The Past, Present, and Future of Resource Efficiency Managers In the Federal Sector

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ABSTRACT

Resource efficiency managers (REMs) are a relatively new and important tool available to federal sites seeking to realize energy efficiency. REMs are individuals skilled in the discipline of energy management that work on site to support energy managers in realizing energy and energy cost savings. The REM concept has been successfully demonstrated many times over, with an average savings-to-investment ratio of $3.4-to-$1 realized. These successes have helped grow the number of federal sites contracting REM services to over 40, with this number increasing annually. And with the Energy Policy Act of 2005 (EPAct 2005) establishing even more aggressive federal energy efficiency goals and requirements, REMs can offer agencies and sites the added technical expertise needed for them to succeed.

INTRODUCTION TO RESOURCE EFFICIENCY MANAGERS

The REM concept is relatively new. REMs are contracted to reside at federal sites and identify and realize resource savings. While "resources" is a general term and refers to energy, water, waste products, pollution prevention, etc., the primary focus is on energy efficiency because this area tends to offer the greatest opportunity for cost savings. Energy savings opportunities can be realized in many ways such as awareness programs, low-cost/no-cost operations and maintenance

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improvements, developing metering and sub-metering plans, analyzing metered data, identifying and managing retrofit projects, utility bill reviews, and utility rate reviews.

Because REMs are resident at the client site, they can work more closely with the site energy manager and facilities staff to identify opportunities and realize savings. Contracts are typically one year, with annual renewal options, and work performance (progress toward goals) is assessed at least annually. Contracts are fixed price and not based on a share of the savings realized.

REMs are not intended to be substitutes for energy managers. Instead, the most effective REMs compliment the site energy manager and the rest of the facilities staff.

More detailed descriptions of REMs and related background information are available at the websites and in the documents listed at the end of this article.

BRIEF HISTORY OF FEDERAL ENERGY MANAGEMENT

On July 20, 1977, Executive Order 12003, Relating to Energy Policy and Conservation, established the first mandate for federal agencies to reduce energy use in buildings. Since then, there have been several more executive orders and laws mandating and legislating additional reductions in federal building energy use. Today, EPAct 2005 requires federal agencies to reduce building energy use per square foot by 2 percent per year in fiscal years 2006 through 2015, compared to the 2003 baseline.

A number of approaches to improve federal energy efficiency have been applied over the years. Initially, energy awareness campaigns aimed at building occupant behaviors such as turning off unneeded lights and appliances and adjusting thermostats to reduce heating and/or cooling energy use were heavily promoted. As the energy saving opportunities became better understood, funding for retrofit projects became available, first from agency appropriations and more recently in the form of alternative financing. And even more recently, low-cost/no-cost activities (primarily improved operations and maintenance) have assumed a larger role in the energy efficiency playbook.

Over the last 29 years, there are a few things we have learned along the way. First, there have been and, more importantly, there

continue to be significant opportunities to improve energy efficiency in federal buildings. Second, there are a number of approaches available to realize energy efficiencies. Third, energy efficiency at a given facility may not be assigned a high priority (and to be fair, we need to recognize that facility managers often deal with a far-reaching and complex range of issues).

THE HISTORY OF REMs IN FEDERAL ENERGY MANAGEMENT

The REM approach was pioneered in Oregon in 1993 when a group of utilities funded six school districts to pilot on-site conservation managers. This effort was largely successful because the savings realized exceeded program costs by several hundred percent. While Washington State University (WSU) began work to promote the same concept the following year, it wasn't until 1996 that the first federally funded REM was placed at the Fort Lewis Army installation.

The Fort Lewis REM proved to be hugely successful in several ways. Because the savings realized exceeded the costs by more than 3 to 1, the Fort Lewis pilot was able to demonstrate the significant potential benefits offered by REMs to federal sites. As a result, the Federal Energy Management Program (FEMP) made available funding to seed REMs at additional federal sites. Also, other organizations entered into the federal REM effort to provide funding and contracting support. Since 1999, the number of federal sites contracting for REM services has grown steadily as a result of the accompanying benefits of energy and cost savings. Along with the growth in federal REM contracts is the increasing number of REM services providers.

