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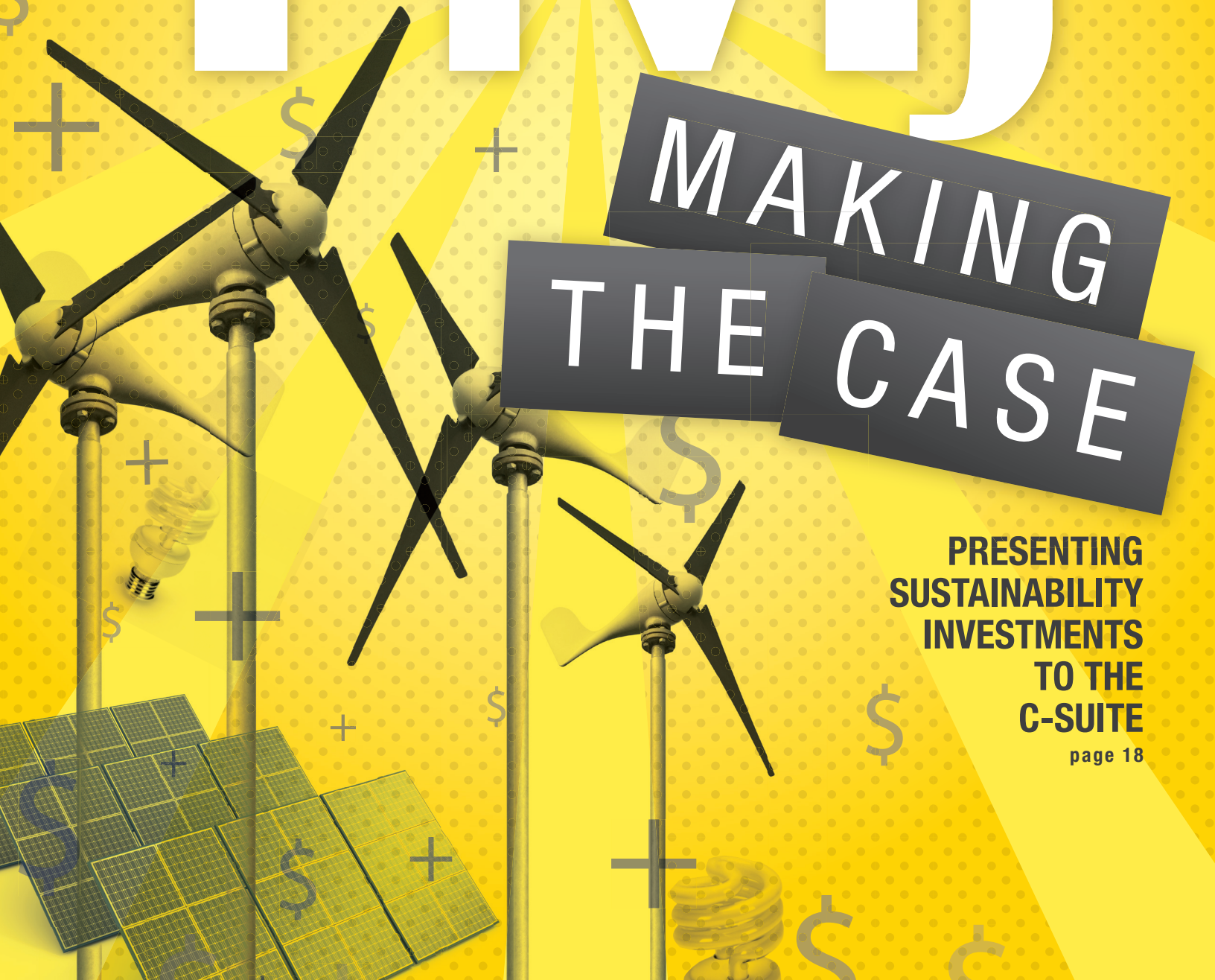

MAKING THE CASE

PRESENTING SUSTAINABILITY INVESTMENTS TO THE C-SUITE

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Making the Case

PRESENTING SUSTAINABILITY INVESTMENTS TO THE C-SUITE

By Sarah Slaughter

Facility managers know that if they can implement building improvements quickly and effectively, they can save money; improve occupant health, safety and satisfaction; meet corporate objectives and comply with emerging government requirements. Many facility managers, however, find it difficult to communicate the urgency and opportunity for these upgrades with top managers and the C-suite. Organizational budgets focus on allocating funds based on the previous year's expenses, and the argument for investing in building upgrades often takes a back seat to other priorities.

