



Investing in Cost-Effective Energy Conservation Programs

By: James R. Behr

Behind every effective energy management program, there's a specifier who's recognized the critical nature of system & system component selection

Energy conservation. How many times did you hear those words during the energy crisis? We haven't depleted our coal and natural gas reserves. We aren't freezing in the dark. The only difference between now and then is that now we pay *dearly* for these services.

Most building owners and property managers implemented conservation programs for various reasons.....ranging from patriotism to fiscal survival. Many obtained fantastic results, many did

not. Regardless, now that ample energy supplies are again available, conservation has seemingly taken a back seat. Energy management is no longer on everyone's mind....some on longer car. Many major corporations have eliminated their energy managers.

To say the least, then, energy management programs have been plagued with setbacks. Perhaps the most serious oversight by those professionals with bottom-line decision-making responsibility has been a failure to approach energy management

programs....specifically energy management *systems* - as a major investment capable of providing substantial dividends.

Professional feedback

From the very advent of the energy crisis, numerous companies and individuals ---- driven by promises of enormous profits C began marketing a magic elixir single device to cut utility bills. Many of these so-called energy management specialists or energy consultants originally worked in total unrelated fields. Many purchased some form of franchise, distributorship or dealership through a multi-level marketing scheme.

Fortunately, these people don't last long. Unfortunately, they're around long enough to generate negative reactions: systems that don't work, lengthy pay back and in many cases, damaged equipment or premature failures. As a result, many owners and managers preciously victimized now believe energy management isn't worth the effort, while others bury their heads in the sand and accept high utility bills.

With today's escalating utility rates, energy management can pay. In fact, it can pay extremely well. Properly designed energy management systems are an investment that, in some cases, can yield dividends that would make stock brokers and investment counselors envious. First-year returns of 50 percent are not uncommon.

Managers possessing any degree of foresight will follow two basic rules: Work with whatever is available and replace only what is absolutely necessary. These rules are crucial and must be applied when developing a cost-effective energy management program. If a piece of equipment has outlived its useful life, replace it. If it has five good years remaining, control it.

Select a good energy management contractor and *work with him*. Proper selection is 75 percent of the battle. You and your staff have no choice but to live with this decision, so make it wisely. A well-written contract passes responsibility for both system design and performance to the contractor. Don't assume the manufacturer will stand behind a system. Most manufacturers will give free advice over the phone. But, responsibility is an entirely different matter.

All too often, the end-user is caught in the middle C between a poorly chosen contract and the manufacturer. Everyone suffers C the contractor, manufacturer and, ultimately, the owner.

System caveats

Avoid anyone pushing products from a single manufacturer. The best systems are designed utilizing components from various manufacturers interfaced to suit a particular building's needs.

Check references, don't accept out-of-town testimonial letters directed to another contractor or the manufacturer. Reputable contractors have their own satisfied customers who are usually more than willing to boast.

Beware of guaranteed savings backed by insurance policies or any other third party. Insurance is never free and these frivolous options only complicate your contract. If problems are encountered, it may become impossible to determine who is ultimately responsible. Additionally, money spent in this manner is no longer available for system enhancements.

A well-defined contract is always your best defense!

Above all remember, energy management is a full time commitment. Many managers and owners make the fatal mistake of assuming their HVAC contractor knows their facility better than anyone, and will rely on the latter's advice, often entering into a contract to design and install an energy management system. Conversely, many HVAC contractors have misled themselves into thinking they can practice energy management when, in fact, their own training may have been a one or two day training seminar held by a multi-level marketing group.

Energy management covers a broad spectrum and requires extensive knowledge, coupled with practical experience relative to load balancing, power factor correction, scheduling, piping design, hydraulic balancing, load management and air balancing, to name a few. Ultimately, you're purchasing an *engineered* system designed to automate a particular facility. Your energy management contractor should have engineering capabilities that take a back seat to his marketing skills!

Pay particular attention to who pays for system adjustments, program changes and off-site monitoring. System debugging takes time, and up-front costs associated with monitoring and adjustments are justified in most cases. Off-site monitoring allows the contractor to make necessary adjustments from his facility, saving valuable travel time and prolonged inconvenience for the building's occupants. Monitoring also permits the compiling of useful historical data relative to temperature variations and equipment run times C possibly spinning off an accurate preventative maintenance program at little or no additional cost. Accumulated data is also extremely useful when investigating persistent problems.

