

Energy Management Practices

1. Fertiliser Sector

Various aspects of energy conservation are as under:

- Certification / declared policies with regard to energy efficiency, quality and environment.
- Company's commitment to energy management
- Energy management cell – organisation and functionality
- Activities undertaken by the company to promote energy management
- Budget for energy conservation and investment decisions.
- Role of industry association and peer group
- Barriers to implementation of energy conservation measures
- Government policies and sectoral policies
- Energy management policy.

1.1 Energy Management Cell (EMC)

In majority of the fertilizer plants, the equivalent organizational setup is in the form of 'Technical Services (TS)' department that performs the duties of a typical EMC. The TS departments also perform the role of troubleshooting, preventive and predictive maintenance, plant/process modifications etc. Mostly these departments are cross-functional in nature and consist of multidisciplinary team of professionals. The key personnel of this department frequently meet frequently the top management and discuss the energy related issues. As reported by the sample plants, major job responsibilities of the EMC consists of :

- Identification of energy conservation projects
- Execution of energy conservation projects in the plant
- Continuous monitoring of energy performance of plant and equipment
- Prepare energy consumption status report for review by different levels of management.
- Interact (formally and informally) with different departments in the plant and motivate them to conserve energy

Second important thing that is required to improve the performance of the EMC is to make budgetary commitment for energy management at corporate level. It is inferred that having a separate budget for energy conservation will certainly show more commitment from top management towards energy management in the plant.

1.2 Promotion of energy management

In majority of plants top management takes the decision on energy management. All the plants set energy conservation targets to improve energy efficiency. Most commonly used basis for setting up the energy conservation target is previous year's energy consumption. However, some new generation plants also use best international figures for same feedstock and fuel to set their energy conservation targets. In the fertilizer industry, the targets are usually expressed in terms of specific energy consumption and energy conservation targets are also specified in terms of proposed reduction in specific energy consumption figures. Few industries also use both the best energy conservation figures in fertilizer sector using same feedstock and fuel and the best operating practices among group plants as basis for setting their energy conservation targets.

With regard to energy consumption norms, it is difficult to give one single energy consumption norm for the fertilizer plants as these norms are expected to vary significantly with technology, fuel and feedstock used in the plants. The units have their own designed / guaranteed specific energy consumption that invariably becomes their energy consumption norm. Moreover, majority of old plants have revamped/retrofitted their process to reduce energy consumption and productivity.

1.3 Capacity utilization and energy consumption of Indian Ammonia plants

Feedstock	Capacity utilisation (%)	Energy Gcal/MT
Gas	96.4	9.48
Naphtha	80.3	11.73
Gas + Naphtha	90.5	10.27
Fuel oil	91.2	13.90
Gas + Naphtha + fuel oil	90.6	10.94
Coal	22.5	42.69
Gas + Naphtha + fuel oil + coal	86.6	11.43

1.4 Employee motivation and education

One of the most important factors to promote energy management at unit level is to develop and encourage the human resources to contribute to the process of energy management and energy efficiency. This ensures a correct mix of top down and bottom up approaches to bring about energy conservation. Motivation and education of employee forms a very important part of development of human resources for the industry. Most common practice to educate the employees is by organising focused training programs. Majority of units conduct in-house training programs on energy efficiency and energy conservation. This reflects that majority plants have developed in-house technological capacity in energy efficiency aspects. Through internal training programs the knowledge is exchanged within the organisation and capacity building takes place. In addition to internal training programs, most of the plants also encourage their employees to take part in external training programs.

Other activities through the industry encourages motivation of its employees for energy conservation is through participatory suggestion schemes and slogans. It has been proven that participation in incentive based suggestion scheme results in generation of new and innovative ideas to reduce energy consumption and improve productivity. The suggestion scheme, wherein all levels of workforce participants, is very crucial for generating incremental innovation to bring down energy consumption. The cumulative effect of small measures to conserve energy can be very significant. All the plants have a suggestion scheme in place to promote energy conservation. Majority of plants also promotes energy conservation by encouraging employees to provide slogans on energy conservation. The suggestion and slogan schemes are also followed by small financial incentives that encourage the staff to participate in these programs.

With regard to publishing of information / case studies on energy conservation, most plants encourage their employees to publish actively in the internal newsletter, and discuss the achievements in internal seminars. However, the extent of participation in external journals / publications was low. It is important to mention that the training budget is overall budget and it includes all aspects of human resource development programs. In most fertilizer plants, energy management aspect is usually built into training related to process, automation and control, and other production and maintenance related aspects. However, there are some training programs specific to energy management.

