CHAPTER: 5

CONCLUSIONS AND RECOMMENDATIONS

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5. CONCLUSIONS AND RECOMMENDATIONS

The present study has been conducted with a view to analyze the internal management planning and control system that prevails in power distribution companies of Gujarat. The objective is to suggest robust mechanism for presenting holistic performance encompassing qualitative and quantitative parameters of performance.

This chapter presents a summary of the findings of the study though all of them are scattered in detail in previous chapters. The summary follows recommendations that are framed on the basis of the analysis conducted for the study. It is focus on enhancing efficiency and efficacy of the present system.

5.1 RESEARCH FINDINGS

The present research study was undertaken basically to review the system of management planning and control system of power distribution companies with a view to impart efficacy and efficiency in the system. For this purpose, critical evaluation was carried out in order to expound the weaknesses in the existence system with a view to identify the areas that need improvement. The major findings of the existing system are as listed below:

5.1.1 ORGANIZATIONAL STRUCTURE & PROCESS

In Gujarat, the organizational structure adopted by power distribution companies is of divisional type. In this structure, core function and responsibility of a division office overlap with those of a circle office. A circle office functions as a controller of controller. The existing system lacks focus on customers and professional approach to render efficient consumer services. In addition to that, it is weak in commercial and professional approach to face the onslaught of competition in the power distribution sector. Along with it, the concept of responsibility center is absent in the present business structure. The system has resulted in vagueness about accountability and responsibility of divisional manager. Furthermore, costing

approach too is absent for cost of power at divisional level. This makes it very difficult to assess the profitability of a division at any point of time.

In case of highly viable investment for system improvement projects, there is delay in project approval owing to the bureaucratic delegation of power at divisional level. Furthermore, post execution review of project, proper allocation of corporate services, proper accounting, common yard stick and benchmarking for performance measurement are conspicuous by their absence. Moreover, usually policy is framed on need basis instead of perusing well thought out long-term business plan.

5.1.2 SWOT ANALYSIS

- The GUVNL and its subsidiary power distribution companies have strengths in different areas like technical knowhow and knowledge, established infrastructure, proactive and dynamic practices, good financial position, established responsibility, ability to adopt change, applicability of IT projects and ability to deliver good quality of power across the state of Gujarat.
- Companies are affected with some weaknesses like organization culture, inability to meet customer's demand and expected services, liability of non productive staff and over protective employees, poor project management, non performance based promotion and finally, high AT&C losses.
- Ample opportunities are observed in power distribution sector of Gujarat. Some of these are higher growth rate in consumers and consumption, socially and economically rich class of people, limited competition, regional benefit, government support, and large number of industrial consumers to provide strong customer base.
- Various threats are identified such as unmetered agriculture consumer base, limited resources, high cost of power, cross subsidization, and political interference.

5.1.3 PERFORMANCE OVERVIEW

In present system, evaluation of performance is carried out based on traditional methods. A division is not evaluated comprehensively considering all strategic areas of engagement. Besides, appropriate importance is not given to critical non-balance sheet areas and financial areas in the evaluation of performance of strategic business units. Further, no benchmark is available to compare performance among divisions

and companies on common and standardized yard-sticks in power distribution business.

5.1.4 KEY PERFORMANCE INDICATORS

In case of power distribution companies in Gujarat, various performance indicators are derived through analyzing data of last three years for different divisions. They are derived on the following inferences:

CUSTOMER SATISFACTION

- Reliability of power supply in Gujarat has remained almost about 96% (including the load shedding). But in different companies it remains different like DGVCL has 98%, MGVCL has 99%, UGVCL has 95% and PGVCL has 93%. It is noted that power reliability index is relatively good in Gujarat. But still lot has to be done in terms of CAIDI (in minutes), i.e., It means that the average time required to restore services is higher than as compared with the benchmark level of 90 minutes.
- In Gujarat, average failure rate of transformer is about 12%. It is required to be brought down to the benchmark level of 5%. Along with it, 56% variation in DTR failure rate is reported because of agriculture consumers.
- GUVNL has an average HT/LT ratio around 1:1, which is good. But it is lower than the benchmark level of 2:1.

