

Energy Management Program at the Atlanta Postal Distribution Center

MICHAEL BROWN, P.E.
SENIOR RESEARCH ENGINEER
GEORGIA TECH EEMC
SAVANNAH, GA

ASIF ANSARI, P.E.
ENVIRONMENTAL COORDINATOR
U.S. POSTAL SERVICE
ATLANTA, GA

ABSTRACT

The US Postal Service operates more than 38,000 post offices across the country and spends \$350 million annually on utilities (1). Driven by President Clinton's 1999 Executive Order that mandates a 35 percent reduction in federal energy consumption by 2010, the Postal Service is aggressively pursuing energy savings (2). One long-range approach initiated in the Atlanta area is the implementation of MSE 2000, a structured management system for energy. MSE 2000 emphasizes training, development of standard operating procedures, energy monitoring, and team-based problem solving.

Implementation activity at the Atlanta Bulk Mail Facility has included a gap analysis, selection of an implementation team, and initial training. During the first quarter of 2001, the energy manual, energy system work procedures and instructions, and energy team training will be completed. This will put the facility on target for formal registration of the management system in the third quarter of 2001. Improved operating and maintenance practices are expected to reduce energy usage by 5-10 percent, and the formal management system will help sustain the savings.

FACILITY BACKGROUND

The United States Postal Service (USPS) is essentially a delivery and distribution service. The Atlanta District of the Postal Service consists of approximately 350 Postal facilities in Metro Atlanta and North Georgia. The District has a workforce of over 13,000 employees, operates over 350 facilities, and maintains a fleet of 4,500 delivery vehicles.

The Atlanta Processing and Distribution Center (Atlanta P&DC) is responsible for all distribution operations in the city of Atlanta and outlying areas south of the city. This facility is approximately 450,000 square feet in size. The Atlanta P&DC is a 24-hour, 7-days a week operation. In FY 2000, energy costs at Atlanta P&DC totaled approximately \$1 million. This expenditure is a major cost item that could be substantially reduced through effective energy management.

With cost savings as a incentive, Atlanta District has begun implementation of an energy management program. The program goal is maximize Atlanta P&DC energy-efficiency and reduce energy costs. If energy management can be shown to be effective at this site, it can be replicated at other corresponding locations.

REASONS FOR MANAGING ENERGY

Regulatory Mandates

Since the mid-1970s, the President and Congress have promoted energy efficiency in federal agencies, explicitly including the Postal Service. Although the policy emphasis has varied over the past 20 years, each statute and Executive Order (EO) represents a milestone in implementing the federal government's energy conservation strategy. The federal facility energy goals can be summarized as follows:

- *To reduce energy use, measured in British thermal units (Btus) per gross square foot, in facilities by at least 20 percent between 1985 and the year 2000 (Energy Policy Act of 1992 (EPACT)).(3)*
- *To reduce Btus per square foot by 30 percent between 1985 and the year 2005 (EO 12902).*

Business Reasons

Facility energy management by the Postal Service is an important business strategy to reduce total operating expenses (TOE). The Postal Service cannot afford to waste energy, particularly in these times of limited funds and other resources. The inefficient use of energy adds to TOE and affects the Postal Service's ability to be competitive. The Postal Service spends about \$350 million annually for facility energy (not including vehicles). Most experts agree that an aggressive program to use energy more efficiently can significantly reduce energy costs

without any adverse impact on the postal mission. An overall reduction in energy use of 20 percent is not unreasonable and would result in a cost avoidance of about \$70 million per year.

POSTAL SERVICE ENERGY PROGRAM

The purpose of the Postal Service energy management program is to make its facilities as energy-efficient as possible and reduce total operating costs. To achieve these results, the Postal Service must develop an approach to reduce electricity and other utility costs; procure energy-efficient products; construct, operate, and maintain energy-efficient facilities; and promote efficient use of energy among Postal Service employees.

Given the strenuous energy demands that must be satisfied, the Postal Service has experimented with several programs. Initially, energy management was part of the environmental effort. The Environmental Management Program (EMP) located at USPS headquarters was the focal point for the coordination, development, and execution of corporate energy management plans. To advance their environment program, USPS has instituted ISO 14000, an Environment Management System at their sites. While ISO 14000 works well for the environmental issues, comprehensive energy management is difficult to achieve with it. To accomplish energy management goals while continuing their environmental program, the USPS decided to implement a separate, dedicated management system for energy, MSE 2000 (4).

ATLANTA P&DC AND MSE 2000

According to Postal Service policy:

“Energy management begins by establishing a set of energy reduction and cost savings goals to which top management is committed. The goals are followed by the creation of an organizational structure and the allocation of sufficient resources, usually beginning with the identification of key personnel at all levels of the organization. Once the new organizational structure (and the effective use of existing structures) is in place, an energy manager should implement a facility wide energy awareness program that makes all facility personnel the manager’s energy allies. At the same time, the Postal Service energy manager needs to identify the best energy and cost saving opportunities, typically by conducting an energy audit. While the manager is uncovering and ranking major energy projects, all personnel can involve themselves by saving energy using no-cost or low-

cost techniques and by discovering additional energy saving opportunities.”

