The Business of Running Buildings: Whose Business Is It?

Tracy Narel, U.S. Environmental Protection Agency
Tudi Haasl, Portland Energy Conservation, Inc.

Whose business is it to run buildings efficiently? *And*, should more of us be making it our business? This paper focuses on evaluating recent developments that are bringing about greater interest in running buildings efficiently. These trends are likely to result in expanded building management services, specifically the tune up of existing buildings and preventive maintenance opportunities.

The paper begins with a review of several of the forces that are making building operations and maintenance an emerging priority. We then proceed to describe how O&M requirements are currently provided and how they may be provided in the future.

With an eye toward the sellers of O&M services for existing commercial and institutional buildings, we discuss who is selling the services and the key attributes of the particular service. With respect to building owners and operators who require these services, we review the portfolio of opportunities available for meeting these needs.

Finally we raise the possibility that a growing set of pressures is expanding the demand for efficient, safe and healthy buildings and creating new business opportunities.

Introduction

Building Operations and Maintenance: An Emerging Priority for Energy Efficiency

There is a growing consensus among industry professionals that significant energy is wasted in commercial buildings because of the inadequate operation and maintenance (O&M) of building systems (National Conference on Building Commissioning 1993, 1994). This fact has caught the attention of government program managers, utilities, and energy service providers.

The Economic Drivers

With the commercial real estate market downturn, many facility managers had to do more with less budget. In many cases, O&M budgets were cut and preventive maintenance was deferred. Ironically, these same continuing tight economic circumstances may begin to move things in the reverse direction because good operation and maintenance is a no-cost or low-cost measure that can positively affect the bottom line (Herzog and La Vine 1992, Owens 1994). In spite of this, little change in O&M practices will occur unless these benefits are repeatedly cast in clear benefit/cost terms, and are developed as part of comprehensive energy management strategies.

Conversations with most building owners and managers demonstrate an understanding of variations of the "pay now or pay later" concept, but experience shows that paying later is preferable. All too frequently (particularly in small facilities), the attitude is "if I save money now by not doing operations and maintenance, maybe I will simply save some money." The short-run benefit of avoided up-front costs is more attractive than the less clear costs of diminished performance, or possible early failure of equipment.

This predominately short-term focus is encouraged by other factors. Most building operators do not actually know how consumptive their buildings are relative to regional or national averages. Even in most buildings with energy management systems, the systems are not configured to provide operators with short-term feedback on key energy consumption patterns and indicators. The potential of EMS is vastly under-used. Finally, tenants are shielded by the cost implications of their energy use

from highly consumptive demands either by full-service leases or ignorance.

In times of tight economic circumstances, investments in productive O&M practices should become an attractive offering in the portfolio of profitable energy conservation measure (ECM) opportunities. Improved O&M does not substitute for other capital intensive ECMs such as improved building envelope, or efficient heating, ventilation, and air conditioning (HVAC) retrofit investments. Operation and maintenance is an element of the energy-efficiency investment that is necessary to ensure that other ECM investments deliver benefits over their expected lifetime. We expect that increasing attention will be paid to O&M as pressures build to squeeze the maximum value out of energy-efficiency investments.

Productive O&M practices should *not* be viewed as a possible means of avoiding or delaying energy efficiency capital retrofit investments. Traditionally, preventive maintenance (PM) is viewed as an attractive way to prolong equipment life. However, in many cases, from the perspective of energy-efficiency and environmental protection, prolonging the life of older, inefficient equipment is not desirable. Program managers in government and utilities need to be mindful of this fact. Investments in PM should only be made to the extent they are profitable when analyzed as part of a comprehensive strategy that also considers early retirement of equipment that may have reached the end of its economic life, even if it is still functioning.

A New Policy Priority

Building operations, maintenance and commissioning were explicitly mentioned in President Clinton's Climate Change Action Plan release in October 1993. In addition to this new mandate, O&M and commissioning were already being given elevated status in new Federal initiatives such as the Energy Star Buildings Program of the U.S. Environmental Protection Agency (EPA) and the Federal Energy Management Program of the U.S. Department of Energy (DOE). Ongoing efforts are also underway in the facility management divisions of several other major agencies including several branches of the U.S. armed forces. These federal efforts were given new impetus by the Executive Order on energy efficiency and water conservation at federal facilities, issued on March 8, 1994. This Order called for "comprehensive facility audits" to include "appropriate energy and water conservation maintenance and operation procedures."

The White House Conference on Global Climate Change (June 1993), listed building operation as an important commercial sector efficiency option. Specific options are included in the design of both the Energy Star Buildings and Rebuild America programs, two programs designed to promote comprehensive, energy-efficient commercial building retrofits. In addition, they were explicitly discussed in the DOE-lead actions relating to cost-shared demonstrations, as well as information and training programs. These DOE programs are designed to build the market infrastructure to support efficient operation practices by providing training and informational resources to building owners and managers.

