electricity Distribution Limited
Km	Kilo meter
KPI	Key Performance Indicator
kVA	Kilo Volt Ampere
LT	Low Tension
MePDCL	Meghalaya Power Distribution Company Limited
MGVCL	Madhya Gujarat Vij Company Limited
MoP	Ministry of Power
MP	Madhya Pradesh
MPERC	Madhya Pradesh Electricity Regulatory Commission
MPMKVVCL	Madhya Pradesh Madhya Kshetra Vidyut Vitran Company Limited
MPPaKVVCL	Madhya Pradesh Paschim Kshetra Vidyut Vitran Company Limited
MPPoKVVCL	Madhya Pradesh Poorv Kshetra Vidyut Vitran Company Limited
MSEDCL	Maharashtra State Electricity Distribution Company Limited
MSP	Minimum Support Price
MVVNL	Madhyanchal Vidyut Vitaran Nigam Limited
MW	Mega Watt
NBPDCL	North Bihar Power Distribution Company Limited
NDPL	North Delhi Power Limited
NE State	North East State
NLDC	National Load Dispatch Centre
NVIS	New Vigilance information System
OMS	Operation Management System
PF	Power Factor
PGVCL	Paschim Gujarat Vij Company Limited
PMDB	Public Meter Distribution Box
PPP	Public-Private Partnership
PSERC	Punjab State Electricity Regulatory Commission
PSPCL	Punjab State Power Corporation Limited
PuVVNL	Purvanchal Vidyut Vitaran Nigam Limited
QR Code	Quick Response Code
QRT	Quick Response Teams
R-APDRP	Restructured Accelerated Power Development and Reforms Programme
RDSS	Revamped Distribution Sector Scheme
RE	Renewable Energy
RERC	Rajasthan Electricity Regulatory Commission
RLDCs	Regional Load Dispatch Centres
RMU	Ring Main Units
SAP	System Application and Products
SBPDCL	South Bihar Power Distribution Company Limited
SCADA	Supervisory Control and Data Acquisition

Abbreviation	Full Form
SDO	Sub-Division Officer
SERC	State Electricity Regulatory Commission
SKY	Suryashakti Kisan Yojana
SMS	Short Message Service
SOP	Standard Operating Procedure
TANGEDCO	Tamil Nadu Generation Distribution Corporation Limited
TERC	Tripura Electricity Regulatory Commission
TOTEX	Total Expenditure
TPDDL	Tata Power Delhi Distribution Limited
TPL	Torrent Power Limited
TPSODL	TATA Power Southern Odisha Distribution Limited
TSECL	Tripura State Electricity Corporation Limited
TSNPDCL	Telangana State Northern Power Distribution Company Limited
TSSPDCL	Telangana State Southern Power Distribution Company Limited
UGVCL	Uttar Gujarat Vij Company Limited
UPCL	Uttarakhand Power Corporation Limited
UPI	Unified Payment Interface
UT	Union Territory
WG	Working Group
YOY	Year on Year

1 Executive Summary

1.1 Background

The sustainability and financial viability of DISCOMs are critical for ensuring a reliable and financially stable power sector in India. Recognizing the importance of the issues faced by DISCOMs, the Forum of Regulators (FOR), during its 88th meeting held on October 13, 2023, focused on the issues faced by the DISCOMs and felt the need for exploring measures to make them financially stable in the long-term. It was further deliberated that certain distribution utilities have been able to successfully transform their businesses through proactive initiatives and therefore it was decided that these best practices can be compiled and presented for others to follow. Accordingly, the FOR constituted a Working Group to study factors impacting the DISCOMs sustainability and to propose actionable recommendations. This report consolidates the findings of the Working Group, offering an in-depth analysis of financial and operational challenges, best practices, and specifies key initiatives to overcome several challenges being faced.

The Terms of Reference for the Working Group were as follows:

1. Identify and analyze the factors impacting the sustainability of DISCOMs.
2. Examine the existing measures and suggest strategies for minimizing operational losses and enhancing efficiency.
3. Analyze employee cost structures and make recommendations for optimization of employee cost.
4. Suggest guidelines to reduce O&M and A&G Costs of DISCOMs.
5. Any other matter related and incidental to the above.

1.2 Approach and Methodology

The Working Group adopted a structured and data-driven approach to carry out the tasks specified under the TOR. The approach and methodology included:

1. **Case Studies**: Best Practices adopted by various successful DISCOMs were studied in detail.
2. **Inputs from SERCs:** Inputs from various State Electricity Regulatory Commissions (SERCs) were obtained to gain a better understanding of the factors impacting DISCOMs financial health.
3. **Identification of Key Sustainability Factors**: Based on the presentations and inputs received, a thorough analysis was conducted to identify the key factors that influence the long-term sustainability of DISCOMs.
4. **Data Analysis**: Detailed analysis of several important parameters such as the ACS-ARR gap, AT&C losses, and employee expenses were carried out.
5. **Benchmarking of Employee Cost**: Benchmarking of employee and A&G cost was caried out to help in optimizing the O&M expenses of various DISCOMs.

6. **Recommendations**: Based on the studies carried out, detailed recommendations were made.

1.3 Case Studies

Several DISCOMS were invited to present their success stories. These included Gujarat Urja Vikas Nigam Ltd. (GUVNL), Dakshin Gujarat Vij Company Limited (DGVCL), Tata Power-Odisha DISCOMs., Tata Power Delhi Distribution Ltd. (TPDDL), Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Limited (MP West DISCOM or MPPaKVVCL), Torrent Power Limited. In addition to these, CESC, Rajasthan also provided their inputs on the initiatives that improved their key performance parameters. Additionally, inputs were also received from some State Electricity Regulatory Commissions (SERCs).

Based on the presentations made by various successful DISCOMs, and extensive analysis, the key factors impacting the financial and operational viability of DISCOMs were identified, which are as follows.

1. **Aggregate Technical and Commercial (AT&C) Loss**: High AT&C loss is a direct loss and adversely affects the profitability of DISCOMs, thus impacting the financial sustainability.
2. **Cross-Subsidies**: Higher cross-subsidies are an anti-thesis to cost-reflective tariffs, and lead to migration of cross subsidizing consumers to open access, resulting in revenue loss for DISCOMs.
3. **Operational & Maintenance Costs**: Rationalizing O&M costs through benchmarking, automation, and workforce management is critical for improving cost efficiency.
4. **Regulatory Assets**: The accumulation of regulatory assets places a heavy burden on DISCOMs and should be completely eliminated.
5. **ACoS-ARR Gap**: The difference between the Average Cost of Supply (ACoS) and Average Revenue Realized (ARR) remains a significant factor affecting the financial health of DISCOMs.

1.4 Employee and A&G cost Benchmarking

Benchmarking of employee and administrative costs is required for better optimization of cost. Accordingly, the employee cost structures were analysed to arrive at better strategies for optimization of cost and develop guidelines to reduce O&M and A&G costs.

In the benchmarking study, the best practices in the utilities from various regions were considered to ensure a diverse mix. Further, for benchmarking, the latest available trued up data were examined. Ten distribution utilities having trued-up data for FY 2022-23 were considered to maintain consistency. For reasons discussed in detail in the subsequent sections of this Report, benchmarking was carried out in Rs./kWh of Sales and Percentage of ACoS.

Findings:

1. Employee costs in the range of around 5% of ACoS and combined Employee and A&G Cost of around 6% of ACoS, is desirable. The costs above these ranges need rationalization.
2. For some Distribution Utilities such as those of Punjab and Himachal Pradesh, Terminal Benefits form over 50% of employee costs. This is significant and requires State Government's intervention as these are legacy issues and hence should be taken over by the State Government either partially or fully.

1.5 KPI based Incentive Framework

Based on the key functions that the Distribution Utility is required to perform, a KPI matrix has been developed. This matrix objectively specifies the weightage each KPI activity carries and how the performance on these individual activities shall be measured and then merged to derive a consolidated score.

It is further suggested that the State Regulators may mandate that any distribution company achieving a minimum of 80%(Threshold) marks on KPI parameters, shall only be eligible to earn incentives.

Once the utility has fulfilled the KPIs specified by the State Regulator, incentives shall be allowed, and it is proposed that considerable portion of the incentive earned should be shared among the employees of divisions/circle that have achieved their targets or have contributed to achieving the KPIs.

Further, to make this mechanism self-sustainable, it is proposed that incentive be allowed only if there is saving arising out of fulfilling of these targets specified by the Commission.

1.6 Recommendations and Way Forward

Based on the study carried out several recommendations have been made in the Report. A set of key recommendations that have been suggested are as follows. It is, however, clarified that as each DISCOM operates under different operational conditions, not all recommendations may be universally applicable.

A. Interventions for AT&C Loss Reduction

1. Implementation of HVDS and Aerial Bunch Conductors in high loss areas
2. Initiating Smart Metering in high loss areas/ high value consumers – Implement Advanced Data Analytics tools for improved analysis and decision making
3. 100% metering of Connections
4. Energy Audit at DT Level
5. Network Strengthening - Reducing Overloading of Lines and Transformers

6. Prepaid Meters and Automated Meter Reading in areas with low billing efficiency
7. Facilitating Distributed Energy Systems
8. Feeder Segregation (wherever high agricultural Load/consumer)
9. Installation of Advanced Distribution Management, GIS, SCADA Systems
10. Re-validation of Assessment Formula wherever billing is being carried out on assessment basis.
11. CSR Alignment with Loss Reduction Strategies - Building Synergy

B. Optimisation of O&M Cost

1. State Governments to either fully or partially takeover Terminal Benefits of employees
2. Distribution Utilities to rationalise manpower based on the benchmark
3. Activity Based Outsourcing, especially those activities which are repetitive and non-critical
4. Use of IT enabled Systems such as **ERP/SAP** for Asset Management to reduce administrative costs

C. Optimising Human Resource

1. Continuation of Leadership **(Managing Director)** at the helm of affairs for at least 3-4 years is critical to make progress
2. Focus on Manpower Capacity Development
3. **Manpower Skill Audit and Rationalisation/Re-deployment**
4. **KPI/KRA based Employee Accountability and Incentivisation**

D. Regulatory Support

1. Tariff Revision - Cross Subsidy Reduction - Regulatory Support for KPI/KRA based Employee Benefit Scheme and liquidation of Regulatory Assets to ensure sustainability of DISCOMs

Further, prioritization of the recommendations has been done in Chapter 7 of this Report based on two critical parameters:

1. **Capital intensity**, and
2. **Impact on DISCOM**

1.7 Other Key Recommendation

Apart from the above, the following aspects need to be ensured for better performance of any distribution utility:

1. **Subsidy Management:** Ensure timely subsidy payments to distribution utilities and avoid structures that incentivize malpractice. For instance, subsidies should not encourage consumers to manipulate consumption brackets.

2. **Recovery through Fixed Charges:** Gradually increase recovery through fixed charges, which should be higher than the current 15-20% to better cover fixed costs and improve cash flow stability.
3. **Continued Government Support:** Ongoing debt restructuring, soft loans, and grants are essential for capital expenditure, particularly under schemes like RDSS. States should also help cover the impact of terminal benefits on utility balance sheets.

The recommendations in this report provide a roadmap for addressing the financial and operational challenges faced by DISCOMs. Implementation of these strategies will ensure the long-term viability of the distribution sector.

2 Introduction

2.1 *Overview*

The Forum of Regulators (FOR) was established through a notification issued on February 16, 2005, in pursuance of the provisions outlined under Section 166(2) of the Electricity Act, 2003 (EA or Act). The body includes the Chairperson of the Central Electricity Regulatory Commission (CERC) and the Chairpersons of the State Electricity Regulatory Commissions (SERCs). The Chairperson of the CERC is the Chairperson of the Forum.

2.2 *Functions of the Forum*

The Forum undertakes a range of activities seeking to evolve consensus on regulatory practices and governance in the power sector and reviews tariff orders for compliance with the Electricity Act and Tariff Policies. The Forum also monitors subsidy accounting under Section 65 of the Act, providing quarterly reports to relevant authorities. Renewable energy purchase compliance is tracked. Additionally, the Forum harmonizes regulations, establishes performance benchmarks, facilitates research, promotes consumer interests, and encourages efficiency, economy, and competition in the sector and works to ensure uniformity in approach on key issues across State Electricity Regulatory Commissions thus ensuring regulatory certainty in the electricity sector.

2.3 *88th Meeting of Forum of Regulators and Constitution of Working Group*

The FOR, in its 88th meeting held on 13.10.2023, discussed that the sustainability of the DISCOMs is a matter of concern as they continue to operate at a loss and that focus seems to be on addressing losses rather than improving efficiency. An example was cited of Himachal Pradesh where the employee cost was exceptionally high, accounting for about 33% to 35% of expenses and that the Commission's approval was required for new recruitments, except for technical positions, which has created friction between DISCOMs and the Commission. It was also informed that additionally, there was a trend of creating numerous divisions and subdivisions near residences, which adds to the inefficiencies and further led to an increase in tariffs.

In view of these issues and after detailed deliberation, the Forum decided that a Working Group (WG) may be constituted to study DISCOM viability with a special focus on loss reduction, employee costs and other issues affecting the viability of the DISCOMs. A benchmarking may be done for employee related costs and losses depending on the topographical structure of the State. The minutes of the meeting of the 88th Meeting of the FOR are annexed to this Report as **Annexure-I**.

Accordingly, the Working Group was constituted with the following composition:

1. Chairperson, MPERC – Chairman of the working group.
2. Chairpersons, HPERC, – Member
3. Chairpersons, CSERC, – Member

4. Chairpersons, PSERC, – Member
5. Chairpersons, APSERC, – Member
6. Chairpersons, TERC, – Member
7. Chairpersons, RERC, – Member
8. Chairpersons, JERC (Goa & UTs), – Member
9. Member (Finance), CERC – Member

A copy of the order constituting the Working Group is enclosed as **Annexure – II**.

2.4 *Deliberations of the Working Group*

The first meeting of the WG was held on 21st June 2024 (minutes of meeting enclosed as **Annexure–III**). The second meeting was held on 9th August 2024 (minutes of meeting enclosed as **Annexure–IV**). The third meeting was held on 03rd October 2024 (minutes of meeting enclosed as **Annexure–V)**. Fourth and the final meeting to finalise the recommendations was held on 25th November 2024 and 26th December 2024 (minutes of meeting enclosed as **Annexure–VI and VII respectively**).

2.5 *First Meeting of the Working Group*

The discussion was focused on the Terms of Reference of the Working Group, which included the following:

"

1. *Identify and analyze the factors impacting the sustainability of DISCOMs.*
2. *Examine the existing measures and suggest strategies for minimizing operational losses and enhancing efficiency.*
3. *Analyze employee cost structures and make recommendations for optimization of employee cost.*
4. *Suggest guidelines to reduce O&M and A&G Costs of DISCOMs.*
5. *Any other matter related and incidental to the above."*

The FOR Secretariat also presented a background note highlighting an analysis of the key factors affecting the viability of DISCOMs.

The Working Group suggested that the reasons for ACS-ARR gap be analysed in detail and the best practices followed by a few progressive DISCOMs be studied for this purpose. The Working Group also suggested benchmarking O&M costs based on consumers served or volume of energy handled and assessing the impact of cross-subsidy surcharge on the viability of DISCOMs. The WG also suggested to use IT tools for data collection and to carry out analysis of tariff orders.

2.6 *Second Meeting of the Working Group*

The meeting commenced with a presentation by GUVNL highlighting best practices adopted by them including strategies adopted for loss reduction, consumer engagement and enhancing employee productivity through continuous training and development, which resulted in improvement in the operational efficiency of DISCOMs of the State.

The second presentation was made by TATA Power Delhi Distribution Limited and Tata Power-Odisha DISCOMs, sharing their learnings, including - extensive use of IT and other technological intervention, consumer engagement, aggressive replacement of faulty meters, CSR activities in high loss areas, enhancing customer care services and employee motivation and improvements in TPDDL as well as in the DISCOMs of Odisha.

2.7 *Third Meeting of the Working Group*

The meeting started with a presentation by Madhya Pradesh Paschim Kshetra Vidyut Vitaran Co Ltd. (MPPKVVCL) which provided an overview of the distribution and retail supply of electricity in Indore and Ujjain. The presentation highlighted the impact of adoption of Smart Meters and the newly installed billing system which was more flexible and automated with features such as instant bill generation, remote disconnection system, etc. Further, they highlighted the beneficial impact of employee reward and recognition initiatives such as *Sona chandi scheme*.

The second presentation was made by Torrent Power, wherein the benefits of underground distribution infrastructure, 100% consumer indexing and installation of electronic meters at the consumer end was presented. The presentation also highlighted the importance of even load balancing on transformers, increased density of transformers and preventive maintenance using fully computerised Operation Management System (OMS).
The WG also requested Torrent Power to provide more details on the loss reduction initiatives adopted by it in Bhiwandi.

It was decided that the learnings from the best practices shared by different Distribution utilities at meetings of working group be compiled by the FOR Secretariat, along with the analysis of issues around the terms of reference of the Working Group to enable finalisation of the recommendations at the next meeting of the group.

2.8 *Fourth Meeting of the Working Group*

During the fourth meeting of the working group, Representative from Madhya Pradesh Madhya Kshetra Vidyut Vitaran Co. Ltd. (MP Central DISCOM) highlighted the key issues being faced by all the Distribution utilities of the State of Madhya Pradesh and shared their learnings and suggested focus areas for consideration of the Working Group. The same was followed by a detailed presentation by the consultant assisting the Working Group on the inputs received from DISCOMs and SERCs and the activities carried out against the terms of Reference.

Some suggestions were made by the members of the Working group, and it was decided that a Report be prepared based on the presentations made and suggestions of WG, and the draft Report be circulated for consideration of the Working Group.

In the fifth and final meeting of the WG, the Working Group adopted the Draft Interim Report and endorsed the final report for feedback and comments from the FOR.

2.9 94th Meeting of FOR

The Report of the Working Group was presented before the FOR in the 94th meeting of the FOR on 10th January 2025 outlining the key findings and recommendations in which the Forum deliberated on its implications and the necessary course of action. It was resolved that the respective States may undertake the required measures to implement the recommendations aimed at enhancing the financial and operational viability of DISCOMs. The Forum after suggesting the following , approved and adopted the recommendations detailed in the subsequent section of this report and suggested that the recommendation be forwarded to MoP and SERC's for suitable action (minutes of meeting enclosed as **Annexure–VII-A)**

1. Separate norms be explored for hilly States and NE States.
2. Increase the threshold KPI to 80%.

2.10 Objective of the Report

The monolithic structure of the State Electricity Boards (SEBs), over the period led to inefficiency in operation and poor financial performance. Many electricity boards were state-owned monopolies, with little competition or market pressure to improve financial performance. Due to price controls and inefficiencies in pricing, SEBs frequently struggled to cover the costs of generation, transmission, and distribution. As a result, many SEBs accumulated huge debts, relied heavily on government bailouts, and faced challenges in financing infrastructure upgrades or expansions. Their financial health was often weak, with limited ability to attract private investment or raise capital from markets.

Additionally, absence of clear financial accountability and lack of operational autonomy, compounded the difficulties faced by the electricity boards. Operational inefficiencies, such as poor management practices, outdated infrastructure, and high technical and commercial losses, contributed to cost overruns and revenue shortfalls. The financial position of SEBs was also affected by the limited ability to adapt to modern technologies or innovative business models. Unbundling of the integrated, State-owned monopolies into separate entities for generation, transmission, and distribution, was seen as a necessary step to address these financial problems, promote competition, and improve efficiency in the sector.

Post-unbundling, a few Distribution Utilities (DISCOMs) achieved notable financial turnarounds through a combination of structural reforms, technological advancements, and State Government support. Better tariff rationalization, improved billing and metering systems, and investment in smart grid technologies helped in reducing technical and commercial losses, thus increasing revenue realization. As a result, several

DISCOMs, demonstrated a significant improvement in their financial health, reducing their reliance on State subsidies and becoming more self-sustaining.

The **objective** of this report is to bring out the **best practices** that have been followed by these progressive Distribution Utilities so that the same can be emulated by others. The Report also tries to benchmark the employee and administrative costs associated with the retail business, which in case of most of the loss-making distribution utilities are beyond acceptable limits. Further, based on the deliberations of the Working Group and inputs provided by various SERCs, the Report also aims to recommend strategies for improving cost efficiency, enhancing operational performance, and ensuring long-term sustainability of DISCOMs.

2.11 Approach and methodology

To meet the above stated objectives, a comprehensive strategy was designed to ensure that the methodology is robust and effectively addresses the complex challenges encountered by DISCOMs.

1. **Case Studies of Successful DISCOMs**: Series of presentations were made by progressive DISCOMs, showcasing their major accomplishments and the underlying factors that contributed to the significant improvements in operational and financial performance. The presentation also flagged issues being faced and areas of concern. These insights and initiatives shall serve as valuable examples of best practices which have been tried and tested to overcome operational and financial challenges.
2. **Inputs and Suggestions from SERCs**: Feedback was solicited from various State Electricity Regulatory Commissions (SERCs). Based on the inputs received, analysis was carried out to understand the key regulatory challenges that DISCOMs face, including tariff structures, cross-subsidy management, and other issues which are critical to ensuring a sustainable power distribution system.
3. **Identification of Key Sustainability Factors**: Drawing from the case studies and regulatory feedback, a comprehensive analysis was undertaken to identify the critical factors influencing the long-term sustainability of DISCOMs. These factors include those affecting financial health, operational efficiency, and the effective management of cost structures.
4. **Study of O&M and Employee Costs**: A detailed examination of the O&M costs, particularly Employee-related expenses and Administration & General (A&G) expenses have been carried out. This includes benchmarking of these costs. This analysis aims to establish some reference costs and provide some guidelines for improving employee efficiency and optimizing costs across the sector.
5. **Deliberation and Recommendations**: Following the analysis, a set of targeted recommendations are put forward to address the core challenges faced by the DISCOMs. These recommendations have been discussed in detail to refine the proposed solutions, ensuring that they are actionable and contribute to the

overall enhancement of DISCOM operations and financial stability. Also, an attempt has been made to grade the recommendations to enable prioritisation starting with low-cost, low effort but high impact solutions.

2.12 Structure of the Report

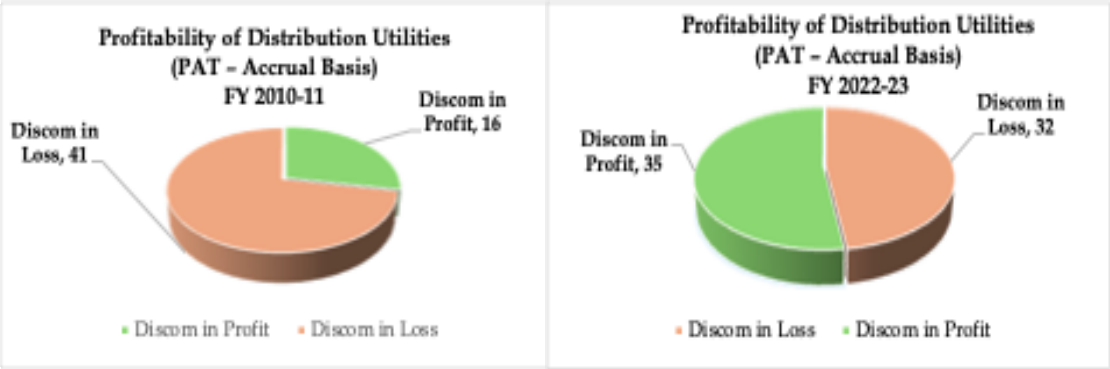
This report is organized into following sections to comprehensively address the challenges and offer solutions to ensure DISCOMs viability.