MSE 2000 addresses all the Postal Service requirements for an energy management system at this facility. The Postal Service made the decision to go forward with MSE 2000 implementation during the late summer of 2000.

CURRENT STATUS OF MSE 2000 AT ATLANTA P&DC

MSE 2000 is a structured system for energy management providing command and control functions as well as technical direction. Implementation achievements are described below.

Gap Analysis

After deciding to institute MSE 2000, one of the first steps is a gap analysis. The purpose of a gap analysis is to compare existing management practice in a facility with the “ideal” presented in the management system standard. Gaps between the actual and ideal are documented and corrected during implementation.

A gap analysis is conducted by interviewing personnel responsible for functions addressed by the management system and asking if they follow procedures outlined in the standard. The completed gap analysis is useful in formulating an implementation plan.

The gap found elements of an existing management system for energy. The P&DC has energy policy and goals dictated by Executive Order from headquarters. Resources are provided for oversight and managing energy saving performance contracts (ESPC). An energy coordinator and MSE team were not designated before the decision to implement MSE 2000. Between the decision to implement and conducting the gap, a team was appointed. But the team composition, authority, and responsibilities are not, as yet, documented.

Energy management projects are used to address program goals. The Postal Service has a standardized performance spec for energy projects (RE 6) (5). Similarly, the Postal Service has a centralized energy procurement function. Data for monitoring energy usage is supplied from the District. Major energy management projects are measured for energy efficiency. The USPS maintains energy records at the District. Employee training needs are assessed and documented.

Table 1. Gap Analysis Results

Element Number	Element Description	Active	Not Active
4.1.1	Energy Manual		X
4.1.2	MSE Procedures		X
4.2.1	Policy and Goals	X	
4.2.2	Responsibility for Energy		X
4.2.3	Energy Coordinator	X	
4.2.4	Resources	X	
4.2.5	MSE Team	X	
4.2.6	Communication		X
4.2.7	Management Review		X
4.3	Energy Planning		X
4.4	Equipment & Process Control		X
4.5	Energy Management Projects	X	
4.6	Document Control		X
4.7	Energy Purchasing	X	
4.8	Monitoring & Measuring	X	
4.9	Corrective & Preventive Action		X
4.10	Recordkeeping	X	
4.11	Internal MSE Audits		X
4.12	Training	X	

Although elements of an energy management system are in place, a documented MSE 2000 system specific to the P&DC is not in place. No specific MSE procedures and guidelines are in place. Responsibility for energy management is spread across several functional areas but does not reside anywhere.

The gap discovered that there is no documented communication procedure for energy management information. Because energy data is maintained at the district level, no facility data showing progress at the local level is developed. With no progress data, management review of energy management at regular intervals is not conducted.

Evidence of documented energy planning procedures, save capital project planning, was not found. Procedures for equipment and process control such as operating conditions and maintenance practices were not available. Correcting management shortcomings through corrective and preventive action procedures was not found. Finally, checking management function through internal audits of the system is not performed. The results of the gap analysis are presented in Table 1.

MSE Team

Instituting a system of energy management at a facility requires selection of a team to coordinate the

management activities. The MSE 2000 standard stipulates team members must come from different functional areas. Suggested areas are engineering, maintenance, purchasing, and operations.

The energy team at Atlanta P&DC consists of the plant manager, area environmental engineer, maintenance manager, operations manager, and maintenance supervisor. The team satisfies the requirement of the standard that all functional areas affecting energy are included. A purchasing representative could not be included on the team because purchasing is consolidated at the level above the individual plant. Energy team meetings are scheduled on the 3rd Thursday of every month.

Energy Manual

The MSE 2000 standard requires preparation of an energy manual showing how a facility will address specific provisions of the standard. One of the initial decisions by the team was drafting an energy policy for the facility. The policy must satisfy existing Postal Service Headquarters energy program requirements, meet MSE 2000 Standard, and address local facility needs. The completed policy states:

Atlanta P&DC will reduce energy use by implementing an aggressive program for improving the facility energy efficiency, procuring energy-efficient products, examining and modifying

operating and maintenance practices, and providing awareness to the workforce. Atlanta P&DC is committed to meeting and exceeding all energy conservation laws and other executive mandates for energy reduction.

Following the energy policy statement, the manual contains twelve sections, one for each of the elements in the standard. Attachments include a plant organizational chart showing the location of the energy team and the USPS Headquarters energy management plan. The team is working on operating and maintenance procedures for major energy systems in the facility.

Training

General training related to the functioning of an MSE 2000 management system and specific training related to energy system operation and maintenance is ongoing or planned. As the facility readies for registration of the management system, training courses related to MSE 2000 are emphasized.

Energy Assessment

During March 2001, an energy assessment for the P&DC was conducted by Georgia Tech EEMC staff engineers. The purpose of the survey was to establish a baseline operating condition and develop ideas for future energy team project opportunities. While the facility usage is below the 1985 base, numerous opportunities for improvement that can be addressed by MSE 2000 were found.

