Communicating the Value of Energy Efficiency Projects To Financial Decision Makers In Not-for-profit Markets

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ABSTRACT

By evaluating energy efficiency projects as investments and presenting them in the language of financial managers, facility managers can make a compelling case for investing in energy efficiency projects instead of competing for scarce capital or expense dollars every year. The comparison between the financial manager's expected return on investments and the returns generated by well-designed energy projects can move such projects out of the competition for annual capital or expense dollars and into the organization's investment portfolio. By providing an analysis that shows energy projects as investments that take into account the life-cycle costs, facility managers can demonstrate that these projects are comparable to, and generally outperform, other endowment investment vehicles.

INTRODUCTION

At nearly every not-for-profit organization, there is a facilities manager who is responsible for maintaining the physical assets of the organization and a financial manager who is responsible for maintaining the financial assets. The facility manager meets this responsibility by reviewing the status of the organization's buildings and building systems, identifying needed repairs or improvements, and determining how to implement those repairs or upgrades. In most cases the way to implement such repairs or upgrades is to include them in a capital or expense budget for the coming year. Facility managers then lobby the administration for funds to implement these projects.

The financial manager, usually the chief financial officer (CFO), is responsible for maintaining and improving the organization's financial assets so that there are adequate funds available to meet current and future needs. The CFO accomplishes this by managing an investment portfolio, by soliciting donations to, or investments in, the organization, and by managing cash flows to operate the organization.

The facilities manager and the financial manager may often have incongruent goals which may result in ineffective communications and a less-than-efficient business relationship. These incongruent goals are usually due to the apparent conflict between their responsibilities: the facilities manager requires money to maintain and upgrade buildings and systems, while the financial manager often works to reduce expenses to maintain and improve the organization's financial wellbeing. We refer to this as an *apparent* conflict because there are many instances in which spending money on the organization's physical assets will also improve financial wellbeing. The conflict appears when the facilities manager and financial manager do not communicate effectively, often as a result of the typical budgeting process.

This article explores ways in which the facilities manager can improve communications with financial decision makers and frame building infrastructure improvements in a way that aligns with financial managers' goals.

THE CURRENT SITUATION

Most organizations operate on an annual budget and, once a year, require department heads to submit a budget to cover necessary operating costs for the coming fiscal year. Since available monies are usually limited and the financial manager has a primary responsibility to control costs, all of the departmental budgets are effectively competing for a portion of limited funding. The financial manager considers the budget requests and must somehow determine how best to apply the organization's funds.

While every organization is unique, most financial managers use some process for prioritizing funds for items that are most important to the organization. Some funding requirements have no apparent economic payback, but are critical to the mission of the organization. The methods used to prioritize vary, but are frequently based on some type of cost/benefit analysis such as simple payback. Simple payback is determined by dividing a project cost by the annual savings generated, or costs avoided, by the project. The result is the number of years that it will take for a job to pay for itself, or return the investment.

When it comes to facilities projects, the methodology of ranking projects quite naturally leads to doing only those projects that are the most pressing, usually replacing failed or outdated equipment and infrastructure. These projects are usually considered priority 1. These are usually projects which, from a customer service perspective, cannot be ignored.

Priority 2 projects may be facility improvements that will enhance or expand the organizational mission or operations but are not considered mission critical. Priority 3 projects fall into the "wish list" category—projects that will improve some aspect of the facility but are not immediately necessary. In addition, the budget for facilities is frequently regarded as a sort of "reserve account" that can be dipped into to fund other departments or programs that directly serve the organization's core mission. As one health care system CEO once shared with us, "I hate to spend money on building systems that our patients can't see."

Once projects are categorized, the simple payback analysis is a fairly common and easy method for comparing competing projects, though it is not necessarily a realistic view of use of funds. Simple payback lacks several details, most notable accounting for the time value of money. Simple payback analysis does not accurately compare the year-one "costs" with "benefit" dollars that may be generated by a project in future years. The value of one dollar in year four is less than the value of one dollar in year one. The reasons for this are varied, but popular tools for comparing investments assign a discount rate to future dollars. That discount rate *discounts* the value of future cash flows to compare them with current year cost or investment dollars. More on discount rates later.