FINANCIAL PERFORMANCE

- Even with the increase of 88% in the unit sales in last six years, the losses have decreased by 33%. This counts a good achievement for power distribution companies in Gujarat.
- AT & C losses (avg.) of GUVNL for the financial year 2009-10 remained about 25.03% while Transmission and Distribution losses were about 24.22%.
- The annual transmission and distribution loss per consumer in units is about 1000 units which are valued at about ₹ 2800 per consumer. Similarly, the collection loss is on an average ₹ 500. For a division the total (AT&C) loss per consumer goes up to ₹ 3300 annually. Further, 8% of total feeders comprise losses above 75%, 10% of total feeders between 50% to 75%

losses, 20% between 25% to 50% losses, 21% between 25% to 10% loss and 39% of total feeders below 10%.

- In GUVNL and its subsidiary distribution companies, the consumption rate of industrial consumers remains about 39%. It is followed by 31%, 11%, 5%, 12% and 2% respectively for agriculture, residential, commercial, licensee and others consumers.
- Due to low collection efficiency, there is collection loss to the tune of ₹ 5 crores per division.
- Division usually has 6% live arrears and 9% PDC arrears on the total assessment. But in monetary terms, average arrears remains about ₹ 26 crores and out of these ₹ 16 crores is accounted by PDC consumers. However, percentage of consumers in arrear is about 7%.
- End-to-End money flow efficiency is found around 93%, which is greater than industrial standard of 92%.
- After unbundling in the financial year 2005-06, there was a remarkable change in Net Profit ratio (net profit to total revenue). It changed from (-) 8.68% in 2004-05 to 1.68% in 2005-06.
- Operating profit margin (operating profit to net sales) of a division varies from (-) 342% to 50% for different type of divisions.
- R & M expenditure to total expenditure is only 1-2%. Hence controlling R & M expenditure does not have any significant impact on the profit of a distribution company.
- Operational and Maintenance (O&M) expenditure to per unit of energy sent remains at about 5.79 paisa. It is lower than the benchmark level of 10 paisa per unit. However, operating expenditure per consumer comes to about ₹ 900 per consumer.

INTERNAL BUSINESS

- Out the total sale of energy, about 31% of energy sale was done to agricultural consumers. Out of it, only 7.5% of energy was metered and about 23.5% were unmetered.
- In GUVNL, during the period under review, there were four electrical accidents occurred per day. Out of it, one was a fatal human accident, two

were fatal animal accidents, and one was non-fatal human accident. The rate of accidents occurred per one lac of consumers remained about 16 in 2007-08. Both ratios of accident remained quite high as compared that with other private players in the power distribution sector.

- The replacement of meters was done in a division annually on an average rate of 7 to 10%, MMB at the rate of 6-10% and sealing at the rate of 11% in respect of total consumers.
- The GUVNL remains vigilant to prevent theft of power. As a whole, some 24% of consumers in respect of the total consumers were checked during 2008-09 and out of that, only 2% of the consumers were detected for theft. Thus, out of the total assessment, only 1.13% of the assessment was realized from theft consumers.

LEARNING AND GROWTH

- In a division, the number of consumers per employee remains about 400. Further, an average of 33 KM line and 25 DTRs are assigned to one line staff.
- Looking at the consumption figures, it is understood that the consumption of HT industries is rising with a rate of 17% and the total consumption of power is rising at a rate of 8% annually. Increase in demand calls for further investment for a new project and also to expand the existing ones with increased capacity and output.

5.2 MODELS AND FINDINGS

Models are developed to understand relationship between different variables that have bearing on DTR failure, Distribution loss, Power reliability and Profit of a division. It is an alternative method to measure performance parameters (y) with divisional parameters (x) for a division. The following models are developed and tested for strength and efficiency of performance.

DTR FAILURE MODEL
$DTRFailure = 7.0521 - 0.0005\ DTRMtce + 0.001\ CONS_{AG}$

DISTRIBUTION LOSS MODEL

T&D loss = 14.1163 + 0.3969 HTLength/Feeder + 0.0011 LTLength – 3E-05 $CONS_{RL}$ + 8E-5 $CONS_{CL}$ – 0.0461 $CONS_{HTIND}$ + 0.0012 $CONS_{LTIND}$ + 0.0005 $CONS_{WW}$ – 0.0118 $CONS_{STL}$ + 0.0006 $CONS_{AG}$

POWER RELIABILTY MODEL

RI = 99.7026 - 0.0002HTLength

PROFIT MODEL

PBT = - 63975 - 495.2 T & D loss + 786.5 CollEffy

Where as

$CONS_{RL.}$ = Average number of residential including rural residential consumers in a division.