RESULTS TO DATE

At last count, there were approximately 40 known federal sites with REMs. These sites represent the following services and agencies:

- Navy
- Army
- Air Force
- Marine Corps

- National Oceanic &Atmospheric Administration
- U.S. Coast Guard
- U.S. Postal Service
- Department of Energy
- General Services Administration (GSA)

There is not an official census mechanism or centralized reporting requirement for federal sector REMs; however, the most recent effort to summarize program benefits yielded the following*:

- The average cost for a full-time REM is $170,000 per year.

- Credited annual savings of $11.2 million.

- Net project investments (project cost minus grants and buydowns) of $52.2 million.

- An overall savings-to-cost ratio of $3.4-to-$1 based on 19.5 contracted positions at $170,000 per year with a resulting annual cost savings of $11.2 million.

Results at the site level are equally impressive:

- At Marine Corps Base Camp Pendleton, the dedicated site energy manager and the full-time REM teamed up to achieve a 44 percent reduction in energy use per square foot compared to the 1985 baseline. Actions included retrofit projects, various applications of photovoltaics, and installation and upgrading master utility meters with plans to sub-meter 85 percent of the buildings for electric and natural gas use [1].

- The first 3 years of the REM program at Fort Polk, LA, has yielded a savings-to-cost ratio of $8-to-$1 through measures such as correcting accounting problems associated with a major energy savings performance contract (with a resulting savings of over $2 million). The REM was also the primary in-house source of technical expertise for reconnecting the fort to the electrical grid following Hurricane Rita.

*Data provided voluntarily for 19.5 contracted positions representing 22 sites.

- A number of federal sites with REMs have been recognized for their outstanding energy management effort, including three 2005 Presidential Awards for Leadership in Federal Energy Management.

These successes have been achieved through a variety of strategies and approaches:

- Various program strategies:
  - — Awareness programs
  - — Operations and maintenance
  - — Procurement programs
  - — Retrofit projects
  - — Utility bill reviews

- Applications of technologies including:
  - — Boiler and chiller retrofits
  - — Compressed air system upgrades
  - — Controls replacements and upgrades
  - — Interior and exterior lighting – T-8 lamps and electronic ballasts, compact fluorescents, HIDs and LEDs
  - — Metering and sub-metering
  - — Renewable technologies (e.g. photovoltaics)

- Project financing through state grants identified by REMs and alternative financing.

STATUS OF REMs IN THE FEDERAL SECTOR

FEMP's operations and maintenance (O&M) program provides limited funding to support REM outreach efforts for federal facilities by further promoting REMs as a way to address the EPAct 2005 goals and improve the performance of buildings and their systems. These funds are also used to assist sites in developing REM contract statements of work. The basis for this support is that REMs should have an interest in identifying and addressing O&M-oriented energy conservation measures (i.e., verifying building and equipment operating schedules, temperature settings, sensor calibrations, etc.) because these low-cost/no-cost measures can have tremendous energy and costs savings that

are, in turn, reported as REM accomplishments. REMs should also be able to help in the development of metering plans, their deployment, and data analysis. Other energy and cost savings opportunities such as utility bill reviews, energy awareness programs, energy efficient project identification, new building and repair project design reviews, etc., can also pursued.

The popularity of REMs in the federal sector is growing on both the supply and demand sides. On the supply side, REMs are available through a variety of sources including the GSA Federal Supply Service (FSS) Energy Services Schedule 871 II category 201*. Because the contractors listed on the GSA schedule provide a range of energy support services, an informal survey of these contractors in spring 2005 identified six contractors that claim the ability to provide REM services. There are other known REM providers that do not appear on the GSA FSS energy services schedule. REMs are also available through the United States Army Engineering and Support Center at Huntsville, AL, which offers its services (on a reimbursable basis) to procure REMs and periodically review their progress. On the demand side, new REMs are being placed regularly at new sites.