The point is that the simple payback analysis does not account for many of the dynamics of financial analysis that a financial manager would use to compare investments. When "selling" facility infrastructure improvements to a financial manager, to communicate effectively, it is important for the facilities manager to understand how the financial manager views funding opportunities. In financial terms, an investment generates (or loses) money, or equity, while an annual expense depletes cash, or reduces equity. The financial manager wants to generate the best possible return on investments to cover operating costs (expenses) of the institution while continuing to build the organization's endowment or investment portfolio. In the eyes of the financial manager, the day-to-day operating expenses are necessary but should be limited to only those costs that are required for continued operation.

For most energy-efficiency projects, there is an opportunity to demonstrate economic benefit by replacing old equipment with new, or with a technology that will increase productivity, or reduce operating expense. Our experience has been that it is hard to justify projects related to energy efficiency because most facility managers have done the most obvious improvements with the shortest paybacks. The next level of improvements typically cost more to generate reasonable simple paybacks.

Given the financial realities of most non-profit organizations, and the approach that facility improvements are viewed as an expense, how can the facilities manager justify significant expenditures on infrastructure projects?

A PROPOSED SOLUTION

The Concept

A solution that we have found successful is for the facility manager to learn and use the specific language of the financial manager. (At the very least, this effort will likely improve communications.) To be successful, it is important for the facilities manager to understand how the financial manager approaches his or her responsibilities, and the actual process that manager uses to assess and prioritize *investments* and *expenses*.

These two financial terms, investments and expenses, are important to differentiate. In financial terms, an investment is an expenditure of assets, usually cash, to generate a future income. An expense is an expenditure that is necessary for the ongoing operation of the organization and comes from cash flows, or in some cases, is financed by debt. In this sense, buying a house is not an investment, but a (living) expense. On the other hand, buying a rental property is an investment because it will generate income. The rate at which income is generated, or returned, is the return on investment.

In the case of most institutions of higher education and most not-for-profit healthcare systems, a large part of the financial manager's responsibility is managing an endowment. That responsibility includes maintaining a balanced portfolio where the endowment money is able to provide a rate of return between 8 and 12 percent annually while minimizing exposure to risk. If the financial manager could generate this type of return with little or no risk, his or her job would be significantly easier.

Along with deciding where to invest endowment funds, the financial manager must manage the organization's assets to generate enough revenue to cover the cost of running the organization, and thoughtfully dole out funds for expenses and capital improvements that will allow the organization to maintain a competitive market position.

For any viable business, one of the simplest rules is "every dollar wasted comes off the bottom line." By demonstrating to the financial manager how dollars wasted in energy *inefficiency* and operational *inefficiency* can be saved, the facility manager can propose smart *investments* that contribute to bottom line savings. If facility managers present their proposals for energy saving projects as investments rather than expenses, and document the return these investments will generate, energy and operational efficiency projects become viable investments to discuss with the financial manager. Efficiency in both the way facilities are maintained, and more importantly, in how the operations budget is controlled, can move the financial manager to view these expenditures as investments rather than expenses.

An Example

Let's consider a building systems project that replaces or modifies existing equipment with more efficient equipment. The project will yield both energy and operational positive cash flow when compared to the "base case" (do nothing) operating budget. The case presented here is from an actual energy efficiency project at a private secondary education school. The project has several measures including:

- Replacing gymnasium and ice rink metal halide lighting with T-5 lighting.
- Installing lighting controls in several buildings.

- Installing a pool cover and humidity control in the pool building.
- Replacing steam traps with retrofit traps.
- Replacing inefficient oil burners with high efficiency burners.
- Installing building controls and a control strategy for a heat pump loop.
- Controlling outside air intake in several auditoriums with CO_2 sensors.
- Re-commissioning an existing solar collection system.

Energy calculations for this project resulted in $168,000 annual energy costs savings and another $6,000 in annual maintenance costs savings. The annual "base case" energy costs were $1.52M, so the project savings represented 11 percent in annual operating cost savings. The project cost $840,900, resulting in a simple payback of 4.83 years for the project.

Project cost	$840,900
Annual energy savings	$168,000
Annual maintenance savings	$6,000
Simple payback	$840,900/($168,000+$6,000) = 4.83

This type of project is one that may or may not be considered by management based on payback. Common barriers to executing such a project may include:

- The project cost does not fit into the annual budgets.
- The financial condition and revenues of the institution might dictate a lower payback is necessary to pass the payback screen.
- Other competing capital projects or expenditures have lower paybacks.

The point is, such projects are typically evaluated as one of the current line item expenses, or capital budget items. The decision to fund such projects is usually based on the projected operating savings and comparison to other competing requests for funds.