1. **Executive Summary -** The opening section provides a concise overview of the report, detailing its purpose, highlighting key challenges faced by the DISCOMs, summarising the findings, and outlining the recommendations and way forward.
2. **Introduction -** This section sets the context for the study by suitably capturing the genesis of this study. It outlines the study's objectives, and the methodologies employed, including data collection, analysis frameworks, and approaches adopted to assess challenges and to recommend solutions.
3. **Background –** This section provides a detailed background and the need for the Study. It also details out the objective of the Study.
4. **Case Studies of Successful DISCOMs –** The section captures detailed insights from the case studies of public and private DISCOMs such as GUVNL, Tata Power, Torrent, and MP DISCOMs. These examples illustrate best practices in operational efficiency, HR policy, financial management, and loss reduction strategies.
5. **Analysis of Key Challenges and their Financial Implications -** This section examines critical factors impacting DISCOM viability, including AT&C losses, ACS-ARR gap, regulatory assets, cross-subsidies other related issues. Each factor's operational and financial implications are analysed, providing a foundation for targeted interventions.
6. **Strategic Recommendations for Improvement –** This section suggests recommendations and highlights best practices that have yielded result in reducing technical and operational losses, optimizing cost structures (Employee and A&G costs), and other key factors responsible for short-term and long-term sustainability.
7. **Annexures -** These include supporting documents, including minutes of meeting, copy of presentations and other documents referred.

3 Background

India's power sector has undergone significant transformation after the notification of the Electricity Act, 2003. One of the significant reforms introduced by the Act was the unbundling of the sector into three distinct verticals, i.e., Generation, Transmission, and Distribution. This segregation was intended to introduce competition, enhance the operational efficiency and improve financial viability of the power sector.

However, for various reasons, the financial condition of the distribution sector remains precarious. It is, however, also observed that while some of the DISCOMs continue to reel under heavy financial losses, there are a few DISCOMs who have shown financial resilience and have managed to turnaround in the past decade. As illustrated in the following graphs, as compared to 16 DISCOMs that booked profit in FY 2010-11, the number of profitable DISCOMs increased to 35 in FY 2022-23.



Source: PFC report on "Performance of Power Utilities 2022-23"

Figure 1: Comparison of Profitability Status of DISCOMs FY 2010-11 vis-à-vis FY 2022-23

This progress underscores the impact of targeted interventions, policy measures, and improved operational practices adopted by some of the DISCOMs. However, despite this improvement, challenges persist, as 32 DISCOMs continue to operate under losses. This underscores the urgent need for a deeper analysis of the strategies and practices employed by the successful DISCOMs. Identifying and documenting these practices is important so that other distribution utilities can learn and implement strategies to improve their financial viability.

Several DISCOMs, which have managed to turn around have implemented innovative approaches, including, *inter alia*, deploying advanced metering infrastructure and DT level monitoring, technological upgrades, improvement in revenue collection through consumer-centric initiatives, controlling theft, etc. By understanding the efficacies of these initiatives, other DISCOMs can adopt similar strategies to address their challenges.

Regulatory certainty is a crucial factor in improving the financial viability of the Distribution Utilities. Regulatory certainty fosters confidence among stakeholders,

including consumers, investors, and financial institutions, which is critical for the long-term viability of Distribution Utilities. A transparent regulatory framework is thus crucial for enabling Distribution Utilities to plan and execute their operations effectively, make investments, and manage risks.

Uniformity in regulatory practices across the country would minimize ambiguities, and establish clear guidelines for tariff setting, revenue recovery, and operational performance standards. To achieve this, it is advisable to synergistically align the regulatory frameworks of individual States with the Electricity (Amendment) Rules, 2024, National Electricity Policy and Tariff Policy issued by Government of India, also keeping in view the State specific scenarios and the best practices that have given results in the past. It is also suggested that in the Rules, SERCs should be allowed the flexibility to formulate Regulations keeping in view the State specific scenarios.

Apart from policy and regulatory measures, the financial viability of Distribution utilities is highly dependent on their ability to reduce Aggregate Technical & Commercial (AT&C) losses.

The AT&C losses of the distribution utilities have witnessed a significant decline, from an estimated[1] 37% in FY 2001-02 to 15% in FY 2022-23. This achievement can be attributed to the implementation of various Government Schemes such as Restructured Accelerated Power Development and Reforms Programme (R-APDRP), Integrated Power Development Scheme (IPDS), Ujwal DISCOM Assurance Yojana (UDAY), Revamped Distribution Sector Scheme (RDSS) etc., which were designed with a specific mandate to reduce AT&C losses through targeted interventions and technological advancements.

However, despite this progress, challenges persist in the distribution sector, which continues to incur substantial losses undermining the financial sustainability of the sector and necessitating further reforms to address structural and operational bottlenecks.

Therefore, the Forum of Regulators, in its 88th meeting held on 13th October 2023 deliberated on the issue of long-term sustainability of the DISCOMs and constituted the Working Group. Based on agreed terms of reference decided by the WG and the approach and methodology as already discussed, inputs of the Distribution Utilities and SERCs have been taken and the consultant assisting the WG has also conducted an independent analysis of ways to rationalise O&M expenses with a focus on Employee and Administrative expenses. The Report also delves into detailed impact assessment of key factors affecting DISCOM viability.

[1] PFC Report on performance of Power Utilities.

Based on this analysis, the Report provides a set of recommendations aimed at addressing the challenges faced by DISCOMs and strategies for enhancing their operational and financial performance.

4 Analysis of Turnaround Strategies of Progressive DISCOMs

The following progressive distribution utilities shared their achievements and initiatives.

1. Gujarat Urja Vikas Nigam Ltd. (GUVNL) and Dakshin Gujarat Vij Company Limited. (DGVCL)on behalf of Distribution Utilities of Gujarat.
2. Tata Power Company Ltd. and Tata Power Delhi Distribution Ltd.
3. Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Limited. (MP West DISCOM or MPPaKVVCL) on behalf of the DISCOMs of Madhya Pradesh.
4. Torrent Power Limited.

In addition to the above, Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited. (MP Central DISCOM or MPMKVVCL) also provided suggestions and areas of focus that can improve DISCOM viability. Similarly, CESC, Rajasthan has also submitted initiatives taken by it to improve the financial position of the distribution business in the District of Kota, Bharatpur and Bikaner in the State of Rajasthan where it operates as Distribution Franchisee. The presentation is attached as **Annexure-VIII** to this Report.

This section deals with the key achievements and initiatives of the above Distribution Utilities which resulted in reduced gap between Average Cost of Supply (ACoS or ACS) and Average Revenue Realization (ARR).

4.1 GUJARAT

4.1.1 Overview

The Gujarat Urja Vikas Nigam Limited (GUVNL) was incorporated as a Govt. of Gujarat Company and owns six other companies (including generation, transmission and distribution) w.e.f 1st April 2005, DGVCL, MGVCL, PGVCL and UGVCL have become Subsidiary Companies of GUVNL.

As of 2023-24, the State distribution utilities of Gujarat had 150 lakh consumers in the State and 62,000 Employees. On behalf of all the DISCOMs of the State, GUVNL presented the performance of the State distribution utilities .

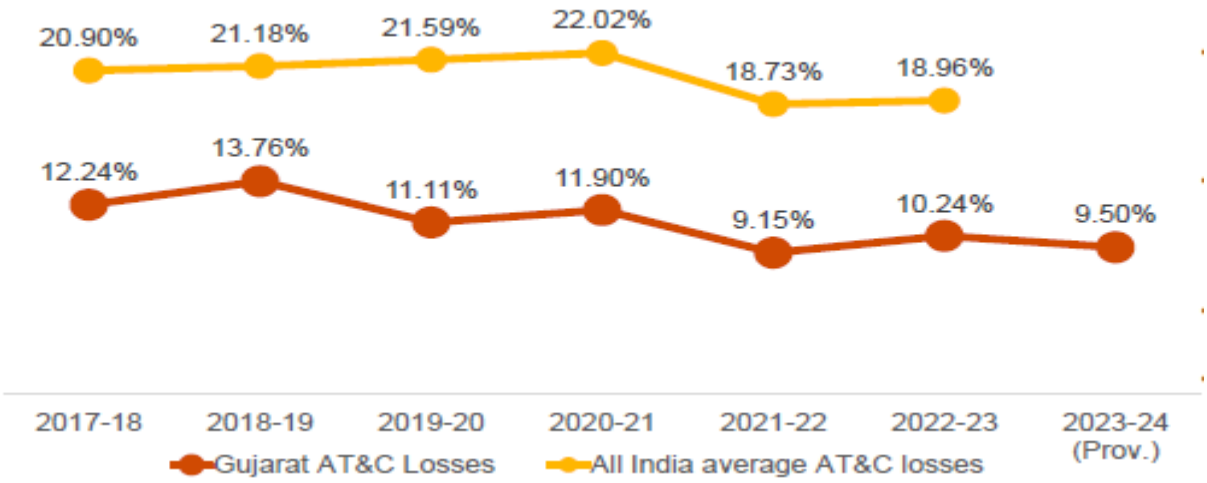
Before enactment of the Act, the State Electricity Board was incurring losses along with supply constraints for its consumers. However, post enactment of Act in 2003, the State was quick to unbundle the board, and since then, a series of progressive steps have been taken to enable the distribution sector in the State to turn profitable. Based on the inputs provided by GUVNL, and further analysis, the best practices and key initiatives

followed by the State DISCOM have been brought out so that the same can be considered for adoption by similar State distribution utilities.

4.1.2 Key Achievements

1. **Comparative AT&C Losses of Gujarat with India's**

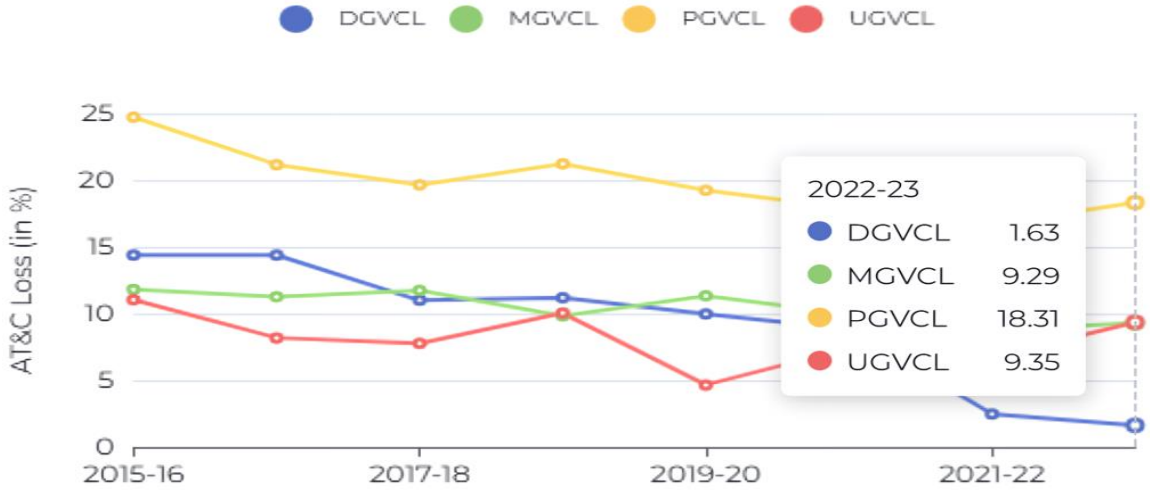
Gujarat's AT&C losses had decreased to 10.24% in 2022-23, showcasing a consistent trend of outperforming the national average. A comparison of all-India average AT&C losses vis-à-vis the quantum of loss of distribution utility of Gujarat, is as shown in the following figure.



Source: GUVNL presentation at FOR

Figure 2: Comparative AT&C Losses of Gujarat with India's

By 2022-23, Gujarat's DISCOMs had achieved remarkable reduction in AT&C losses, demonstrating improved operational efficiency and better management practices. DGVCL's losses dropped to an impressive 1.63%, MGVCL's to 9.29%, UGVCL's to 9.35%, and PGVCL's to 18.31%. The individual loss levels of these distribution utilities are as shown in the following figure.

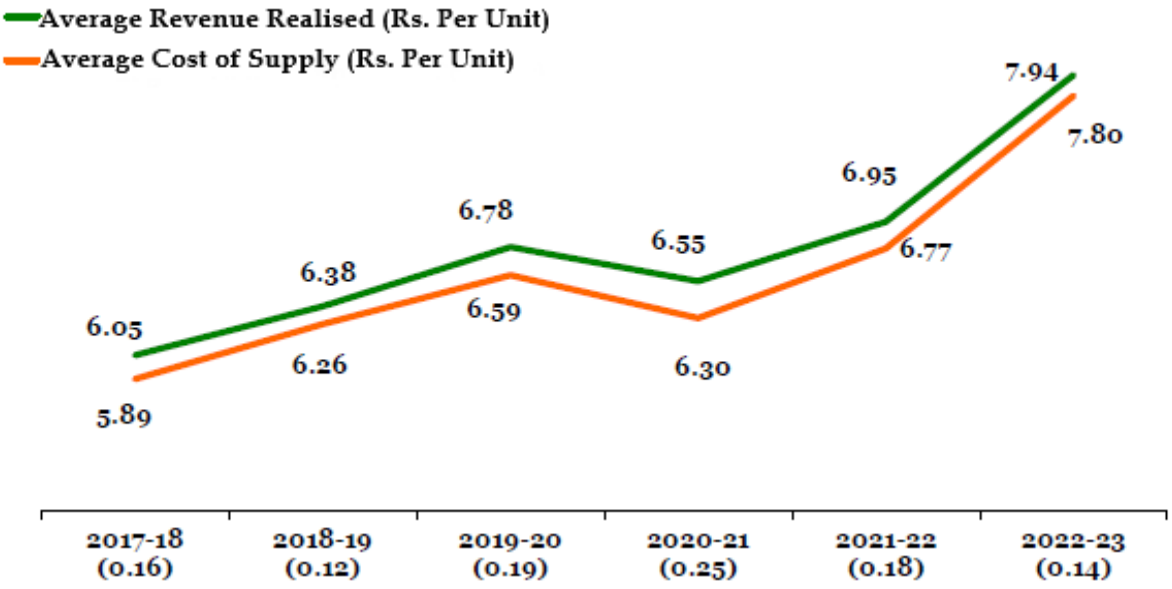


Source: iced.niti.gov.in

Figure 3: Individual Loss Levels of GUVNL Distribution Utilities

2. **Average Cost of Supply (ACoS) and Average Revenue Realised (ARR)**

It is further observed that the State has been able to achieve consolidated ACoS-ARR surplus in the past years and is as shown in the following figure.



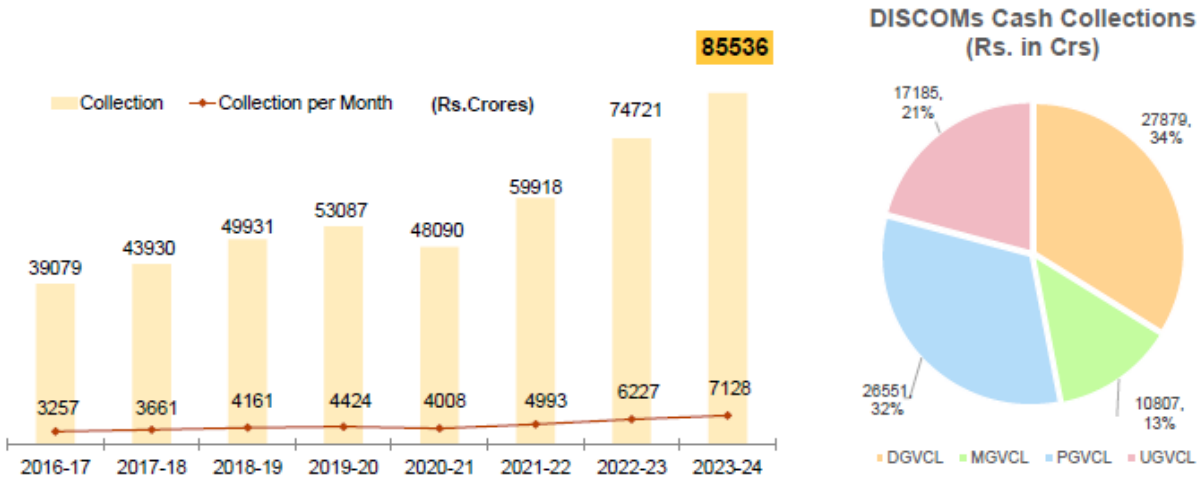
Source: GUVNL presentation at FOR

Figure 4: ACoS and ARR of Gujarat DISCOM

3. **Cash Collection**

The total cash collections by Gujarat DISCOMs in 2023-24, was Rs. 85,536 crores, with a monthly collection of Rs. 7,128 crores. This reflects significant growth as compared to 2016-17, when total cash collections were Rs. 39,079 crores, and monthly collections amounted to Rs. 3,257 crores.

The increase of over 118% in total cash collections demonstrates notable progress in revenue collection capabilities. Monthly collections have also more than doubled during this period, indicating improved efficiency in cash flow management. The consistent rise in cash collections reflects the impact of sustained efforts to enhance **customer interaction, improve payment mechanisms, and reduce outstanding receivables**. Stronger cash flows enabled GUVNL to maintain financial stability, invest in infrastructure improvements, and deliver reliable services to their consumers. Important Reforms undertaken by GUVNL are summarised as under:



Source: GUVNL presentation at FOR

Figure 5: GUVNL DISCOM Cash Collection (Yearly & Monthly bases)

4.1.3 The Turn-Around - How Reforms Helped Change?

1. **Jyoti Gram Yojana (JGY)**

   The JGY, launched in September 2003, was aimed to address the issues of poor power supply quality in Gujarat's villages. The scheme involved the segregation of 11 kV feeders into dedicated agricultural and non-agricultural lines. 90% of fund, was to be given by Government of Gujarat (GoG) as Grants, provided 10% will be contributed by the villagers. Within 3.5 years, the program covered 17,839 villages with 78,000 kms of new power lines, 2,257 dedicated feeders, and thousands of transformer centres. As a result, Villages began receiving uninterrupted power for non-agricultural uses, while farmers received 8 hours of consistent electricity supply on daily basis. Success of the Scheme is attributable to customer participation in an initiative aiming to reduce losses.

2. **Suryashakti Kisan Yojana (SKY)**

   The SKY, was launched in July 2018 by the Gujarat government. Before SKY, agriculture consumption accounted for 21.46% of Gujarat's electricity consumption in 2017-18 but contributed less than 5% of the revenue, requiring significant subsidies. Under SKY, grid-tied photovoltaic systems were installed on farmers' lands, with a funding model involving 5% farmer contribution, 30% subsidies each from State and central governments, and 35% through loans. Farmers benefited from reliable grid-quality power for 8 hours daily, sold surplus solar energy at INR 7 per kWh, and gained full ownership of the systems after 7 years.

3. **Financial Reforms**

   As part of strategic financial reforms, GUVNL adopted a centralized financial management approach to optimise the electricity billing and payment processes. Under this system, consumers pay their electricity bills directly to the Distribution utility (DISCOM) and these payments are subsequently transferred to GUVNL,

which serves as the central financial hub, utilizing optimum credit facilities from banks to manage working capital effectively. The organization then systematically distributes payments to all power suppliers, while also administering applicable rebates.

4. **Tackling AT&C Losses**

   Gujarat has successfully reduced its AT&C losses, achieving the loss level of around 55% lower than the national average. This significant improvement is due to rigorous vigilance, including the establishment of 16 dedicated police stations specifically tasked to deal with power theft and related issues, proactive inspection and disconnection drives, and creation of special courts to expedite legal proceedings. Additionally, implementation of High Voltage Distribution Systems (HVDS) has enhanced operational efficiency and reliability, while replacement of mechanical meters with electronic meters, has improved metering and billing process.

5. **Upskilling Workforce**

   Recognising the importance of upskilling and reskilling its workforce, Gujarat established the Gujarat Energy Training and Research Institute (GETRI) in 2006. By FY 2005-06, over 620 training programs had been conducted, focusing on technical skills, behavioural change towards customers, safety, and corporate training. These initiatives were further supported by the United State Agency for International Development (USAID) and the Distribution Reform Upgrade and Management (DRUM) project. GETRI plays a crucial role in **capacity building** through research and analysis, and has developed international tie-ups and partnerships with academic institutions, research organizations, and institutions working in the field of net-zero emissions. The institute also provides consultancy services and organizes workshops, seminars, and events to ensure continuous learning and engagement.

6. **Infrastructure Development**

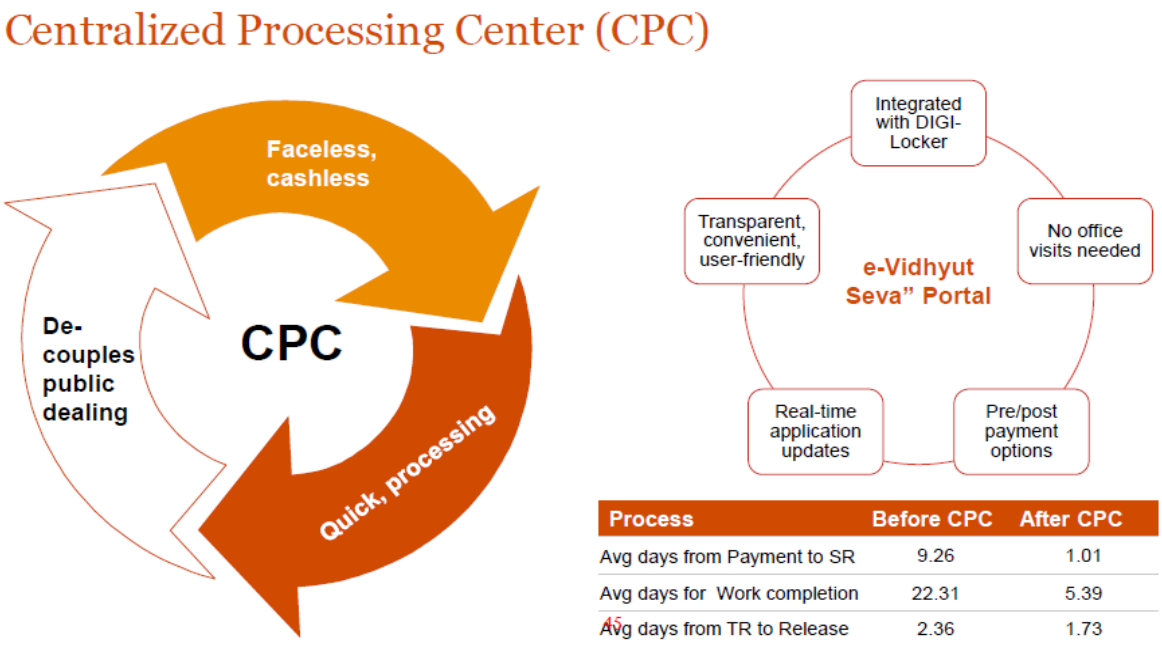
   To strengthen and modernise distribution infrastructure, significant investment was made to implement Advanced Distribution Management Systems (ADMS) and Smart Grid technologies for enhanced efficiency, responsiveness, and overall performance of the strategic network upgradation system.