Because the entire facility is cooled, air-conditioning was studied. The facility has 2-1000 ton chillers, 2-50hp constant volume chilled water pumps, and 19-30hp air handlers. The controls throughout the facility have been converted to DDC from pneumatic. During the conversion to DDC in multi-zone office areas, supply temperature control was switched to return and supply duct air temperature measurements. This provides no individual room control, and all room thermostats are connected.

In addition, inspection of outside air dampers revealed many disconnected damper actuators. Thus, economizer operation during moderate weather is impossible. Several flexible duct connectors on the air handler supply side were found to be leaking conditioned air. Inspection of the air handlers

disclosed water leaks, evidence of coil cracks. These problems can and should be addressed with comprehensive maintenance and operating procedures.

Another major energy user at the facility is for compressing air. The plant has 3 compressors, 2-100hp and 1-200hp. A survey of the system found the operating pressure to be 142 psig. Additionally, many abandoned pneumatic control lines were pressurized and leaking approximately 6 cfm. Electrical measurements on the compressors to show loading revealed that the compressors are not fully loaded and modulate most of the time. Increasing the load by shutting down an under loaded compressor and adding more storage can accrue significant savings.

Two areas surveyed briefly were building lighting and envelope. Dock light and truck spotlights were found to be on continuously. The facility has thirteen loading docks with high-speed rollup doors. During the survey, it was observed that the roll up doors are left open all the time during processing. This permits a significant amount of infiltration into the space.

MSE 2000 Opportunities

MSE 2000 can provide the structure and direction to address the problems discovered during the gap analysis and energy assessment. The energy team is working to institute policies that address the most pressing problems and opportunities. Currently, the team is focused on formalizing energy monitoring and measuring and drafting procedures and work instructions that cover operation and maintenance of energy systems.

Table 2 presents opportunities identified during the energy assessment. Finding energy saving opportunities is usually not a difficult task. The purpose of an energy management system is to institute practices that allow opportunities to be captured and sustained.

The energy team is actively evaluating procedures and work instructions that will define responsibility for identifying operational problems, repair and verification.

Table 2. Energy Management Opportunities found during Assessment

System: HVAC	
Operation	Maintenance
Lock temperature set-point	Repair outside air dampers Repair duct leaks Repair coil leaks
System: Air Compressor	
Lower air pressure Turn off extra compressor	Repair air leaks

Although the energy opportunities listed in Table 2 appear mundane, efficient operation at any facility necessitates well defined purchasing, maintenance, and operating practices. These must be in place before capital measures are ever considered because in most instances new capital projects entail more advanced operating and maintenance practice than traditional systems.

EXPECTED BENEFITS OF A COMPREHENSIVE ENERGY MANAGEMENT PROGRAM

The Postal Service energy management program will net both energy and non-energy related benefits. Expected benefits are listed below.

Cost savings

Well-planned investments and improvements in operating and maintenance practices will result in energy savings that more than pay back what is invested. As a result, the Postal Service will experience enhanced cash flow and earn a higher return on its capital base.

Employee well-being

Properly functioning HVAC or lighting systems can both save money and increase employee comfort, raising productivity as well as employee morale.

Reduced air emissions

The burning of fossil fuels results in air emissions including hydrocarbons, sulfur dioxide, carbon monoxide, particulate matter and various air toxins. Curbing Postal Service energy use will cut down on such emissions, helping the Service to reduce liability for such emissions, aiding communities to attain or maintain adherence to national ambient air quality standards and improving public health.

Reduced greenhouse gas emissions

The United States has agreed to voluntarily reduce its greenhouse gas emission by 30 percent relative to 1990 levels. Reduced fossil energy use by the Postal Service will help the U.S. to fulfill its voluntary commitments, and will help USPS to meet the EO 13123 greenhouse gas goals (2).

Enhanced Postal Service reputation

Companies that are perceived to be striving to reduce air emissions and greenhouse gases often receive favorable publicity and public recognition. Such enhanced reputation is a tool that Postal Service can effectively deploy in marketing efforts in an increasingly competitive world.

Contribute to reducing energy dependence and improved balance of trade

The U.S. is the world's leading importer of petroleum fuels and a large importer of natural gas. Reductions in petroleum or gas use will curb such imports and enhance the U.S. trade balance.

Enhanced development of new energy technologies

The Postal Service, because of the size of its purchases, can significantly encourage emerging renewable, *alternate* fuel and fuel-saving technologies.

Compliance with EPAct and Executive Order 13123

The Energy Policy Act of 1992 set certain energy saving goals for federal agencies, and EO 13123 has updated these. Through past energy investment and management the Postal Service has met the EPAct goal for FY2000. Implementation of MSE 2000 will allow them to achieve the goals of EO 13123.

References

1. United States Postal Service Annual Report, 1999, Washington, D.C.
2. "Greening Government through Energy Management," Executive Order 13123, Federal Register, Vol. 64, pg. 30851, GPO, 1999.
3. Energy Policy Act 1992, Public Law 102-486, Stat. 2776, 1992.
4. ANSI/MSE 2000 Standard Document, American National Standards Institute, Washington, 2000.
5. Facility Energy Management Guide-AS 558, US Postal Service, Washington, September 1998.