Training A New Energy Team… And Putting It To Work

A Case Study of What It Took Before New Rates And Plant Improvements Could Be Implemented

David Burrell, C.E.M.
Vice President, Operations
The Altus Group

In this particular plant, work on energy conservation actually began over six months before the new rate package was negotiated. Management chose a broad based effort to maximize the energy savings and a major effort has been made within the plant. This effort will continue over a period of two years.

ENERGY AWARENESS

Management Buy-In

This is extremely important. Programs cannot succeed unless there are one or more people who believe passionately in them and are willing to take a leadership role in making them happen. Top management at this plant made a decision to establish a cross-functional Energy Team and back it strongly. Their continuing support contributed heavily to the team's success.

Plan of Action

A plan of action was prepared for the first Energy Team meeting, at which management:

- Introduced outside support personnel to the team
- Demonstrated complete support for the team
- Provided the team with the authority and freedom to act
- Encouraged individual creativity and style from all members

Establishing the Energy Team

Our Energy Team Training Program consists of a series of sessions conducted on-site. All training materials for establishing a team, and materials for continuing evaluation exercises, were supplied for the team leader and members.

The goal was to provide training and leadership to guide the team and all plant employees in screening, identifying and implementing specific energy related projects. Key elements in the success of establishing and continuing team development are good preliminary planning, along with identifying the roles that team members and leaders will play. These should be addressed in the initial meetings.

The Energy Team at the Plant consists of an excellent blend of leaders from all levels and departments, represented predominantly by hourly workers. Since the beginning, all members of the Team have been strongly motivated. This is demonstrated by the way in which they continue to pass on ideas and enthusiasm to other plant personnel. Their message is *"Everyone **can** make a difference!"* In addition, a review of their Mission Statement which they developed further confirms their high motivation as they continue to set an excellent example of teamwork. The team's defined functions are:

- Education—Collect and disseminate information on energy conservation
- Collect Ideas—Be the central collection point for ideas on saving energy
- Evaluate Ideas—Decide which are to be implemented
- Review Ideas—Help determine incentive awards
- Implement the Ideas—Be responsible for implementing approved ideas

- Feedback on Results—Track and monitor results of submitted ideas

As this team evolves and assumes more responsibilities, our role as a consultant is to help it stay focused, continue to clarify its vision and values, provide technical assistance, maintain good communication throughout the plant, monitor successes, recognize and reward participants, and implement identified energy saving ideas.

Team Challenges

Establishing a new team is always a very exciting project. It also requires time and patience. Even with planning and organization, there are always challenges to be met in an environment of change, new freedoms, and innovation.

1) Working Together.

The Energy Team proved to be no different from most new teams. They brought a variety of attitudes into the group. Some were members of a team for the first time, and brought fresh ideas and an abundance of enthusiasm. Others had an attitude of "been there, done that, and it probably won't work." Most of them were skeptical of management's continuing support. Almost all of them needed guidance to learn to think like managers; to learn to trust themselves; and to trust each other.

2) Training Needs

In addition to learning to work together and function as a team, all the members had to be trained to become "energy aware" and to recognize energy savings opportunities in the plant. They were also charged with providing this information to other plant personnel and motivating their fellow employees to become actively involved in saving energy, while saving jobs!

3) Follow the Rules

As the Energy Team began to realize that their collective ideas really could make a difference, their enthusiasm sometimes caused frustration. As in all plants, procedures were required to get approval for funds to implement new projects. Once projects were identified as "money and energy savers" the Team sometimes had to be reminded to "follow the rules" and fill out detailed paperwork to get projects funded and implemented properly.

4) Staying Organized

Time schedules and job conflicts had to be addressed early-on. The Team's accomplishments to date are highly commendable, since all members are operating in a production-oriented environment. Each member has a very responsible full-time job in addition to being part of the Team. They continue to prioritize and set attainable goals.