The financial analysis of potential improvements, however, can help facility professionals make the business case for updates by translating opportunities into clear economic terms. Most importantly, financial calculations can include possible or

expected cost increases to help teams evaluate the urgency associated with performance improvements and make the argument for investing now rather than waiting until later.

Establish the business case

The primary measures of economic efficiency in lifecycle cost analyses for buildings are the present value net savings (PVNS) and overall rate of return on investment (ROI). These two measures can be used to compare and rank sets of mutually exclusive alternatives to select the most effective course of action.[1]

To make the case for investments, facility managers can use current information about a building's operating costs to establish the base case for the financial analysis. Current data on annual resource use for energy (such as monthly kilowatt hours for electricity), water, wastewater and solid waste, together with the unit costs for those resources (such as dollars per kilowatt hour for electricity), provide the basic data for the analysis.

Most organizations have established basic procedures for financial analysis. The "study period" for the financial analysis reflects the expected useful life of the building as well as the investor's time horizon; since the average age of buildings in the U.S. is more than 40 years old, longer time periods are appropriate for evaluating major building systems. For instance, the U.S. federal government has established a maximum study period of 40 years for analyzing investments for buildings.

Organizations also establish their "discount rate," which is the monetary cost to that organization. The discount rate may reflect borrowing costs or returns from alternative investments (such as returns from savings accounts or treasury bonds). The discount rate for U.S. federal government building projects is set equal to the return on U.S. treasury bonds; its current "real" discount rate (which excludes inflation) is currently 2 percent for a 40-year study period.

Identify the alternatives for building improvements

Facility managers may identify several possible alternatives to improve building performance, and will need to collect basic information to analyze the financial benefits. The first step is to obtain good estimates of the initial investment costs, as well as the expected cost reductions (or savings) related to each cost category. The critical aspect is to identify the incremental additional costs associated with the expected savings.

For example, if a building needs new HVAC equipment, the FM should identify the cost of standard equipment as well as higher-efficiency models. The additional costs for higher-efficiency equipment compared to standard can then be used to determine the initial incremental investment costs. The annual savings expected from the higher performance equipment are calculated from the operating costs of the higher performance equipment compared to the standard equipment, such as a 10 percent reduction in energy use.

The FM can obtain the initial incremental costs from vendors and manufacturers and estimate the annual expected savings from vendor data supplemented by actual in-field performance data from government laboratories, engineering experts and other sources. For example, Lawrence Berkeley National Laboratory provides energy savings estimates for numerous types of facilities, such as high-performance relocatable classrooms (Rainer and Hoeschele, 2003).

The operating costs for buildings differ significantly by location and can change by varying rates over time. FMs should consider recent price increases and explicitly include annual escalation rates for costs that have increased rapidly. For instance, Baltimore has experienced a 9 percent annual increase in water/sewer costs over last four years (Sharper, 2012).

The consumer price index, compiled by the U.S. Department of Commerce for major cities, provides price trends for local energy, water and sewer and solid waste disposal costs over the last 20-30 years (BLS, 2013). The Energy Information Administration provides annual energy price projections (EIS, 2013) which establish the energy escalation rates used to assess U.S. federal capital projects.

Facility managers may also want to include various combinations of improvements in the analysis, since sometimes building upgrades are less expensive when they are done at the same time rather than separately and can provide complementary benefits.

[1] Some organizations use the payback period, which is a simple calculation of the initial investment divided by the annual savings. The payback period is not a measure of economic efficiency because it ignores the savings over the full study period and excludes the cost of money. It is solely used as a measure of liquidity.

Case study: Measuring economic efficiency

The director of facilities for a large company has been asked to suggest the most economically efficient improvement for the headquarters building that will reduce operations costs and meet the company's threshold for investments, specifically where the ROI is greater than the organization's discount rate of 3 percent. His team has identified two alternatives:

1. A high-efficiency HVAC unit that reduces energy costs by 10 percent.

2. A combination alternative that includes:
   a. A highly insulated roofing system which reduces heating/cooling loads;
   b. A new downsized high-efficiency HVAC unit; and
   c. Rainwater capture from the roof that can be used to flush toilets, causing a 20 percent reduction in water use.

