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Commercial Loss Reduction Techniques in Distribution Sector - An Initiative by MSEDCL

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ABSTRACT: The large amount of Commercial losses cannot, however, be reduced by strengthening of the network. The need of the hour is to implement a separate programme of action for reducing Commercial losses. Increase in losses resulted in inefficient distribution system and poor quality and reliability of power supply to consumers which resulted in tremendous consumer dissatisfaction as well as it has affected the financial performance of the utilities. The main object of the paper is to implement a distribution system having negligible NTL losses. In this paper, schemes which are implemented to minimize Commercial losses by MSEDCL, have been discussed. In this regard contribution by MSEDCL, Chandrapur Circle is presented.

Keywords: Losses in Distribution System, Commercial losses, MSEDCL, IR Meter, Damini Pathak,

I. INTRODUCTION

The main objective for distribution loss monitoring & control is to monitor important distribution parameters, capture hierarchical view of energy accounting, gap analysis, Network assets of power distribution utilities, intelligent analysis tools for plugging loop holes and identifying revenue leakage, adding into perform network planning and management activities, calculate / identify technical and Commercial losses at any point in the network. Ideally, losses in an electric system should be around 3 to 6%. In developed countries, it is not greater than 10%. However, in developing countries, the percentage of active power losses is around 20%.

The concept of Aggregate Technical & commercial (AT&C) losses was introduced by some state regulatory commissions in past decade. The advantage of the parameter is that it provides a realistic picture of energy & revenue loss situation. The AT&C Losses comprise of two elements.



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II. TECHNICAL LOSS

Each component of an electrical network (an overhead line, Underground cable or a transformer, etc) offers resistance to flow of current and thus consumes some energy while performing the duty expected of it. The cumulative energy consumed by all such components is termed as “Technical Loss.” The movement of electricity in a T&D system produces power losses within the lines, transformers and other equipment. The power lost through a T&D system must be generated by power plants. Therefore, additional costs of a T&D system are the power generation and capacity increase required to offset power losses in equipment.

III. COMMERCIAL LOSSES

Any illegal consumption of electrical energy, which is not correctly metered, billed and revenue collected, causes Commercial losses to the utilities. The Commercial losses are primarily attributable to discrepancies in Meter Reading, Metering, and Theft by direct hooking.

IV. T & D LOSS

The sum total of —Transmission & Distribution losses is termed are T&D loss.

V. AT&C LOSS: (AGGREGATE TECHNICAL AND COMMERCIAL LOSS)

The aggregate of T&D loss and Collection loss is termed as “AT&C loss” (Aggregate technical and Commercial loss). In the regulatory regime AT&C loss is main criteria to judge the financial health of a Distribution Utility.

VI. IN DEPTH COMMERCIAL LOSSES

Commercial losses are caused by non-technical or Commercial factors namely pilferage, theft, defective meters, errors in meter reading, estimating un-metered supply of energy etc. Any illegal consumption of electrical energy, which is not correctly metered, billed and revenue collected, causes Commercial losses to the utilities. The Commercial losses are primarily attributable to discrepancies in following activities:

A. *In Meter Reading:-*

Commercial losses occur due to discrepancy in meter reading. Meter reading problems are manifested in form of zero consumption in meter reading books which may be due to premises found locked, untraceable consumers, stopped/defective meters, temporarily disconnected consumers continuing in billing solution etc. Further, coffee shop reading, collusion with consumers is also source of Commercial losses to utilities which are primarily due to meter reading.



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B. In Metering:-

Most of utilities across India are using either electro-mechanical or electronic meters for consumer metering. Commercial losses through metering can be in form of meter tampering in various forms, bypassing of meters, usage of magnets to slow down the meters, tampering of PT circuits, CT/PT ratios (in case of HT meters) etc.

C. Theft by direct hooking:-

This is most common and visible form of Commercial losses in which people tend to tap LT lines to indulge in theft through direct hooking.