$CONS_{CL.}$ = Average number of commercial consumers in a division.

$CONS_{HTIND.}$ = Average number of HT industrial consumers in a division.

$CONS_{LTIND.}$ = Average number of LT Industrial (L1, L2, L3 Tariff) consumers in a division

$CONS_{WW.}$ = Average number of water work consumers in a division.

$CONS_{STL.}$ = Average number of Street light (SL, TL, PL – Tariff) consumers in a division.

$CONS_{AG.}$ = Average number of agriculture (A1, A2 and A3 Tariff) consumers in a division.

Feeders = Number of feeders of a division.

HTLength = Total HT line length of all feeders of a division in KM.

LTLength = Total LT line length of all LT circuits of a division in KM.

RI = Reliability Index of a division in percentage, on the annual basis.

HTMtce = HT line maintenance carried out (in percentage) for a division in a year.

DTRFailure = Distribution transformer failure rate of a division (in percentage), on the annual basis.

DTRMtce = Distribution transformer maintenance carried out in respect to total transformers of a division during the year in percentage.

T&D Loss = Transmission and Distribution loss of a division in percentage on annual basis.

CollEffy= Collection efficiency of a division on annual basis in percentage.

PBT = Profit before tax of a division in lacs, on annual basis.

5.2.1 SPECIFICATION AND RELATIONSHIPS

The following results are observed when the Models were applied.

- It is inferred that there is significant relationship between DTR failure with DTR maintenance and agriculture consumers in a division. Considering that other factors as constant, they explain the variation in DTR failure rate at 56.60%.

- With 10% increase DTR maintenance activities 1% rate of DTR failure can be saved.
- In a division, 1% DTR failure comes as contribution from 1000 agriculture consumers.
- It is observed that there is significant relationship among T & D losses with HT line length per feeder, total LT line length and a consumer mix of a division and, they, considering other factors remain constant, explain 72.60% of variation in T & D losses of a division.
- There is no impact of consumer mix observed on collection efficiency of a division.
- It can be concluded that significant relationship of power supply reliability (in terms of reliability index) exists with total HT line length of feeders and it explains 27% of variation.
- There is no relationship of reliability index observed with total number of feeders in a division.
- It is further observed that reliability of power supply diminish due to total length of HT feeders, and not because of number of feeders in a division.
- There is strong and significant relationship between Profit before tax with T & D losses and collection efficiency of a division.
- It is determined that 62.22% of variation in profitability is explained by T & D losses and collection efficiency on the part of a division with an assumption other factors as constant.
- When T&D losses decrease to the tune of 10%, the profit shall increase by 13% while collection efficiency increase by 1%, the profit shall increase by 40% subject to the condition that other parameters are constant.
- One percent reduction in the T & D losses will affect increase in the profit before tax (PBT) by ₹ 5 crores, while one percentage rise in the collection efficiency will save from the collection loss to the tune of ₹ 7.5 crores per division.

5.2.2 FINDINGS FROM PDS MODEL

As a part of research methodology, it was thought to prepare scorecard with the help of PDS Model. It stands in relation to the selected divisions as shown in the TABLE 5.2.

The findings are listed as follow:

- The Lalbaug (Urban) division is found to be the best performing division even though it lacks in the KPI: theft prevention business.
- The Ankleshwar (Industrial) division is a laggard with low score in the KPI revenue & collection, field maintenance services, and safety and accidents.
- The Khambhaliya division is reported as the lowest performing division even though it provides good control for the KPI - theft prevention, and has good metering and billing performance.
- Out of all industrial divisions, the Ankleshwar Industrial division has secured first rank even though it has comparatively low score with events of accidents.
- Among urban divisions, the Lalbaug division is the getting highest score. Correspondingly, the divisions like Surat urban, Rajkot city-2 and Junagadh are reportedly showing the score in descending order.
- Out of all rural/mix divisions, the Bavla division is securing the highest score. It has shown good profitability although it shows poor score in matters of safety and accidents.

5.3 RECOMMANDATIONS

Based on the study conducted by us, we have the following recommendations to suggest improvement in the present system.