To avoid these common barriers for projects that offer significant value to the organization, we recommend comparing the annual cash flows of the base case (also known as the do-nothing alternative; always an option) with the annual cash flows of the project case. The cash flows should include the initial project costs, the annual energy savings, the annual maintenance savings, and any avoided costs for planned projects that would have replaced some or all of the equipment upgraded by the proposed project. By calculating the difference in cash flows, and representing the retrofit case savings as a return on investment, a rate of return can be presented to the financial manager.

There are several ways to analyze rate of return, and most financial managers have developed their own method of evaluating potential investments. These methods are usually combinations of standard methods. It is important for the facilities manager to understand the financial manager's methodology and apply it when presenting cost/benefit results.

For the purpose of this article, we will demonstrate a net present value (NPV) analysis, a widely accepted means for determining the relationship between an investment and the future cash flows it will generate.

Net Present Value (NPV) Analysis

The NPV analysis shows the current year value of future cash flows by applying a discount rate* to future cash flows. Those future discounted cash flows, by year, are then totaled. The sum is the net present value of the cash flows expressed in *today's* dollars. (This calculation can be done manually with a discount table, or using the NPV function in Excel®) The result represents the return on investment (i.e., the sum of the future cash flows) in current year dollars. It is important to understand that the comparison of alternatives compare negative cash flows for operations. A good efficiency project produces less negative cash flow based on lower operating costs. The difference between alternatives can be represented as savings; that is, a less negative cash flow.

In the case of building systems improvements, one should represent the length of term based on the expected useful life of the equipment. For example, one would model lighting improvements over a ten to fifteen year period while a chiller plant would be modeled for 25 to 30 years.

*A word about the discount rate. The discount rate is generally determined from the interest rate the organization would typically pay for the sum of money borrowed for the length of time being analyzed, with an added factor to account for risk. The method for determining the appropriate discount rate varies from financial manager to financial manager and is part of the "art" of economic analysis. Different investments might represent different levels of risk to an institution (thus a higher discount rate) and may also represent different terms over which the investment should be viewed.

A discussion with the financial manager is necessary to determine the most appropriate term over which to evaluate the investment. The term over which the financial manager wants to account for depreciation of the equipment is usually a good term to use for the analysis.

The NPV analysis can be modified to show return over any number of years subsequent to the investment. For example, if the financial manager wants to compare a project investment with a seven-year mutual fund investment, one can determine the NPV of seven years worth of cash flows generated by the project, even though the expected life of the equipment is longer.

For the case illustrated below, we have applied the following assumptions:

1.	Base case annual energy cost:	$1,528,000
2.	Project price (investment):	$840,900
3.	Length of term:	10 years
4.	Annual energy savings:	$168,050
5.	Annual maintenance savings:	$5,828
6.	Energy escalation rate:	3%
7.	Maintenance cost escalation	3%
8.	Discount rate:	10%

A simple payback analysis for our sample project shows a payback of nearly five years. (Project cost divided by year one savings.) The same project analyzed by the more sophisticated net present value method shows a 51 percent rate of return and would significantly outperform the typical 8 to 12 percent returns expected for endowment investment vehicles. Such an investment would be extremely attractive to most financial managers and would certainly outperform almost every other investment option being considered. The significant added benefit of such an investment is the improvement to the institution's infrastructure and presumed market advantage in attracting customers (students, patients, and other users of the institutions services).

Assumptions

The value of any analysis is based on the accuracy of the assumptions and a diligent assessment of risk. Below is a review of each of the assumptions used in the above analysis.

- **Annual Electric Cost**. This assumption should be easily verified if the

Table 1: Economic Analysis of Project Investment

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7. Maintenance cost escalation 3%
8. Discount rate: 10%

Base Case Cash Flows	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Energy Costs	($1,528,000)	($1,573,840)	($1,621,055)	($1,669,687)	($1,719,777)	($1,771,371)	($1,824,512)	($1,879,247)	($1,935,625)	($1,993,693)
Annual Cash Flow	**($1,528,000)**	**($1,573,840)**	**($1,621,055)**	**($1,669,687)**	**($1,719,777)**	**($1,771,371)**	**($1,824,512)**	**($1,879,247)**	**($1,935,625)**	**($1,993,693)**