FUTURE FOR REMs IN THE FEDERAL SECTOR

EPAct 2005 requirements for federal energy management are significant:

- Reduce building energy consumption 2 percent per year in fiscal years 2006 through 2015;
- Install electric meters on all buildings *where practicable*; and
- Design and build new federal buildings that use 30 percent less energy than the current ASHRAE 90.1 standard *where cost effective*.

While federal sites will be stretched to meet these goals, REMs are particularly well suited to provide the additional technical support needed to succeed. For example, there are several approaches available

*http://www.gsaelibrary.gsa.gov/ElibMain/SinDetails;jsessionid=www.gsaelibrary.gsa.gov-2eb10%3A439f25a2%3Ae3474e3e53676a3f?executeQuery=YES&scheduleNumber=871+II&flag=&filter=&specialItemNumber=871+201

to meet the energy reduction goals. First is O&M improvements that may offer a 10 percent savings [2] through primarily low-cost/no-cost measures such as retro-commissioning, more aggressive O&M strategies such as predictive maintenance and reliability centered maintenance approaches, and O&M contracting incentives. Next are the current standard approaches of project retrofits which are inclusive of project identification, design, and financing (which is quite frequently of the alternative type). Energy awareness programs and product procurement programs also remain proven approaches to realize energy efficiency improvements.

The metering requirement will likely pose a challenge to federal agencies and their sites. A successful metering program contains a number of steps: developing the metering program objective, designing a system to meet the objective, identifying funds to purchase and install the metering system, gathering and storing data, analyzing data, developing recommendations for action based on data analysis, and completing recommended actions. Opportunities for REMs in the metering area include program and system design, system procurement financing, and data analysis.

Designing and building highly energy efficient buildings may also create new opportunities for REMs at federal sites. REMs should be able to identify technologies that satisfy the cost effective requirement based on local factors such as energy rates, operating requirements, and energy supply and metering infrastructures.

SUMMARY

The past successes of REMs have demonstrated them to be a viable alternative to federal sites seeking to improve energy efficiency and reduce operating costs. These successes are being noted as additional sites contract for REM services and more REM providers come onto the scene.

With the enactment of EPAct 2005, federal sites will need to renew their efforts to improve energy efficiency with an added emphasis on expanding into the areas of building energy metering and highly efficient new building design and construction. REMs are particularly well suited to compliment the federal site staff in meeting the EPAct goals and realizing the benefits that follow.

For More Information on REMs

Contracting for a Resource Efficiency Manager (DOE/EE-0299), July 2004, available at http://www.eere.energy.gov/femp/pdfs/rem_guidebook.pdf.

Fact Sheet: Resource Efficiency Managers Offer Alternative Approach to Realizing Energy Efficiency, February 2004, available at http://www.eere.energy.gov/femp/pdfs/om_rem.pdf.

Washington State University Energy Program REM website offers a variety of outreach materials aimed (newsletters, fact sheets, and case studies) at both REMs and those considering obtaining REM services: www.energy.wsu.edu/projects/rem/rem.cfm.

References

1. FEMP. 2005. *Marine Corps Base Camp Pendleton Shares the Keys to Their Successful Energy Program*. FEMP *Focus*. Summer 2005. Washington, DC. Available URL: http://www.eere.energy.gov/femp/pdfs/fempfocus_summer05.pdf.
2. Hunt, W.D. and G.P. Sullivan. 2002. *Assessing the Potential for a FEMP Operations and Maintenance (O&M) Program to Improve Energy Efficiency.* PNNL-14076. Pacific Northwest National Laboratory, Richland, WA. Available URL: http://www.pnl.gov/main/publications/external/technical_reports/PNNL-14076.pdf.