Reaching our Energy Efficiency Potential and our Greenhouse Gas Objectives

Are Changes to our Policies and Cost Effectiveness Tests Needed?

By

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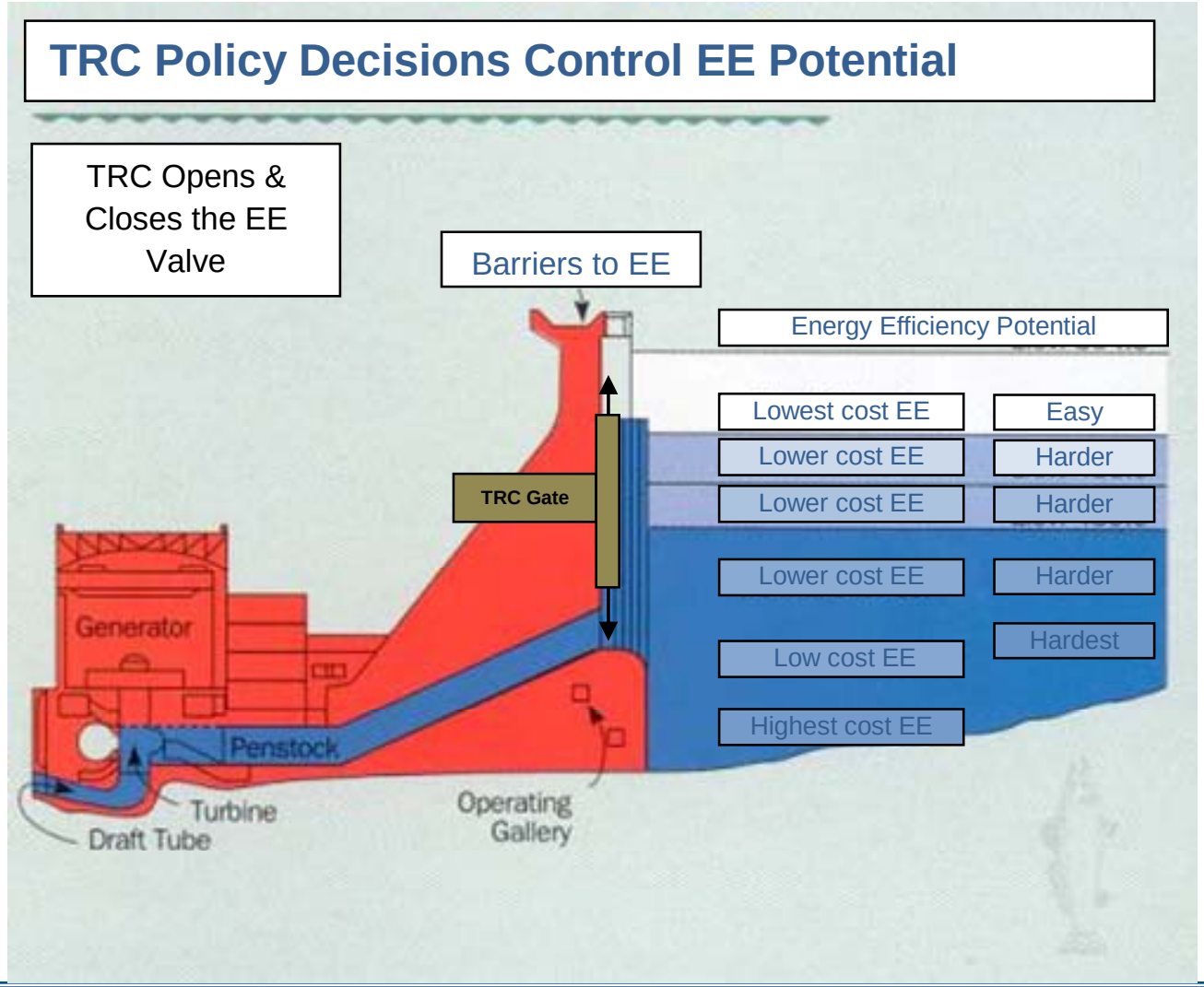
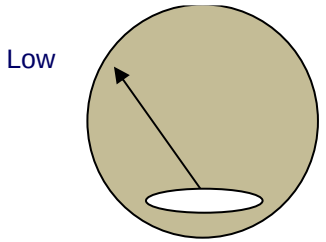
The TRC is the EE Valve



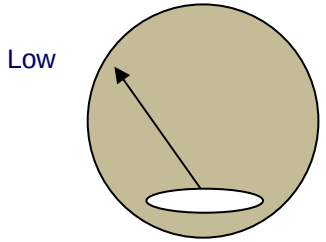
The EE Control Valves are…

Low EE ---------- High EE



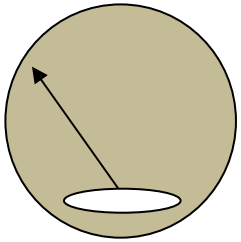
Avoided Cost

High EE ---------- Low EE



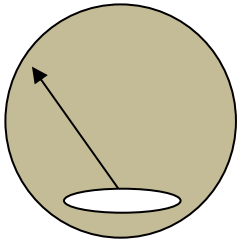
Discounting

Low EE ---------- High EE



Carbon Value

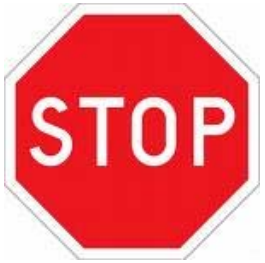
Low EE ---------- High EE



Effective Useful Life

These values are set is state and federal policy.
How they are set limits the amount of energy and carbon that can be saved.

