

Executive Summary

The energy crisis confronting northwestern United States, and its foreshadowing of challenges the facilities and property management industry may face in the near future, calls for property management teams to implement innovative measures to improve their building's energy efficiency and reduce energy bills.

The need to develop an Energy Management Conservation Program is imperative. While energy conservation measures implemented without an overall plan reduce energy use and costs, they do so with unequal impact. Another problem associated with not having an Energy Management Conservation Plan is missed opportunities. It also leads to uncoordinated and often counterproductive efforts. The lack of a plan places the facility management team in a reactive rather than proactive mode. A notable example is the response to deregulation. An Energy Management Conservation Program is a roadmap to efficiency. The plan identifies where the facility is currently in terms of energy efficiency, where the facility needs to be, and how it is going to get there. The plan must be flexible and be able to respond quickly to changes in the market place.

The benefits of a well executed Energy Management Conservation Program are numerous:

- Energy efficiency enhances the asset value of a property. According to the Environmental Protection Agency, recent studies have demonstrated for every dollar invested in energy efficiency, as much as \$3 in increased asset value results.
- Greater energy efficiency means a smaller energy bill. For some organizations reduced energy costs are incentive enough to pursue energy efficient technologies and strategies.
- Energy efficient buildings are attracting a growing number of savvy tenants providing the owners/operators a market advantage.
- Lenders and investors look for energy efficiency in properties, and some have begun to recognize energy efficiency as a physical asset, much like marble flooring.
- Wall Street is becoming interested in how properties are managing energy use. This directly affects governmental bond ratings. Energy costs are a benchmark Wall Street examines closely.
- Energy efficiency is also helping to keep buildings fully occupied. Tenants, taxpayers, and public officials are sensitive to environmental issues and saving natural resources such as saving acres of trees and the reduction of tons of sulfur and carbon dioxides.
- Energy efficient buildings are more comfortable and easier to work in.
- Some insurance companies are considering premium reductions to buildings demonstrating energy efficiency. A building that manages its energy well and efficiently probably maintains their equipment well, is careful about slips and falls, and is a good caretaker. This reduces risk to the insurer.
- A staff that is effectively trained is more productive and an asset to the organization. A sense of pride and accomplishment develops.

- Taxpayers and public officials are pleased to see tax dollars are being managed wisely.
- Effectively managed properties are now viewed as an asset, instead of a cost center. This enhances the property management profession.
- Our Energy Conservation Management Program demonstrates that the building is well managed, cost effective, and of high quality.

James R. Thompson Center Energy Management Conservation Program

In 1999, a new management team was hired to manage the operations of the James R. Thompson Center. Our team, looked at the bottom line costs of operating the building including an analysis of building systems and energy bills. The analysis provided us with justification in hiring an Energy Manager to oversee the operations of the mechanical systems.

The Energy Manager reviewed the entire building operation and utility plan. Many problems were discovered. The Building Automation System (BAS) was underutilized and in disrepair. Most equipment was operated in "hand" instead of "automatic" mode. Defective sensors produced continual "alarm" signals, which were generally ignored by the operators.

There was no specific equipment operation program. Many fans and pumps were run 24 hours a day, 7 days a week. Heating and cooling systems were not set back on evenings or weekends. Boilers and large pumps were operated even though smaller, more efficient, equipment existed.

Variable air volume (VAV) systems were poorly maintained or inoperable. Dampers that did not modulate, were set in a fixed position.

Access to the computer controlled lighting system was compromised. Unauthorized access caused whole floors to be illuminated in situations where a single sector was needed. The entire lighting program required scrutiny for efficient operation.

The absence of staff training was a major problem. Improperly operated equipment and systems was the accepted practice. Proposed new strategies were challenged. "It won't work" and, "It's always been done this way" were standard responses. A thorough, methodical, and well thought out plan was needed.

First, we used best practices by contacting the local electrical utility provider (Commonwealth Edison) and similar, Class A properties. This was done in order for an "apples to apples" comparison. The Energy Manager and utility representatives reviewed all incoming services, meters, and rate structures for accuracy and to identify trends.

Second, a Central Dispatch Center was established. The BAS and lighting control system are closely monitored. Tenant service requests are also received here and responded to promptly.

Third, an equipment operation plan was initiated. "Tuning up" otherwise referred to as commissioning ensures design intent and outlines procedures. Major systems are brought on line during off-peak hours to avoid high energy costs. Ice making occurs throughout the night to keep high daytime demand charges under control. Equipment is operated in order to maintain a proper environment.

Fourth, the BAS was repaired and enhanced. Faulty sensors were replaced. Valve actuators and damper controls were repaired. Temperature initiated programs were created to operate vestibule heaters.

Time-of-day programs based on occupancy were developed to minimize equipment run times. The BAS now controls and monitors telephone and electrical closet, garage, and elevator exhaust fans.

A maintenance crew is testing, repairing, and recalibrating VAV's and thermostats throughout the building. As each zone is completed, tenant comfort and system efficiency improves.

Further energy savings were realized with the regular cleaning of lighting fixtures, reducing the loss of light output in half.

