

Michaels Engineering Energy Brief

LIFE CYCLE COSTS

SUGGESTIONS...

Do you have certain Energy Efficiency topics you'd like to know more about? Send an email with your suggestion to the author listed below and your topic might become a future Energy Brief!

DID YOU KNOW...

...Life cycle cost includes the TOTAL cost of building and operating a system or building over the life of the project.

...The ubiquitous payback is only a rough approximation of cost effectiveness. Life cycle cost for new construction projects is the criterion you need to evaluate when making your decisions.

MEET THE AUTHOR



Jeff Ihnen is the Energy Division Manager at Michaels Engineering. For more information on this topic or additional energy concerns, please contact Jeff at:

(608) 785-1900 or
JLI@MichaelsEngineering.com

→ WHAT IS COST EFFECTIVE?

Imagine that you are my financial advisor. The following are four actual ventilation system options for a ground-source heat pump system that I need for my new building. The base case is the least expensive, least efficient option. The other three alternatives compare to the base case.

Which option do you recommend?

If you picked Alternative #1, you're fired. Stunned, you ask, "What are you talking about?" My response - "You've just recommended something that is going to cost me \$38,000 extra over the life of the project. The baseline you are comparing to might even be the best deal! If you don't do the life cycle cost analysis, how do you know?"

	First Cost	Annual Operating Cost	Incremental First Cost	Annual Operating Savings	Payback (Years)
Base Case	\$ 50,000	\$ 29,924	NA	NA	NA
Alternative #1	\$ 107,780	\$ 8,048	\$ 57,780	\$ 21,876	2.64
Alternative #2	\$ 155,285	\$ 3,238	\$ 105,285	\$ 26,687	3.95
Alternative #3	\$ 247,937	\$ 9,881	\$ 197,937	\$ 20,044	9.88

Life cycle cost includes the TOTAL cost of building and operating a system or building over the life of the project. It includes first cost, energy cost, maintenance cost, cost of capital, and fuel cost escalation. All future operating costs are converted to present cost using time value of money formulas.

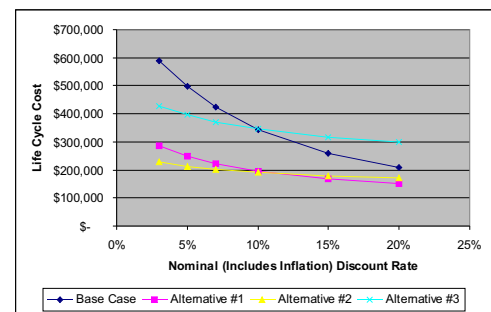
→ THE BOGUS PAYBACK

The ubiquitous payback is only a rough approximation of cost effectiveness. Life cycle cost for new construction projects is the criterion you need to evaluate when making your decisions. Why? Payback isn't worth anything. I can't buy books, computers, vehicles, or pay my people more with payback. I can buy these items with greenbacks.

→ WHY DO SOME CUSTOMERS SPECIFY PAYBACK?

Many of our clients, particularly for-profit enterprises, will specify a maximum payback period that they consider cost effective for retrofit projects. However, payback isn't the criterion. It is a result of the criterion. The real criterion is positive cash flow; meaning savings are greater than payments from day one. Determining cash flow requires life cycle cost analysis.

To demonstrate, take a look at how the four options above stack up using different discount rates. A discount rate indicates the cost of capital. A 20% discount rate means capital is expensive whereas a 5% discount rate is on par with the rate at which a public institution like a school can issue bonds for capital improvement.



→ DISCUSSION

Consider how rapidly the life cycle costs decline versus the rising discount rate for the least efficient base case. See why for-profits need a lot of energy savings (quick payback) per dollar invested? To them, a dollar today is worth a LOT more than a dollar saved 10 years from now.

Alternative #1 with the quickest payback isn't the lowest cost option until your cost of capital exceeds about 12%. Nearly any public institution can finance projects at a lower rate than 12%. Have you been making the right decisions?