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The Hidden Benefits of Energy Efficiency A Case Study

Energy efficiency retrofits save significant amounts of money in more ways than just reduced energy costs...As much as 17% greater than by calculating energy savings alone.

Here's how: For example, the average lighting retrofit will reduce energy consumption by about 25% over previous systems. Consider the lighting requirements of a large school with 10,000 light fixtures.

Benefits from reduced electricity use:

Assumptions:

5,000 hours per year lighting usage

Each fixture uses 60W of electricity

12 cents is the cost for one kW of electricity

Base energy cost: \$360,000

Reduced energy cost: \$270,000

Net savings per year = \$90,000

Value of Extended Equipment life:

Assumptions:

\$40 average cost per electronic ballast installed

5,000 ballasts

Rated at 60,000 hours of operation, which is 12 years base and 16 years with the retrofit.

Base ballast replacement cost per year = $\$200,000 / 12 = \$16,667$ per year

Ballasts replacement costs with 25% reduction = $\$200,000 / 16 = \$12,500$

Net savings per year = \$4,167 (4.63% of energy savings)

Value of Reduced Maintenance:

Assumptions:

\$5 per lamp including installation

20,000 hours of lamp life, 4 years base and 5.3 years with efficient system

Base yearly maintenance costs: $\$5 \times 10,000 = \$50,000 / 4 = \$12,500$

Reduced yearly maintenance costs: $\$50,000 / 5.3 = \$9,434$

Hidden Benefits Breakdown

Savings for the sample case per year:

Reduced Electricity use savings:

\$90,000

Extended Equipment Life:

\$4,167 (4.63%)

Reduced Maintenance:

\$3,066 (3.41%)

Energy Price Spikes:

\$5,625 (6.25%)

Carbon Credits

\$2,333 (2.59%)

Energy Alone:

\$ 90,000

Hidden Benefits:

\$105,191

17% Greater cost savings per year.

Net savings per year = \$3,066 (3.41% of energy savings)

Value of reduced risk to Energy Supply Price Spikes:

Assumptions:

One quarter of the year is susceptible to electricity price spikes of 25%.

750,000 kWh are saved with the new system.

Cost of electricity is 3 cents/kWh higher when the price spikes.

Avoided price spike then equals (3 cents)(750,000 kW/yr)(1/4)

Net savings per year = \$5,625 (6.25% of energy savings)

Value of Selling Carbon Credits:

Assumptions:

1.37 lbs of CO₂ are created for every kWh of electricity used.

750,000 kWh = 466.5 metric tons of CO₂ avoided.

CO₂ carbon credits have a value of at least \$5.00

Net value of carbon credits per year = \$2,333 (2.59% of energy savings)

The value of enhanced Public Image:

Although this cannot be computed, companies who associate themselves with sustainability and “being-green” can differentiate themselves from competitors, as well as gain better access to talent, be more productive, and gain market share. Energy reductions and initiatives can be published to improve the organization’s image to employees, clients, suppliers, distributors, shareholders, and other groups involved with the organization.

Total calculated benefits beyond energy savings:

\$15,191 - A full %17 greater savings than by calculating energy savings alone.

Assumptions and data for this case study are modeled after “The ‘Secret Benefits’ from Energy Conservation,” Which appeared in Vol. 28, No. 1 of the journal: Strategic Planning for Energy and the Environment.