

BUSINESS OPPORTUNITIES IN ELECTRICAL ENERGY MANAGEMENT

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INTRODUCTION

There are two main forms of energy - electrical energy and fuel energy. This Paper deals with electrical energy. But many of the concepts are equally valid for fuel energy.

Electrical energy is a costly and scarce resource. That it should be managed effectively goes without saying.

In the context of business opportunities arising from the need for effective electrical energy management we can consider two broad areas :

The Supply Side, which includes Generation, Transmission and Distribution, and
The Consumer Side, mainly Industries, which account for 55% to 60% of the total electrical energy consumption.

As of today, the Supply Side is largely Government controlled, and though potential is there, business opportunities as such are limited. Let us therefore focus on business opportunities on the Consumer side.

In order to identify these opportunities, we need to have some idea of what really is involved in practical terms in managing the energy resource effectively.

AN ELEMENTARY CLOSED LOOP SYSTEM FOR EFFECTIVE MANAGEMENT

As in the case of any resource, effective management is best ensured through a closed loop system of control. Fig. 1 illustrates an elementary closed loop.

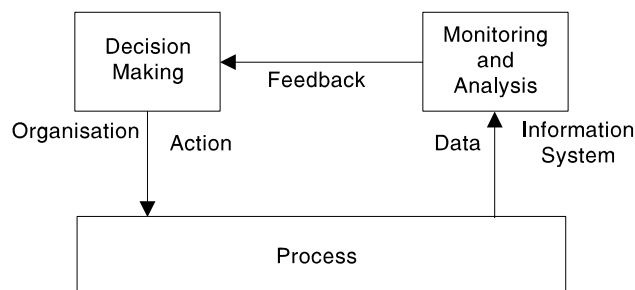


Fig. 1 - Elementary Closed Loop

Decisions regarding utilisation of the resource are taken at appropriate levels. The decisions are implemented in the process which handles the resource. The implementation is monitored, analysed and the data is fed back to the decision making level, thereby closing the loop. Thus the decision making level is aware of how the implementation is progressing, and can initiate corrective action if any inadequacies are shown up by the data. Because of feedback and corrective action, implementation gets progressively refined and a high level of efficiency is achieved.

ELECTRICAL ENERGY MANAGEMENT LOOP

In the case of Electrical Energy, the closed loop needs some refinement. This is illustrated in Fig. 2. In effect there are three closed loops within each other.

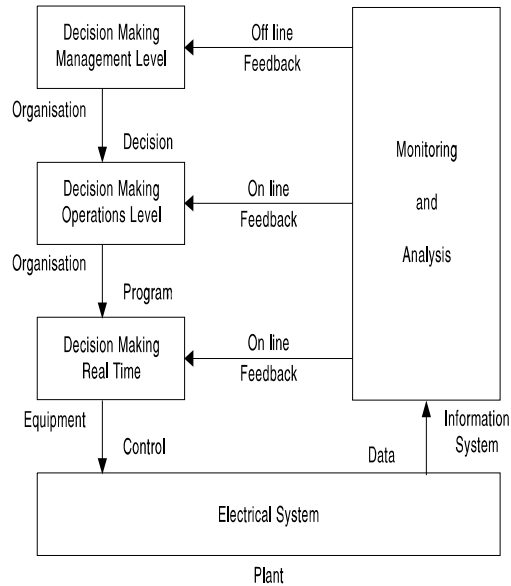


Fig. 2 - Electrical Energy Management Loop

The outer loop provides off line feedback for management level decisions. These decisions are generally of an overall nature, for example, strategy, targets, investments etc., and these provide the frame work for effective control.

The middle and inner loops provide on line feedback necessary to implement control measures. The control measures are the crucial part of effective management.

The middle loop generally provides adequate on line data based on which operations level personnel can take control decisions and implement them. Decision making requires certain level of skills.

In many cases therefore decision making is also included in the middle loop. The manual implementation then becomes virtually an unskilled job.

The inner loop provides for automatic implementation, which in certain cases is highly desirable, for example, in Demand Management.