COSTS/BENEFITS	HVAC UNIT	COMBINATION ALTERNATIVE
Initial incremental investment	$20,000	$50,000
	Annual savings	
Energy	$7,922	$7,922
Water		$6,732

Table 1: *Financial costs and net savings of alternatives in U.S. dollars.*

▼ **STUDY PERIOD = 40 YEARS, DISCOUNT RATE = 3%**

COSTS/BENEFITS	HVAC UNIT	COMBINATION ALTERNATIVE
	Economic measures (no price escalation)	
Present value net savings *(PVNS)*	$163,126	$288,735
Overall rate of return on investment *(ROI)*	8.9%	8.1%
	Economic measures (0.5% energy, 4% water annual price escalation)	
Present value net savings *(PVNS)*	$179,293	$479,604
Overall rate of return on investment *(ROI)*	8.9%	9.3%

Table 2: *Evaluation of alternatives with future price escalation in U.S. dollars.*

The FM team has compiled the current data on energy and water use for the building, as well as the incremental initial costs and expected savings for the alternatives (Table 1). The savings are calculated using the current actual energy and water usage and related costs for the building, as well as the expected savings.

The FM team first calculates the present value net savings, which is the accumulated annual savings over the study period brought into current year dollars, minus the initial incremental investment. The team knows that an alternative is economically efficient when the PVNS is greater than or equal to zero; that is, when the discounted net savings is greater than the investment. The company's study period is 40 years, and real discount rate (excluding inflation) for building projects is 3 percent.

The FM team then uses the PVNS to calculate the overall rate of return on investment, which is the annual financial return from the initial investment. They calculate the ROI using the ratio of the discounted annual savings (excluding the initial incremental investment) to the investment, with the discount rate as the expected rate of return for reinvestment of annual savings. An alternative is economically efficient when the ROI is greater than the discount rate.

The director of facilities decides to examine two scenarios. First, he uses the current energy and water costs and calculates the PVNS and ROI for the 40-year study period. In this first scenario, both alternatives are economically efficient (since the PVNS is greater than zero), and the combination alternative has a greater net savings than the HVAC unit (Table 2). However, the HVAC alternative has a higher ROI at approximately 9 percent than the combination alternative.

In the second scenario, the director of facilities includes the possibility of price increases for both energy and water costs. He recently read an article that predicted, for his region, that future energy prices would escalate moderately at 0.5 percent per year (excluding inflation), but that water and sewer prices would increase significantly, at 4 percent a year, due to new required investments in the infrastructure. He understands that another way to view the financial analysis results is that the alternatives reduce a potential future liability in operations costs, which is particularly important in locations that expect to see significant and rapid price increases.

With the annual energy prices escalation at 0.5 percent and water/sewer prices escalation at 4 percent, the discounted net savings (PVNS) for each alternative increases, but the savings increase more rapidly for the combination alternative than for the HVAC unit (Table 2). The ROI also increases for the combination alternative, indicating that it would provide a higher annual return on investment than the HVAC unit if these prices increase significantly in the future.

Under both scenarios, the alternatives are preferable to maintaining the status quo, as they provide approximately three times the rate of return currently available to the organization on the market. In addition, if the organization decides not to invest in either alternative, the analysis indicates

Conducting a thorough financial analysis allows FMs to make a solid, fact-based business case for selecting and implementing building improvements.

that it will incur significantly higher operating costs, which it could have avoided with these investments.

With the financial analysis in hand, including the two scenarios, the director of facilities is able to make the clear business case for implementing the building improvement immediately, and specifically recommending the combination alternative with the highest present value net savings in both scenarios, and the highest return on investment if prices significantly increase in the future.

Look for savings in all the right places

Facility managers should periodically collect resource use and cost data to evaluate different opportunities as they arise, and update the information as the situation changes. For instance, the initial investment cost for a high-performance alternative may decrease over time, or local prices for energy or water may increase unexpectedly. These changes may make an alternative more economically attractive and strategically important than it was previously.

