

Energy Efficiency and the Tyranny of Economics

The difference between
cost/effectiveness

Presentation goals

- Assorted cost/benefit analysis approaches
- Predicting the future: tarot cards, yarrow sticks, economics.
- Cost/Benefits in energy efficiency

Economic analysis

- Simple Payback: first cost divided by annual savings (in dollars)
- Discounted payback, rate of return.
- Cost of saved energy:
 - Levelized, (utility perspective)
 - Societal cost (TRC)
- Consumer cash flow

Cash NOW!

- Discount Rate: Time Value of Money
 - The rate at which your money is returned
 - In investments, the annual interest paid.
 - Roughly, the inverse of the payback period
- The value of money received in the future relative to today
- Used in the same way as an interest rate on a loan (the bank's discount rate is the interest rate)

Whose Cash, When

- Different perspectives, different discount rates.
 - Societal, the longevity (rate of return) of an investment for a social good (a generating plant, highway, education system)
 - Utility, the return on an investment relative to investor or regulator tolerance
 - Consumer, the tolerance for future income from a current cash

Inflation: Why we care

- The tendency for goods to cost more over time (CPI)
- The more inflation the more uncertainty in the value of future cash
- An Inflation rate determine value of a dollar that you keep in your mattress over time.
- We need to be sure that the analysis takes into account the changing value of money

Fuel Escalation

- The changing value of fuel relative to inflation
- Historically similar or smaller than inflation
- Recommended sources: Tarot, NPCC, Daddy

What is your discount rate?

- Society should be making long term decisions
 - Infra-structure might be a century or more (1%)
 - Power plants might last 40 years (2.5%)
 - The legislators need to see results in five years (20%)

What is your discount rate

- The utility
 - The investors need a secure return and stay ahead of inflation (8%)
 - The regulators need a good return for the ratepayers (10%)
 - The utility investors need to compete with the blue chips (15%)

What is your discount rate

- Consumer
 - I have to get as much as my savings account! (2%)
 - I have to compete with my mutual funds (8%)
 - I need to go on a really nice vacation next year (50%)
 - I need to get a mortgage (7%)

Real Dollars

- Discount rates should be net of inflation
- If the utility discount is 10% and inflation is 4% then the real discount rate is about 6%
- To do the long term analysis the dollars you are using need to be specified
 - For example, if you do the analysis today with today's prices then you are using 2007 “real dollars”
 - If you want to compare to a different time then the inflation rate between those times will be needed

Cost/Effectiveness

- **Societal:** What matters to the society as a whole. The ratio between all costs incurred by anybody (Total Resource Cost) and all benefits received by anybody.
- **Utility:** The cost of the energy saved relative to the cost of some other energy that might be purchased, usually levelized (\$/kWh).
- **Consumer:** The value of the savings to the initial investment (payback period, IRR)

An Exercise in C/B Analysis

Famous Final Words

- Cost/benefit is easy, predicting the future is hard
- “Son, there’s a big difference between price and cost” –Milt
- Remember the importance of Journalism:
 - Tell a good story!