Avoid contractors who want to automate everything. Intelligent buildings are often the result of unintelligent decisions. A single failure can be catastrophic, often times fatally crippling an entire complex for extended periods of time.

Aside from selecting your contractor, the single most important item is surveying the facility. A good survey or audit must contain all pertinent information regarding energy consumption. It should concern every piece of equipment within the facility. Equipment data relative to burner efficiency, equipment sizing and any unusual operating characteristic must be considered.

Utility rates

Next, examine utility rates. Is your facility on the most advantageous rate? Today's competitive market has caused many large consumers to switch from electrical power to natural gas. Utilities are keenly aware of the ramifications associated with lost revenues, and as a result, are modifying their rate structures. Off-peak rates, time-of-day scheduling and interruptible service can provide significant savings.

On a recent project involving a large supermarket, the customer's billing structure was modified to include off-peak demand. This rate changes allows the energy management system to aggressively control equipment during on-peak periods: Monday through Friday, 8AM to 10PM.

During off-peak periods, particularly Saturday and Sunday, load shedding is inhibited, limiting demand only while the utility actually measures demand. Demand is not measured Saturday and Sunday during pre-defined off-peak periods.

In this instance, the supermarket had its highest traffic patterns during off-peak periods. The resultant heavier loads and higher demand are not controlled. Energy management and alternate rate structures can work hand-in-hand, offering owners and managers the best of both worlds.

The final step is to correlate all data regarding the past year's utility bills. In many instances, you will be able to accurately reconstruct utility bills. The results are generally enlightening, sometimes staggering. At this point, you should know precisely how much energy is consumed for heating, air conditioning, domestic hot water, lighting, etc. Pay particular attention to electrical demand charges. Demand penalties can easily account for 50 percent or more of a total bill.

With a firm understanding of how much energy is expended for each specific task, you now have the basis to start designing an effective energy management system.

Start with operating efficiency. Can it be improved? If so, what will it cost? Optimizing equipment performance is generally not expensive and normally provides a rapid return. After improving performance, is it cost-effective to let the energy management system control it?

The energy crunch caused many owners to reduce ex-filtration . Many also added insulation. Check for significant changes in both heat loss or heat gain. Older heating equipment, in particular, is normally grossly oversized. Derating heating equipment is inexpensive and can product good results.

High bay areas or areas with ceilings exceeding 12 feet re generally subject to stratification. Destratification will recoup considerable amounts of wasted heat, improving comfort levels while adding to total energy savings.

Controlling your largest power consumers: heating, air conditioning and domestic hot water. Analyze each item carefully, considering normal operating hours, equipment sizing and efficiency. Pay particular attention to electrical demand charges. In many instances, demand charges account for in excess of 50 percent of total costs.

Today's microprocessor-based controllers offer versatility unheard of five years ago. Whenever possible, equipment runtimes should be controlled based on both outdoor conditions and time-of-day scheduling. Programming should compile relevant data concerning runtimes. This data is particularly useful to determine the exact amount of energy consumed by each specific piece of equipment.

Each control point should also have an automatic override to ensure comfort levels in the event of an upset condition. Above all, it must be failsafe, returning control to the original equipment in the event of a failure. Operating costs may temporarily be somewhat higher. However, comfort levels will be uncompromised.

Don't invest in whistles and bells. Stick to basics. After all, energy management is an investment, and your ultimate goal is recovering that investment and pocketing the dividends. Use realistic payback periods and don't expect miracles. Realistic projections seldom cause embarrassment.

If capital expenditures become a problem, prudent use of existing budgets can govern your approach. One recent project involved a major Pittsburgh hotel. Funds were limited preventing installation of an entire system. By working with this customer. We installed a portion of the system using funds preciously allocated to utility costs. Their investment was recovered within four months. The remaining portion of that system is now being installed with money saved by the first phase of the project.

Don't avoid getting involved. You know your building better than anyone and your input is valuable and necessary. Commonsense engineering, coupled with good management skills and an experienced energy management contractor will get results. Above all, don't procrastinate! Costly energy is being wasted.

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