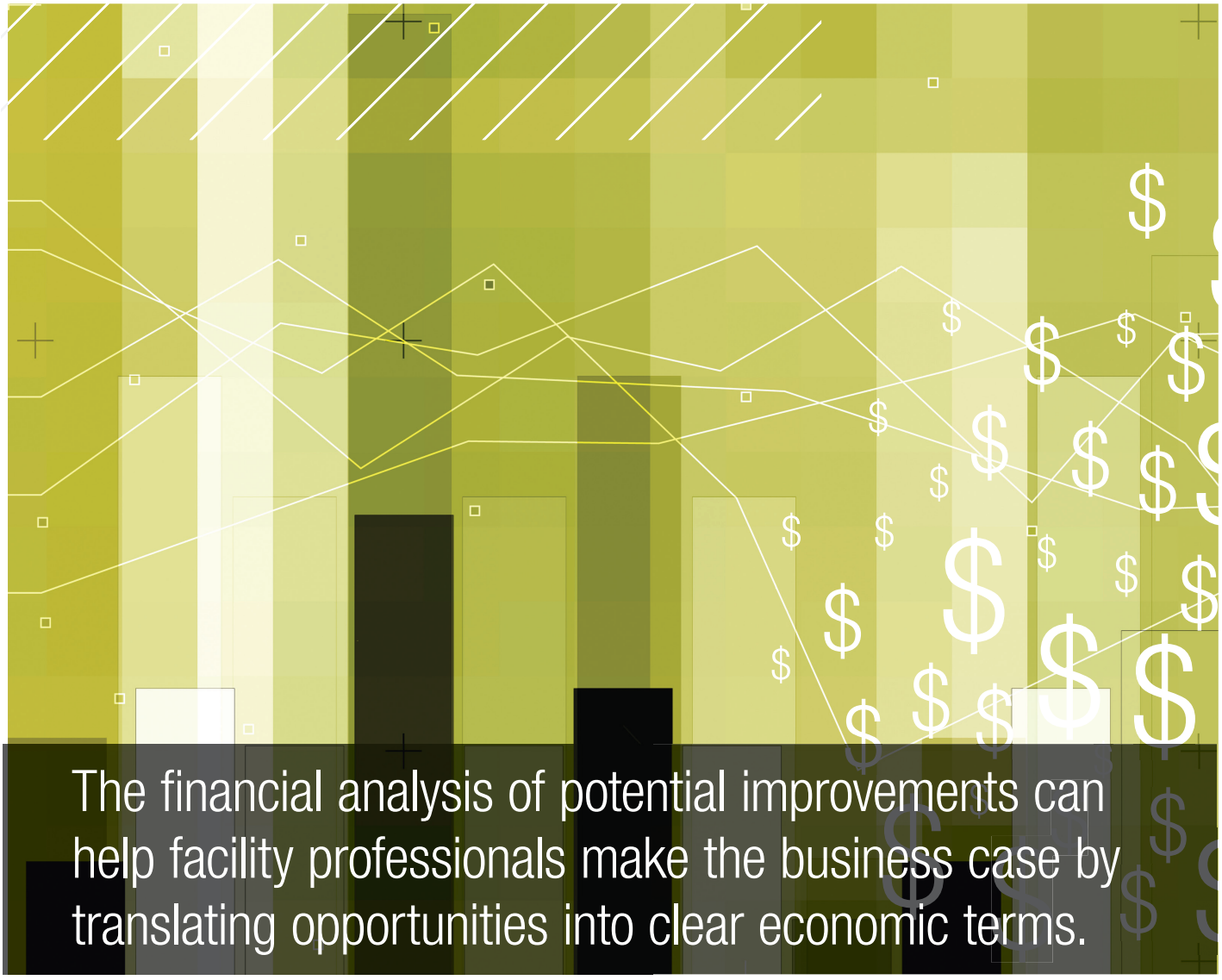
Although many FMs are watching energy prices, they may not be as aware of other potential economic benefits from green buildings, particularly concerning future increases in operations and maintenance costs such as:

- Local water and sewer costs;
- Cleaning and landscaping costs;
- Office and food waste disposal costs; and
- Employee health costs.

Keeping an eye on emerging major cost categories, particularly as unit prices increase, can reveal new opportunities for providing significant economic returns as well as improving building efficiency and effectiveness.

Facility managers can learn more about these economic efficiency calculations through several sources:

- Professional training sessions available through government and industry organizations, such as guidance documents and online training from the U.S. Federal Energy Management Program (FEMP);
- Reference books (e.g., Ruegg and Marshall, 1990); and
- Technical white papers and other references (e.g., Slaughter, 2013).



The financial analysis of potential improvements can help facility professionals make the business case by translating opportunities into clear economic terms.

Conducting a thorough financial analysis allows FMs to make a solid, fact-based business case for selecting and implementing building improvements. Increases in local operations costs (such as unit costs for energy and water) should be included in the analysis to reduce vulnerability to future price increase and to better understand the strategic value of these investments. Finally, FMs can regularly update the analysis to reassess the feasibility of different alternative to reduce costs, improve building operations, and meet corporate objectives. FMJ

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