4.1.4 New Age Reforms

1. **Centralised Processing Centre (CPC)**

   The CPC is designed to be a completely digital and paperless system, focused on quick and efficient processing of tasks. Some of the notable CPC features include integration with digital lockers for document management, a user-friendly "e-Vidhyut Seva" portal, and the ability to complete tasks remotely without any office visits. The system also provides real-time application updates and flexible pre/post payment options.

For example, the average time taken from payment to task completion, and from task completion to final release, has been reduced by over 75%.



Process	Before CPC	After CPC
Avg days from Payment to SR	9.26	1.01
Avg days for Work completion	22.31	5.39
Avg days from TR to Release	2.36	1.73

Source: GUVNL presentation at FOR

Figure 6: Details of Centralised Processing Centre

2. **Consumer-Centric Initiatives**

   The DISCOMs have introduced consumer-centric initiatives, such as **online bill payment, digital customer service, and improved complaint resolution mechanisms**. These measures have enhanced the overall experience for residential, commercial, and industrial consumers.

3. **Leadership and Skill Development for Employee**

   The **Leadership Development Program** focuses on nurturing future leaders through structured policies, fast-track promotions, and specialised training at institutes like IIMs and IITs. Platforms such as the "Ideation Premier League" encourage innovation, while initiatives such as "**PAHAL"** is an initiative designed to recognise, celebrate, and motivate exceptional team members, both as individuals and as a united force while, "**Employee Connect**" enhances engagement and communication across the workforce.

4.1.5 Investments

With strong cash flows, GUVNL is making investments in strengthening transmission and smart meters.

1. **Transmission Strengthening**

   Gujrat is making significant investment of Rs 1 lakh crore towards the transmission strengthening initiative.

Specific targets include adding 1,000 new substations and 12 substations of 765 kV that can operate at higher voltages, as well as extending the total transmission line length to 55,000 circuit kilometres. These upgrades to the grid infrastructure were intended to increase transmission capacity, efficiency and improve grid stability. Additionally, the plan emphasised incorporating technological advancements into the transmission network. This suggests the adoption of modern, cutting-edge solutions to modernise and optimise the power distribution system in Gujarat.

2. **Revamped Distribution Sector Scheme (RDSS)**

RDSS adopts the TOTEX Model, merging capital and operational expenditures for resource allocation and balancing long-term investment with operational needs. A key initiative is the large-scale deployment of **1.65 crore smart** prepaid meters in two phases to improve **billing efficiency and customer engagement**. Additionally, **metering of distribution transformers** above 25 kVA ensures better energy flow monitoring. The scheme allocates Rs. 3,693 Crore for infrastructure modernisation, Rs. 5,933 Crore for loss reduction, and Rs. 10,602 Crore for smart metering, aiming to enhance reliability and reduce losses in Gujarat's distribution network.

4.2 TATA Power

4.2.1 Overview

Tata Power operates across various segments of the power sector, including generation, transmission, and distribution. As of 2024, Tata Power's distribution operations are across multiple regions, including Delhi, Mumbai, Ajmer, and four regions in Odisha. The company serves over 12.5 million consumers, making it the largest private distribution player in the country in terms of consumer numbers. Tata Power operates under multiple frameworks, such as licensee operations (e.g., Mumbai, Delhi, and Odisha) and public-private partnerships (Ajmer distribution franchise).

The past record shows that at the time of taking over distribution supply, the supply area was facing lot of challenges in Delhi and Odisha, which was characterised by poor quality of supply, high AT&C loss, faulty/unmetered connections resulting in low Collection efficiency, Billing efficiency and Revenue recovered per unit etc. With several initiatives, the company was able to transform its operation and turn Distribution Utilities into a profitable business. In view of its achievements in multiple regions, TPDDL and TATA presented their key achievements and their process/initiatives .

4.2.2 Tata Power Delhi Distribution Limited (TPDDL)

Following the unbundling of the erstwhile Delhi Vidyut Board (DVB), TPDDL (erstwhile North Delhi Power Limited (NDPL)) is a joint venture between Tata Power and the Government of National Capital Territory of Delhi wherein the majority stake

is held by Tata Power. The company started its operations on July 1, 2002 and serves approximately 1.2 million registered consumers with a peak load of around 1,350 MW, operating across an area of 510 square km.

4.2.2.1 Key Achievements of TPDDL

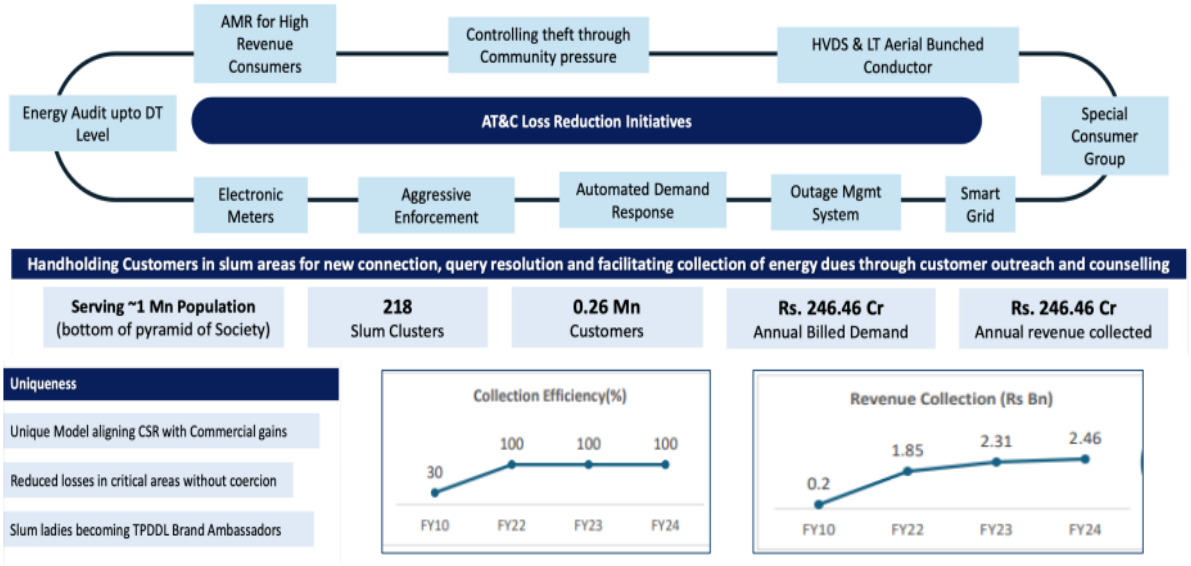
1. **AT&C Losses**

   TPDDL has achieved a significant reduction in AT&C (Aggregate Technical and Commercial) losses over the years. In FY 2002-03, during the takeover from DVB, the losses were as high as 53.1%, indicating inefficiencies in technical and commercial operations.

   With the implementation of various strategies as discussed subsequently, these losses decreased to 5.9% in FY 2023-24. The utility exhibited **significant improvement** and outperformed the AT&C target of 6.91% specified by Delhi Electricity Regulatory Commission.

2. **System Reliability**

   TPDDL has improved its operational performance from July 2002 to March 2024. System reliability – Average Service Availability Index (ASAI) has increased from 70% to 99.9% while transformer failure rates have dropped from 11% to 0.68%. The network length has been expanded significantly from 6,750 km to 14,108 km ensuring improved coverage and reliability. Additionally, peak load capacity has increased from 930 MW to 2,218 MW, and streetlight functionality has surged from 40% to 99.6%.



3. **Impact on Key Components.**

   TPPDL has submitted that due to implementation of few key initiatives, several key performance parameters improved drastically. The initiatives taken along with performance parameters are shown in the following figure.

   Figure 7: Initiative for Reduction of AT&C Losses

As can be inferred from the above, the distribution utility was able to achieve the following;

a) **Collection Efficiency**: The graph shows the collection efficiency before and after the electronic meter installation. The collection efficiency has improved from around 30% to 100%.
b) **AT&C Losses**: The AT&C losses have shown a decreasing trend due to various initiatives such as electronic meter installation, theft control, upgradation of infrastructure, energy audit at DT level etc., taken by TPDDL, which resulted in a significant decrease in losses from around 53% to 6% in Delhi.
c) **Revenue Collection**: The revenue collection has shown a major improvement following the electronic meter rollout, theft control and automatic meter reading for high revenue consumers etc.

4.2.2.2 Major Initiatives

TPDDL has achieved significant milestones through various projects aimed at improving efficiency, reducing losses, and ensuring better service delivery. The strategies and their implementation methodologies are as follows:

1. **Reduction of Aggregate Technical and Commercial (AT&C) Losses**
   a) Carrying out regular energy audits up to the Distribution Transformer (DT) level.
   b) Introduction of Automated Meter Reading (AMR) systems for high-revenue consumers,
   c) Community engagement and aggressive enforcement to combat theft.
   d) Adoption of a smart grid system, including High Voltage Distribution Systems (HVDS) and LT Aerial Bunched Conductors for enhanced efficiency and safety.
   e) Reduction in overloading of distribution infrastructure through capacity augmentation.

2. **Reliability and Network Modernization**
   TPDDL focussed on enhancing system reliability by upgrading infrastructure, such as replacing outdated transformers to maintain service during repairs. Safety and reliability were improved through fencing substations and installing Ring Main Units (RMUs) due to which it was able to achieve 99.9% system availability, suggesting a robust and modernized network.

   Further, the Automated Meter Reading (AMR) system for high revenue consumers was adopted to transmit real-time energy data to a centralized platform. It integrates with business applications like SAP for accurate billing, tamper detection, and operational management which minimizes manual

intervention, enhances energy tracking, reduces losses and improves overall efficiency.

3. **Technology Advancement**
   Advanced technology played an important role in improving the operational parameters, including AT&C losses. TPDDL has installed over 4.33 million smart meters, promoting efficient energy management. GIS mapping was also adopted for consumer indexing, asset tracking, and network planning, while SCADA systems enabled centralized control and real-time monitoring and outage management system.

4. **Consumer Engagement**
   TPDDL established special consumer groups to address challenges in slum clusters, offering outreach programs, customer handholding, and energy dues facilitation. The company improved customer experience by reducing new connection energization time from 51.8 days in 2002 to 5.57 days by 2024 and achieving a consumer satisfaction index of 97%.

5. **Societal Impact and CSR Alignment**
   TPDDL has aligned corporate social responsibility (CSR) initiatives with its business goals, creating sustainable community-focused programs. Women from slum areas were engaged as brand ambassadors, fostering trust and reducing losses in challenging regions.

6. **Key Policy Initiatives**
   TPDDL has advocated for regulatory reforms such as introducing Power Purchase Adjustment Charges and Regulatory Deficit Surcharges to address financial deficits. These initiatives, recognized by the Delhi Electricity Regulatory Commission (DERC), aim to ensure timely recovery of cost of supply.

4.2.3 Tata Power – Odisha DISCOMs

Between 2020 and 2021, Tata Power successfully secured the bid to manage the operations of all four power distribution utilities in Odisha through a public-private partnership (PPP) model. As part of the initiative, four entities were established under a joint venture with the Odisha State government, with a 51:49 ownership structure, with majority of stake being held by Tata Power. These entities include Tata Power Central Odisha Distribution Ltd (TPCODL), Tata Power Southern Odisha Distribution Ltd (TPSODL), Tata Power Western Odisha Distribution Ltd (TPWODL), and Tata Power Northern Odisha Distribution Ltd (TPNODL).

4.2.3.1 *Key Achievements*

1. **AT&C Losses**

Tata Power has achieved a significant reduction in AT&C losses after the takeover post FY 2020-21 and FY 2021-22. In FY 2017-18, the losses were in the rage of 30%-40% across the four distribution utilities, indicating inefficiencies in technical and commercial operations.

With the implementation of various strategies as discussed subsequently, these losses decreased to 9%-16% by FY 2024-25. Efforts to reduce these losses include infrastructure upgrades such as installing advanced metering systems, replacing old and inefficient transmission equipment and, strengthening the distribution network. Significant amount of capital expenditure was infused by Tata Power after the takeover for upgradation of the existing infrastructure. Additionally, improved billing systems, incentivising employees through appropriate reward system including promotions and increased vigilance against power theft have also played crucial roles in bringing down the AT&C losses in the region.

A brief snapshot of the DISCOM-wise reduction in AT&C loss is given below:

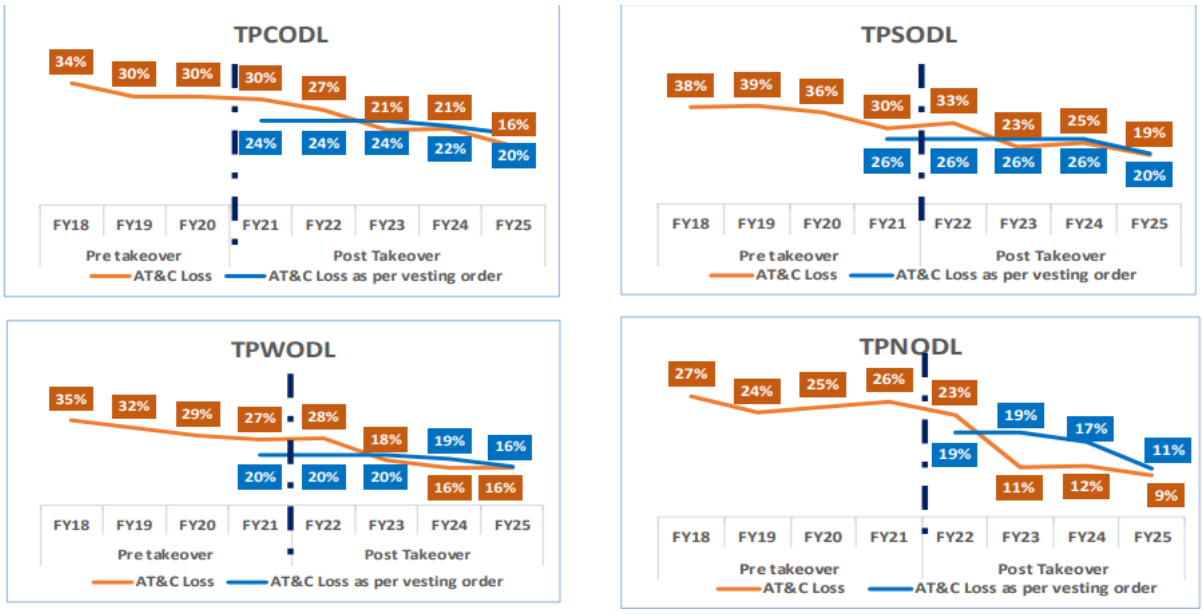


Figure 8: DISCOM Wise Reduction of AT&C Losses

2. **Impact on Key Components.**

Due to implementation of few key initiatives, several key performance parameters improved drastically. Post takeover by Tata Power, the performance parameter is shown in the following figure.

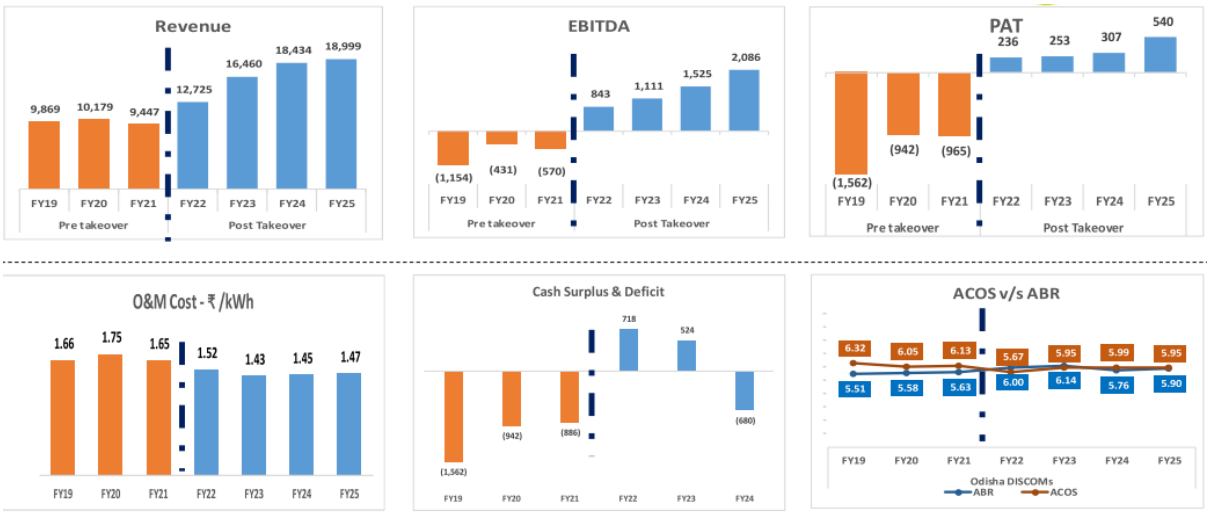


Figure 9: Performance Parameters Post Takeover by TATA Power

As can be inferred from the above, the distribution utility was able to achieve the following;

a) **Revenue**: The revenue collection has shown a major improvement post takeover by Tata Power, which has increased from Rs.9869 Crore in FY 2018-19 to Rs.18,999 Crore in FY 2024-25.

b) **EBITDA**: A remarkable turnaround was achieved, with EBITDA increasing from a deficit of Rs.1,154 Crore in FY 2018-19 to a surplus of Rs.2,086 Crore in FY 2024-25.

c) **PAT:** Profit After Tax (PAT) showed a significant improvement from a loss of Rs.1,562 Crore in FY 2018-19 to the estimated profit of Rs.540 Crore in FY 2024-25.

d) **O&M Cost:** The operational cost per kWh reduced from Rs.1.66 in FY 2018-19 to Rs.1.47 in FY 2024-25.

e) **Cash Surplus:** The DISCOMs moved from a cash deficit of Rs.1,562 Crore in FY 2018-19 to an estimated surplus of Rs.718 Crore in FY 2024-25.

f) **ACOS vs ABR:** Post takeover, the Average Cost of Supply (ACOS) vs Average Billing Rate (ABR) gap narrowed, with ABR closely aligning with ACOS, improving financial viability

4.2.3.2 Major Initiatives

Tata Power – Odisha DISCOMs have achieved significant milestones through various projects aimed at improving efficiency, reducing losses, and ensuring better service delivery. The strategies and their implementation are given below:

1. **Capital Investment and Network Reliability**:

   Tata Power committed over Rs.5600 Crore in capex to strengthen the distribution network in 5 years, supported by a Rs.3000 Crore grant from the Odisha government. The investment focused on modernizing and upgrading the distribution network to enhance system reliability, reduce losses, and ensure uninterrupted power supply. The measures are as follows:

   a) **Network Upgrades:** Augmentation of transformers and installation of Ring Main Units (RMUs) to improve fault management and load distribution.
   b) **Technological Advancements**: Implementation of automation systems like SCADA for real-time remote monitoring, thermo-vision scanners for inspection, and drones for infrastructure maintenance.
   c) **Metering Improvements**: Replacement of defective meters with smart meters, ensuring transparency and accurate energy accounting.
   d) **Safety and Load Growth:** Enhanced substation protection, including fencing and replacement of outdated circuit breakers, supports increasing energy demand while maintaining safety standards.
   e) **Outage Reduction:** Introduction of trolley-mounted substations for rapid deployment during outages to minimize service disruption.

A brief snapshot of the same is as below :

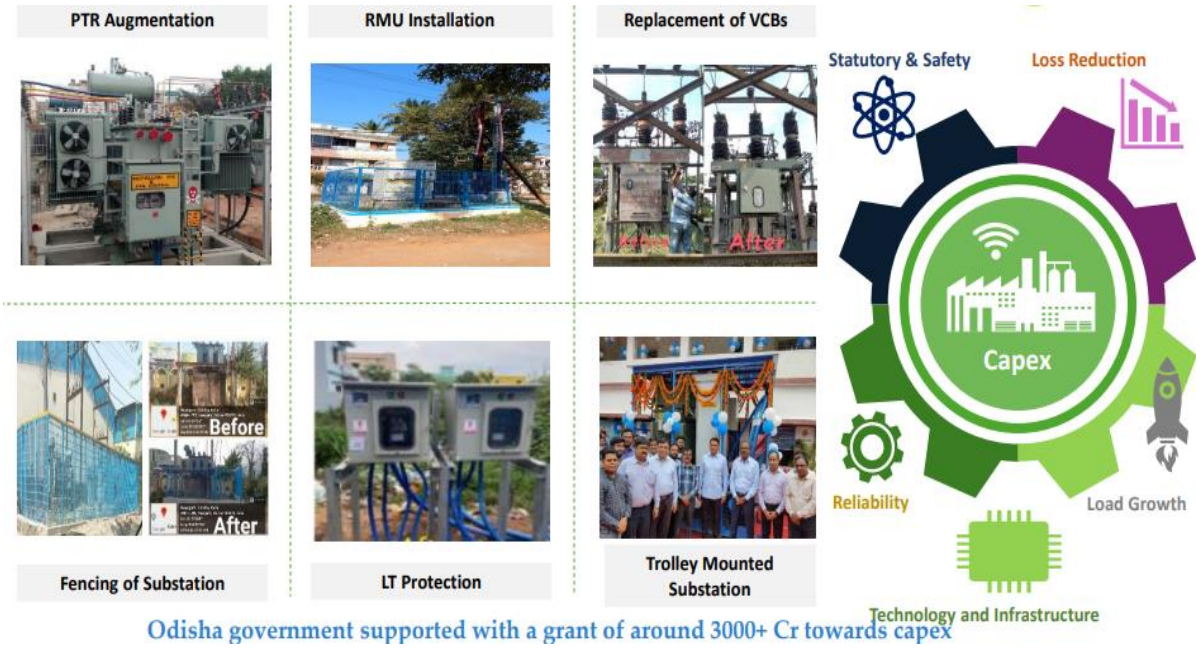


Figure 10: Before and After pictures of Upgradation/Improvements

2. **Operational Efficiency and Loss Reduction:**
   The Tata Power-DISCOMs have undertaken efforts to reduce AT&C losses, achieving a reduction from approximately 29.45% in FY 2021 to 18.79% in FY 2024. In addition to the metering infrastructure, initiatives like de-hooking, reduction in provisional billing and targeted collections have resulted in improved cash flow.

