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Recommendations for improving working relations with the energy auditors.

Introduction:

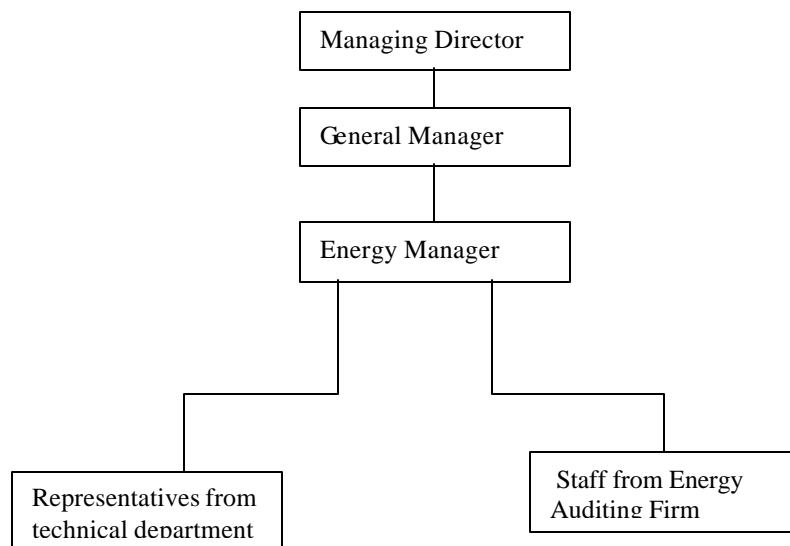
It is necessary for the management, officers and staff of a firm should have some awareness about the energy conservation and its benefits. Carrying out the energy audit without any awareness and just to comply the rules and regulation will not be fruitful. I feel that the most important role of an energy manager or energy auditor to make the management and the operation and maintenance personnel of a firm understand the benefits of the energy audit. The second important thing is the approach and attitude of management, i.e. sometime the approach is very conservative type and they are not ready to part any type of data to any outside agency. This approach causes difficulty in obtaining the past data, which is very much required along with the existing collected data to perform the analysis.

Before mentioning straightway recommendations for improving the working relations with the energy auditors, I would like to point out the steps, which are required to be taken before commencement of energy auditing work.

Steps to be taken before commencement of energy audit:

Step 1:

The first step should be to make somebody, preferably with technical background and holding senior position in the firm, in-charge to look after the energy audit work. This person shall be responsible for all the work related with energy auditing right from hiring the energy auditing firm to the final submission of the report and also implementation of the recommendations as suggested in the report. This person may be designated as Energy Manager. The energy manager shall report directly to the General Manager. The hierarchy is as shown below.



The energy manager shall be responsible for the coordination between different departments. Energy Manager shall have nominated representative of different departments under him for coordinating the activity related with the energy auditing.

Step 2:

The energy manager should ask the applications from few good energy-auditing firms with proven past record. They should be asked to submit the documents, like list of the firms where the energy audit has been carried out along with the

copies of work orders, list of the equipment they have, qualification of the staff, etc. Short listing shall be done on the basis the capability, resources and past experience. Parallel to this short-listing activity, tender documents shall be prepared and issued to the short-listed parties.

Step 3:

After that the energy auditing firms should be invited to have a discussion. The two most important aspects shall be discussed in detail.

- Scope of work
- General and commercial terms and conditions

Scope of work:

1. The details of plant and equipment to be covered for energy auditing shall be finalized in consultation with the energy auditor. Energy auditor should visit the plant and give his opinion where he feels that there is a scope of saving. Some of the equipment, generally a plant have are listed below.

- Motors
- Transformers
- Fluorescent Lamps
- Rectifiers
- Furnace
- Various types of electronic equipment
- Computers
- Pumps
- Compressors
- Boilers
- Electrical cables
- Electrical swirchgear

2. Methodology of collection of various data shall also be fixed.
3. List of measuring instruments that the energy auditor has and also list of equipment supposed to be provided by the firm shall be finalized. It is always preferred that on line type of measuring instruments for data recording with time and date should be deployed for effective and efficient data collection. Normally a good and reputed energy firm is equipped with all type of data recording instruments.
4. Data available with the plant personnel: The energy-auditing firm should be told the type of data that could be made available to them during the energy auditing.

General and commercial terms and conditions;

The second and important part is the general and commercial terms and conditions. It consists of the following.

1. Completion Time: A realistic completion time of the study should be fixed after having discussion with the energy auditor.
2. Number of persons to be engaged.
3. Working hours
4. Terms related labor laws if applicable.
5. Mode of payment and schedule of payment
6. Advance payment
7. Any other terms and condition like transportation, boarding and lodging facility etc. shall also be taken care of.
8. Any vague term should be avoided. For example, relation of certain percentage of payment with implementation of schemes as suggested in the report.