1.5 Budget for energy conservation

In majority of fertilizer plants, project approval and budgetary allocation for large projects is done on case to case basis. In the fertilizer sectors having a separate budget for energy conservation represents a proactive approach by the plants to encourage implementation of energy efficiency projects.

1.6 Role of industry association and peer group

Fertilizer industry presents a good example of openness and cooperation among industries. Information exchange with industry association and peer group industries takes place by sharing information through plant visits. Sharing of case studies and accessing and sharing technical information through industry associations such as FAI are important means of exchange of information among plants.

Majority of fertilizer industry considers the role of industry association very crucial in providing information about energy management. Fertilizer association plays an important role in the dissemination of information about energy conservation by organising industry meet / seminars on energy management. The association also helps the industry by providing information about energy conservation opportunities and by providing technological database on energy efficiency. Few plants also expressed that the industry association helps in providing national / international benchmarks for energy consumption.

1.7 Barriers for implementation of energy conservation options

First high cost of technology / energy efficient equipment is the main barrier to adoption of energy conservation measures in the plants.

2. Proposed energy management policies in fertilizer industry

2.1 Role of top management

In order to secure commitment from the shop floor, it is imperative for top management to demonstrate its commitment to promote energy management and energy conservation at corporate level. Strong and focused leadership is crucial for carrying forward an integrated energy management plan that includes all levels of management and entire shop floor.

Since energy forms a large part of the costs of production, all the plants realize the importance of role of top management and rate it as a crucial parameter that must be stressed while making corporate / plant level energy management policies.

2.2 Setting up energy management cell

“Since energy is everybody’s business, therefore it is nobody’s business”, this is the attitude that is usually visible in organizations that do not have clear guidelines on energy conservation and management structure to support implementation of energy management programs. Having an organizational set up that rests energy management as a core responsibility of a group/functional unit is central to achieving energy management goals at corporate / plant level. EMC is expected to coordinate with all the departments within the plant to identify, develop and execute energy management projects. Its responsibilities are cross functional and headed by a full time energy manager. Therefore, setting up EMC is another main area that must be stressed in corporate energy management policies. Although majority of fertilizer units has technical services / engineering departments that routinely carry out main functions of a typical EMC, having a separate EMC would certainly give focus and objectivity to the energy management activities in the plant.

2.3 Energy Audit

Third most important aspect i.e. energy audit help in identifying the possible areas of energy conservation along with techno-economic analysis to enable implementation. Energy management policy must emphasize the role of other energy audits as a tool to identify major energy consuming areas and improve energy efficiency.

2.4 Monitoring and targeting

Monitoring and targeting of key energy parameters help the industry to benchmark and compare its own performance over the years. The industries can also compare their energy performance with other industries nationally and internationally.

2.5 Internal energy award system and ushering a culture of preventive and predictive maintenance

In order to motivate the staff to participate actively in energy management exercise, an incentive / reward scheme should complement participatory approach involving group activities. Majority of the plants feels that a system of rewards acts as a catalyst to motivate employees to provide suggestion and schemes to reduce energy conservation. "Prevention is better than cure" – this is certainly true for the plant and equipment. Better maintained plant and equipment not only save on loss of production but also help in minimizing energy consumption in plant and equipment. Therefore, preventive and predictive maintenance schedule should be emphasized in company's energy management policy.

2.6 Energy Management Information System (EMIS)

Like any typical MIS, objective of EMIS is to enable different levels of management to review and monitor the energy consumption. With the help of EMIS systems, energy consumption status reports can be generated for suiting the needs of different levels of management.

2.7 Training and Capacity building

Development of human capacity is very crucial to generate new and innovative ideas in-house for promoting energy management. It is important that companies develop specific training modules related to energy efficiency and management as part of its HRD training policy. This can be done by encouraging the plant to participate in both internal and external training programs on energy management and energy conservation.

In addition the staff should be encouraged to publish achievements in energy management in both internal and external publications. Similarly, personnel can also participate in relevant national and international conferences to exchanges ideas on relevant subjects. Industry associations can play a crucial role in these cases.

Reference:

Energy Management Policy – Guidelines for Energy Intensive Industry in India, Chapter 5, pp 66-95 by Bureau of Energy Efficiency