Establish Appropriate Process Refinement and Resource Requirements to Ensure Sustainability in curbing Energy Losses

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Abstract

This paper provides an overview of the process a utility can follow to put measures in place to ensure sustainability of managing energy losses by means of a well researched resourcing methodology.

Key words – Energy losses, sustainability, resourcing, processes, people

1. Introduction

Managing energy losses sustainably is a major problem for many utilities across the world, especially in developing countries. These utilities are normally faced with limited resources and lack the financial investments required to manage losses effectively. In addition, there are unrelated factors such as socio-political pressures and misaligned internal processes that contribute towards an increasing trend in energy losses. A study performed by PA Consulting, an international management consulting company, showed that energy losses in Argentina reduced from 27% to 10% and in Brazil from 17.5% to 13.5%, over 5 and 3 years respectively. These improvements entailed extensive changes in the organizational structure of these utilities and included amongst others, bringing in external expertise and making huge financial investments estimated in millions of US dollars.

1.1 The Energy Losses Programme

Eskom Distribution initiated the Energy Losses Management Programme (ELP) in 2006, to actively investigate and address the problem of energy losses.

The project undertook a detailed analysis of the business and proposed a strategy to address the challenges. The key objectives of the ELP strategy were to:

- arrest the increasing energy losses trend,
- reduce energy losses to an acceptable level; and
- ensure sustainability of effective losses management in the future.

To date the first two objectives have been achieved. Thus, the emphasis has shifted to ensuring that the learning from the ELP is sustained via a new approach to the governance, resourcing and management of processes related to energy losses. This paper details the approach Distribution is investigating to realize this.

1.2. The Challenge

The ELP has highlighted the following challenges which electricity distribution utilities around the world face in the energy losses domain.

- A lack of dedicated and focused resources with the required expertise to manage energy losses e.g. some revenue protection departments only have expertise to deal with the residential customer base but not with industrial or commercial customers.
- Conflicting priorities between departments, resulting in the management of energy losses not getting the required focus
- The lack of independent quality assurance mechanisms on energy losses management activities, to ensure effectiveness of these initiatives

Over the duration of the programme the following were identified as critical success factors in sustainably managing energy losses:

- Streamlining of business and value chain processes related to energy losses management
- Addressing organisational structural deficiencies
- Addressing human resource deficiencies and ensuring effective utilization of all available resources
- Reassigning accountabilities and responsibilities where required
- Aligning relevant Key Performance Areas in the organization

At the outset, the desired end state was decided upon, after analysis of the business as a whole. Next gaps were identified which hampered the business from realizing the end state and intervention were developed and implement to close these gaps.

This paper outlines how utilities can effectively focus its processes, people and technologies to successfully manage energy losses sustainably.

2. The Energy Losses management process

The first step in ensuring sustainability was to define the activities involved in the energy losses management process. The Eskom Distribution business is driven by prescribed processes and clearly defined value chains. It was necessary to balance the requirement of meeting the energy looses objectives without individual departments losing focus on their overall key performance areas and role as defined by these processes and value chains.

Extensive analysis led to a definition of the energy losses process, as shown below. The process defines the tasks involved in fully understanding the level of losses, curbing of energy losses and ensuring sustainability. These include energy reconciliation, executing corrective measures and quality assurance & reporting respectively.