3. **Technological Adoption**:
   Advanced systems such as SCADA for centralized power system control, smart metering for energy transparency, GIS for network mapping, and drone-based inspections were implemented to modernize operations. Additionally, initiatives like Advanced Distribution Management Systems (ADMS) and thermo-vision scanners ensured efficient and reliable network management.

4. **Customer Experience Enhancement**:
   Tata Power established 24/7 call centres, digital payment solutions, and customer care centres. Programs like "Gaon Chala Camps" and SMS-based outage communication improved customer engagement. Over 35% of bills are now paid digitally, with a Consumer Satisfaction Index exceeding 90%.

5. **Employee Welfare**:
   A robust welfare program was introduced, including the Stagnation Promotion Policy, group health insurance, and enhanced working environments. Tata Power also emphasized inclusivity by recruiting from local communities, including ex-servicemen and women self-help groups.

6. **Societal Engagement and Electrification**:
   Initiatives such as "Mission Cheetah" brought unbilled rural consumers into the billing net. The establishment of Bidyut Seva Kendras extended service outreach, while arrear collection drives helped recover Rs.1762 Crore, exceeding initial targets.

   These technology-driven and other initiatives have collectively resulted in improving the reliability, transparency, and operational efficiency thereby ensuring sustainable growth and profitability in operations.

4.3 MP DISCOMS

4.3.1 Overview

Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Limited (MPPKVVCL) was established through an order issued on 1 July 2002 and it is fully owned by the Government of Madhya Pradesh and incorporated under the Companies Act, 1956. As of **2024**, MPPKVVCL has over 1,490 - 33/11 kV substations and 19,964 km of 33 kV lines. The distribution network includes 3.15 lakh distribution transformers (DTRs) and 1,38,103 km of 11 kV lines. The company serves 61.00 lakh consumers across 15 circles and 55 divisions of the State, reflecting the scale and coverage of its power distribution system.

The past record shows that the DISCOM was facing a lot of challenges pertaining to AT&C loss characterised by low Collection efficiency, Billing efficiency and Revenue per unit etc.

4.3.2 Key Achievements

1. **AT&C Losses**
   MPPKVVCL has achieved a significant reduction in AT&C (Aggregate Technical and Commercial) losses over the years. In FY 2015-16, the losses were recorded at 25.26%, indicating inefficiencies in technical and commercial operations. With the implementation of various strategies, as discussed subsequently, these losses steadily decreased to 12.6% in FY 2022-23 and by FY 2023-24, these losses further dropped to around 10.88%. The utility exhibited **significant improvement** and outperformed the AT&C target of 16.09% specified under the RDSS (Revamped Distribution Sector Scheme).

2. **Impact on Key Components.**
   Due to implementation of few key initiatives, several performance parameters improved drastically. A comparison of these performance parameters is as shown in the following figure.

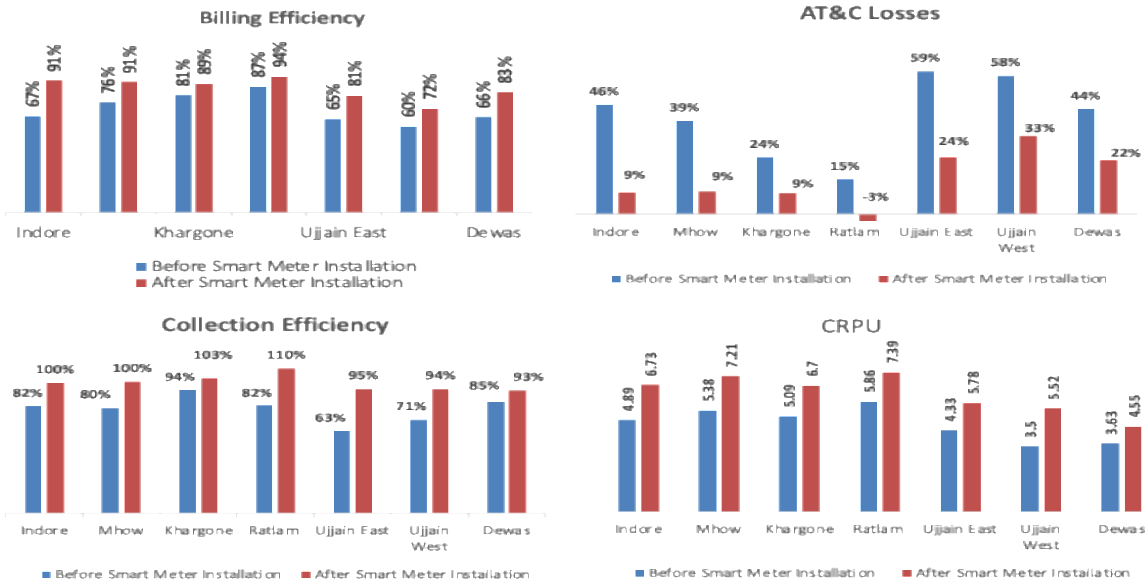


Figure 11: Impact on Key Components

As can be inferred from the above, the distribution utility was able to achieve the following;

a) **Billing Efficiency**: The graph shows the billing efficiency before and after the smart meter installation. In most regions, the billing efficiency has improved after the smart meter deployment, with increases ranging from around 67% to 91% in Indore.

b) **AT&C Losses**: The AT&C losses have shown a decreasing trend after smart meter installation with losses dropping from around 46% to 9% in Indore and from 39% to 9% in Mhow.

c) **Collection Efficiency**: The collection efficiency has improved in all regions after the smart meter implementation. In Indore, collection efficiency increased from 93% to 100%, while Mhow and Khargone have seen the most significant improvement in collection efficiency from 80% to 100% and from 94% to 103%, respectively.

d) **CRPU**: The CRPU (Cost to Revenue per Unit) metric has shown a major improvement following the smart meter rollout, reflecting enhanced operational efficiency and effective cost management.

3. ACS-ARR Target vs Achievements

Due to improvement in its operations and loss reduction, the Utility managed to rapidly reduce the ACS-ARR gap in the recent years. The ACS-ARR target (As per RDSS) and actual performance by MPPKVVCL over the last four years is as shown in the following graph.

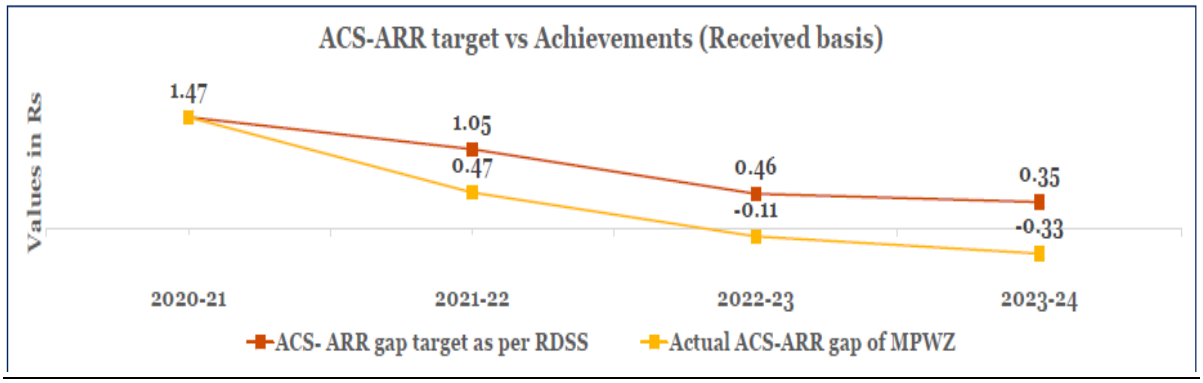


Figure 12: ACS-ARR Target vs Achievements

The above graph shows a marked improvement in the DISCOM's performance in the later years. For FY 2023-24, the target ACS-ARR gap was set at Rs. 0.35, and MPPKVVCL turned around its business achieving ACS-ARR surplus of Rs. 0.33 which is significant considering that in FY 2020-21 there was huge gap of Rs. 1.47/kWh.

4.3.3 Major Initiatives

MPPKVVCL has achieved significant milestones through various projects aimed at improving efficiency, reducing losses, and ensuring better service delivery. Some of its strategies and implementation are given below:

1. **Smart Meter Project**

   The smart meter deployment has enabled the utility to build a state-of-the-art data analytics engine that can generate 63 types of analytical reports. This data-driven approach allows the utility to gain deeper insights into its operations and make more informed decisions. The smart meter implementation led to a 13.63% increase in the average monthly units billed, while the average monthly per-consumer electricity bill has improved by 21.46%. The smart meters have identified 18,196 cases of aberrations, which have resulted in additional billing of Rs. 21.96 Crores. This showcases the utility's ability to detect and address instances of energy theft or anomalies through the smart metering system. The smart meters have allowed the utility to impose PF (Power Factor) penalty amounting to Rs. 7.46 Crores and provide PF incentive of Rs. 25.68 Crores, highlighting the utility's efforts to encourage consumers to maintain optimal power factor and improve energy efficiency. The smart meter infrastructure has enabled the utility to successfully carry out 6.57 Lacs of remote reconnections and disconnections, amounting to around Rs. 308.63 Crores in recovered arrears. The project has facilitated the conversion of 3,707 smart meters into net meters, with a connected load of 25.9 MW. It has also started a door-to-door revenue collection process, offering on-the-spot receipts through a mobile app, making payments more efficient for consumers.

2. **Feeder Separation**

Under this project, MPPKVVCL successfully separated the supply of electricity to agricultural and non-agricultural consumers through dedicated feeders. This initiative has shifted agricultural demand from peak to off-peak hours, leading to power purchase cost savings and a reduction in AT&C losses. As a result, the average supply hours for non-agricultural feeders reached 23 hours and 39 minutes, while agricultural feeders saw an average of 9 hours and 34 minutes of supply.

3. **Revenue Collection**

To improve revenue collection, MPPKVVCL monitors feeder-wise Revenue Per Unit (RPU) and develops targeted strategies to improve it. A focused effort has been made to recover old arrears through measures like **Japti/Kurki actions and bank account seizures**.

4. **New Vigilance information Systems (NVIS)**

The New Vigilance Information System is an advanced digital platform designed to enhance the vigilance and enforcement operations and improve overall efficiency in electricity distribution. The system enables real-time monitoring and actionable insights to address irregularities, making it easier to identify and mitigate losses. By integrating with smart metering infrastructure and advanced analytics tools, NVIS strengthens the DISCOM ability to uphold compliance, optimize resource allocation, and enhance customer trust through improved service delivery, loss reduction and reduced power theft incidents.

5. **Rental DTR scheme**

This has been introduced for temporary agricultural consumers. The company also identifies irrigation DTRs with no temporary connections to prevent unauthorized usage and provides irrigation power supply during off-peak hours to optimize the system and reduce losses.

6. **Customer Satisfaction & Employee Motivation**

The company has implemented multiple measures such as SMS-based communication for outage notifications and bill sharing via WhatsApp. An automatic compensation mechanism ensures that consumers are paid if the company fails to meet guaranteed performance standards. In FY 2023-24, MPPKVVCL conducted 2,467 consumer awareness campaigns covering various topics. Additionally, it offers multiple payment options, including UPI, net banking, RTGS, checks, and offline counters. Consumers are also rewarded with incentives for prompt and online payments.

7. **Employee Welfare Schemes**

To motivate its employees, MPPKVVCL has introduced several initiatives, including free health checkups through its AROH program, aimed at improving

employee well-being. The company also runs the "Sona Chandi" scheme, where employees such as SE, EE, AE, and JE are recognized with certificates and gold or silver coins for outstanding performance in areas like revenue collection, AT&C loss reduction, and bill collection.

4.4 TORRENT POWER LTD.

4.4.1 TPL- Ahmedabad

In 1997, the company acquired the Ahmedabad Electricity Company (AEC) by purchasing the Gujarat government's 28.89% stake, forming Torrent Power AEC Limited. The utility has transformed the operations into one of the top-performing power entities with significant improvements in operational efficiency and reliability of supply.

4.4.1.1 Key Achievements

1. **System Reliability** - In 1998, the system average interruption frequency index (SAIFI) was 46.30, indicating a high number of outages per year, Torrent Power's efforts have resulted in a significant improvement, with the SAIFI reduced to only 1.00 in 2024. Similarly, the system average interruption duration index (SAIDI) has decreased from 43.21 hours in 1998 to just 0.26 hours in 2024, showcasing the company's effort in minimising the duration of outages.

2. **Distribution Transformers** - In 1998, the number of distribution transformers (DTs) was limited to 3,032, with a total capacity of 1,037 MVA. By 2024, the number of DTs has increased to 9,517, with a total capacity of 4,424 MVA. The substantial expansion and capacity developments are done to improve the distribution network's efficiency and to accommodate the growing energy demands in Ahmedabad.

3. **Distribution Network** – The number of 11 kV feeders has increased from 280 in 1998 to 1,470 in 2024, a significant expansion that enables the company to distribute power more effectively and efficiently.

4. **Energy Demand** - The maximum demand has increased from 601 MW in 1998 to 1,834 MW in 2024, reflecting the rising energy needs of the region. Additionally, the number of consumers has grown from 9.79 lakhs in 1998 to 20.99 lakhs in 2024, underscoring the company's ability to meet the expanding energy requirements of Ahmedabad's growing population.

5. **Collection Efficiency -** In 1998, the collection efficiency stood at 92%, while in 2024, it has reached 100%.

6. **AT&C Loss** – The losses have significantly reduced from **19.04**% in 1998 to just **4.18**% in 2024.

4.4.1.2 *Major Initiatives*

TPL-A has primarily focussed on the following three critical areas:

1. Reliability & Quality of Supply
2. Customer Services
3. System Efficiency

1. <u>Reliability & Quality of Supply</u>

With a focus on reducing power shortages and improving its network by increasing capacity and revamping the distribution system, it had undertaken initiatives like transitioning from overhead networks to underground systems, and by adopting condition based monitoring systems to ensure reliable electricity delivery. Focus areas include reliability parameters, redundancy at critical voltage levels (33 kV and 11 kV), and addressing issues like underground network failures and repeated fuse-off complaints. As a result, SAIFI and SAIDI parameters have improved considerably.

(a) "**Meter to Cash**" system was to optimise its revenue management and enhance operational performance.

(i) The **metering system** emphasises tamperproof metering, rigorous installation practices, and a specific focus on high-value consumers to ensure accuracy and reduce energy theft.

(ii) The **billing process** is managed through an **ERP-based** system with pre- and post-auditing mechanisms, close monitoring, and comprehensive consumer indexing, ensuring transparency and accountability.

(iii) On the **revenue management** front, the company has strengthened customer touchpoints, enhanced its legal framework, and eliminated external interferences to improve collections and reduce losses.

In 1998, the collection efficiency stood at **92%**, while in 2024, it has reached **100%**.

(b) **Revamping of Distribution Infrastructure:** The company has **upgraded its distribution infrastructure** by relieving overloaded feeders, implementing reactive power compensation, adding feeder and distribution transformer (DT) capacity, and reinforcing the network to ensure uninterrupted and efficient power supply. These system upgrades have also significantly improved the reliability and efficiency of power distribution and has catered to increasing demand.

2. <u>Customer Services</u>

The company has implemented customer-centric initiatives through tools such as Customer Relationship Management System and 24x7 Call Centres. It has ensured proper outage management, transparent procedures, and convenient customer services, including extended working hours. The

performance is measured through metrics such as metering complaints, achieving customer perception targets, and improving IT implementation for better service delivery.

3. **System Efficiency**

Efforts to improve system efficiency includes identifying power leakages, implementing advanced Meter-to-Cash systems, and ensuring accurate metering while replacing defective meters. It has focussed on revenue protection, assurance systems, and expediting legal connections or load extensions. Key performance indicators involve monitoring meter accuracy, identifying distribution transformers (DTs) with high losses, addressing DOE cases, and balancing network loading.

4. **Technological Advancement**

Torrent Power has implemented the following initiatives to improve the operational efficiency and financial viability of its distribution utility .

(i) **Automated Meter Reading (AMR) system** for High-Tension (HT) consumers : This system integrates energy meters with modems and GPRS technology to enable real-time data transmission. It connects HT consumers, solar plants, and captive power plants to a centralised data analysis platform. The data is processed and integrated with business applications like SAP for billing, tamper detection, and operational management. This ensures accurate energy usage tracking, minimises manual intervention, and supports proactive issues to improve efficiency and reduce energy losses.

(ii) **Mobile App** for Android and iOS platforms which is designed to improve customer convenience : The application provides features such as easy bill payment, instant complaint registration for power outages, appointment booking, and consumption monitoring through graphs. Customers can also verify employee details for on-site visits and provide feedback. This user-friendly app ensures better service delivery, increases transparency, and strengthens customer engagement, ultimately improving revenue collection.

(iii) **Web portal** is to provide end-to-end digital solutions. Customers can log in to manage their accounts, pay bills, view consumption trends, and request various services online. With over 6 lakh accounts created and approximately 78% of customers paying online, the portal significantly reduces manual processes. It also offers attractive discounts through partnerships with payment platforms and processes digital service requests, ensuring seamless interaction with customers while improving collection efficiency.

(iv) **Vigilance and enforcement** strengthened distribution utility's efficiency through non-discriminatory enforcement, energy audits, intelligence

gathering, and removal of illegal connections and unauthorised wires, thereby reducing theft and pilferage.

These technology-driven initiatives have collectively resulted in improving reliability, transparency, and operational efficiency thereby ensuring sustainable growth and improved customer satisfaction.

4.4.2 TPL-Bhiwandi

Torrent Power Bhiwandi is a Distribution Franchisee (DF) and commenced its operation at Bhiwandi Circle of MSEDCL on 26th Jan 2007. Initially, 10-year agreement was signed (January 26, 2007, to January 25, 2017) and was successfully completed. It was further renewed for another 10 years (January 26, 2017, to January 25, 2027).

At present, the utility is dealing with 3.95 Lakh consumer base, with Distribution Tr. Capacity of 1,355 MVA and Power Tr. Capacity of 1,085 MVA.

At the time of takeover, Bhiwandi Circle was facing severe challenges in its power distribution system, such Aggregate Technical and Commercial (AT&C) losses of 58%, mandatory load shedding of 6 hours daily and additional distress load shedding due to a 300 MVA deficit in the Extra High Voltage (EHV) network. The transformer failure rate was alarmingly high at 40%. Unregistered customers added to inefficiencies and the supply reliability was poor, leading to frequent appliance failures.

4.4.2.1 Key Achievements

The power distribution landscape in the Bhiwandi circle has undergone a remarkable transformation since takeover by Torrent Power. Compared to the position in 2007 , the utility has shown improvement in various parameters as below :

Parameters	UoM	Till Jan 2007 (Takeover)	As of FY 2023-24	Variance w.r.t takeover
T&D Loss	%	48.6	9.64	(38.96)
Collection Efficiency (incl. Subsidy)	%	68.29	100.41	32.12
AT&C Loss (incl. Subsidy)	%	64.9	9.27	(55.63)
Power Availability	%	75	99	25
HT SAIFI	Nos.	383.3	33.93	(91.15)
HT SAIDI	Hrs.	201.6	33.32	(83.47)
DT Failure Rate	%	40	0.74	(39.22)

4.4.2.2 Key Initiatives

1. **AT&C Loss Reduction -** Strengthening Network Efficiency and reliability by modernising outdated and theft-prone infrastructure. Overhead lines were replaced with **Underground systems** to reduce faults and improve safety. Measures to protect networks, such as introducing Medium Voltage Covered Conductors (**MVCC**) have improved system reliability. Advanced technologies,

including **SCADA** systems, RMUs, auto-reclosers, IoT-enabled Transformer Monitoring Units, and Fault Passage Indicators (FPI), were deployed to optimise performance and address operational challenges effectively.

2. **Transforming Metering, Billing, and Consumer Management** - Metering systems were upgraded to improve accuracy and billing efficiency. Under the **Ujjwal Bhiwandi Abhiyan** (UBA), 1.25 lakh unauthorised connections were legalised, significantly reducing losses. Feeder-level tracking and theft deterrence were implemented to ensure better revenue collection and integrate unauthorised consumers into the system.
3. **Operational Excellence and Rural Outreach –** This was addressed by streamlining operations through digital tools like **Field Force Applications** and **Digital Mapping Systems**. To extend services to remote areas, mobile energy bill collection vans were introduced. Additionally, a NABL- Accredited Meter Testing Laboratory was established to maintain high standards in metering equipment and ensure precision in operations.
4. **Customer-centric Initiatives** - The following steps were taken for customer satisfaction in the Distribution Franchise (DF) areas:

    a) **State-of-the-Art Service Centres**:, Digitally enabled customer service centres were strategically located to cater to the needs of various consumers .
    b) **24/7 Call Centre Support**: A round-the-clock call centre with IVRS handles customer complaints and queries seamlessly.
    c) **Digital Engagement Platforms**: TPL offered multiple digital platforms such as a website, mobile app, and WhatsApp for queries, complaints, and payments, with diverse online payment options such as net banking, credit/debit cards, and payment wallets.
    d) **Proactive Customer Updates**: Customers receive timely notifications about meter readings, billing, outages, safety, and tariff information through SMS, banners, and digital platforms.
    e) **Community Outreach**: TPL engaged through society camps, new connection camps, and interactive sessions such as e '**SAMVAD**,' fostering better communication and trust with consumers.

4.5 CESC , RAJASTHAN

CESC, was selected as the Distribution Franchisee in Rajasthan through competitive bidding. The company operates through its wholly-owned subsidiaries, which manages distribution in key regions of the State. The details of these subsidiaries along with the area of supply and consumer details are as follows:

1. Kota Electricity Distribution Ltd (KEDL) commenced operations on 1st September 2016, as a Distribution Franchisee of **Jaipur** Vidyut Vitaran Nigam Limited (JVVNL) and now have 2.69 Lakh consumers in an area of 176 sq. Km.
2. Bharatpur Electricity Services Limited (BESL) commenced operations on 1st December 2016, as a distribution franchisee of **Jaipur** Vidyut Vitaran Nigam Limited (JVVNL) and now have 0.74 Lakh consumers in an area of 50 sq. Km.