VII. MINIMIZATION OF COMMERCIAL LOSS

- i. Measures for controlling direct tapping by non-customers and customers. Replace all 11 KV feeder lines and 3 phase distribution lines with hard core plastic cable that will lead to minimize the Commercial losses from direct hooking.
- ii. Measures for controlling pilferage of energy by existing customers. Prepaid Energy meters should be installed in major theft area.
- iii. Measures for reducing defective metering.
- iv. Meter installation by ensuring height and location of installation for easy readability of meters & Locating meters should be in public domain in full public view.
- v. Measures for improvement in billing and collection. Correct billing and timely delivery of bills go a long way in improving the revenue collections. The normal complains viz. non-receipt / late-receipt of bills, wrong bills, wrong reading status, wrong calculations etc. should be avoided.
- vi. Users Associations, Panchyats and Franchisees in Billing and Collection .The electricity Act, 2003, should be successfully inculcated to develop a sense of belonging to and stake in the entity.
- vii. Legal Measures for Reducing Commercial Losses – The Electricity Act, 2003, has brought radical changes in all the facets of the electricity sector. The relevant Sections of the Act are 126, 127, 135, 138, 145, 150, 151, 152, 153, 154, 156, 157, 168, 169, 170 and 171.

VIII. SCHEMES IMPLEMENTED TO MINIMIZE COMMERCIAL LOSSES BY MSEDCL

In just 5 years, MSEDCL reduced Commercial losses from considerably through various drives. In order to minimize Commercial losses MSEDCL had to concentrate on its ageing infrastructure. To overcome the power crisis and improve consumer services MSEDCL made in-depth study involving sub- division wise research of distribution network and planned ambitious projects.



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A. Restructured – Accelerated Power Development & Reforms Programme (R-APDRP) Part - A

R-APDRP is another flagship scheme sponsored by Govt. of India and financed by Power Finance Corporation of India (PFC). There are 134 towns having population more than 30,000 as per 2001 census selected in Maharashtra under this scheme. The work in 95 towns has already commenced.

Commercial loss reduction oriented includes Creation of IT infrastructure and allied works are included in Part-A for which a turnkey contract of Rs. 204 crore has been awarded to M/s. Larsen and Toubro Ltd. and the works are in advanced stage of completion. A Data Centre at Mumbai and a 24x7 operating Centralized Customer Care Centre at Bhandup have been commissioned under Part A.

B. **Anti theft drive** : This is being implemented on regular basis. MSEDCL has established 43 flying squads and 6 dedicated police stations functioning under vigilance department to detect and handle power theft cases quickly.

C. **Meter shifting**: For many consumers, meters were installed in hard-to-access places, making theft easy to conceal. MSEDCL, therefore, decided to shift all meters to the front of buildings to make them as conspicuous as possible. This project is currently in progress on a large scale.

D. **Mass Meter Replacement Project**: MSEDCL has decided to replace all the meters which have been in service for last 10 years and more under mass meter replacement programme. It is planned to replace all the electro mechanical meters with static ones. A process has already been initiated for purchasing about 30 lakh meters for the purpose. This is a huge project which will definitely lead to increase in metered sale.

E. Metering and energy audit related initiatives:

i) **Feeder Metering**: MSEDCL plans to install high quality meters at all necessary system points, including interconnecting points. Feeder metering of all 10,334 feeders is complete and photo reading of these feeder meters is also put in place.

ii) **Field Level Administrative set-up of Distribution Utility:**

In MSEDCL, the business is managed through Administrative offices set up at different locations and having a different status. Normally the hierarchy is as follows.

iii) **Circle Office**: Normally it controls activities of a District or any other area depending on number of consumers served and load catered. One such Circle office can have 4 to 6 Divisions functioning under it.

iv) **Division Office**: Typically catering around 1lac consumers. Each Division has 4 to 6 subdivisions functioning under it. It is responsible for overall control and monitoring the Revenue, Metering Billing and collection activities.

v) **Sub Division Office**: Each subdivision is responsible for O&M of the network under its jurisdiction. In some States the subdivisions are responsible for Metering Billing and Collection of revenue.



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vi) **Monthly Energy Accounting:** MSEDCL started an initiative for metering of Agricultural Consumers . There are in all 3,37,297 Distribution Transformer Centers(DTCs) in operation, out of which about 2.42 Lakh DTCs have already been metered. MSEDCL started to undertake Monthly Energy Accounting at Division, Feeder and DTC level.

F. **Photo Metering:** to address Billing complaints: wrong meter reading/ more consumption by consumers, MSEDCL took a first of its kind initiative in the country.

G. **Ease of Billing:** MSEDCL has started a number of initiatives to make it easy for consumers to access and pay their bills. All bills have been put on the internet for providing easy access to the consumers. The payment gateways available to consumers have been increased by commissioning ATM Cash Collection Centers, Drop Boxes and offering the consumers the facility to make e-payments.

H. Demand Side Manangement

Akshay Prakash Yojana: Akshay Prakash Yojana (APY) is a demand side management measure, whereby, MSEDCL has attempted to restrict rural feeder loads to 20% of actual value by reducing pilferage, removing inefficient devices and better load management.