ENERGY AWARENESS TRAINING

Conservation is largely a "people" item. A good Energy Awareness Program was developed and is being administered on a continuing basis to insure that utility upgrades are successful. Excellent results are being achieved by using good communication tools, supplying current information, encouraging active participation, and involving personnel at all levels in the plant.

Establishing the Need for Training

After meetings with top management and personnel at different levels in the plant, it was clear that an Energy Awareness Program would be beneficial. Some of the steps then taken included:

1) Set goals

A clear understanding of the impact of utilities on The Plant was needed by staff members in each department. They also needed to know how it related to their individual departments. An overview of the plant's utilities history was provided, to be used as a benchmark in setting goals for future utility reductions. To eliminate any feelings of threat because of change, and to eliminate misconceptions, we worked closely with all staff to assure a full awareness of the Energy Program.

2) Prepare statistics

Both management and plant personnel had little knowledge or understanding of the impact of utilities or the role of energy in the plant. Simple graphs, visuals and handouts relating to the program were used to educate at all levels.

3) Motivate

In conjunction with the Energy Team, personnel at all levels were

encouraged to actively participate in efficiently managing utilities in the plant, and to identify savings opportunities. For example, one day was designated as Energy Awareness Day, with outside speakers for each of the utilities. Primary emphasis was placed on residential energy conservation. All personnel were invited to participate.

4) Incentive Program

We coordinated closely with the Human Relations staff, to discuss incentive techniques that have been used successfully in other plants. A plan was developed to establish an expanded recognition and incentive program, designed specifically for submitted energy savings ideas.

5) Schedule Training Sessions

A training timetable was developed and training sessions scheduled for various subjects. To date, training has been given on the following selected subjects:

- Review of the Plant's Electric Bill Analysis
- Establishing an Energy Team
- Energy Awareness
- Electric Motor Management/Maintenance
- Compressed Air Systems
- Pumps and Pneumatic Systems
- Air Pollution Control Systems
- How to Identify Energy Savings Ideas
- How to Evaluate and Implement Ideas
- TQM (Total Quality Management)
- How to Prepare Project Authorization Requests

Techniques for Training

1) Set Early Goals

It takes time for a new team to begin to function effectively. Start the team off with initial goals that, without intimidating or overwhelming people, will force members out of their previously comfortable habit patterns and into cooperative efforts with a purpose. Select targets with an eye to the future. As a team experiences success, they develop confidence, which results in more successes.

2) Quality Speakers

Included in all our training sessions were notebooks, written materials, forms, posters, and handouts. More important, speakers who are experts in their fields made quality presentations to the Energy Team. This provided variety in the program and supplied valuable information for them to pass on to fellow workers.

3) Management Involvement

Much of the Energy Team's success and team spirit can be attributed to the strong support of management, and their willingness to empower it with the ability to make decisions. Open communication and regular progress reviews are encouraged to maintain this high level of success.

Expected Results

Some good ideas are being generated by the Energy Team. When completed, these improvements should reduce operating costs by $.30-$.80 per ton of product.

IN-PLANT SAVINGS PROJECTS

Identifying Projects

In order to get the maximum results, a complete plant-wide analysis was conducted. The plan of action included:

- A complete analysis of utility demand and energy use by all plant equipment
- Detailed audit of all utility rates and costs
- Identification of specific projects that can result from changes in operating procedures, maintenance items and capital investments

- Measurable goals that reflect the changes the Plant was willing to make

Understanding where utilities were being used and the amounts of energy that each consumes helped to identify those areas of greatest opportunity. We began by preparing an inventory of plant equipment, then divided the list into the following categories:

1) Electrical

- Determine Load: kW, horsepower, voltage, etc.
- Type of load: constant, intermittent, seasonal, etc. Operational hours: daily, weekly, annual
- Energy consumption: estimate in kWh

