The Economic Benefits of Performance Contracting

Dane Taival

Today, organizations with aging buildings, shrinking budgets and reduced staffs are faced with environmental and safety compliance requirements—all in the face of volatile utility costs. Few viable options remain when institutions are faced with the need to simultaneously reduce operating costs and upgrade their building heating and cooling systems in such a challenging environment. Improving the efficiency and modernizing a heating, ventilation and air conditioning (HVAC) system through energy services performance contracting has proven to be an effective way for organizations to reduce operating costs, as well as upgrade building systems and infrastructure across the United States for more than two decades.

Energy services performance contracting is a package of products and services customized to both business and building requirements to deliver significant energy and operating cost reductions. It is based on the concept that facility upgrades and recommended retrofit work can potentially be funded through energy savings and other potential economic benefits that are validated through industry-developed standards. The idea is to use financing methods to enable HVAC system upgrades that can effectively conserve energy and create utility cost avoidance—ultimately allowing energy and operational budgets to cover the cost of implementing and financing the upgraded system.

With performance contracting, energy efficiency is making fiscal and environmental sense to an increasing number of facility managers. Performance contracting can finance projects and promote environmental stewardship. Successful performance contracting also creates sustainable buildings that can improve worker health, increase productivity and decrease energy and operating costs.

How performance contracting works

The basic premise of the performance contracting model is that it encourages innovation, new technologies and applications—while eliminating steps and changes that do not contribute to the operational performance of new systems and equipment. In performance contracting, the contractor is accountable for the entire package of services (design, purchase, installation, maintenance and equipment/system performance). Often, no up-front money is needed from the building owner. In short, performance contracting saves energy and delivers comfort with responsibility and within building code requirements.

As facility managers across the country implement strategies to save energy, it is becoming increasingly clear that the performance contracting approach not only saves energy but achieves superior building performance and financial outcomes. A 30 percent reduction in energy use can yield a 5 percent increase in net operating income and in overall asset value, according to the U.S. Department of Energy. To achieve this outcome, facility managers need to take a comprehensive approach that involves planning and analysis, strategic energy procurement and intelligent energy conservation.

The first step in the performance contracting process is selecting an energy service company (ESCO). After researching and selecting an ESCO, a performance contracting opportunity progresses through a feasibility study. This confirms savings potential, technology selection, project financing identification, final contract negotiation, construction, and ongoing measurement and verification.

Flexible contracting options help organizations meet high performance goals—including responsible asset management—by financing capital improvements with energy and related operational savings. Facility managers enjoy an accelerated purchasing process, facility upgrades (modernization, infrastructure,

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service and maintenance), and financial and performance outcomes generally not possible through the traditional plan and specification procurement process. The standard HVAC system performance contract typically lasts 10 years.

Predictive maintenance—as part of an energy saving performance contract—improves system reliability and reduces owner cost by adding life to the equipment. An established predictive maintenance program allows facility managers to understand system performance, helps protect the organization's investment and ensures that the HVAC system offers maximum energy efficiency.

Performance contracts can deliver stable, predictable energy and operating budgets over the length of the contract. Services that can be included under the performance contract to produce long-term cost savings include:

- Continuous engagement and oversight of operations and maintenance practices;
- Energy and utility consulting services, including systems design and application services;
- New high-efficiency HVAC equipment, including boilers, rooftop units, etc.;
- Renewable energy such as geothermal heat pumps, solar and photovoltaic;
- High-efficiency lighting;
- Automated control systems to optimize heating, cooling and lighting;
- Energy efficient window replacement;
- Water conservation equipment and practices;
- Maintenance services over the lifetime of the project; and
- Commissioning of new equipment and systems, or retro-commissioning of existing equipment and systems to ensure systems are performing as intended.

Incorporating green technologies

When it comes to incorporating green technologies into the performance contracting process, facility managers should ensure the ESCO is aware of goals early in the process prior to any detailed analysis. They also need to request use of the most energy-efficient technology as the first choice in all cases.

As part of the performance contracting process, an investment-grade facility audit will be conducted to identify savings opportunities, appropriate energy conservation measures and the final not-to-be exceeded cost. During this stage, energy modeling and analysis tools can be used to evaluate the energy and economic impacts of building features.

Facility managers can then finalize the selection of green technologies based on the organization's goals, its geographic location, its energy costs and its available rebates and grants. As part of the performance contracting process, selected technologies will not exceed maximum costs identified in the contract.

The length of time the project can be financed will be one factor driving the technologies selected. In the U.S., most states stipulate a timeframe of 10 to 20 years.