IX. CASE STUDY AT MSEDCL, CHANDRAPUR CIRCLE

MSEDCL, Chandrapur Circle is one of the circle which implemented the various measures to reduce Loss efficiently. Due to which Losses has been reduced considerably from 17.487 % in 2003-04 to 7.5% in 2012-13.

In the ongoing actions to reduce Commercial Losses Chandrapur Circle implemented the following Projects.

A. IR Meter Installation against Replacement & NSC

During 2012-13, in MSEDCL, Chandrapur Circle, Electromagnetic & Electronic meters were replaced by IR Meter resulted in about 38% increase in consumption against faulty & electromechanical meter replacement. Also IR meter is utilized for New Service Connections to avoid any malpractice as below:

IR Meter Installed (Nos.) (NSC)	13541 Nos.
Replaced meters	26476 Nos.

B. Theft Detection Drive in MSEDCL, Chandrapur Circle during 2012-13,

1) Theft by hooking electric line

- i) Recovered cases Nos:- 08 Amount:- Rs. 1.12 Lakh
- ii) Compound cases Nos:- 08 Amount :- Rs. 0.17 Lakh

2) Checking of unauthorized connection load extension.(case U/s 126)

- i) Recovered cases Nos:- 21 Amount:- Rs. 3.81 Lakh

3) Theft by Tempering meter and other means(cases U/s 135-138)



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- i) Recovered cases Nos:- 52 Amount:- Rs. 9.38 Lakh
- ii) FIR cases Nos:- 02 Amount:- Rs. 0.25 Lakh
- iii) Compound cases Nos:- 50 Amount:- Rs. 2.68 Lakh

C. Achievement of Damini Pathaks MSEDCL, Chandrapur Circle

Due to increasing number of female engineers in the workforce of MSEDCL necessitated the thought of their empowerment. A novel idea of formation of all women’s squads popularly known as Damini Pathaks is being implemented. A Damini Pathak, headed by a local female engineer and assisted by 2-3 outsourced female employees, equipped with digital camera, a security guard in uniform and a vehicle has been established at MSEDCL, Chandrapur Circle under the leadership of Superintending Engineers, Chandrapur.

These squads undertake the surprise checks of the photo meter readings in their area. The aim of the exercise is to address the consumer complaints regarding photo meter reading. The members of the squad visit the households between 10 a.m. to 4 p.m. when generally housewives are present at homes
Damini Pathak Progress Report Jan.2013 to Dec. 2013 under this Circle as follows.

Table 1:

Name of Incharge	Date	Month/duration	No. of consumers checked			Total	Descipancies in No			Total
			RL	CL	IP		RL	CL	IP	
	Jan. 2013 to Dec. 2013	Jan. 2013 to Dec. 2013	4818	1920	428	7166	2661	1039	122	3822

Expenditure on Damini Pathak during Jan.2013 to Dec. 2013 as below:

Outsourcing lady (02)	Rs. 122400/-
Security	Rs. 37832/-
Vehicle	Rs. 89349/-
Total	Rs. 249581/-
<i>All Total EXPENDITURE :-</i>	<i>Rs. 249581/-</i>
<i>All Total Recovery:-</i>	<i>Rs. 1728578/-</i>

Discrepancies includes Theft Case(135), DL To CL Use (126), Bill not received, Illegal Extension, 0' Units bill given, Faulty Meter, Faulty status in bill though Meter is Normal, Meter shows very Less Consumption/ Meter Slow , INACCS & RNA, LOCKED/RNT & Other.

Thus the Damini Squads are working satisfactorily and results are encouraging under MSEDCL, Chandrapur Circle.



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X. CONCLUSION

As per above discussions it is found that there are various factors responsible for Commercial losses (NTL) which need to be eliminated. Case Study at MSEDCL, Chandrapur Circle has been carried out which includes IR Meter Installation against Replacement & NSC, Theft Detection Drive & success of Damini Pathaks to reduce Commercial Losses. In the ongoing power sector reforms, the focus has rightly been shifted to improving its efficiency to reduce losses. Reducing these losses ensure that the cost of electricity to customers will be reduced and in turn the efficiency of the distribution network will be improved. Ultimately, this may contribute in the process of overall national development & good quality and reliability of power supply to consumers. In this paper, schemes were discussed to minimize Commercial losses by MSEDCL. Technological aids available in the form of aerial bunched cables, insulated/partially insulated LT lines, new metering technologies such as remote metering, pre-paid metering, meters with recording features, etc. should be adopted.

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