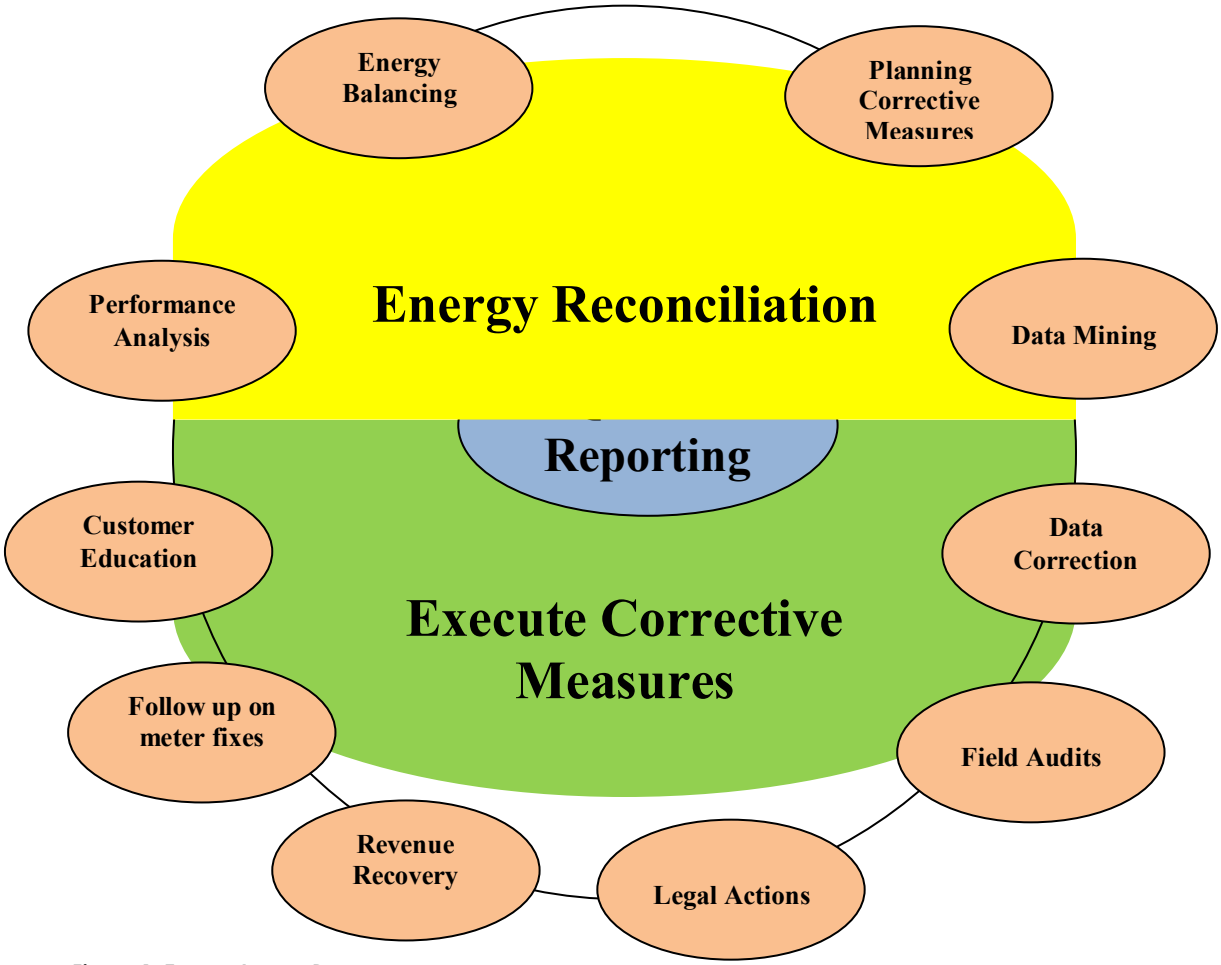

Figure 1: Energy Losses Process

2.1 Energy Reconciliation

Energy reconciliation is the first part of the energy losses process (figure 1). The primary purpose of energy reconciliation is to equip the business with the ability to determine accurately the level of losses which in turn would trigger corrective action. The key activities within the energy reconciliation process are:

- Balancing energy (i.e. determining the difference between energy generated and energy sold) at different levels of the electricity distribution network through the installation and commissioning of statistical metering.
- Analysis of consumption patterns of customers relative to the amount of energy consumed in that specific area
- Identifying anomalies from energy balancing and consumption patterns analysis as a trigger for corrective actions.

Comprehensive energy reconciliation will assist the organisation in identifying high energy loss areas and planning corrective measures.