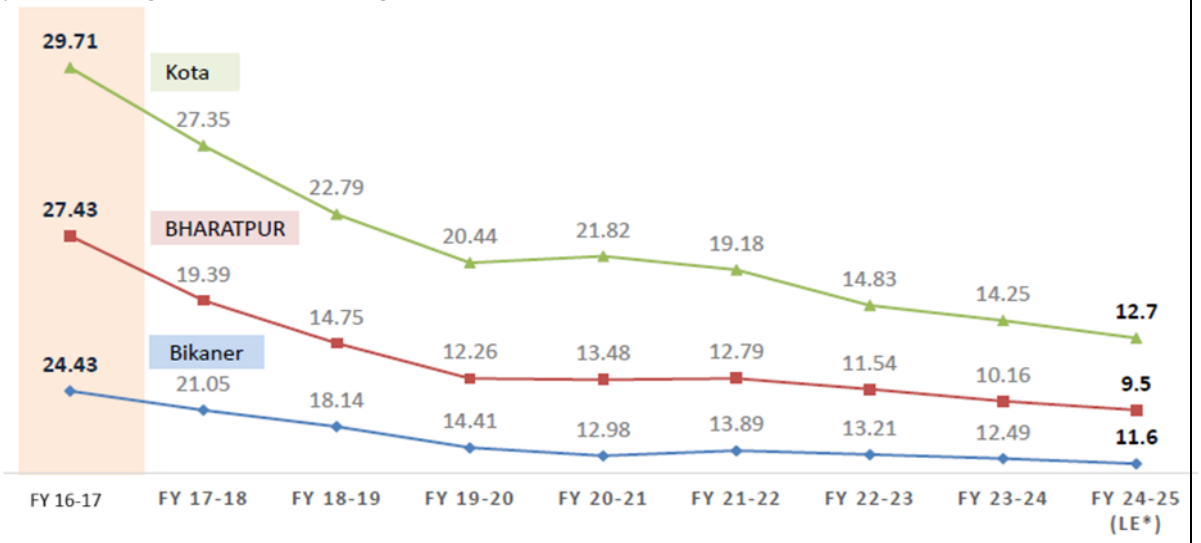
3. Bikaner Electricity Supply Limited (BkESL) commenced operations on 1st May 2017, as a distribution franchisee of **Jodhpur** Vidyut Vitaran Nigam Limited (JDVVNL) and now have 1.78 Lakh consumers in an area of 155 sq. Km.

The past record shows that at the time of assuming distribution supply in Rajasthan, the supply area was facing significant challenges, including high T&D loss, low collection and Billing efficiency and inadequate consumer service etc. However, due to several initiatives taken by the distribution franchisee, the company was able to transform its operations and turnaround the situation into a profitable venture.

4.5.1 Key Achievements

1. T&D Losses

The T&D loss trajectory of all three CESC Distribution Franchises (DFs) in Rajasthan (KEDL, BESL, and BkESL) showed significant improvement over the years. The graph representing the same is shown below:



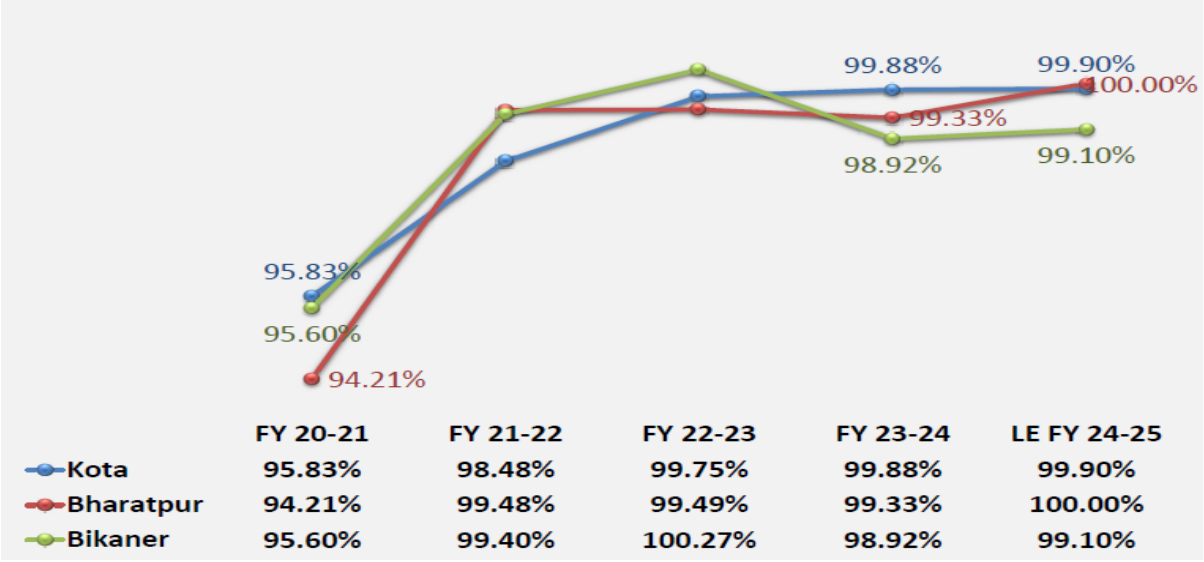
Source: CESC Presentation

Figure 13: T&D Loss Trajectory of CESC Rajasthan DFs

In the base year (FY 2016-17), the losses were recorded at 29.71% in Kota, 27.43% in Bharatpur, and 24.43% in Bikaner. By FY 2023-24, these losses were significantly reduced to 14.25% in Kota, 10.16% in Bharatpur, and 12.49% in Bikaner. Projections for FY 2024-25 indicate further reductions in AT&C losses up to 12.7% in Kota, 9.5% in Bharatpur, and 11.6% in Bikaner. The substantial reductions in AT&C loss indicates that the utility exhibited significant improvement and has enhanced its operational efficiency.

2. Collection Efficiency Trajectory

The collection efficiency of the three distribution franchisee (KEDL, BESL, and BkESL) have improved over the years as shown in the graph below:



	FY 20-21	FY 21-22	FY 22-23	FY 23-24	LE FY 24-25
Kota	95.83%	98.48%	99.75%	99.88%	99.90%
Bharatpur	94.21%	99.48%	99.49%	99.33%	100.00%
Bikaner	95.60%	99.40%	100.27%	98.92%	99.10%

Source: CESC Presentation

Figure 14: Actual Collection Efficiency and Trajectory of CESC Rajasthan DFs

In FY 2020-21, the collection efficiencies were recorded at 95% for Kota, 94.21% for Bharatpur, and 95.60% for Bikaner. Following the implementation of targeted initiatives, detailed in subsequent sections, these DFs have achieved significant progress in FY 2023-24, achieving collection efficiency of 99.88%, 99.33%, and 98.92%, respectively. These outcomes reflect the effectiveness of sustained efforts taken by the DFs in improving the revenue collection system.

4.5.2 Major Initiatives

CESC Rajasthan (DFs) have achieved significant milestones through various projects aimed at improving efficiency, reducing losses, and ensuring better service delivery. Their strategies and implementation details are as below:

1. **Loss Reduction Initiatives –**

a) **DT Level Audit & Identification of High-Loss Areas:** Detailed audits and identification of pockets with high losses were conducted, followed by area-specific strategies to mitigate these issues.

b) **IT-Driven Loss Monitoring:** The integration of IT-based reports and analysis, including real-time updates on consumer data enabled better tracking and control of losses. Systems such as DT metering, feeder metering, and data analysis are used for continuous monitoring of loss and identification of areas needing intervention.

c) **Metering and Energy Monitoring:** The installation of DT and feeder metering has been prioritized in high-loss areas, with the data used to analyse and minimize losses. Further, use of aluminium control cables and heightening DT meter boxes have helped in preventing theft and pilferage.

d) **Surveillance and Vigilance Activities:** Routine surveillance activities, such as de-hooking (removal of unauthorized connections) and network cleaning,

are conducted to prevent theft. Vigilance teams, supported by local authorities, help enforce these measures.

e) **Network Optimization:** The replacement of old, unarmoured cables with armoured ones, along with installation of PMDB (Public Meter Distribution Box) boxes, aimed at securing the network against theft and ensuring optimal functioning.

f) **Category-Based Loss Control:** Areas are categorized based on their loss levels (red, blue, green), with targeted measures in place for each. Red zones (high loss) receive intensive surveillance and de-hooking activities, while blue and green zones undergo regular monitoring and intervention as needed.

2. **Key Activities for locating Loss Pockets -**

   a) This includes 100% DT-based consumer indexing, tagging specific categories, and continual surveys to flag unaccounted consumers.
   b) DT energy metering in high- and low-loss areas, theft deterrents like aluminium cables, and monthly loss reporting enhance monitoring.
   c) Metering all 11 KV feeders, mapping DTs to feeders, and regular loss tracking enable corrective actions and technical loss optimization.

3. **Billing & Collection –**

To improve the billing process for high-value consumers, several initiatives were implemented which includes -

   a) Achieving 100% AMR (Automated Meter Reading) for HT consumers and ensuring billing on the 1st day of each month.
   b) Billing for all high-value consumers with a load greater than 18.65 kW is completed within the first week of the month.
   c) Emphasis has been placed on route sequencing to optimise meter reading efficiency. An in-house app facilitates enhanced monitoring, tracking of meter locations, and addressing site-specific requirements.
   d) A mechanism for bill scanning during delivery has been developed to ensure 100% timely bill delivery. These measures collectively streamline the billing process and enhance operational efficiency.

4. **Revenue Realization Strategy –**

The Revenue Realization Strategy which focuses on categorizing and effectively addressing outstanding dues based on the amount owed by the consumer is categorised as below -

   a) **For dues exceeding Rs.50,000**, dedicated Executive Officers monitor accounts, while SDO teams provide reminders through calls. Quick Response Teams (QRT) pursue non-paying consumers, and cables are removed immediately against unauthorised reconnections.

b) **For dues between Rs.20,000 and Rs.50,000**, Junior Executive Officers, supervised by senior officers, handle follow-ups and consumers receive reminders during the first visit, followed by disconnection on the second visit. DET officers play an active role in rigorous site-level follow-ups.

c) **For dues ranging from Rs.5,000 to Rs.20,000**, third-party vendors manage accounts under SDO and ARO supervision. Tele-calling reminders and door-to-door visits are conducted, with disconnections enforced after three attempts.

5. **Customer Service Avenues –**

CESC Rajasthan offers a range of customer-centric services to enhance consumer satisfaction and convenience. These include

a) a centralized customer care system, multiple digital payment platforms, and mobile cash vans for on-the-spot payment collection.

b) A mobile app, SMS-based communication, and dedicated new connection camps.

c) Services through WhatsApp CHATBOT by the name "201CRAJBOT" for Direct Consumer information, Live Agent support, New Connection Application & Status, Online payment facility, etc. which is available in both Hindi and English .

d) A 24-hour call centre equipped with 180 lines ensures round-the-clock assistance, while grievance redressal camps address consumer concerns effectively. Additionally, consumer-friendly bill designs further simplified the billing process.

These technology-driven initiatives have collectively resulted in improving the reliability, transparency, and operational efficiency thereby ensuring sustainable growth.

4.6 MP CENTRAL DISCOM

On behalf of all DISCOMs in Madhya Pradesh, MP Central DISCOM has provided many suggestions on improving DISCOM viability, some of which are as follows:

a) Frequent Bill/Surcharge Waiver Schemes discourages timely payment of bills and hence should be reconsidered.

b) Due to changing annual cropping pattern from two crops per year to three crops per year, the assessment formula to compute agricultural sales requires to be reviewed as the same directly affects the loss levels. A Study by the State Commission is under progress to re-assess agricultural consumption.

c) No motivation to shift to Roof Top due to highly subsidised domestic tariff which should be reconsidered as increase in Roof Top Solar connections will result in reduction in line loss and reduced subsidies.

d) Shift all agricultural load to solar generation hours and necessary infrastructure support to be provided by the State Government.

e) Input based Franchisee Option may be explored.

f) Effective disconnection of supply in case of nonpayment of dues– Employee wise accountability for timely disconnection of connections.
g) Find ways to factor in market rates before undertaking planned maintenance. Ways to ensure visibility of market rates to employees of DISCOMs needs to be explored.
h) Incentivise economic activity by targeted subsidy to industrial and commercial consumers by the State Governments. – State Government gets compensated in terms of higher tax receipts due to increased economic activity.
i) Taking over of high cost debt by State Government – Reducing cost of Debt. – Refinancing of Debt by utilities is a must to lower debt burden.
j) Due to farm policies such as MSP in favour of Paddy (a water intensive crop requiring higher pumping requirement), agricultural consumption is increasing affecting both loss levels and water table.
k) Reduction in Cross subsidy is vital for continued growth in commercial and industrial activities.
l) Recovery of Fixed Charge Obligation through Fixed Tariffs. – Rationalisation of Fixed Charges is necessary across DISCOMs for increased sustainability.
m) Over drawal by Domestic consumers beyond contracted demand may be penalised.
n) Frequency based Dynamic Pricing may be implemented for better demand response.
o) Manpower Benchmarking Norm may be specified for DISCOM which shall act as a reference point for Distribution Utilities.

4.7 SERCs

Data pertaining to cross subsidy, Regulatory assets as well as other factors impacting viability of DISCOMs were received from six SERCs which have been annexed as **Annexure-IX** to this Report.

5 Identification, Analysis of Factors impacting DISCOM Viability along with Recommendation on improving Operational Efficiency

In accordance with the Terms of Reference and having perused the case studies brought out in Section 3 of this Report along with and inputs received from SERCs (**Annexure-IX)** , key factors that have a direct co-relation with the commercial viability and sustainability of the DISCOMs are listed below.

1. AT&C Loss Reduction
2. Cross Subsidies
3. O&M Costs
4. Human Resource Optimisation and Workforce Management
5. Timely issuance of Tariff Orders
6. Regulatory Assets
7. ACS-ARR Gap

A detailed understanding of the above issues is vital for policymakers and stakeholders to devise targeted reforms. Addressing these challenges requires a multifaceted approach, combining regulatory reforms, operational efficiency improvements, and strategic investments in infrastructure upgrades and modern technology. The impact of these factors on sustainability of DISCOMs has been discussed in detail in this section of the Report. Along with identification and analysis of these factors, this section also specifies several initiatives, action points, remedies that have worked in the past and have been referenced from the representations made by several DISCOMs before the Working Group. These initiatives have been suitably co-related with the distribution utilities implementing such initiatives so that it provides a direct reference to any interested utility which intends to opt for implementing the said initiatives.

5.1 Factors impacting the Sustainability of DISCOMs

The sustainability of DISCOMs is influenced by several interrelated factors. A detailed analysis of these factors, as identified above, reveals their profound impact on the operational and financial viability of DISCOMs.

5.1.1 AT&C Losses

AT&C Losses (Aggregate Technical and Commercial Losses) refer to the total loss of electricity in a distribution network, encompassing both **technical losses** and **commercial losses**. This metric is vital for assessing the efficiency and is a key indicator of financial viability of DISCOMs. High AT&C losses reflect significant inefficiencies, leading to a direct negative impact on the **financial health** and **sustainability** of DISCOMs.

5.1.1.1 *Components of AT&C Losses:*

1. **Technical Losses:** While certain amount of technical loss is unavoidable, the same may vary from 3%-4% in case of a compact urban distribution licensees with higher HT:LT ratio to up to 9% in case of a large distribution network or in case of distribution licensee operating in a difficult terrain. These losses occur due to inherent inefficiencies in the physical infrastructure of the distribution network. Technical losses are primarily linked to **energy dissipation** that happens as electricity travels through transmission lines, transformers, and other network equipment. This is a result of factors such as resistance, insulation defects, and poor design in the distribution system. The major reasons for these losses are as follows:

    a) **Outdated and inefficient Infrastructure:** Ageing transformers, outdated cables, and poorly maintained distribution lines are prime contributors to technical losses. As infrastructure ages, its efficiency declines, leading to increased losses. For instance, older transformers are less efficient and consume more energy to supply the same amount of power, causing higher technical losses.
    b) **Voltage drops:** In an inefficient system, voltage drops can occur, leading to higher losses over long distances. This issue is particularly prevalent in rural areas where distribution lines are longer and not maintained appropriately.
    c) **Improper sizing of equipment:** In some cases, transformers or other network components may not be appropriately sized for the load, leading to higher losses.

    As discussed, though these losses to a certain extent are unavoidable, however, technical losses beyond 9-10% is a red flag and needs to be analysed to plug in leakages.

2. **Commercial Losses:** Commercial losses are a result of non-technical issues related to how electricity is managed, billed, and paid for. They occur when electricity is not properly accounted for in the billing process, or when customers draw electricity without paying for it. These losses are completely avoidable and are primarily due to the following reasons.

    a) **Theft and Pilferage:** One of the most significant contributors to commercial losses is **theft**. Consumers may bypass meters, have illegal connections, or tamper with electrical equipment to steal electricity without being billed. This is especially prevalent in certain regions with poor enforcement.
    b) **Underbilling or Non-billing:** Inaccurate metering, poor data management, and under-reporting of consumption can also lead to commercial losses. For instance, inaccurate readings from old or faulty meters result in customers being undercharged due to provisional billing, leading to lost revenue.

c) **Meter Tampering:** In some cases, customers may tamper with their meters to reduce the recorded consumption, which directly reduces the amount of revenue DISCOMs can collect.

5.1.1.2 Financial impact of AT&C Losses on DISCOM Viability

High AT&C loss is a critical issue for DISCOMs, directly impacting their power purchase costs, **revenues**, **cash flows**, and **ability to reinvest** in the infrastructure. The financial implications of high AT&C losses are severe and are as follows:

1. **Reduced Revenue Generation:** High commercial losses mean that DISCOMs are not collecting all the revenue they should, making it difficult to cover operational expenses or repay debts. This gap in expected revenue is a significant contributor to the **ACS-ARR gap.**
2. **Increased Operational Costs:** The financial burden caused by AT&C losses forces DISCOMs to incur additional costs, such as buying additional power to meet demand. This undermines their operational efficiency and leads to increased operational costs that should not be passed through.
3. **Inability to invest in Infrastructure:** With significant financial losses due to AT&C losses, DISCOMs often struggle to invest in necessary infrastructure upgrades or expand their distribution networks and need to borrow loans at high interest rates. This creates a vicious cycle where poor infrastructure leads to higher losses, which in turn makes it difficult to invest in solutions to reduce those losses.

5.1.1.3 Comprehensive measures to reduce AT&C Losses

Addressing these losses requires a multi-pronged strategy that integrates technical advancements, operational reforms, and consumer-focused measures. The following section elaborates on critical interventions with reference to successful implementation by leading DISCOMs in India.

1. Strengthening Distribution Network

Modernizing and upgrading infrastructure is pivotal in reducing distribution losses. This involves the following.

(a) Replacement of ageing transformers and distribution lines with efficient transformers and advanced conductors and switchgears. All the progressive distribution utilities covered in this report have undertaken extensive infrastructure upgrades to minimize bottlenecks.

(b) Technological interventions such as Geographic Information System (GIS) mapping and Supervisory Control and Data Acquisition (SCADA) systems deployed by utilities such as **TATA led distribution utilities**, **Gujarat DISCOMs and MP(West**) is noteworthy and has been instrumental in enhancing network planning and asset management by providing precise spatial data for network optimization.

(c) The implementation of Advanced Distribution Management Systems (ADMS) offers real-time monitoring and automated network control,

enabling DISCOMs to optimize load distribution and respond promptly to outages. ADMS deployment by **TPDDL** and **GUVNL** played pivotal role in reduction in AT&C losses.

(d) Implementing High Voltage Distribution Systems (**HVDS**) is must to reduce non-technical loses as it is difficult to tamper with. **TPDDL** and **GUVNL** have implemented HVDS effectively in high-loss regions.

(e) Similarly, LT Aerial Bunched Conductors have been adopted by DISCOMs such as **TPDDL** and **TPL** to combat theft, improve safety, and enhance network reliability.

2. Energy Audits at Distribution Transformer (DT) Level

Conducting energy audits at the Distribution Transformer (DT) level allows DISCOMs to identify leakages and address inefficiencies systematically. By analysing energy flow data, DISCOMs can pinpoint areas of high losses and take corrective actions. **GUVNL, MP(W), TPDDL, CESC and TPL** have achieved significant reductions in AT&C losses through regular DT-level energy audits, ensuring precise identification of problem areas and targeted interventions.

3. Feeder Separation

Feeder separation schemes focus on segregating agricultural and non-agricultural loads, enabling better load management and reducing losses. GUVNL and MP(W) have implemented agricultural feeder separation projects, particularly in regions with substantial agricultural consumption. These projects have significantly helped in ensuring efficient power distribution, minimize pilferage, and improve supply reliability for non-agricultural consumers. This is highly recommended in areas with higher agricultural consumption.

4. Implementation of Robust Metering Systems

Effective metering systems are vital for addressing both technical and commercial losses as the consumption based on actual meter readings is vital to operational efficiency. **All connections should be metered to leave little scope for assessment billing.** The following measures are suggested for loss reduction

(a) **Smart meters**, which ensure accurate billing and reduce theft, have been widely deployed by DISCOMs such as TPDDL, GUVNL, MP(W). These meters are very useful for high-loss areas and high-revenue customers. Retrofit to existing electronic meters should be explored to reduce costs.

(b) Implementing **prepaid metering systems**, particularly in areas with low billing efficiency, serves as an effective strategy to reduce AT&C losses. In DISCOMs such as GUVNL and MP(W), this approach has successfully improved revenue collection.

(c) **Advanced Metering Infrastructure** (AMI) further enhances efficiency by enabling remote meter reading and tamper detection. Reducing manual

errors and theft significantly reduces provisional billing which is one of the major reasons for reduced billing efficiency.

(d) **Meter tamper detection systems** have been particularly effective in alerting DISCOMs to illegal connections or meter manipulations, ensuring swift corrective actions.

(e) **Automated Demand Response** (ADR) systems adopted by TPDDL have led to optimize energy consumption during peak load periods, reducing stress on the grid.

Combining the above initiatives have proven effective in reducing both technical and commercial losses and fostering more efficient operations. Hence, it is very important for Utilities to develop concrete metering plan and implement the same with proper monitoring.

5. Loss Detection Systems and Data Analytics

The deployment of **analytics-driven loss detection systems** has revolutionized how DISCOMs address AT&C losses. Advanced analytics tools enable the identification of high-loss areas by analysing consumption patterns and detecting anomalies. By analysing data, DISCOMs can predict potential losses and implement proactive measures in high-risk areas. These systems are effective in reducing both technical and commercial losses and fostering more efficient operations.

6. Improving Revenue Collection and Controlling Theft

(a) In some States, **frequent waiver schemes** are dis-incentivising timely payments. Honest consumers also feel cheated due to such schemes which bail out serial offenders. Hence, such schemes may be implemented with caution.

(b) The **assessment formulas** specified in case of unmetered connections especially in case of agricultural consumers are old and based on old consumption pattern and crop cycle, which may be leading to under billing.

(c) In areas where power theft is more common, targeted outreach through NGOs and awareness campaigns are crucial. DISCOMs such **TPDDL, TP-Odisha, and Gujarat** have implemented such programs.

(d) Strict enforcement strategies are essential in high-theft areas. DISCOMs such as **TPDDL, GUVNL, and TPL** have implemented strong measures, including specialized theft detection teams, regular inspections to swiftly address theft. **Dedicated courts and police stations** streamline the legal process, ensuring quick resolutions which acts as a deterrent.