2) Natural gas and other fuels

- Input in MMBtuh
- Type of load: constant, intermittent, seasonable, etc. Operational hours: daily, weekly, annually
- Energy consumption: estimate in MMBtu

After the inventoried list was categorized, those pieces of equipment that had the following characteristics were identified:

- High demand peaks and low operating loads
- Excess capacity
- Inefficient system design
- Inefficient system application
- Excessive wear or high maintenance
- Waste streams

From this accumulated information, spreadsheets were developed to produce trend charts and load profiles. Additional information was gathered from in-plant submeter logs, operating logs, maintenance

records, etc. This helped to identify billing variations and more opportunities.

3) Utility Rates

Research is required to understand the exact costs of utilities within your plant. We began with a copy of the new contract. From the rate information we built a computer model that projects the cost components of the new rates. We have identified costs for the following items:

- **Electric demand**: kW, interruptible, real time pricing, buy-through rights, other

- **Electric energy**: kWh, interruptible, real time pricing, buy-through energy, other

- **Total**: cost per unit of product for all of the above components

Identifying the *cost per unit of product* is the key to producing positive bottom-line results. To obtain these results, a system will be developed that is simple and reliable. All members of the Team will be advised of these costs, and will clearly understand their importance in dealing with any proposed utility changes in rates or contracts.

4) Specific Projects

From the analysis of the above information, specific projects were selected—some by the Team and some by the consultant. Changes in operating procedures, maintenance procedures and upgrades in system efficiency have been identified. Comparisons of existing equipment to industry standards or later technology will help screen these projects. The most valuable part of the analysis is to assure that each team member has an accurate understanding of the costs and what might be done to improve the system. Operators and maintenance personnel will identify additional projects from this knowledge.

Project Evaluation

A detailed estimate of the cost to implement each project requires input from engineering, contractors, maintenance and suppliers. The expected savings from each project was estimated using information from the energy use and utility rate analysis.

After an initial evaluation was completed, a group discussion with operations, production, engineering, maintenance, finance and management staff was scheduled. If you don't include everyone who is directly impacted by changes, you run the risk of overlooking an important item in your final project recommendations.

Project Implementation

Once we had approval for implementation on a project, our work had just begun. Careful planning for each step of the project will help assure "on-time and under budget."

MEASUREMENT AND INFORMATION

A specific set of goals should be set at the beginning of any project and a method of measuring results should be determined. In some projects this requires installation of sensors and/or connection to the data highway to assure accurate and efficient collection of data for comparison. The closer to real time that data is gathered, compared and translated into usable information, the more valuable it becomes.

Using the initial historical information as a base, regular comparisons will be made between the "base" operating energy and other costs with the "after new rates and projects " operating energy and other costs. We will not forget to compare before and after unit costs of production, as well.

After each comparison, we will compile the results in a simple format and share them with all team members and departments. If you have a real time information technology system that is available to each operator and department supervisor, the results will show up much quicker on your bottom line.

Implementation of new rates and projects is not an easy task. The results will come slowly and only continue with regular effort by well informed and supported staff members. The important ingredients are: plan and organize well; set realistic and measurable goals for each project identified; and share the information with all of your team members. The new rates and a plant-wide energy program will then be integrated into the very fabric of the plant operation.

ABOUT THE AUTHOR

Dave Burrell, C.E.M., is a vice president with the Altus Group, Inc. His assignments involve a wide variety of clients (large industrials, commercial and institutional facilities.) His experiences include utility rate evaluations (electric, gas, water and alternative fuels), utility contract negotiations, utility audits, computer modeling of energy use, project management for energy conservation projects, monitoring system development and enhancements, development work with energy-related equipment, and evaluation and system upgrades for a variety of building systems.

His background includes 15 years in financial management of retail businesses, and experience as a manager and developer of real estate properties.

The Altus Group, 2407 N. Cooper Street, Arlington, TX 76006 (817)265-8822; FAX (817)795-8718