2.2 Execute Corrective Measures

Once energy reconciliation has been done, the focus shifts to the development of a comprehensive plan to address high loss areas. These plans will include:

- Co-ordination of audits, which include physical meter verifications, with a view to determine whether there is a trend in the way meters are tampered and how to curb that trend. Following up on fixes identified during field audits is also critical to ensure full benefits from audits.
- Education of customers to change from a culture of non-payment and meter tamper; a change in customer behaviour is crucial to managing energy losses.
- Data correction.
- Recovery of revenue from customers where the integrity of the installation was compromised
- Legal action to prosecute customers for illegal connections.

Once corrective measures are instituted, the organisation has to ensure quality assurance and reporting plans are put in place.

2.3 Quality Assurance and Reporting

Quality assurance is conducted to ensure process compliance in reconciling energy and executing corrective actions. The quality assurance aspect of energy reconciliation would include ensuring that statistical metering installed for purposes of energy balancing provides accurate information and that the information is available in a seamless manner. Quality assurance within the corrective measures space would mean validating that problem finding and fixing are done as per predefined standards.On the other hand reporting is crucial in order to provide visibility for losses management activities. Reporting of loss levels, problems found, corrective measures executed, revenue loss prevented and revenue recovered are some of the key aspects that have to be reported and reviewed.

3. Support for the process

Once the energy losses management process has been defined, the next logical step was to determine the appropriate manner in which the organization would support the process. Various approaches to organizational support to manage losses were considered in the process of determining an ideal that suited Eskom Distribution. The key learning from this exercise was that it was crucial that each utility consider its unique environment and develop an organizational support system that best suited it.

From the different options evaluated as part of determining an appropriate organizational structure for managing losses in Eskom Distribution , the following crucial needs were noted:

- A centralised unit to manage energy losses
- Clarity of responsibility and accountability for activities related to the management of energy losses and the enforcement thereof
- Coordination between energy losses management and the associated revenue recovery

- The ability to measure technical and non-technical losses and institute corrective actions. The use of data analysis techniques to determine high loss focus areas as a guide for audit teams
- Quality assurance of losses management activities
- internal and external stakeholder Communication
- A centralised prosecution function

4. Resourcing the Organisation for Energy Losses Management

Once the principles behind the type of organizational support required are defined, the next step would be to determine the human resource requirements. This entailed understanding the required levels of skill, the number of resources required as well as the costs involved in implementing the resource structure. Some of the key points that emerged from this analysis were that:

- Revenue protection employees must have the required skills and competencies to audit industrial and commercial customers and not only residential customers.
- A strong legal skills set is required within the revenue protection department to assist with the collection of evidence and prosecution of offenders.
- Financial and billing skills and competencies are critical to ensuring that the department is able to effectively recover revenue
- Enhanced technical skills are required to assist with meter verification and audit of large customer installations.
- Strong project and contractor management skills and competencies are necessary to ensure that contractors are effectively managed.

5. Technologies

The final step in ensuring sustainability would be to investigate opportunities for the use of technology in managing losses. The guiding principle in the use of technology in the management of energy losses is that:

- The technology used must be appropriate for the environment
- It must serve as an enabler of desired business outcomes
- The technology must be customized for the organizations infrastructure and employees skills

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The ELP Programme has demonstrated that technology is able to assist with:

- Accurate reporting of losses,
- Balancing of energy,
- Sourcing and analysis of data,

- Prevention of losses.

7. Conclusion

Now that an understanding of the extent of the energy losses problem has been highlighted and measures to manage losses effectively have been implemented, a way to ensure sustainability needs to be identified. The above analysis has placed Eskom Distribution in a comfortable position to take the required decisions to ensure sustainability of energy losses management. On implementation of the above mentioned recommendations, Energy losses management, will once again, be part of normal business activities.

Core to any sustainable energy losses management model are the following key concepts:

- Sustainability requires actively policing
  The business must have a comprehensive program to actively engage customers, identify fraud internally and externally and take appropriate action against offenders.
- A cost / benefit model
  A financial model is critical to ensure that the cost of the resources employed is recovered via reduced losses and revenue recovery.
- A Scorecard
  Buy-in is required from executive management on the development and implementation of a scorecard which effectively measures the performance of all business areas involved in the reduction of losses. The scorecard should be cascaded down to individuals within the organization.