5.3.1 ORGANIZATIONAL STRUCTURE

- An individual division should be treated as a Profit-Center. It has to prepare its own balance sheet and the profit & loss account with quarterly reporting to the corporate office.
- Loss Control Cell (LCC) should be set up at divisional level. It will help to monitor and control energy loss, and improve overall profitability of a division. The manager of LCC shall be responsible if losses go beyond 30%.
- A separate Business Planning and Budgetary Control Cell (BPC) may be setup at the corporate level to prepare long term business plans. It will also implement and monitor the strategy.
- In a revised organization chart, the circle level should be eliminated.

- Cost of corporate office should be allocated to a division on the basis of sent out units.
- To evaluate profitability of a division and to eliminate effect of cross subsidization, Weighted Average Sale Price (WASP) MODEL should be applied.

5.3.2 KEY PERFORMANCE INDICATORS

Evaluation of division is carried out effectively with the help of certain Key Performance Indicators (KPI). The earlier chapter presents the working of these indicators on the basis of the present status as reported from different divisions. For the purpose, the responses obtained through the questionnaire are also considered as decision input. The indicators may be spelt out as under:

- It is necessary to reduce supply restoration time up to the benchmark level in reference to CAIDI. It is possible only by implementing full fledge SCADA project in urban and industrial divisions.
- The agriculture consumers have strong and significant impact on DTR failure rate. Hence, it is recommended to improve maintenance and load pattern on transformers that supply power to agricultural consumers.
- It is recommended that due concentration has to be paid to 8% of the feeders at which losses go above 75%. It proves beneficial and the strategy has to be gradual reduction in number of feeders in this category.
- It is recommended to monitor distribution loss per consumer closely even if T&D losses remain low or comparable.
- In view of increase in number of accidents every year, it is strongly recommended to take safety measures and provide adequate training and safety equipments to line staff on duty or on sites. In case of erection work of HT or LT lines and service lines safety measures have to be strictly observed as per electrical standards to reduce accidents.
- In light of rapid changes in business and possibility of prospects it would be advisable to do long term investment. With it, if quality and reliable power supply is maintained in industrial zones by reducing undelivered energy then it may in turn enhance the revenue and profitability.

- R & M expenditure may exert serious effect on consumer service like quality of power supply. It may in turn affect the sales and the profit to be generated. This expenditure has to be given reasonable attention. In case of industrial or urban divisions, it is therefore recommended that R & M expenditure should not be reduced at the cost of service to consumers.
- It is suggested that energy sent out table and energy sold out table may be prepared for every division. They are meant specifically for evaluating financial performance. On the basis of energy unit sent/sold out tables and unit sales per customer per day, it is further suggested to calculate profit per customer per hour. According to it, when new investment of project is planned in a division the motive for it should be to maximize profit by improving power reliability.

5.3.3 EVALUATION OF DIVISIONAL PERFORMANCE

- It is understood that common and standardized yardsticks should be made available to measure performance of power distribution business. Power Distribution Business Scorecard MODEL is suggested for the same and it is displayed in the TABLE 5.1. It can be used effectively for evaluation of divisional performance of power distribution companies in Gujarat.

TABLE 5 - 1 : PDS MODEL WITH STAGE WISE IMPLEMENTATION

Stage of Implementation	Key area	KPI	% Weights
First	Customer Satisfaction	Quality and reliable supply	10
	Customer Satisfaction	Field Maintenance Service	9
	Internal business	Metering & Billing	8
	Financial Performance	Cost and Losses	20
Second	Customer Satisfaction	Customer Service	9
	Internal business	Safety	5
	Financial Performance	Revenue and Collection	8
	Internal business	Theft Prevention	5
Third	Financial Performance	Finance and Profitability	8
	Learning and Growth	Human Resources	4
	Learning and Growth	Project	8
	Learning and Growth	Training	3
	Internal business	Legal	3
Total			100

5.4 FUTURE DIRECTION OF RESEARCH

The present research has been carried out through proper investigation in to the internal planning and control system as they prevail in the power distribution companies in Gujarat. The study can also be applied in the similar way to power distribution companies in other states. However, there may be different working environment at other states but the study can have equally and easy access to the condition over there and that is because of robustness of the proposed models.