

Beyond the Utility Bill Impact...

Who?

Eric Woodroof, Ph.D.

400 Energy Audits

\$100 Million in Savings

>25% ROI

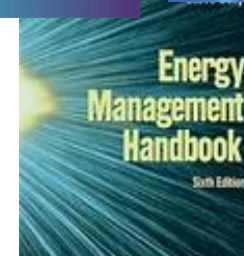
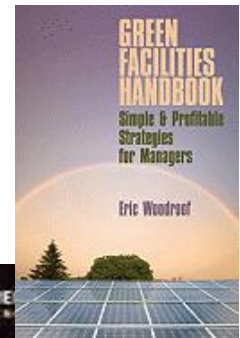
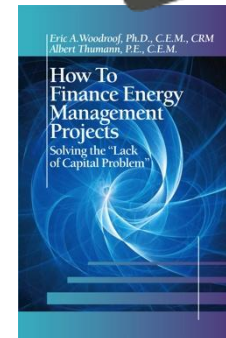
>100 Seminars on 6 Continents

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87 Countries



Energy Conservation Also Yields: Capital, Operations, Recognition and Environmental Benefits

“CORE” Benefits are Highly Probable and Worth a Double-Digit Improvement to Energy Savings

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ABSTRACT

Previous research indicates there are additional (often unreported) benefits from saving energy.^{1,2} This paper identifies these “additional benefits” and describes how to calculate their value.^{3,4} In addition, we found a high percentage of facility managers experienced some of these benefits. For example, in a recent survey, 92% of facility managers experienced reduced maintenance material costs as a result of energy conservation (primarily because lights, filters and other equipment lasted longer when operated less hours per year). Due to site-specific factors, not all facility managers will experience every benefit, however a high percentage of respondents (92%, 71% and 63%) did experience three of the six “additional benefits” surveyed. Because facility managers do receive some of these “additional benefits”, we developed two approaches to quantify their value. When applicable, these benefits should yield a direct and verifiable dollar savings a majority of the time. Via a simple example, we calculated these benefits to be worth approximately 31% of additional value beyond the direct energy dollar savings (and that was only applying half of the possible benefits). There are other benefits that defy quantification, some of which we list at the end of the paper for use in future research and when evaluating energy conservation projects and programs.

Survey Results

Additional Benefits of Energy Conservation	% of Facility Managers that Experienced this Benefit
1. Reduced Maintenance Material Costs	92%
2. Reduced Maintenance Labor Costs	71%
3. Permanently Avoided Capital Investment	33%
4. Avoided Procurement Costs	63%
5. Avoided Purchases of Carbon Offsets	10%
6. Enhanced Image, Public Relations or Recognition	44%
7. Reduced Sales Taxes/Environmental Penalties	Not Surveyed
8. Improved Building Value	Not Surveyed

“CORE” Benefits

Additional Benefits of Energy

Lights on less means
they last longer

1. Reduced Maintenance Material Costs
2. Reduced Maintenance Labor Costs
3. Permanently Avoided Capital Investment

Ex: You save a lot of
energy, and don't need
that extra chiller that
was planned.

HVAC on less means
less labor to replace
filters

“CORE” Benefits

Using Chiller Ex... You
would also avoid legal,
admin and other
procurement costs

Less Energy Used means
Less
Carbon/Sustainability
Offset Costs

4. Avoided Procurement Costs

5. Avoided Purchases of Carbon Offsets

6. Enhanced Image, Public Relations or Recognition

Free “Green Marketing”

Templates are within Paper

Benefit #1: Sample Calculation for Reduced Maintenance Material Costs:

Assume you turn off a lighting system 25% of the time (due to vacancy). If lights are used 25% less, the lighting ballasts (and lamps) should last about 25% longer. Let's calculate the impact on the ballast material first:

A ballast life is rated for 60,000 hours of operation. If your building operates the lights 5,000 hours per year, they would need to replace the ballasts at the 12th year. If there are 5,000 ballasts, each costing about \$20 in material (includes shipping and taxes), then at the 12th year, the material replacement cost would be:

$$\begin{aligned} &= (\$20/\text{ballast})(5,000 \text{ ballasts}) \\ &= \$100,000 \end{aligned}$$

Annualized ballast material replacement cost would be:

$$\begin{aligned} &= (\$100,000)(1/12 \text{ years}) \\ &= \$8,333/\text{year} \end{aligned}$$

If the lights are only “on” 3,750 hours/year (a 25% reduction), the ballasts should last 16 years. This would reduce the annualized ballast material replacement cost to:

$$\begin{aligned} &= (\$100,000)(1/16 \text{ years}) \\ &= \$6,250/\text{year} \end{aligned}$$

Thus, the Annualized Material Savings for ballasts are:

$$\begin{aligned} &= \$8,333/\text{year} - \$6,250/\text{year} \\ &= \$2,083/\text{year in ballasts} \end{aligned}$$

“CORE” Benefits

Via Example Application, we calculate:

Additional Benefits (most are Annual)	% Improvement to Energy Savings
1. Reduced Maintenance Material Costs	4.8%
2. Reduced Maintenance Labor Costs	6.2%
3. Permanently Avoided Capital Investment	
4. Avoided Procurement Costs	
5. Avoided Purchases of Carbon Offsets	10%
6. Enhanced Image, Public Relations or Recognition	
7. Reduced Sales Taxes/Environmental Penalties	10%
8. Improved Building Value	
Total Additional Value from this ECM	
% Additional Value Improvement Beyond Energy Savings of \$75,000/year	31%

Thank You

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