The lighting control system was reprogrammed. Entire floors are shutdown during unoccupied periods. Tenants requesting after hours access are given minimal sector illumination.

Fifth, the Energy Manager has implemented a periodic staff training program. Mechanics are now learning theories of thermodynamics and air conditioning to support additional training in chiller, thermal ice storage, and boiler operations.

The BAS activity log and mechanic task sheets are reviewed daily with each employee. Any unusual equipment operation or procedure not conforming to the operations guidelines are discussed and resolved. This process assures compliance with the program's goals and holds the engineers accountable.

Sixth, the Energy Manager also plays a vital role in planning future projects to maintain and improve operations while continuing to reduce energy costs. Replacement of the two, 12,000 volt, 500 horsepower electric boilers with natural gas-fired units has been approved and is in design. The new system will improve efficiency, lower maintenance costs, and increase dependability.

Additional lighting cost savings are anticipated by installing power load reduction panels. These will allow for reduced electrical lighting levels when natural light illuminates the area.

Occupancy sensors are under consideration for lighting control in telephone and electrical closets and mechanical areas. Outside lighting and parking garage lighting levels will be reduced at late hours. Additional fixture and ballast retrofits are planned.

Long range options include utilizing variable speed fan drives, replacing the BAS with a Direct Digital Control system, a heat mirror to control daylight and temperature, and glazing options including tints and films.

Savings Calculations

The Property Management Team of the James R. Thompson Center is committed to saving money and natural resources through energy conservation. We have been successful in this endeavor because of the elements identified in our facilities energy management plan. Because of this, the savings realized are significant.

In Fiscal Year 1999, the James R. Thompson Center consumed 33,310,611 total kilowatt hours (kWh) and \$2,215,530.26 was spent on electrical costs. With the hiring of a new management team in Fiscal Year 2000, the total kWh used per year was drastically reduced to 18,129,396 kWh. Even though the utility rates during this period (\$0.122 per kWh) nearly doubled from Fiscal Year 99 (\$0.067 per kWh), the total electrical costs of \$2,206,563.54, was still lower than the previous year.

As we approach the close of Fiscal Year 2001, the efforts of the management team are most noticeable. As of May 1, 2001, the James R. Thompson Center consumed a total of 11,925,640 kWh and \$1,495,704.13 was spent on electrical costs. It is estimated that we will realize total savings of more than \$300,000.00 from the previous fiscal year – even with increased costs per kWh.

Fiscal Years	Total kWh Usage	Total Electric Cost	Electric Cost per KWH
Total FY99	33,310,611	2,215,530.26	0.067
Total FY00	18,129,396	2,206,563.54	0.122
Total FY01 as of 5/01/01	11,925,640	1,495,704.13	0.139

Quantitative Benefits

The benefits realized by the James R. Thompson Center's Energy Conservation Program are numerous. Due to the tremendous savings realized through the program, funds are available for other state programs and initiatives. The citizens of Illinois have benefited from our conservation efforts as well. We are extremely proud of the fact that our department did not have to request additional tax dollars from the State Legislature to cover increasing utility costs. Moreover, the dollars we saved due to reduced electrical costs have been used to offset the doubling of natural gas costs at other State facilities.

Our conservation efforts have also benefited the environment. In Fiscal Year 1999, we used 4,201,000 cubic feet of water. In Fiscal Year 2000, we reduced our usage to 2,867,000 cubic feet. Partially due these efforts, the James R. Thompson Center has received a Competency in Institutional Water Treatment Award four of the last five years.

Further, our reputation and level of customer service has improved. Our service recipients, agency tenants, now work in an efficiently run office building with high levels of air quality, appropriate temperatures, and adequate lighting. Our customer satisfaction surveys results show that their needs are being met, that they are happy with the results, and are aware of the changes we have made. The Energy Conservation Program reflects positively on the facility, the Department of Central Management Services, and the State of Illinois.

Relevancy of Use by Local, State, and Federal Entities

The James R. Thompson Center's Energy Management Conservation Program is relevant to every local, state, and federal government facility. Our program allows us to develop "allied partners" committed to energy conservation.

Now more than ever, facility management teams are charged with finding ways to reduce operating costs. Utility costs are dynamic, and the single largest cost that we encounter. With the current energy crisis, facility management teams must examine their utility expenses and implement measures to reduce them.

The James R. Thompson Center's Energy Management Conservation Program, including the hiring of a certified Energy Manager, serves as a model for local, state, and federal government facilities to follow. Management teams now have a proven model to benchmark against as well as adopt "best practices." Even if the facilities are not of the same size or magnitude of the Thompson Center, ensuring an "apples to apples comparison," facilities can benefit by implementing an equipment operation and maintenance program, investing in an Automated Building System, regular staff training and review, and developing a plan to incorporate energy conservation measures such as occupancy sensors, power load reduction panels, and the purchase of variable speed equipment.

With the implementation of an Energy Management Conservation Program, local, state, and federal government facilities will demonstrate that energy conservation is taken seriously, not just talked about. The resulting savings will encourage every citizen to make energy conservation a priority in their daily lives.