The functional block designated 'Monitoring and Analysis' together with the feedback mechanism represents an Information System, essentially comprising instrumentation and people. Good instrumentation is the key to effective energy management.

ENERGY AUDITS

Energy Audit is a part of the outer loop that generates off line data. Like financial audit, Energy Audit is best organised as two streams, Internal Energy Audit and External Energy Audit.

Internal Audit is an on-going activity within the Industry, just like any other MIS function, carried out by the Industry's own personnel, may be with some help from an Energy Consultant if needed.

External Energy Audit can be a periodic exercise, say, once year, carried out by an Energy Consultant. External Audit is useful in three ways:

It provides independent inputs to the Management.

Because of wider exposure and better expertise, External Auditors can bring to light energy saving opportunities that might get overlooked in Internal Audits.

It provides a good opportunity for persons engaged in Internal Audit to share experience and learn

BUSINESS OPPORTUNITIES IN ENERGY AUDITING

Though industries had felt the need for effective management and conservation of electrical energy, there was reluctance in most industries to invest money towards this end. However, this attitude is changing and more and more managements are now willing to invest.

There is also a move from the Government to make Energy Audits mandatory.

These two developments create many openings for setting up Energy Auditing as a Business. For success of such a business the pre-requisites on the technical side include :

Industry background and experience of handling electrical systems in industries
Ability to understand and analyse different operations typical in industries, from the energy usage point of view.

Thorough knowledge of electrical energy management products available in the market for implementing various energy conservation schemes.

Good portable instruments for taking measurements on various parameters

BUSINESS OPPORTUNITIES IN INSTRUMENTATION

Energy Audits can identify opportunities for saving energy, but actual savings are realised only when appropriate control measures are implemented by closing the middle and inner loops.

As we have noted earlier, good instrumentation is crucial for this.

In the past instrumentation had a limited role :

To monitor the health of the electrical system - for which Voltmeters and Ammeters were adequate

To record electricity consumption for costing or billing purposes - through energy meters.

For this limited role electromechanical meters were adequate and cost-wise attractive.

However, in the context of optimisation and effective management, instrumentation has acquired a new role. Emphasis has shifted
From Monitoring to Measurement, and
From Recording to Controlling.

For this enhanced role inadequacies of electro-mechanical instruments pose major constraints. On the other hand, electronic technology, more precisely, digital technology offers immense possibilities and cost effective solutions.

Excellent business opportunities therefore exist for developing, manufacturing or trading in a variety of instruments needed for monitoring, analysis, displaying, recording and controlling in real time electrical parameters that have a bearing on costs.

In this business, the application for products is in electrical systems but the products themselves are electronic, based on sophisticated digital techniques. Therefore a successful business requires strengths in both these areas and involves a good deal of concept selling.

The products may range from simple stand alone panel meters at the low end to sophisticated multi-function instruments at the upper end.

Instrumentation for energy management is an emerging market with immense growth potential.

BUSINESS OPPORTUNITIES IN CENTRALISED SYSTEMS

For effective management, monitoring has to be done at several nodes spread over a wide geographical area in an industry. While, in this situation, stand alone instruments can meet certain basic needs, the arrangement also suffers from certain drawbacks :

Readings from these instruments will be in the nature of raw data, whereas effective control requires the data to be analysed into a readily usable form. Because of the geographical spread and the resulting time lag between readings from different instruments the data is not correlated in real time. For example, when assessing shift-wise performance, if reading of one instrument is at the start of the shift and another 30 minutes later, the results could be totally misleading. For effective implementation of control measures which only leads to significant savings, the middle and inner loops have to be in place. These operate with on line data. Data collected manually from stand alone instruments spread over a vast area can never be on line.

For effective monitoring and control, therefore, there is no alternative to a Centralised System which inherently takes care of all the three closed loops.

A variety of centralised systems can be designed, integrated and supplied from readily available Transducers, PLCs, PCs and software packages. This is a niche market with excellent business opportunities but requires expertise in systems.

CONCLUSION

Energy management and conservation has been a favourite topic for seminars and workshops for over a decade. It is only in the last two years or so that a beginning has been made to put this into practice. Therefore business opportunities in this area are just opening up and the growth potential is immense.