The DOE demonstrations will explicitly consider complementary non-hardware innovations. The DOE information and training initiative is designed to "work with industry representatives to design a certification process to encourage facilities managers to adopt efficient building operation and maintenance practices," and to "establish a project on savings available through improved commissioning practices" (White House 1993). Each of these programs is evidence of the new emphasis given to operation and maintenance at the federal policy level.

The EPA Energy Star Buildings Program is one of several specific examples of how this new emphasis has been incorporated in recent program design. The Energy Star Buildings Program is a voluntary energy-efficiency program for U.S. commercial buildings. Using the established track record and customer base of the Green Lights program, this program focuses on the profitable investment opportunities that are available in most commercial buildings, using proven technologies.

The basis of the Energy Star Buildings Program is a five-stage upgrade strategy affecting all aspects of building energy use. The second of these five stages is a building tune up comprised of a selective package of operation and maintenance activities resulting in modifications to equipment and procedures. Many of the activities are low-cost or no-cost and produce immediate energy savings. The recommended tune-up strategy includes implementation of a solid preventive maintenance program and an operator training program. As a package, this strategy not only provides direct energy savings, but also lays the foundation for equipment retrofit investments pursued in other program stages.

In addition to the several federal energy efficiency initiatives, the Indoor Air Division of the U.S. Environmental Protection Agency is catalyzing the creation of the Building Air Quality Alliance. This Alliance is a voluntary partnership program being developed through a collaborative effort between leaders in the indoor air quality community and the EPA. The goal of this Alliance is to achieve substantive improvement in IAQ in the nation's buildings by providing both guidance and incentives to implement good IAQ management practices.

Current Operation and Maintenance

Broadly speaking, operation and maintenance in today's commercial buildings is accomplished in one of three ways: by in-house O&M staff, by outside contractors, or by a combination of both. In-house operation and maintenance programs generally have one of three configurations:

- An O&M staff dedicated to a particular site
- An O&M staff responsible for several buildings who travel from building to building depending on need. This is often the case for large corporate retail chains, county and city governments, and some school districts
- A hybrid system, where some staff float between sites (mainly technical staff such as the refrigeration or HVAC technicians) and one or two staff are dedicated to each site.

Frequently an owner may augment in-house staff by hiring service contractors. Some owners choose to outsource all the O&M work. There are several types of outside contractors that an owner may hire to accomplish this. The following lists outside O&M service providers by type:

- Specialized service contractors
- Maintenance service contractors
- Full service contracting firms
- Maintenance management firms
- Energy service companies

The services these firms provide are differentiated in several ways. One important dimension to consider in selecting contractors is the breadth of the services they provide and the economic importance that the O&M service component plays in their business.

The specialized service contractors provide the narrowest scope of O&M services.

These contractors generally sell, install, repair, and service a particular type of equipment such as refrigeration or water treatment systems. Their O&M service is limited to the specific technology they sell and may be far less important as a bottom-line money-maker than the sales of equipment.

Maintenance service contractors offer a broader range of O&M services (including installation and repair) but generally do not sell equipment. However, they may provide janitorial services as a major share of their business. These firms generally have technicians who are responsible for several different buildings. Profits for these firms may depend mainly on the amount or size of the O&M service contracts they sell.

The full service mechanical contractors may perform O&M on all types of mechanical systems including controls. They also design and install systems and often distribute manufacturers' HVAC equipment and control systems. Because of the variety of services these contractors perform it is not immediately clear, without extensive further investigation, what percentage of their business is obtained from the O&M service contracts.

Maintenance management firms usually provide dedicated on-site staff. The maintenance management firm might provide only key management staff, such as the facility manager and chief operating engineer, or they might provide these key personnel plus all of the technicians, including carpenters and painters. These firms capture the outsourcing business of owners who determine that such an approach is less expensive than having their own in-house staff. Maintenance management firms base their entire business on O&M service. An emerging motivation to install this type of arrangement is the amount of savings the contractor generates for the owner from improved O&M practices.

Energy service companies (ESCO) are becoming key players in the O&M market along with the ESCO divisions of major energy management control system (EMCS) manufacturers. The ESCOs share a common characteristic with some of the service contractors already discussed: a majority of their O&M services are linked to an initial investment in capital equipment. This investment may be an EMCS sold by the ESCO's parent company or a comprehensive commercial building retrofit package. They differ from other service contractors because their equipment is always linked to energy efficiency. Regardless, capital equipment is really the bread and butter side of the business. Soft, O&M service-only contracts are clearly a second-best arrangement for the ESCOs; one that many do not actively market.

An important priority for understanding the market share captured by each of these vendors is development of a baseline market analysis. A project to accomplish this is being funded by the U.S. Environmental Protection Agency and the U.S. Department of Energy.

In a tightening economic environment along with evolving complexity of building systems and increased demand for safety and health, proper O&M that focuses on energy efficiency and indoor air quality appears to be an emerging marketing attribute for all players to consider.