7. Loss Reduction through LT consumption displacement

(a) **Facilitating Distributed Energy Systems**: Distributed energy systems, such as solar rooftops and energy storage systems (ESS), offer a transformative solution to reduce losses and enhance grid efficiency. By encouraging the adoption of these systems, DISCOMs such as TPDDL, GUVNL, and TPL have displaced LT consumption thereby reducing losses.

(b) Supply to Agricultural Feeders during Solar Hours: The distribution utilities especially in RE rich States, based on their power purchase portfolio may explore to shift their load during the periods when cheap solar power is **available locally**. This would require investments of distribution infrastructure.

(c) **Introduce Energy Efficiency Programs** by incentivizing consumers to adopt energy-efficient appliances.

(d) Concept of **dynamic pricing** may be introduced so that consumer is more aware of the price of their consumption on real time basis. This may help shift demand in a more efficient manner.

(e) **Explore mini micro-Dam based Irrigation:** The possibility of reducing agricultural consumption by setting up mini and micro dams/ponds for localised irrigation. This shall not only improve the local eco-system but will also replace the highly cross subsidised agricultural consumption.

8. **Corporate Social Responsibility (CSR) for Commercial Gains:**

CSR Alignment **with Loss Reduction:** To achieve lasting reduction in energy losses, CSR initiatives should be strategically deployed in areas characterized by high theft and pilferage.

9. **Public-Private Partnership (PPP) Models**

The adoption of the Public-Private Partnership (PPP) models has shown significant promise in addressing AT&C losses in high-loss areas. For instance, TPL's Bhiwandi model, Odisha Model as well as CESC Rajasthan's performance demonstrates how privatized operations with clear accountability and performance incentives can transform the efficiency of DISCOMs. This approach has enabled significant reductions in losses while ensuring improved service quality and financial viability.

5.1.2 Cross Subsidies

Cross-subsidies in electricity tariff can be defined as a mechanism whereby some consumer groups are charged a higher tariff as compared to the cost of supplying power to them. The additional revenue generated from them is used to tide over the revenue shortfall from other consumer groups, who are charged lesser tariff as compared to the cost of supplying power to them. In case of cross subsidies, subsidisation is inbuilt in the tariff, unlike any external support (e.g., government funds) which is provided in the case of direct subsidy. Cross subsidy is a matter of

tariff design, which can be adjusted depending on the intended level of cross-subsidisation. While this approach serves a **social goal**, it introduces several economic and financial inefficiencies that can undermine the long-term sustainability of the electricity distribution system as discussed below:

5.1.2.1 Mechanics of Cross Subsidies:

1. **Higher Tariffs for Industrial and Commercial Users:**
   a) Industrial and commercial consumers, due to their high paying capacity, typically are charged higher rates to cross subsidise agricultural consumers and some domestic consumers falling under lower slabs of consumption.
   b) The rationale is to **redistribute costs** across consumer segments so that vulnerable groups do not face the full financial burden of electricity supply, which could lead to **energy poverty** in these areas.

2. **Lower Tariffs for Residential and Agricultural Users:**
   a) Agricultural users and Residential consumers, especially in rural areas and those having consumption in lower slabs often pay heavily subsidized electricity rates, which helps ensure basic energy access.
   b) Subsidized rates for agriculture can lead to over-consumption of electricity for non-productive uses, causing **wastage** and inefficiency in electricity distribution, further increasing the **financial burden** on the DISCOMs (distribution utilities) which is thereafter loaded on to industrial and commercial consumers.

5.1.2.2 Economic and Financial impact of Cross Subsidies:

While cross subsidies have the goal of protecting vulnerable consumer groups, they have several unintended negative consequences that can lead to long-term financial challenges for DISCOMs.

1. **Distorted Tariff Structures:** Cross subsidies create **non-cost-reflective tariffs**. When tariffs do not reflect the true cost of supply, they lead to market distortions, making it difficult for consumers to make informed decisions about their energy use. Businesses that face inflated electricity tariffs may reduce their energy consumption or relocate operations to regions with more favourable tariffs, which can lead to **lost revenue** for DISCOMs and an imbalance in the revenue model.

2. **Impact on Industrial and Commercial Consumers:** The higher tariffs imposed on industrial and commercial consumers can have detrimental effects on these sectors, leading them to seek alternative sources of power to reduce costs. This may include:

   (a) **Captive Generation:** Many industries, particularly in energy-intensive sectors, may opt for **captive power generation** (producing their own electricity) to avoid the high tariffs imposed by the DISCOM. This shift

reduces the **cross-subsidising consumption**, leading to further loading of cross subsidising consumers that are still sourcing power from DISCOMs.

(b) **Open Access:** Industries may also explore alternative power through open access, as a cost-effective alternative. This transition further erodes HT sales which in turn affects the revenue base for DISCOMs.

3. **Financial Strain on DISCOMs:** Over-reliance on cross subsidies can create a **circular financial strain** on DISCOMs. The larger the gap between actual supply costs and the tariffs charged to certain consumer categories, the greater the **deficit,** DISCOMs face. To bridge this gap, DISCOMs may rely on subsidies, loans, or borrowing from financial institutions, which can result in a growing **financial burden**.

5.1.2.3 The need for gradual rationalization of Cross Subsidies:

While cross subsidies serve a short-term social purpose, they lead to long-term inefficiencies. Therefore, a gradual approach to **rationalizing cross subsidies** is essential for improving the financial health of DISCOMs and ensuring more sustainable electricity pricing.

1. **Aligning Tariffs with Actual Cost:** A major step in rationalizing cross subsidies is gradually aligning **tariffs with the actual cost of supply** across all consumer categories. This will **arrest migration** of cross subsidising consumers.

2. **Implementing Direct Subsidy Transfers:** In any case cross subsidy should remain within the band of ±20% of ACoS. In case State Government wants to provide further relief to any vulnerable consumers (such as Residential/ Agricultural), it should be provided by way of direct subsidy transfer and regulators should not be expected to bring tariff of any consumer category below 80% of ACoS by way of Cross subsidization.

5.1.3 Operation and Maintenance (O&M) Costs

Operation and Maintenance **(O&M) costs** are an essential aspect of a DISCOM's expenditure. These costs include employee expenses, administrative costs and repair and maintenance expense. Although necessary for the smooth running of utilities, **inefficient management of O&M costs** can significantly affect the profitability and financial sustainability of DISCOMs.

Key Components of O&M Costs:

1. **Employee Costs:** A large portion of O&M expenses is tied to **employee costs**, which includes salaries, benefits, pensions, and other compensation-related expenses. These costs are usually fixed and ongoing, providing limited flexibility during periods of financial distress. If employee costs are too high, it can place considerable strain on the overall financial structure of a DISCOM.

2. **Equipment Maintenance Costs:** Maintaining the distribution infrastructure — including **transformers, substations, distribution lines**, and other network components, is another substantial component of O&M costs. This includes the cost of regular inspections, repairs, and replacements. If equipment is old or prone to failure, maintenance costs can escalate, increasing the overall O&M burden.
3. **Administrative Costs:** The **administrative cost of distribution licensees** refers to the operational and regulatory expenses including legal expenses incurred by electricity distribution companies (or licensees) in the process of delivering electricity to consumers. These costs are integral to ensuring that distribution networks function smoothly, comply with regulations, and maintain the infrastructure necessary for efficient electricity delivery and cost recovery.

5.1.3.1 *Financial impact of Inefficiencies in O&M:*

Inefficiencies in O&M costs can have a **huge impact** on the financial stability and profitability of a DISCOM:

1. **Strained Profitability:** Excessive O&M costs reduce the margin between revenue and expenditure. If O&M expenses grow disproportionately compared to revenue growth, it can push a DISCOM into financial stress, resulting in the need for **subsidies**, tariff hikes, or even **government bailouts** to maintain operations.
2. **Reduced ability to invest in Infrastructure:** With a large portion of resources tied up in O&M expenses, DISCOMs may struggle to make the necessary investments in new infrastructure, technology upgrades, or customer experience improvements. This creates a **vicious cycle**, where limited investment leads to inefficiencies in network management, further increasing O&M costs.
3. **Increased Regulatory scrutiny:** High O&M costs may attract attention from Regulators, especially if they believe that DISCOMs are not managing resources efficiently. This scrutiny could lead to regulatory actions, including **disallowances**, which might affect the overall financial health of the DISCOM.

5.1.3.2 *O&M Cost Optimisation:*

A few strategies to optimize the O&M costs include:

1. **Workforce Productivity:** Managing employees in a more productive manner is essential, particularly when a DISCOM's labour force is a significant part of O&M expenditure. Implementing strong **performance management** systems can help ensure that employees are held accountable for their performance. By setting **clear goals and KPIs,** DISCOMs can ensure that their workforce is focused on delivering value and not contributing to inefficiencies.
2. **Predictive Maintenance and Asset Management:** Predictive maintenance refers to the use of data analytics to forecast when assets, such as transformers or power lines, are likely to fail. By implementing predictive maintenance technologies, DISCOMs can reduce unplanned outages, improve asset longevity and avoid costly emergency repairs.

3. **Outsourcing of activities:** Instead of outsourcing manpower, it is recommended to outsource activities especially those which are repetitive and non-critical.

In addition to the above initiatives to reduce the cost, one should also try to enhance the efficient use of the human resource at hand through proper training and development.

5.1.4 Optimizing Human Resources for enhanced Efficiency in DISCOMs

1. **Operational Efficiency:**
   (a) The operational success of a DISCOM is fundamentally driven by the efficiency of its workforce. Optimizing human resources is crucial for ensuring these functions are performed efficiently and effectively, as even the most advanced technologies will not deliver desired outcomes without the right human input. For instance, **Tata Power Odisha** implemented a workforce optimization strategy that focused on strategic staff deployment and reducing operational inefficiencies. This was done by aligning staffing levels with actual demand and ensuring employees were placed in positions where they could maximize their impact.
   (b) **TPL** and **TPDDL** demonstrated the importance of workforce optimization by adopting smart technologies such as remote monitoring and advanced metering systems. These innovations were accompanied by a parallel effort to upskill the workforce, which allowed the DISCOMs to significantly enhance operational efficiency.
   (c) **Gujarat DISCOMs**, took a comprehensive approach by integrating workforce training with technological advancements, ensuring that employees not only operated sophisticated equipment but were also equipped to troubleshoot and maintain them effectively. Through continuous development programs, the DISCOM ensured that its workforce remained adaptable to new technologies, allowing the company to maintain high operational standards and reduce inefficiencies in service delivery.

2. **Employee Motivation as a Driver for Change:**
   (a) The motivation of employees is one of the most powerful drivers of organizational success in DISCOMs. Motivated employees are more likely to perform beyond basic expectations, engage in innovative problem-solving, and work collaboratively towards shared organizational goals.
   (b) **TPDDL** also placed a strong emphasis on building a motivating work culture by incorporating recognition programs into daily operations. These programs recognized employees for their achievements and contributions, whether in reducing operational losses, improving customer service, or introducing innovative solutions.

(c) For **Gujarat DISCOMs**, emphasis on workplace culture helped create an environment where employees were encouraged to share knowledge, collaborate on problem-solving, and celebrate team successes. As a result, the company achieved higher levels of job satisfaction, lower turnover rates and improved overall employee productivity.

3. **Aligning Employee KPIs with Organizational Objectives:**
One of the most effective methods for optimizing human resources is aligning employee performance with the strategic goals of the DISCOM. By ensuring that Key Performance Indicators (KPIs) are clearly defined and directly linked to organizational objectives, DISCOMs can ensure that every employee's contribution is in line with the company's long-term vision. **Tata Power Odisha** and **TPDDL** successfully demonstrated the effectiveness of this approach by linking KPIs to critical goals such as reducing technical losses, improving customer service response times, and enhancing regulatory compliance.

4. **Strategic workforce planning:**
(a) Strategic workforce planning is essential for ensuring that a DISCOM's workforce is flexible, capable of responding to market changes, and prepared for future challenges. **Tata Power Odisha** and **MP(W)** focused on recruiting talent with expertise in critical areas such as data analytics, smart grid technologies, and engineering, ensuring that the workforce was equipped to handle new technological challenges. By promoting a culture of continuous learning, these DISCOMs built a workforce that could quickly adapt to industry trends and evolving customer needs.
(b) **Gujarat DISCOMs** and **TPDDL** and few others provided competitive compensation packages, career development programs, and opportunities for professional growth. Employees were encouraged to stay with the company long-term by offering clear career advancement opportunities and recognizing their contributions through performance-based incentives.

5. **Continuity of Leadership**
It has been observed that the **Managing Directors of the State Distribution utilities** are frequently changed and there is no continuity of leadership. This results in **lack of continued vision** and new initiatives do not achieve the desired momentum and lose steam with the change in leadership. In most of the cases where there is continuity of leadership for at least 3-4 years, the initiatives have attained their end results and there has been considerable improvement in these distribution utilities e.g., **APDCL, Distribution utilities of Haryana**.

TPDDL also focused on creating leadership succession plans to ensure that future leadership transitions were seamless. By developing and mentoring high-potential employees, the company ensured that it had a pipeline of capable leaders

ready to step into senior roles when required. This forward-looking approach prevented disruptions during leadership changes and maintained continuity in the DISCOM's operations.

6. **Training and Capacity Building: Critical for Skill Development**

Building Relevant Skills for the Power Sector:

(a) The power sector is rapidly evolving with technological advancements such as smart grids, renewable energy integration, and automation. For DISCOMs to remain competitive, their employees must stay abreast of these advancements. **Tata Power Odisha**, **MP(W)**, and **GUVNL** implemented continuous training programs to upskill employees in emerging technologies, including Advanced Metering Infrastructure (AMI), grid modernization, and energy management systems. These training initiatives allowed employees to remain relevant in the face of technological disruptions and improve the DISCOM's overall service quality.

(b) Employees must also be trained to handle the external challenges that come with working in the power sector, including regulatory changes, technological shifts, and demand fluctuations. **MP(W)**, **GUVNL**, and **TPDDL** integrated resilience-building programs into their training initiatives. These programs were designed to teach employees how to adapt to changing circumstances without compromising on performance. For instance, in response to new regulatory frameworks, these DISCOMs conducted training sessions to familiarize employees with the latest compliance requirements, thereby preventing costly mistakes.

(c) Moreover, leadership training played a crucial role in helping managers and senior leaders develop the skills necessary to guide teams through periods of uncertainty. The leadership programs, offered by **GUVNL** and **TPDDL**, enhanced employees' decision-making abilities, crisis management skills, and their capacity to inspire and motivate teams during times of change.

5.1.5 Timely Issuance of Tariff Orders

The timely **issuance of tariff orders** is critical to the financial health and operational stability of DISCOMs. Tariff orders issued by regulatory bodies, set the rates at which electricity is sold to consumers, and they play a central role in ensuring that DISCOMs can recover their costs and remain financially viable. Delays in the issuance of the tariff orders, can have profound implications for DISCOMs, leading to cash flow problems, financial instability, and operational challenges.

5.1.5.1 Measures and Strategies to Ensure Timely Issuance of Tariff Orders

1. **Regulatory Mechanism Improvements**

(a) **Specified Timelines for Tariff Issuance:** The State Electricity Regulatory Commissions have specified the timelines for filing of Tariff Petitions by the Utilities. It is suggested that in addition to the above, the timeline for issuance of Tariff Orders in accordance with the Section 64(3) of the Electricity Act may

also be included in the Regulations. This will ensure that tariffs are determined on time.

(b) **Simplified Review Process:** Streamline regulatory review procedures by adopting standard templates and pre-defined evaluation criteria to reduce processing time. It is observed that most of the Regulatory Commissions have specified standard formats in which data is required to be submitted while filing the ARR and Tariff Petitions. It is observed that these data templates at times require voluminous data that may not be related to tariff and therefore these formats may require simplification to reduce regulatory over burden. It is also observed that these formats are required to be interlinked and therefore specifying editable templates for providing the information along with tariff regulations may reduce time taken on seeking clarifications from the utilities.

(c) **Use of Technology:** Many SERCs are using eFiling portals for filing of petitions. Deploying advanced data analytics in the digital portals of SERCs to automate data collection and analysis for tariff petitions, would enable faster decisions. Initiatives such as Regulatory Web Tool and Information Management Portal (an Initiative of FOR) where key data with respect to other States as well as practices being followed are updated from time to time, can prove to be very helpful for other States while taking decisions. Such initiatives of automated data collection can also be implemented at the State level.

2. **Strengthening Coordination Between Stakeholders**

(a) **Timely Submission by DISCOMs:** Enforce strict deadlines for DISCOMs to submit Annual Revenue Requirement (ARR) filings and supporting documents.

(b) **Stakeholder Engagement:** Conduct pre-scheduled consultations with consumers, government representatives, and industry experts to resolve objections and incorporate early feedback in the process.

3. **Capacity Building for Regulators and DISCOMs**

(a) **Training Programs:** Organize capacity-building initiatives for regulatory staff and DISCOM personnel to enhance their understanding of tariff-setting methodologies, data requirements, and best practices.

(b) **Resource Allocation:** Ensure adequate staffing and funding for regulatory bodies to expedite the processing of tariff petitions.

4. **Recognition and Penalties**

(a) **Recognition for Timely Actions:** Reward DISCOMs and regulatory bodies that adhere to prescribed timelines through KPI/KRA based incentives.

(b) **Penalties for Delays:** Impose financial or operational penalties on entities/personnel responsible for undue delays in the submission or approval of tariff orders.

5.1.6 Regulatory Assets

Regulatory assets are financial tools used by DISCOMs to manage the gap between the costs incurred in providing electricity and the revenues generated through tariffs. When DISCOMs face a situation where they are unable to recover certain costs immediately, regulatory assets allow them to defer those costs to future periods. This practice is generally employed to provide **temporary financial relief** to utilities struggling with short-term cash flow challenges, but it has significant long-term implications that can affect the financial health and sustainability of DISCOMs.

How do Regulatory Assets (do not) Work?

(a) Regulatory assets, while providing short-term financial relief, result in an **accumulation of deferred liabilities**. These liabilities accumulate when DISCOMs continuously defer cost recovery rather than addressing the underlying cost or revenue issues.

(b) As the regulatory assets accumulate, it becomes more challenging for DISCOMs to recover these costs in future, as large-scale tariff hikes may be needed to clear these deferred amounts. E.g. **Case of Delhi DISCOMs**.

5.1.6.1 Challenges of relying on Regulatory Assets:

1. **Financial Health and Long-Term Planning:**

   (a) The continued reliance on regulatory assets can skew the financial planning of DISCOMs, as they may not depict an accurate picture of their real **cost-to-revenue ratio**. If the deferred costs are substantial, it can create a false sense of stability in the short term while hiding deeper, systemic financial problems.

   (b) Over-reliance on deferred costs can prevent DISCOMs from undertaking necessary reforms in cost management, procurement practices, and operational efficiencies.

2. **Impairment of Service Quality:**

   With a large portion of their resources tied up in recovering deferred costs, DISCOMs may lack the necessary funds to invest in **infrastructure upgrades**, **maintenance**, or **expansion** of their network. This reduces their ability to improve service quality and address issues such as **technical losses** or **service reliability**.

3. **Inflationary pressure on Tariffs:**

   (a) **Repeated accumulation of regulatory assets** can lead to inflationary pressure on tariffs, as future tariff increases may need to reflect not only **current cost**

escalations but also past accumulated costs and carrying costs. This creates a **cumulative burden** on consumers, who face higher rates over time.

(b) The pressure on consumers can also escalate if **fuel price hikes** or other cost increases occur, forcing DISCOMs to adjust tariffs to cover the historical regulatory asset backlog.

5.1.6.2 Strategies for addressing Regulatory Asset accumulation:

1. **Real-Time Cost Recovery:**

   (a) One of the most effective ways to reduce the accumulation of regulatory assets is not to create any new Regulatory Assets. For the recovery of old Regulatory Assets, the same can be either passed on in the form of regulatory surcharges or the State Regulator can transition to a **framework that allows cost reflective tariffs**.

   (b) Implementing **automatic pass-through mechanisms** for fuel price variations or changes in procurement costs can help eliminate the need for regulatory assets altogether, as these changes can be directly reflected in tariffs without deferring costs to the future.

2. **Debt Restructuring and Government Support:**

   In cases where regulatory assets have become unmanageable, **debt restructuring** or **government interventions** may be necessary to ease the financial burden on DISCOMs. Governments can continue to provide support in the form of **grants** or soft **loans** to help clear regulatory assets, while simultaneously working on long-term reforms to improve DISCOM financials.

5.1.7 ACS-ARR Gap

The **ACS-ARR** gap (Average Cost of Supply vs. Average Revenue Realized) is a crucial financial metric used to assess the financial health of **DISCOMs**. This gap essentially represents the difference between the actual cost incurred by the DISCOMs in supplying electricity to consumers (ACS) and the revenue collected or realised from these consumers (ARR). When the cost of supply exceeds the revenue generated, it results in a financial shortfall that severely impacts the sustainability and growth of DISCOMs.

5.1.7.1 Key Factors Contributing to the ACoS-ARR Gap:

1. **AT&C Losses higher than the Normative Losses:** As any losses over and above the norms are mostly not allowed by the State Regulator, any shortfall in meeting the norm directly impacts the ACoS-ARR gap.
2. **Non-Cost-Reflective Tariffs:** One of the primary reasons for a high ACS-ARR gap is the presence of non-cost-reflective tariffs. Tariffs that do not reflect the true cost of supply create a discrepancy between the revenue DISCOMs can recover and the actual cost incurred in delivering electricity.
3. **Delayed or Infrequent Tariff Revisions:** Due to delay in tariff revisions, if tariff adjustments are not made on time or are inconsistent with cost escalations, the

gap between ACS and ARR widens, making it difficult for DISCOMs to cover their costs.

4. **Operational Shortcomings:** Inefficient distribution networks, high technical losses, and poor management of assets can also contribute to the ACS-ARR gap. Operational inefficiencies not only increase the cost of supply but also reduce the revenue DISCOMs can generate, as a portion of the power is lost during distribution or is unbilled due to inaccurate metering or billing systems.

5.1.7.2 Financial Implications of persistent ACS-ARR Gaps:

When the ACS-ARR gap persists over time, it leads DISCOMs into a **vicious cycle of financial distress**. The gap requires **external financial intervention** in the form of loans, government bailouts, or subsidies to bridge the revenue deficit. While these measures provide temporary relief, they come with long-term consequences:

1. **Increasing Debt Burden:** Borrowing to cover revenue shortfalls results in rising debt levels, leading to higher interest liabilities. Over time, this can lead to a situation where DISCOMs are financially unable to meet their debt obligations, further worsening their financial health.
2. **Government Bailouts:** Reliance on government bailouts can help in the short term, but this approach is not sustainable in the long run. It leads to a continued dependence on public funds and hampers the ability of DISCOMs to become self-sustaining.
3. **Inability to invest in Infrastructure:** The financial strain caused by an ACoS-ARR gap limits the resources available for essential infrastructure development, such as upgrading the distribution network, expanding grid capacity, and investing in smart grid technologies. Without these investments, DISCOMs are unable to improve service delivery, reduce losses, or enhance system reliability.
4. **Delayed Technology Adoption:** The financial challenges prevent DISCOMs from adopting newer technologies, such as renewable energy integration or automation, which are essential for improving operational efficiencies and cost-effectiveness.