Retrofit Case	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Investment	($840,900)									
Energy Costs	($1,359,950)	($1,400,749)	($1,442,771)	($1,486,054)	($1,530,636)	($1,576,555)	($1,623,851)	($1,672,567)	($1,722,744)	($1,774,426)
Maintenance Savings	$5,828	$6,003	$6,183	$6,368	$6,559	$6,756	$6,959	$7,168	$7,383	$7,604
Annual Cash Flow	**($2,195,022)**	**($1,394,746)**	**($1,436,588)**	**($1,479,686)**	**($1,524,076)**	**($1,569,799)**	**($1,616,892)**	**($1,665,399)**	**($1,715,361)**	**($1,766,822)**

Difference in Cash Flows	($667,022)	$179,094	$184,467	$190,001	$195,701	$201,572	$207,619	$213,848	$220,263	$226,871

Net Present Value of Cash Flows	$432,477
Rate of Return on Cash Flows	**51%**

building(s) in question are separately metered. If there are no easily verified metering devices, a connected load calculation is typically used, with some assumptions made as to equipment run times. Weather data can be used to help determine run times of heating and cooling equipment. Further verification can be determined by comparing results to primary metered data.

- **Project Price (Investment)**. This piece of information is usually self-evident and is based on either quotations for work done or internal methods for determining costs of installation if self-performed.

- **Length of Term**. This is usually based on either general accepted accounting principles for depreciation of equipment, Internal Revenue Service rules, or other accepted standards for a particular piece of equipment.

- **Energy Savings**. Energy savings should be quantified by accepted engineering calculations comparing base case equipment and run times with replacement equipment and run times.

- **Maintenance Savings**. These data should be developed by a careful evaluation of maintenance cost records for the affected equipment being replaced. In simple cases such as lighting, the cost to replace discrete pieces of equipment in both the base case and retrofit case can be determined by calculating the runtimes and then applying the UL listing of typical equipment life (given in hours of runtime) which are available for standard lamps and ballasts. For other equipment such as HVAC equipment, current maintenance costs for older or failing equipment should be compared to quoted annual maintenance contract costs from vendors to determine possible savings. In a life-cycle analysis, it should also be noted that maintenance savings as a result of warranty coverage for new equipment can be annualized over the term being considered.

- **Energy Escalation Rate**. This should be determined by the team responsible for the analysis and is usually based on historical data, published cost of living indices, or on commodities futures markets at the time an analysis is being conducted. Of the three, the futures market probably provides the least reliable (riskiest) data due to the volatility of energy markets. A more conservative approach would be to use an accepted cost of living index. This is an important assumption in that it has a significant impact on the analysis. Whatever the methodology used, be prepared to defend it when presenting the analysis.

- **Maintenance Cost Escalation**. These data should be based on cost of living indices, or historical data the institution may have available for wages of maintenance personnel, and costs of maintenance items.

- **Discount Rate**. Should be provided by the financial manager for the institution.

SUMMARY

By evaluating energy efficiency projects as investments and presenting them in the language of financial managers, facility managers can make a compelling case for investing in energy-efficiency projects. The comparison between the financial manager's expected return on investments and the returns generated by well-designed energy projects should move these projects out of the competition for annual expenses and into the organization's investment portfolio. By providing the analysis that shows energy projects as investments that take into account the time value of money, facility managers can demonstrate that these projects are comparable to, and generally outperform, other endowment investment vehicles.

The process to follow for presenting an efficiency project to financial management is:

1. Determine project cost.
2. Determine annual baseline cash flows for the "do nothing" option or a standard installation option. Costs should include annual energy costs and annual maintenance costs of building systems being considered for a retrofit project.
3. Determine annual savings that would result from a retrofit project, including energy savings, maintenance, and any other operational savings.

4. Develop a cash flow of the retrofit case. Show the cash flows going out for the expected useful life of the retrofit equipment.
5. Compare the cash-flow differences between base case and alternatives. The difference between the base case and the retrofit case is the savings generated (cash flow improvement) by the project.
6. Represent the annual cash flow savings as rate of return on the investment (project cost) by applying a net present value analysis of the cash flow difference between the cases.
7. Review and refine your assumptions with financial management.
8. Conduct a risk assessment by identifying the risk associated with the assumptions made as part of the analysis.

CONCLUSION

Both facility managers and financial managers of not-for-profit institutions can view energy efficiency projects as viable investments for endowment funds and improve the institution's building infrastructure at the same time. Added benefits of being able to demonstrate environmental stewardship through energy efficiency, as well as the impact of new equipment technology on the institution's operations, makes a compelling case for investing in energy efficiency projects.

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