Shorter financing terms may limit the use of some technologies (i.e., solar energy often has a payback longer than 10 years). The availability and key parameters for grants or rebates that the technologies may qualify for also need to be considered by facility managers—as they have the potential to dramatically improve the financial return of a particular technology.

Depending on the building's needs, green and/or renewable energy technologies selected during the investment-grade audit may include the following:

- **Solar/photovoltaic technology** is especially useful in warmer regions of the country. Solar panels convert the sun's energy directly into electricity.
- **Wind power systems** convert wind energy into electricity using wind turbines. New technologies have decreased the cost of producing electricity from wind.
- **Ground source heat pump systems** are effective where there is enough land for the well-field. During the winter, heat from the ground travels through a heat exchanger into the building. In the summer, heat from the building is moved back to the cooler ground.
- **Daylighting** uses natural light to illuminate building spaces to reduce reliance on electric lighting during daylight hours.
- **Cogeneration** (also called combined heat and power—CHP) involves the simultaneous generation of two energy forms—electricity and heat—from one source. CHP captures the heat generated by electricity production. The heat, usually vented away as a nuisance, is redirected for heating needs in the buildings. This resource works best for large districts.
- **Thermal ice storage** improves the reliability and cost effectiveness of the infrastructure by shifting peak cooling loads to off-peak hours. Ice produced overnight is used to cool the building during the day. Because there is greater reliance on the most efficient power plants during off-peak hours, off-peak electricity is less expensive. This gives the facility manager substantial cost savings as well as environmental benefits.
- **Advanced automation controls** include but are not limited to demand ventilation. This controls outside air introduction into the building based on building load. Ventilation is a key part of a high performance classroom and is the most expensive component in heating and cooling a building.

Identifying return on investment

When selecting emerging technologies, facility managers can work with their ESCO to identify systems that fit their building and locale.

Once those systems are identified, facility managers should weigh the proposed infrastructure investment against a conservative estimate of future energy costs compared to historical costs. To derive the identified return on investment, it's important to diligently follow the plan through the entire project.

The facility manager's work doesn't stop when construction is complete. Monitoring utility usage and costs will go a long way toward confirming the value of the project.

Regular communication with the ESCO will also be important to ensure that they remain committed to meet the terms of the contract—since most such contracts hold the ESCO responsible for results that are below what was promised.

Sustaining building performance for life

A building requires ongoing measurement to ensure continued energy efficiency. It is important to carefully review building operating parameters and energy consumption.

Emerging technologies can be useful at this stage as well. They identify preventive maintenance needs to remedy potential problems before they strike and gather trend data. The following technologies—which are now readily available—meet the increasing demands for environmental certification:

- **Infrared thermography** creates maps of a building that show temperature variations. Priority can be given to areas identified as outside the preferred temperature range. Heat loss or inefficient airflow (i.e., too much or too little conditioned air) is often an inexpensive repair.
- **Ultrasonic analysis** focuses on HVAC hardware. It identifies problems related to component wear, steam trap failures, and to fluid and vacuum leaks. Ultrasonic analysis is simple and inexpensive.
- **Vibration transducers** detect how smoothly a machine is running to evaluate its condition. This analysis can help technicians diagnose problems such as misalignment, rotor rub and mechanical instability, which serve to shorten the useful life of equipment.

It pays to go green

When energy costs average nearly 80 percent of the total utilities cost, the savings from a performance contracting initiative can be monumental. Utility costs are reduced through replacement of inefficient equipment, improved facility operation, support services and consistent monitoring of building efficiency. Operational savings include reduced material inventories, decreased repair expenses, diminished downtime, productivity benefits, improved process efficiency and other financial benefits.

Performance contracting projects have been used successfully to deliver such infrastructure renewal and economic benefits for more than 25 years for government agencies and private owners alike. Approximately US$20 billion in performance contracting projects have been completed since 1990. With a track record like this, performance contracting has become the method of choice for many state and local government officials in the United States—enabling them to balance their buildings and budgets in a fiscally-responsible and risk-averse way. Private organizations can now reap the benefits of an energy- and cost-saving model refined in the public sector. Performance contracting is a creative vehicle to use to both cut costs and upgrade facilities to better serve your business objectives. **FMJ**

Dane Taival is the vice president of the Trane contracting solutions business and is responsible for developing and delivering commercial building modernization and improvement services and solutions. For more information, visit www.trane.com. Taival may be contacted at dtaival@trane.com.