5.1.7.3 Addressing the ACS-ARR Gap: A Dual Approach

To resolve the ACS-ARR gap, there is a need to adopt a **two-pronged strategy** that focuses on both **revenue enhancement** and **cost reduction**:

1. **Regular Tariff Adjustments:** One of the most important steps is to ensure that tariffs are revised periodically to reflect the actual costs of supply. SERCs may adopt a **transparent and predictable tariff adjustment mechanism** that considers cost escalations such as fuel price increases, inflation, and currency fluctuations.
2. **Cost-Reduction Measures:** In parallel with tariff adjustments, DISCOMs must undertake measures to reduce the overall cost of supply. Some key strategies include:
    2.1. **Enhancing Operational Efficiencies:** Streamlining operations by upgrading old infrastructure, reducing transmission and distribution (T&D) losses,

improving billing and metering systems, and modernizing grids, can reduce operational costs and improve the overall cost-effectiveness of the distribution system.

2.2. **Adoption of Technological Solutions:** Implementing advanced technologies such as automated grid management systems, and data analytics can help detect inefficiencies, reduce losses, and improve customer service. Implementation of Smart Meters needs to be done in phased manner with priority towards high loss areas.

2.3. Power Purchase Optimization: DISCOMs should adopt comprehensive strategies to ensure cost-effective procurement while maintaining a reliable and uninterrupted power supply. Developing a Resource Adequacy Plan and getting it approved is critical to ensure adequate generation and reserve capacity to meet forecasted demand reliably. Further, robust forecasting mechanisms involving advanced analytical tools, is required to be adopted to better anticipate demand, renewable energy generation and to benefit from power markets.

2.4. Renewable Energy Integration: Incorporate distributed renewable energy sources such as solar and wind into the power procurement portfolio. These sources often have lower costs, benefit from government incentives, and support sustainable development by reducing long-term energy consumption. Further to enhance the effectiveness and reliability, incorporating Energy Storage Systems (ESS) is highly recommended. ESS can mitigate the variability of renewable energy, ensure grid stability, optimize energy utilization, and maximize the efficiency of the overall energy system. Ways to integrate Renewable Energy as presented by Additional Chief Secretary of Power, Government of Madhya Pradesh, offering valuable insights into the integration of decentralised renewable energy projects is annexed as **Annexure-VI**.

5.2 *Correlation Between Performance Metrics: ACS-ARR Gap, AT&C Losses, Billing Efficiency, and Collection Efficiency*

The performance metrics of DISCOMs, such as ACS-ARR Gap, AT&C Losses, Billing Efficiency, and Collection Efficiency, are inter-dependent and provide a comprehensive view of their financial and operational health. Understanding and addressing these interrelations is crucial for enhancing DISCOM performance.

5.2.1 Analysis of the Correlation

To analyse the correlation between key performance metrics, including ACS-ARR, AT&C Loss, Billing Efficiency, and Collection Efficiency, the data of several DISCOMs is presented in the table below:

Table 5:1 - Correlation Metrics (ACS-ARR, AT&C Loss, Billing Efficiency, and Collection Efficiency)

State	ACS-ARR Gap (Rs/kWh)		AT&C (%)		Billing Efficiency (%)		Collection Efficiency (%)	
	FY 2021-22	FY 2022-23	FY 2021-22	FY 2022-23	FY 2021-22	FY 2022-23	FY 2021-22	FY 2022-23
HPSEBL	0.09	0.8	12.9	10.59	87.25	89.41	99.82	100
JBVNL	**1.61**	**2.47**	**30.85**	**30.28**	**72.51**	**69.72**	95.37	100
MSEDCL	0.02	1.42	16.73	19.07	84.77	84.94	98.23	95.28
MePDCL	**0.09**	**1.41**	**25.52**	**23.97**	**78.94**	**87.97**	94.35	86.43
TANGEDCO	1.01	0.96	11.44	10.31	89.49	90.83	98.95	98.75
TSNPDCL	1.52	1.19	14.11	22.19	91.19	92.83	94.19	83.82
TSSPDCL	1.4.0	1.08	9.14	17.2	90.86	91.5	100	90.49
TSECL	**0.53**	**1.00**	**31.17**	**28.15**	**75.26**	**75.3**	91.46	95.41
DVVNL	**1.63**	**2.08**	**31.04**	**24.04**	**74.36**	**78.41**	92.74	96.87
MVVNL	**2.51**	**2.39**	**35.63**	**24.22**	**82.64**	**84.94**	77.89	89.22
PuVVNL	**1.79**	**2.92**	**40.02**	**27.27**	**79.85**	**82.6**	75.12	88.06
Andaman & Nicobar PD	2.83	0.51	19.8	19.81	80.74	81.86	99.33	97.96
Ladakh PD	**0.39**	**1.99**	**48.29**	**30.33**	**59.48**	**69.67**	86.94	100
BEST	1.60	2.06	7.89	4.18	95.37	95.82	96.59	100
Mizoram PD	**1.32**	**2.07**	**36.23**	**26.27**	**70.55**	**73.73**	90.39	100
TPSODL	**0.38**	**0.74**	**34.26**	**31.32**	**76.64**	**75.04**	85.77	91.53
IPCL	0.34	0.8	4.02	6.56	96.9	96.99	99.04	96.34

Source: RPM Meeting of MoP 18th and 19th Jan 2024

Correlation between ACS-ARR Gap and Low Billing Efficiency: As is evident from the above, there is a correlation between a large ACoS-ARR gap and low billing efficiency. It is observed that where there is significant ACoS-ARR gap, the billing efficiency is very poor, establishing an inverse co-relation. Therefore, improving billing efficiency plays a central role in reducing AT&C losses. By implementing the initiatives highlighted in this report, DISCOMs can substantially reduce their billing losses as is the case of several successful DISCOMs such as Tata Power Odisha, MP(W), TPDDL, GUVNL, CESC and TPL who have been able to achieve lower AT&C losses levels by improving their billing efficiency.

6 Analysis and Benchmarking of Employee and Administrative Cost Structure

6.1 Overview

It has been observed that though most of the ARR components have been standardised, the O&M expenses in case of Distribution Utilities vary significantly. Operations and Maintenance (O&M) expenses are a controllable parameter comprising of following major cost components.

1. Employee Expenses
2. Administrative and General Expenses
3. R&M Expense

Upon further analysis of components of O&M expenses, it is observed that the variation in O&M expenses of distribution utilities is mainly observed in case of employee expenses and in certain cases, in A&G expenses. These expenses primarily vary due to the following reasons;

a) **Legacy issues** – Some State Distribution utilities such as HPSEBL and PSPCL have significantly high employee expenses as these distribution utilities have inherited huge number of employees from the erstwhile Electricity Boards.

b) **Terrain** – Based on the terrain and consumer density, the employee expenses as well as administrative expenses varies significantly. For eg. for the same number of sales, O&M expenses is expected to be higher in case of hilly, NE states as well as in case of islands territories such as A&N Islands and Lakshadweep.

c) **Consumer Mix** – Consumer mix also has a considerable impact on the employee and A&G expenses. For a given Sales, a distribution utility with higher mix of LT consumers is expected to incur higher employee and A&G Expenses as compared to a distribution utility with lower mix of LT consumers.

These State specific issues pose challenges when it comes to specifying benchmarked norms that applies to all. It is however, observed that as majority of Indian States are fairly balanced with regards to the combined impact of the above three criterion, an attempt has been made to indicate benchmarked cost for these distribution utilities which comprises of majority of electricity consumers of the Country.

For special cases such as Hilly, NE States and Island territories, a factor may be specified which can suitably capture the challenges being faced by these specific distribution utilities.

In view of the above and with an objective of optimising these controllable expenses, it was decided to include in the report an analysis of employee cost structure and recommendations with regard to optimisation of the cost. In addition, this report also specifies guidelines to reduce the O&M and A&G costs.

6.2 Analysis of Employee and A&G Cost Structure

This Section deals with the analysis of structure of employee and administration expenses for several distribution utilities and based on the prudent costs allowed by the

State Commission for several distribution utilities, an attempt has been made to carry out benchmarking of the cost. The major cost components of Employee and A&G Expenses is as follows:

1. Employee Expenses primarily include the following costs.
    a. Salaries and Wages
    b. Terminal Benefits
    c. Incentives
2. A&G Expenses primarily includes the following costs.
    a. Insurance
    b. Rent and Lease
    c. Electricity Charges
    d. Travelling Expenses
    e. Cost of Outsourced activities
    f. Cost of Contractual Employees
    g. Stationary, Phone Bills
    h. Other Administrative expenses

6.2.1 Employee Expenses

Apart from including the salaries and wages component, employee expenses also include terminal benefits such as pension and gratuity. Therefore, it is important that while specifying the benchmarking, cost towards terminal benefit is factored in.

6.2.2 A&G Expenses

A&G expenses include all administrative expenses such as rent, electricity charges, travel expenses, insurance etc., Apart from the above, it is also observed in some distribution utilities that A&G expenses also include cost incurred on contractual employees and outsourced activities.

6.3 Benchmarking of Employee and A&G Cost and Optimisation

6.3.1 Benchmarking Philosophy

Benchmarking cost in power utilities is a valuable tool for identifying inefficiencies, driving operational improvements, and ensuring that resources are used effectively. By continuously comparing their performance against industry standards and peers, utilities can achieve sustainable cost reductions, improve service quality, and enhance overall financial performance. It also provides transparency and accountability, particularly in a regulated environment, where utilities must justify their costs to regulators and customers.

Benchmarking of cost relies on comparing relevant cost of similar entities and should be carried out only if sufficient data is available. Further, the utility being evaluated is required to be compared to organizations of similar size, type, service territory, and regulatory environment. The process should be transparent with clear definitions and methodologies used for cost measurement, data collection, and analysis. This ensures

that results are credible and can be acted upon with confidence. Further, benchmarking should use consistent cost measurement metrics over time to allow for meaningful comparisons and to track improvements or declines in performance.

Based on the analysis of cost structure of O&M expenses and its components i.e., Employee and A&G Expenses, it is observed that across utilities there are certain variations with regards to the following costs:

1. Terminal Benefits
2. Cost towards contractual Staff and Outsourced activity

As already discussed, to have uniformity, while carrying out the benchmarking, these expenses have been included for all the utilities that have been considered for benchmarking of cost.

Regarding cost towards contractual staff and outsourced activity, it is observed that in some utilities these costs are included in the A&G expenses and do not form part of employee expenses and therefore while carrying out benchmarking, considering only employee expenses will not be correct as this may not reflect the true cost. In view of the same, an alternate scenario has also been developed wherein, benchmarking has been carried out for combined employee and A&G Expenses.

6.3.2 Sample Selection Criteria

To carry out benchmarking study, the utilities across regions have been considered. This ensures a proper mix of distribution utilities based on which benchmarking has been carried out. Apart from this, as these costs are scalable and tend to increase year on year basis, it was important that while comparing the cost, the same year data is considered. Further, the benchmarking has been carried out based on latest actual cost that were trued up by the respective State Commissions after carrying out due prudence check. As the most recent year for which approved true up data is available is FY 2022-23, while selecting distribution utilities, only those utilities for which FY 2022-23 truing up has been carried out have been considered.

The list of distribution utilities that have been considered for the purpose of benchmarking of costs is as below.

1. Punjab State Power Corporation Limited (PSPCL)
2. Madhya Pradesh Poorv Kshetra Vidyut Vitran Company Limited (MP East DISCOM)
3. Madhya Pradesh Paschim Kshetra Vidyut Vitran Company Limited (MP West DISCOM)
4. Madhya Pradesh Madhya Kshetra Vidyut Vitran Company Limited (MP Central DISCOM)
5. Chhattisgarh State Power Distribution Company Limited (CSPDCL)
6. South Bihar Power Distribution Company Limited (SBPDCL)
7. North Bihar Power Distribution Company Limited (NBPDCL)
8. Uttarakhand Power Corporation Limited (UPCL)
9. Himachal Pradesh State Electricity Board Limited (HPSEBL)
10. Paschim Gujarat Vij Company Limited (PGVCL)

6.4 *Benchmarking Methodology*

Before recommending benchmarked cost, it is imperative that the possible basis of benchmarking is discussed. It is observed that O&M expenses directly depend upon the scale of operations. Further, possible metrics to gauge scale of operations of a distribution business can be quantum of sales or amount of fixed assets. It is further observed that the average cost of supply of any distribution licensees' factors in all the cost and inherent challenges related to that specific distribution area. Hence, benchmarking of employee and A&G cost which is also affected by similar factors will automatically get factored in if the cost is benchmarked against the ACoS. In view of the above, the possible basis of benchmarking can be as follows:

1. Based on expenses per unit of Sales expressed in Rs. /kWh or paise/kWh.
2. Based on expenses incurred to service per crore of Gross Fixed Assets expressed either in terms of percentage or cost incurred to maintaining one Crore of GFA.
3. Based on the expenses incurred as a percentage of ACoS.

On analysis, it is observed that unlike Repair and Maintenance expenses which depend upon value of fixed assets, employee expenses as well as A&G expenses may not be directly dependent upon the value of assets. Further, value of assets is largely affected by the vintage of the assets and therefore benchmarking against value of fixed assets may not reflect the true cost. Instead, the employee and A&G expenses are more of a function of the retail operations which is truly reflected by quantum of sales and hence should be considered. Therefore, the benchmarking has been carried out in terms of per unit sales. Further, for the reasons already discussed above, the benchmarking has also been carried out based on percentage of ACoS.

It is further re-iterated, that while considering employee expenses, for uniformity purposes cost of terminal benefits has also been considered.

6.4.1 Employee expenses per sales (Rs/kWh):

The employee expenses per unit of Sales is as shown below.

Table 6:1 - Employee expenses per unit of sales (Rs/kWh)

DISCOM	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
HPSEB-HP	1.70	1.89	1.94	1.67	2.17
PSPCL-PJ	0.77	0.80	0.81	0.86	1.00
CSPDCL-CH	0.37	0.42	0.40	0.37	0.67
East DISCOM-MP	0.45	0.50	0.49	0.51	0.57
Central DISCOM-MP	0.45	0.33	0.40	0.39	0.47
SBPDCL-BH	0.41	0.45	0.45	0.46	0.47
West DISCOM-MP	0.35	0.46	0.33	0.31	0.40
PGVCL-GJ	0.31	0.40	0.35	0.39	0.34
UPCL-UK	0.28	0.28	0.31	0.29	0.29
NBPDCL-BH	0.28	0.32	0.32	0.32	0.28

Source: Various Tariff Orders issued by State ERCs

As per the above, the DISCOMs highlighted in green represent the desired state of efficiency and financial performance. These entities indicate the potential outcomes of streamlined operations, optimized costs, and effective regulatory practices. However, it does not mean that there is no room for improvement even within this group, these DISCOMs should not be complacent to not try to further refine their operations, reduce inefficiencies, and aspire towards better operational efficiency.

While the DISCOMs that are better in terms of the above benchmark cost appears to be on the right trajectory, the focus must remain on consistently implementing best practices and adapting strategies proven successful in other progressive utilities.

6.4.2 Employee expenses as a percentage of ACoS:

Table 6:2 - Employee expenses as a percentage of ACoS

DISCOM	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	ACOS (2022-23)	Employee Expenses as a % of ACOS (FY 2022-23)
	Rs./kWh						
HPSEB-HP	1.70	1.89	1.94	1.67	2.17	6.94	31%
PSPCL-PJ	0.77	0.80	0.81	0.86	1.00	7.09	14%
CSPDCL-CH	0.37	0.42	0.40	0.37	0.67	7.02	10%
East DISCOM-MP	0.45	0.50	0.49	0.51	0.57	7.16	8%
Central DISCOM-MP	0.45	0.33	0.40	0.39	0.47	6.80	7%
West DISCOM-MP	0.35	0.46	0.33	0.31	0.40	7.50	5%
SBPDCL-BH	0.41	0.45	0.45	0.46	0.47	9.94	5%
PGVCL-GJ	0.31	0.40	0.35	0.39	0.34	7.64	4%
UPCL-UK	0.28	0.28	0.31	0.29	0.29	6.90	4%
NBPDCL-BH	0.28	0.32	0.32	0.32	0.28	7.10	4%

Source: Various Tariff Orders issued by State ERCs

DISCOMs highlighted in green are around the desired level of cost efficiency. Anything below 5% is highly desirable and expenses in the range of 5-6% of ACoS is acceptable for Distribution Utilities in plain regions. Anything beyond 6% requires graded rationalisation. However, for Utilities in hilly areas and island areas, percentage will vary based on Utility specific factors and SERCs will have to consider those factors

It is observed that the employee expenses in case of **HPSEBL** and **PSPCL** are **significantly higher** as compared to others. It is learned that the **major chunk of these expenses is due to high terminal benefits**. In the case of HPSEBL, in FY 2022-23 around **50**% of the total employee expenses comprises of terminal benefits. Similarly, in case of PSPCL, the terminal benefits account for around **60**% of total employee costs. These huge terminal benefits have resulted in increase in ACoS and needs to be addressed.

Such huge impact of terminal benefits has not been observed in any other sampled distribution utilities.

As discussed earlier, to incorporate the impact of contractual employees, combined cost of employee and A&G expenses have been benchmarked in the following paras.

6.4.3 Employee and A&G Expenses per sales (Rs/kWh):

The employee and A&G expenses incurred per unit of sales is as shown in the following table.

Table 6:3 - Employee and A&G Expenses per sales (Rs/kWh)

DISCOM	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
HPSEBL-HP	1.76	1.94	1.99	1.72	2.16
PSPCL-PJ	0.84	0.88	0.84	0.89	1.03
CSPDCL-CH	0.43	0.49	0.46	0.43	0.70
East DISCOM-MP	0.81	0.67	0.69	0.71	0.64
SBPDCL-BH	0.52	0.55	0.54	0.56	0.63
Central DISCOM-MP	0.62	0.65	0.61	0.58	0.52
West DISCOM-MP	0.54	0.68	0.46	0.50	0.45
NBPDCL-BH	0.43	0.45	0.45	0.45	0.44
PGVCL-GJ	0.37	0.46	0.41	0.45	0.40
UPCL-UK	0.31	0.31	0.35	0.34	0.33

Source: Various Tariff Orders issued by State ERCs

As per the above, the DISCOMs highlighted in green represent the desired state of efficiency and financial performance.

While the DISCOMs that are better in terms of the above benchmark cost are on the right trajectory, the focus must remain on consistently implementing best practices and adapting strategies proven successful in other progressive utilities.

6.4.4 Employee and A&G Expenses as a percentage of ACOS:

The employee and A&G expenses as a percentage of ACoS is as shown in the following table.

Table 6:4 - Employee and A&G Expenses as a percentage of ACOS

DISCOM	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	ACOS (FY 2022-23)	Expenses as a % of ACOS (FY 2022-23)
	Rs. /kWh						
HPSEBL-HP	1.76	1.94	1.99	1.72	2.16	6.94	31%
PSPCL-PJ	0.84	0.88	0.84	0.89	1.03	7.09	15%
CSPDCL-CH	0.43	0.49	0.46	0.43	0.70	7.02	10%
East DISCOM-MP	0.81	0.67	0.69	0.71	0.64	7.16	9%

DISCOM	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	ACOS (FY 2022-23)	Expenses as a % of ACOS (FY 2022-23)
	Rs. /kWh						
Central DISCOM-MP	0.62	0.65	0.61	0.58	0.52	6.80	8%
West DISCOM-MP	0.54	0.68	0.46	0.50	0.45	7.50	6%
SBPDCL-BH	0.52	0.55	0.54	0.56	0.63	9.94	6%
NBPDCL-BH	0.43	0.45	0.45	0.45	0.44	7.10	6%
PGVCL-GJ	0.37	0.46	0.41	0.45	0.40	7.64	5%
UPCL-UK	0.31	0.31	0.35	0.34	0.33	6.90	5%

DISCOMs highlighted in green are around the desired level of cost efficiency. Anything below 6% is highly desirable and expenses in the range of 6-7% of ACoS is acceptable for Distribution Utilities in plain regions. Anything beyond 7% requires graded rationalisation. However, for Utilities in hilly areas and island areas, percentage will vary based on Utility specific factors and SERCs will have to consider those factors.

The FOR in the 94th Meeting suggested that separate norms be explored for hilly States and NE States. In line with the recommendations, data of 8 hilly and North-eastern States were analysed and is as shown in the following table.

Table 6:5 - Employee and A&G Expenses as a percentage of ACOS for Hilly and NE Regions

DISCOM	Total Employee + A&G Expenses/kWh	ACOS	Expenses as a % of ACOS (FY 2022-23)
HPSEBL-HP	2.16	6.94	31%
UPCL-UK	0.33	6.90	5%
ASSAM	1.1	9.36	12%
Ladakh	2.9	18.74	15%
Tripura	1.73	16.28	11%
Meghalaya	1.26	5.80	22%
Nagaland	1.77	8.93	20%
Manipur	1.85	12.17	15%

It is observed from the above that the expenses to operate and maintain distribution infrastructure in difficult terrain are substantially higher with the exception of Uttarakhand where the actuals are lower as the entire pension liability is managed through a Trust and not all expenses are recovered through tariff. It is recommended that other State utilities in hilly regions should initially strive to reach the level of O&M expenses of 10% of ACOS in the next 3-4 years and then gradually to be in the range of 6-8% of ACOS.

This analysis underscores the importance of benchmarking workforce cost efficiency and provides a roadmap for all DISCOMs to achieve balanced and sustainable operations while ensuring robust infrastructure maintenance.

6.5 *Recommendations on Employee and A&G cost structures for optimization of employee cost*

Multiple suggestions were received from the distribution utilities on ways to sustainably rationalise the Employee and A&G cost. Effective management of Operations and Maintenance (O&M) costs, particularly Employee Expenses and Administrative & General (A&G) expenses, is vital for the long-term financial viability of Distribution Utilities (DISCOMs). These costs constitute a significant portion of the operational budget and directly impact the quality and reliability of service delivery. Streamlining these expenditures is not merely about cost-cutting, but is a strategic exercise aimed at enhancing financial performance while ensuring consistent, high-quality service. Chapter 4 of this Report already deals in detail on the ways to optimise O&M cost. This section delves into further detailing of how to further rationalise these costs and also how to formulate a KPI based performance matrix for evaluation of Organisation performance.

6.5.1 Workforce Rationalization and Skill Mapping

To start with, skill mapping or manpower audit exercise is required to understand areas of overstaffing, **identify redundant roles** so that they can be **re-assigned**, skill gaps to understand the **upskilling, reskilling needs and activities that can be outsourced** to reduce cost. This process will ensure the deployment of human resources as per the organization's operational needs and strategic goals, ensuring that resources are neither underutilized nor stretched thin. One of the ways, DISCOMs achieve this is by **outsourcing non-core activities, such as administrative support or routine maintenance tasks**, to external vendors. This approach enables internal resources to focus on critical functions that directly affect service delivery, thereby reducing administrative overheads.

