

## Is green a good investment?

WHILE MY company focuses more on reducing demand than on generating energy, the results are the same. Our clients use less energy, lower their carbon emissions, and reduce dependence on foreign oil. Yet these benefits aren't always the dominant buying motive. In fact, I am frequently asked, "How much does it cost and what is the payback?"

*When evaluating a renewable energy project, the challenge is establishing an accurate discount rate involving many variables.*

Usually the first cost is greater than the fossil fuel alternative. The payback question is harder to answer. I hope to dissuade you from using the "P" word to evaluate sustainability projects and to provide insight into the underlying question, "Is green a good investment?"

### Investment value, IRR, and net present value

The value of an investment is based on available alternatives for spending capital. The smartest investment is the one that provides the highest return at the lowest risk. Consumers asking about payback are literally defining the best value as getting their money back in the shortest time. In this case, the best investment is doing nothing. If the project is considered an investment (versus an expense), the ideal metric is internal rate of return (IRR). The IRR establishes the worth of an investment based on a variety of factors including the consumer's financial situation.

One should look at an investment in terms of its net present value (NPV): the value of a series of cash flows after adjusting for the rate of inflation. For example, the present value of \$100 per year for 10 years is \$1,000. The NPV of the same cash flow is \$853 adjusted for 3% annual inflation. To avoid losing real value, any fixed interest

rate investment would have to equal or exceed the inflation rate. The NPV is calculated using the bank interest rate less inflation. For other investments, such as renewable energy systems, the NPV is calculated using the internal rate of return (IRR). If the IRR is more than the cost of the invested capital, the investment is positive. Considering the example above, avoiding \$100 per month in utility costs is akin to receiving \$100 per month. However, the IRR is calculated using a discount rate that is based on several conditions, including inflation.

### The key factor: financial alternatives?

When evaluating a renewable energy project, the challenge is establishing an accurate discount rate involving many variables. These may be subjective and different for each investor: risk tolerance, the cost of capital, volatility of utility prices, technology type, location, and most notably, the consumer's financial condition. A higher discount rate reduces the net present value of an investment. For example, a risk-averse consumer would assign a high discount rate to a share in an oil well versus a home improvement that reduces utility expenses. The reverse is true for a pipeline investor who views the "safe" home investment as a lost opportunity to earn high yields. Neither investment is wrong; rather, each is dependent on the consumer's financial situation and values.

*Renewable energy systems have additional variables to factor into the IRR —net system cost, operating costs, anticipated life span, and utility price escalation.*

Consumers usually do not make a purchase based simply on financial return. Let's assume they do and let's reject green benefits such as improved health, comfort, indoor air quality, and reduced carbon emissions. What



The advertisement features a collection of Mafell power tools. On the left is a Chain/Slot Mortiser. In the center is a Chain Beam Saw. To the right is a Portable Band Saw. Further right is a Circular Saw and more tools. The Timberwolf Tools logo is on the far right, with the website timberwolftools.com and phone number 800-869-4169. The slogan at the bottom reads: "Your best source for the world's finest Timber Framing Tools".



On a cabin built by Ed Shure (Timmerhus) in Nederland, Colo., the crew “flies in” the heat pump to the mechanical room.



Al Wallace

A solar hot water panel installation in Golden, Colo., between snow storms.

then is the IRR on green investment options using a variety of sustainable technologies?

Consider a \$10,000 investment in a geothermal heat pump that saves \$1,000 annually over a fossil fuel system and has a useful life of 20 years. The simple return on investment would be 10% with a payback of 10 years. In determining the IRR, the discount rate is established by the potential uses for the \$10,000. Consumer A with \$10,000 in credit card debt may have a discount rate of 16%—the impact of not using the cash to pay off the high interest debt. Consumer B may have a discount rate of 4% established by the interest on a home equity line of credit. For the same investment, Consumer A would have a negative IRR while Consumer B’s would be positive: this project would be good for Consumer B, but not for Consumer A. Calculating the NPV, Consumer A would lose \$4,400 while consumer B would make \$2,800. Re-stated, a payback of 24 years is good for Consumer B and a payback of 6 years is bad for Consumer A. This example highlights the importance of using IRR for evaluating sustainable alternatives versus relying on simple payback.

Renewable energy systems have additional variables to factor into the IRR—net system cost, operating costs, anticipated life span, and utility price escalation. Net cost is the installation cost less financial incentives such as tax credits. Operating or maintenance costs may vary from a heat pump with a 10-year warranty to a wind turbine

with a five-year warranty. The anticipated life span of the heat pump is 15+ years, with 50+ years on the ground loop. The ground loop adds value to the property. Utility prices are volatile: propane is now three times the price of natural gas in Colorado, yet five years ago the costs were comparable. IRR increases when costs are lowered, systems last longer, and utility prices rise.

To determine which green investment is right for you, consider these observations.

- Energy efficiency and renewable energy have a higher IRR than current fixed interest rate investments.
- Insulation and air sealing should precede any investment in renewable energy and delivers a higher IRR than geothermal, wind, or solar.
- With few exceptions, replacement windows have a low IRR.
- Given similar financial incentives, ground source heat pumps provide a higher IRR than solar hot water, solar PV, or small wind turbines.
- Solar PV has a higher IRR than a 10-kilowatt wind turbine on a tall tower, except at northern latitudes with consistent 10–12 mph winds.
- Small wind turbines on short towers and tankless water heaters rarely provide a positive IRR.

Since everyone uses energy even during a recession, investing in reduced energy costs is a sound strategy for your wallet and the world.

— Al Wallace

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