Step 5:

After finalization of scope of work and general and commercial terms and Conditions the short-listed parties may be asked to submit their prices. Since, the scope and terms and conditions have already been finalized and all the parties are at par in this regard, the work may be awarded to the party who has offered the lowest price.

Step 6:

After award of work the energy-auditing firm starts the work. They start collecting data, measuring different parameters, interacting with the plant personnel etc. The nominated representative from each discipline and the energy manager will coordinate various activities related with energy auditing. It is important that the plant personnel should not have the feeling that the energy auditing is faultfinding mission. It is the responsibility of the energy manager that he should build a confidence among the plant personnel so that there should not be any ill feeling towards the energy auditing.

Step 7:

Preparation of the report:

The report should be well organized and it should not look like a text book with many formulas and worked examples. It should be concise with appropriate numbers of Graphs and tables. The content of the report should be clear and it should be prepared in such a manner that even a non-technical person should be able to understand it. The small and large investment suggested for the energy saving shall be categorized separately.

Step 8:

Presentation of the report:

All the persons involved in the energy audit as well as operation and maintenance staff should participate in the interactive session during

presentation of report. Any doubt or clarification shall be obtained from the energy auditor.

Step 9:

After presentation of report and after incorporation of all the suggestions/clarifications that were raised/discussed during presentation of report, the final report shall be submitted.

Step 10:

Implementation:

In normal practice the role of energy auditor ends after submission of report. Since the implementation of report depends on the firm that how fast they do it. The recommendations that require not much investment should be implemented at the earliest. As far as adoption of new technology and installation of new equipment is concerned, it should be done carefully and certain points like the technology should be proven, the equipment should be reliable and from a reputed firm etc. shall be taken care of.

In my opinion the involvement of energy auditor during implementation is also necessary so that he could clarify any doubt which arises during the implementation stage. After implementation the results obtained should also be analyzed. For example, estimated reduction in electricity bill and actually obtained reduction. The results shall be submitted to the management for their appraisal.

Recommendations:

In my opinion if the above mentioned steps are followed, most of the barriers related with energy audit will be removed.

Finally, I recommend the following steps to improve the working relations with the auditors.

- Energy auditing should be taken as a joint effort of auditor and his team and plant personnel to make a further improvement in a system. It should not be taken as the energy auditor has come to correct certain wrong deeds

done by the plant personnel. As we all know that there is always some scope of improvement in any type of system since, nothing is perfect. Therefore energy auditing should be taken as a further improvement in already improved system.

- As mention earlier that support from management and plant personnel is very essential to make any energy auditing successful.
- A prior discussion between energy auditing firm and plant management is essential before taking up the energy auditing work to finalize the scope of work.
- The scope of work and general and commercial terms and conditions shall be very clear acceptable to both the parties.
- Role of plant personnel shall be predefined for proper coordination. Incentive schemes should be implemented to motivate and recognise the efforts of plant personnel in energy saving.
- Implementation of recommendations is important and energy auditor should be fully involved. There should be a clause in the work order related with involvement of energy auditor.
- Energy auditor should have a thorough and clear approach. He should be clear and confident about his recommendations. No thumb rules or short cuts should be applied. Every recommendation should be properly supported with theoretical calculations. He should have software for simulations etc.
- On line type measuring instruments with data storing capacity are necessary for energy auditing and energy auditor should have this because in many cases plant may not have such type of instruments.
- The report should be concise and charts and graphs should be included so that a non-technical person could also understand it. Techno-economical analysis should be done properly. If the pay back period is more than one

year the Internal Rate of Return or Net Present Value shall also be taken into account.

Conclusion:

Care should be taken to incorporate the energy efficiency measures during the design stage itself, because once the energy inefficient equipment is procured and installed, it becomes difficult to replace it before the completion of its expected life due to economical reasons. During evaluations of bids the life cycle energy cost should also be taken into account.

Equipment which are basically recommended for saving in energy, have sometimes indirect benefits also which is difficult to measure in monetary term. For example a soft starter or a variable speed drive besides saving energy also reduces the sudden jerks and heavy inrush of current during starting. This increases the life of the motor due to less mechanical and electrical stress.

We find that the present trend in industry is to adopt the new technology very fast. Most of the manufacturing and process industries go for atomization. Process optimizers, Programmable Logic Controllers, DCS etc. are being installed in most of the industries to increase the productivity, efficiency and of course reduction in energy consumption also takes place.

Lastly, energy auditing is not a one-time exercise it is a continuous process to make the system more and more energy efficient.