6.5.2 Rationalisation/Taking over of Terminal Benefits by State Governments

As also discussed earlier, in case of Himachal Pradesh and Punjab, the burden of terminal benefits is significantly higher which has resulted in the increase in the ACoS. As **terminal benefits are legacy issues and difficult to rationalise/curtail, it is recommended that these costs are partially or fully met by the State Government** thereby leading to cost rationalisation.

6.5.3 Leveraging Technology for Operational Efficiency

Technological advancements play an indispensable role in reducing costs and boosting productivity. Integrating Information Technology (IT) solutions into core operations is a key step in minimizing manual interventions and improving operational accuracy. For example, the deployment of smart meters and automated billing systems has proven effective in enhancing billing efficiency and reducing administrative burdens. These technologies provide accurate data in real-time, enabling faster and more reliable decision-making.

The integration of **automation and digitization** is vital, with the implementation of technology solutions for **metering, billing, and collection (MBC)** significantly reducing manual intervention and associated costs. Additionally, **role consolidation and automation** can help optimize overlapping responsibilities in functions such as

billing, customer service, and network monitoring, decreasing manpower needs while maintaining service standards.
Modernizing distribution networks is another critical area for cost optimization. Torrent Power's success in Ahmedabad and Bhiwandi and TATA's success in Delhi as well as Odisha demonstrates the benefits of technological interventions in distribution systems.

6.5.4 Performance-Based Incentive Structures

Aligning employee incentives with key performance indicators (KPIs) ensures accountability and drives efficiency. If employees are motivated by means of suitable reward, the productivity is bound to increase. It is therefore suggested to not only establish a structure to carry out KPI/KRA based incentive but also to provide ample clarity and visibility to the employees on what they shall get or lose if they do not achieve the KPIs and KRAs. In view of the same, the following is suggested.

- A mechanism to be evolved that shall allow additional allowances to better performing employees as incentives upon achieving performance benchmarks.
- **These incentives should be allowed only if there are savings that can be co-related with better performance. Therefore, it is suggested that the system should be self-sustaining.**

6.6 KPI based Incentive Framework

6.6.1 Overview

On perusal of several successful initiatives undertaken by several distribution utilities, the **role of trained and motivated employees** emerges as one of the major contributors to the success of the utilities. Whether it is steady reduction in AT&C Losses, or infrastructure upgrade, the role of employees has been **pivotal**. It has also been observed that these performing distribution utilities have slimmer manpower, but effective utilisation of these employees has benefited them immensely.

It is also learnt that whenever the organisation goals as well as employees' goals have been aligned for e.g., in case of **TPDDL, CESC and Odisha DISCOMs**, the results have been much better. However, several other distribution utilities are yet to figure out how to keep the employees motivated and at the same time accountable. To guide these distribution utilities, it is deemed fit that a framework be devised which can be used by the distribution utilities to enhance its efficiency and keep its employees motivated. It is observed that once the employees are aware how implementation of any important initiative will benefit them, they tend to make extra efforts to get the job done. Hence, it is important that the framework should provide such visibility to each employee.

6.6.2 Incentive Mechanism

Based on several key functions that distribution utility is required to perform, a KPI matrix has been developed. This matrix objectively specifies the weightage each KPI activity carries and how the performance on these individual activities shall be

measured and then merged to derive a consolidated score. It is suggested that based on different priorities, these KPIs can vary from one distribution utility to another but it is imperative that it should be specified upfront so that there is clarity with regard to consequences of success and failures. It is further suggested that to kick start the initiative, the State Regulator may specify this KPI matrix along with incentive/disincentive mechanism. The State Regulator may also direct these utilities to come up with innovative sharing mechanism of these incentives/disincentives among performing and non-performing employees. This may bring some discipline and accountability among the employees.

Further, the State Regulator may state that any distribution company achieving a minimum of 80%(Threshold) mark, shall only be eligible to earn incentives. Further, some key activity target that are critical in nature may be required to be met in addition to the threshold limit. Once the utility has fulfilled the KPIs specified by the State Regulator, incentives be allowed. It is proposed that considerable portion of the incentive earned should be shared among the employees of divisions/circle that have achieved their targets or have contributed to achieving the KPIs.

Further, to make this mechanism self-sustainable, it is proposed that incentive shall be allowed only if there is savings arising out of fulfilling these targets specified by the Commission. A sample assessment matrix of KPI based Performance appraisal system is as shown below.

Table 6:6 - Assessment Matrix for a Distribution Utility

Name of Distribution Licensees:				**Year under Evaluation:**	
Category	**Overall Weightage**	**Sr. No.**	**Key Performance Indicators**	**Reference**	**Weightage (%)**
(A) Loss Reduction	**40**	(i)	Billing Efficiency should not be lower than 90% for the Financial Year		**40**
			Collection Efficiency (>99%)		**10**
			AT&C Loss (%)	State Tariff Regulations	**10**
		(ii)	Provisional Billing/Assessment Bills shall not be in excess of the limits specified by the respective Commission	<5% of total Bills	**10**
		(iii)	Compliance to directions - Loss Reduction	Regulations, Orders issued.	**10**
		(iv)	Complete Consumer Indexing and GIS mapping		**10**
		(v)	Annual Energy Audit at DT Level		**10**

Name of Distribution Licensees:				Year under Evaluation:	
Category	**Overall Weightage**	**Sr. No.**	**Key Performance Indicators**	**Reference**	**Weightage (%)**
(B) Reliability	**20**	(i)	SAIFI, SAIDI and MAIFI Reports	As per SOP Regulation	**30**
		(ii)	Transformer Failure Rate	Reduction YOY	**20**
		(iii)	No Planned Load Shedding/Rostering		**20**
		(iv)	Approved Resource Adequacy Plan to meet power demand	As approved by Commission	**30**
(C) Capital Expenditure	**20**	(i)	Timely filing of Capex Plan for approval	As per Regulation	**10**
		(ii)	Timely completion of at least 80% of the planned capex		**30**
		(iii)	Non-Planned Capex not in excess of 10% of planned Capex		**20**
		(iv)	Nos. of Overloaded Transformer (>90% Rate capacity) should not be more than 10% of the total transformers.		**10**
		(v)	No unmetered Consumers		**30**
(D) Regulatory Compliance/Safety Compliance	**10**	(i)	Timely Filing of Tariff Petitions	Timelines specified under the Tariff Regulations	**20**
		(ii)	Timely submission of Compliance to Directives		**20**
		(iii)	Timely preparation of Audited Accounts		**30**
		(iv)	Regulatory Compliance with regard to Safety related issues.		**10**
		(v)	Compliance to Regulation 65(3) of EA – 03 - Subsidy		**20**

Name of Distribution Licensees:				Year under Evaluation:	
Category	**Overall Weightage**	**Sr. No.**	**Key Performance Indicators**	**Reference**	**Weightage (%)**
(E) Customer Satisfaction	**10**	(i)	Timely issuance of New Connections – At least 90% of the applications to be disposed of within the timelines specified under Supply Code and other relevant Regulations	Distribution Supply Code	**30**
		(ii)	Adherence to timelines specified for fault rectification and complaint addressal (90% complaints/request to be within the timelines specified under the SOP Regulation)	As per SOP Regulations	**30**
		(iii)	Online Portal for making Service Requests including application for new connections		**20**
		(iv)	Establishment of CGRF	As per CGRF Regulations	**20**
Total	**100**				

It is suggested that the above mechanism should form part of the Regulations so that the same is enforceable. Further, the above matrix may be required to be appropriately modified based on the progress of a given distribution utilities on several parameters.

A similar mechanism has also been specified by CERC by way of Regulation in its recently notified Central Electricity Regulatory Commission (Fees and Charges of Regional Load Despatch Centre and other related matters) Regulations, 2024 and is applicable to RLDCs and NLDC. CERC, in these Regulations, has specified broad categories of KPIs to measure the performance of LDCs and has also approved a detailed procedure for assessing performance against these KPIs. Under this mechanism, NLDC and RLDCs shall be evaluated based on their performance on several KPIs and after adding the marks scored against all KPIs, incentives and dis-incentives shall be applicable.

7 Recommendations and Way Forward

Improving the profitability of Indian DISCOMs requires a multifaceted approach that addresses operational inefficiencies, enhances financial discipline, promotes sustainable energy practices, and strengthens regulatory frameworks. By focusing on them and by adopting a consumer-centric approach, DISCOMs can overcome their financial challenges and contribute to the long-term sustainability of the power sector.

The summary of key recommendations to address issues related to sustainability of Distribution Utilities has been outlined as below.

7.1 Summary of Key Recommendations

7.1.1 AT&C Loss Reduction

7.1.1.1 Strengthening Distribution Infrastructure and Metering Systems

1. All **connections** should be metered and meters should be functional. Ensuring **100% metering** will go long way in ensuring viability of DISCOMs.
2. **Replacement** of ageing transformers and distribution lines with efficient transformers and advanced covered conductors and switchgear **minimises technical losses**.
3. The technological intervention such as **Advanced Distribution Management System (ADMS)**, **Geographic Information System (GIS)** mapping and **Supervisory Control and Data Acquisition (SCADA)** systems has been found to be instrumental in **flagging losses**.
4. Implementing High Voltage Distribution Systems (**HVDS**) and LT Aerial Bunched Conductors **(ABC)** is must to reduce non-technical losses as it is difficult to tamper with.
5. Implementing **DT Level metering** and **Energy Audits** at Distribution Transformer (DT) Level to map losses.
6. **Feeder Separation,** wherever agricultural consumption is high, has been found to be useful in reducing losses and improving load management.
7. **Smart meters**, which ensure accurate billing and reduce theft, are highly recommended starting from high loss areas. Retrofitting existing electronic meters can be a cost-effective option.
8. **Implementing prepaid metering systems**, particularly in areas with low billing efficiency, serves as an **effective strategy** to reduce AT&C losses.
9. **Advanced Metering Infrastructure (AMI)** significantly reduces provisional billing which is one of the major reasons for reduced billing efficiency and high AT&C Losses.

7.1.1.2 Ways to improve Revenue Collections

1. **Frequent waiver schemes** have become a recurring practice which disincentivises timely payments. Hence, it is advised that such schemes may be implemented judiciously to maintain financial discipline. Any waivers granted

by the State Government should be treated as subsidies and should be paid in advance to mitigate cash flow constraints of DISCOMs.

In some cases, it is observed that tariff subsidies are deferred by State Governments. As any recovery which is deferred, entails a carrying cost, the same needs to be borne by the State Government and paid to the distribution utility. In case of any delay in recovery, the working capital burden increases and therefore, it is suggested that while computing the carrying cost to be paid by State Government, the rate of Interest on Working Capital as approved by the State Commission from time to time may be considered. These measures will ensure that the distribution utility is not financially prejudiced.

2. **The assessment formula** specified in case of unmetered connections especially in case of agricultural consumers, requires revalidation based on current consumption patterns.

7.1.1.3 Displacing LT consumption

1. It is recommended to facilitate the Distributed energy systems, such as solar rooftops and energy storage systems (ESS), which offer a transformative solution to reduce losses and enhance grid efficiency.
2. Concept of dynamic pricing may be introduced so that consumers are more aware of the price of their consumption on real time basis. This may help to shift demand in a more efficient manner.
3. Explore mini micro-Dam based Irrigation: The possibility of reducing agricultural consumption through setting up mini and micro dams/ponds, which can in turn be used for localised irrigation.

7.1.1.4 Role of CSR in Loss Reduction - Building Synergy

It is suggested to undertake Corporate Social Responsibility (CSR) initiatives synergistic with loss reduction strategies. The focus is to be on projects that promote energy efficiency, infrastructure development, and consumer engagement in high-losses areas.

7.1.2 Ways to Optimise O&M Cost

a) As expenses towards **Terminal Benefits** are quite significant in some States, it is suggested that the respective State Government may either takeover this liability partially or fully, as has been done in several other States.

b) Instead of outsourcing manpower, it is recommended that **outsourcing be done of activities** especially those which are repetitive and non-critical.

c) **Predictive maintenance** refers to the use of data analytics to forecast when assets such as transformers or power lines are likely to fail. By implementing predictive maintenance technologies, DISCOMs can reduce unplanned outages, improve asset longevity, and avoid costly emergency repairs.

d) IT enabled Systems such as **ERP/SAP** can be used for Asset Management, which significantly reduces the administrative cost**.**

7.1.3 Ways to Optimise Human Resource

a) **Continuation of Leadership (Managing Director)** at the helm of affairs for at least 3-4 years is critical to make progress in a sustainable manner.
b) Carry out **Manpower Skill Audit** and based on the same, **Training, Upskilling and Re-skilling** be carried out. This allows Employees to contribute more effectively to organisation's performance.
c) Having a **Performance Based Incentive Structure** motivates employees to contribute.
d) **Aligning employee KPI's with Organisational goals** ensures synergistic outcomes.

7.1.4 Ways to Rationalise of Cross Subsidies

a) **G**radually aligning **tariffs with the actual cost of supply** across all consumer categories will **arrest migration** of cross subsidising consumers.

b) Rather than relying on cross subsidies, governments can explore the option to provide **direct subsidy transfers** to vulnerable consumers (residential and agricultural users) to help them afford actual cost of electricity.

7.1.5 Timely Issuance of Tariff Order

a) It is suggested that ERCs by way of appropriate provisions in the Tariff Regulations, specify the timeline for issuance of Tariff Orders in accordance with the Section 64(3) of the Electricity Act.
b) Streamline regulatory review procedures by **adopting standard templates** and pre-defined evaluation criteria to reduce processing time. It is suggested to simplify the tariff formats by seeking specific inputs and to provide with editable templates and specify the way these data are required to be furnished.

7.1.6 Measures to Avoid Regulatory Assets

a) **Regular Pass through of Uncontrollable expenses** such as Power Purchase Cost avoids accumulation of Regulatory assets.
b) **Taking over or financing legacy Regulatory Assets** by State Governments to reduce impact of carrying cost and liquidation.
c) **Time** Bound issuance of **Tariff and True up Orders**.

7.2 *Other Key Recommendations*

Apart from the above, there are certain soft aspects that need to be ensured for sustainability and viability of the distribution utilities. Some of them are as under:

7.2.1 Platform for Sharing Best Practices:

Several utilities have taken some important and innovative steps towards betterment of its business, and it would be immensely beneficial if these distribution utilities have a common platform as a Forum of Distribution Licensees wherein these best practices and other agendas can be taken up. The Forum shall serve the following purposes:

a) **Sharing** of Best Practices through regular meetings.
b) Act as a Repository of Knowledge
c) **Platform** to learn new technological interventions and sector updates
d) **Collectively** voice their concerns more assertively.

7.2.2 Subsidy Management:

The State Governments need to ensure that the subsidy is paid to the distribution utilities in advance. Further, the structure of subsidy should be such that it should not incentivise or promote any kind of malpractice. E.g. one of the distribution utilities submitted that just because subsidy was only allowed on consumption below 150 kWh, several consumers used wrongful means to remain in that bracket.

7.2.3 Recovery through Fixed Charges:

It has been observed that, fixed cost component constitutes more than 50% of the total Aggregate Revenue Requirement (ARR) for most distribution utilities. The recovery through the fixed charge component of the retail tariff is typically limited to around 15-20%. This arrangement introduces element of uncertainty in revenue recovery, when actual sales fall short of the projections made by the State Electricity Regulatory Commissions (SERCs) during determination of ARR (Aggregate Revenue Requirement). In such cases, the utility experiences reduced revenue recoveries impacting its cash flows and affecting its ability to meet financial obligations towards power purchase, infrastructure maintenance, and debt servicing.

To address this issue, it is imperative to gradually increase the proportion of revenue recovered through the fixed charge component of the retail tariff. By progressively increasing the recovery of up to 30-50% fixed costs with fixed charges, the financial viability of the utility can be strengthened, ensuring more predictable and stable revenue streams.

7.2.4 Continued Government Support:

a) It is recommended that the State as well as Central government continue to aid in extending debt restructuring as well as in providing soft loans and grants for important capital expenditure through scheme such as RDSS. The focus should be to clean the balance sheets so that these utilities have required leverage in executing its plan.
b) The Central Government frames various policies which can have a bearing on Average Cost of Supply (ACoS) of DISCOMs. In the past some of such measures taken include:-
    (i) Waiver of transmission charges for Renewable Power
    (ii) Blending of Biomass
    (iii) Reduction of cost of Green Hydrogen
    (iv) Loading infrastructure cost for providing connection to Solar rooftops on Aggregate Revenue Requirement of DISCOMs.
    (v) Providing LT Connections upto 150 kW to facilities ease of business, which may transfer consumer's losses to DISCOM's account.

Before making policy in such matters the State Government and Forum of Regulators (FOR) may be consulted by the Central Government. Furthermore, it is recommended that if any cost reduction is to be made to the beneficiaries under such polices, it would be preferable to provide grants directly to beneficiaries rather than increasing ACoS and electricity tariff.

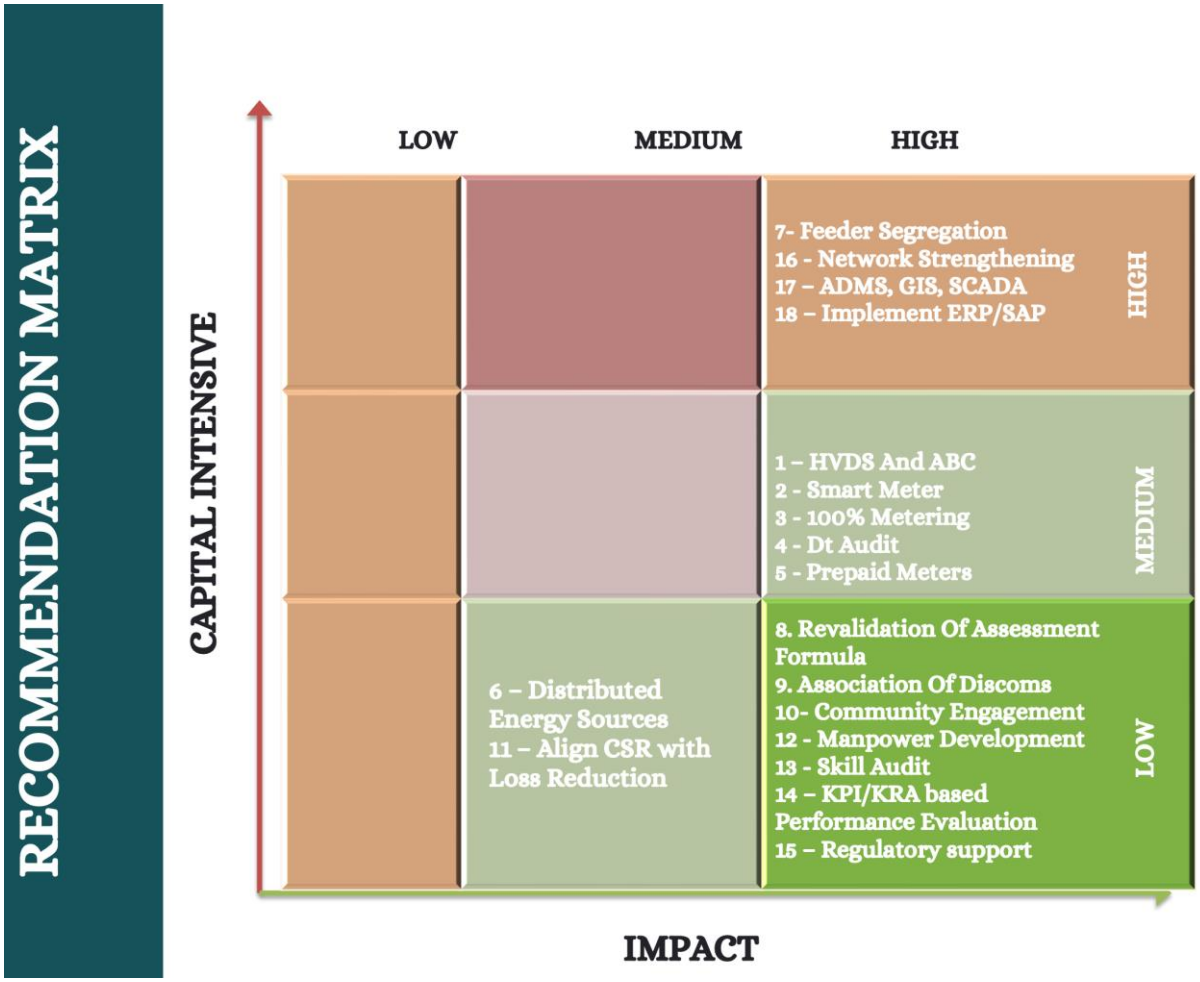
7.3 Recommendation Matrix

Based on the analysis carried out in the previous sections of this Report, several sets of recommendations have been made to target specific issues which are affecting financial as well as operational viability of the distribution utilities. However, as each Distribution utility is unique in its operations and have separate set of challenges, not all recommendations apply for all. Based on the Utility's specific current standing on several key parameters, these initiatives are required to be prioritized. Further, while prioritising, the following two important aspects are required to be considered:

1. Capital Intensity
2. Impact on Operational Efficiency and Sustainability.

The key recommendations as discussed in this Report have been categorised as under:

Figure 15: Recommendation Matrix



The recommendations are also listed below for easy reference.

Table 7:1 – List of Recommendations

S. No.	List of Recommendations
1	HVDS and Aerial Bunch Conductors
2	Initiating Smart Metering in high loss areas/ high value consumers – Implement Advanced Data Analytics tools for improved analysis and decision making
3	100% Connections to be metered
4	DT Level Energy Audit
5	Prepaid Meters and Automated Meter Reading in areas with low billing efficiency
6	Facilitating Distributed Energy Systems
7	Feeder Segregation - (Wherever high agricultural Load/consumer)
8	Re-validation of Assessment Formula wherever billing is being carried out on assessment basis.
9	Setting up of an Association of Distribution utilities – Facilitate Knowledge sharing and Policy Advocacy
10	Community Engagement - Consumer Awareness Campaign
11	CSR alignment with Loss Reduction Strategies - Building Synergy
12	Focus on Manpower Capacity Development
13	Manpower Skill Audit and Rationalisation/Re-deployment
14	KPI/KRA based Employee Accountability and Incentivisation
15	Tariff Revision - Cross Subsidy Reduction - Regulatory Support for KPI/KRA based Employee Benefit Scheme
16	Network Strengthening - Reducing Overloading of Lines and Transformers
17	Installation of Advanced Distribution Management, GIS, SCADA Systems
18	Implementation of ERP, Exploring IT/AI enabled services/Digital Transformation

It is clarified that based on the progress of distribution utilities on several parameters, the priority of the above recommendations may change and therefore, the above recommendations are required to be re-aligned for each distribution utility.