New Directions for O&M Services

As we move into the mid-1990's, new directions are emerging with respect to how energy-related O&M services will be bought and sold. Maintaining facility operation, and its linkage to higher occupancy rates and profitable operation of the building, does not require much explanation. Properly operating air conditioning systems are no longer a privilege, but a necessity. Furthermore, properly functioning air handling systems are crucial in buildings where indoor environments are directly linked to occupant safety and staff productivity.

Developing In-House Resources

Owners and operators who continue to perform maintenance using in-house staff (predominantly larger, owner-occupied buildings), may take on new program configurations and place greater emphasis on training and employee incentives. The success of an in-house O&M program hinges on management's commitment to directly develop and reward the personnel delivering these services. A complete training program needs to include:

- general operation and maintenance training that establishes the procedures and approach to a comprehensive O&M plan including energy management and preventive maintenance
- specific operation and maintenance training that focuses on a building's complex equipment and systems, such as the energy management control system
- training in the use of O&M manuals
- instruction in the use of EMCS and computerized systems to diagnose O&M problems.

Growing Third-Party Services

Demand for third party services, such as those offered by maintenance management firms, can be expected to grow. In addition to those smaller buildings which traditionally contract out for operation and maintenance, an increasing number of large facilities are expected to turn to outside firms for the cost-effective delivery of a broad range of services. Several reasons are typically given for the outsourcing decision (Kanemasu 1993):

- Fits into broad corporate strategy
- Allows the corporation to focus on its core competencies
- Provides greater flexibility because the service contractor can better adjust to meet changing facility management needs
- Reduces maintenance cost
- Results in richer services to building occupants

In addition, third-party providers are likely to become more sophisticated in delivering (selling) their services. We should expect to see a greater emphasis put on "bottom-line" appeal in the selling of operation and maintenance services (Klammt 1993). To be highly successful, O&M service vendors will have to define and sell their product on the basis of benefits to the customer. The emphasis in selling needs to be on benefits, not just technical features.

Increasing the energy-efficiency of operations will be a key element of this appeal. The energy reducing strategies implemented by a maintenance management firm will save the building owner money that can be used to pay for such services. The logical extension of this could be an arrangement where a portion of the management company's profits are tied to energy saving performance. This would be a direct carryover into a new market sector from the shared savings/performance contracts that form the basis of most ESCO contracts today.

Conclusion

Several converging factors might form the critical mass of a growing business opportunity in the operations and maintenance of buildings. These include:

- Indoor air quality
- Americans with Disabilities Act
- Phase-out of CFC refrigerants
- Desire to reduce operating costs (reduced energy costs are a highly profitable candidate)
- Desire to be environmentally responsible.

Today these represent additional responsibilities to already-stretched operation and maintenance budgets. Yet, very few businesses have really stepped in to offer relief to the building owners' or operators' headaches by offering a truly comprehensive service. We may be looking at a new business opportunity offering a new type of full-service service-possibly a total environmental service company.

There are already new firms showing up in the marketplace. One firm in the Washington, D.C. area is offering clients "one stop shopping" for environmental and Disability Act-related consulting services. For the moment, this firm and similar firms are limiting their business to problem diagnosis, pulling up one step short of offering true one-stop environmental service to actually operate buildings.

Making a total environmental service company profitable will not be easy. Nonetheless, current conditions and trends are placing building owners and managers in a position where enhanced management services would be welcomed. It may not be time yet. But, when the time comes, energy-efficiency will be one of the cornerstones on which the opportunity is built.

References

Herzog/Wheeler & Associates, Lance LaVine and Bob Lorenzen. 1991. *Office Building Operations Case Study Reports.* Minnesota Building Research Center, Minneapolis, MN.

Herzog, Peter, and Lance LaVine. 1992. "Identification and Quantification of the Impact of Improper Operation of Midsize Minnesota Office Buildings on Energy Use: A Seven Building Case Study." *Proceedings from the 1992 ACEEE Summer Study on Energy Efficiency in Buildings,* Volume 3, pp. 121-129. American Council for an Energy Efficient Economy, Washington, D.C.

Kanemasu, Lance and Bernie Van Der Hoeven. 1993. "Outsourcing." *Proceedings from the 1993 Research Focus Group on Best Practices in Facility Management,* pp. 177-186. International Facility Management Association, Houston, TX.

Klammt, Fred. 1993. "Asset Management . . . an O & M Perspective." *Proceedings from the 1993 Research Focus Group on Best Practices in Facility Management,* pp. 169-175. International Facility Management Association, Houston, TX.

National Conference on Building Commissioning 1993, 1994. *Proceedings.* Portland Energy Conservation, Inc., Portland, OR.

Owens, George R. 1994. "The Energy Task Force: The Rouse Company's O&M Energy Project - A Case Study. " *Proceedings from the Second National Conference on Building Commissioning.* Portland Energy Conservation, Inc., Portland, OR.

White House Office on Environmental Policy 1993. *The Climate Change Action Plan.* Washington, D.C.