Objectives



What this paper is NOT about:

1. Not for B/C approach recommendations or to push for a specific approach.
2. Not about energy supply choice decisions, the current B/C tests handle this well.
3. Not about getting full use out of our current energy infrastructure – assumes that this will be handled well in the future.

Objectives

What this paper IS about:

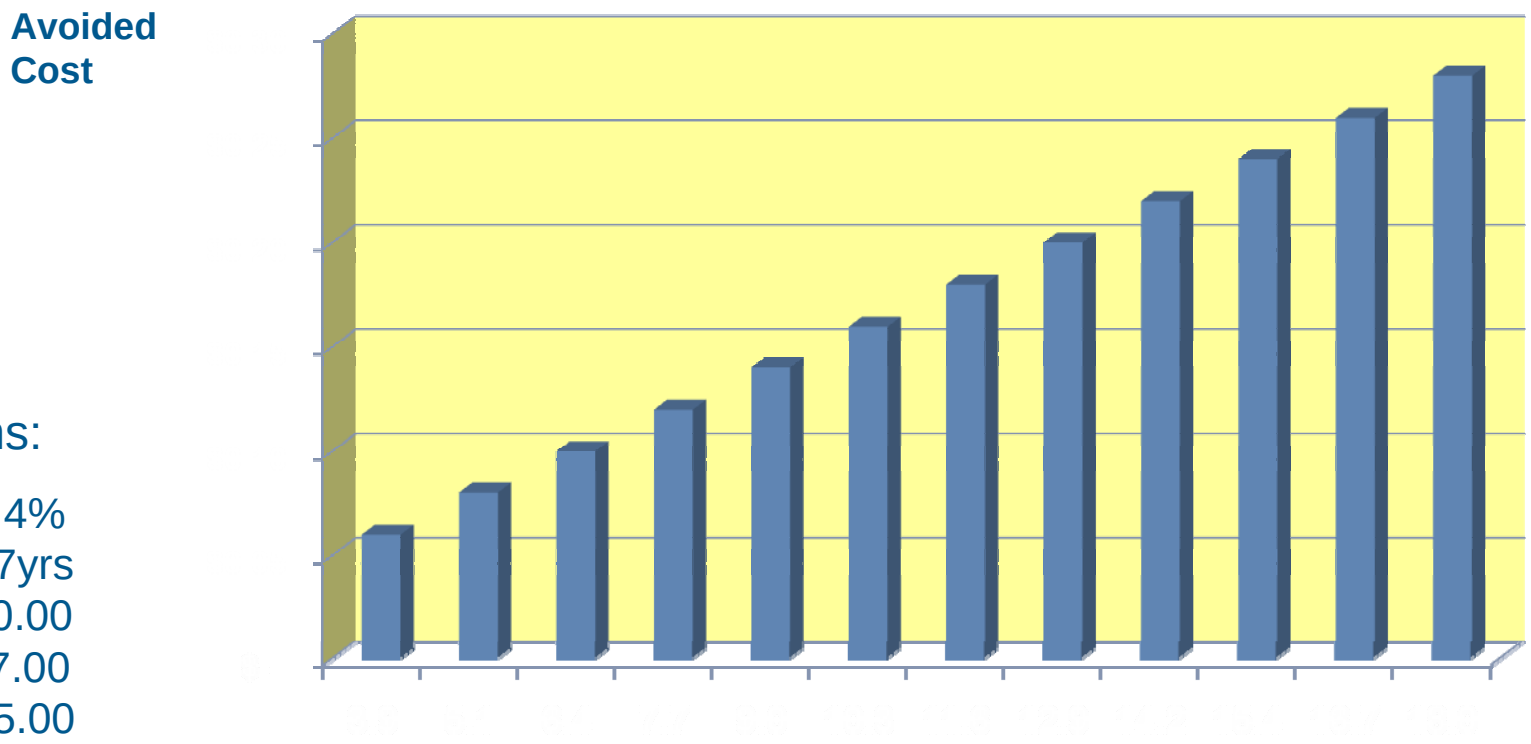
1. This paper is about B/C analysis of climate change programs that use EE as an approach.
2. To bring attention to current B/C approaches and their use as a climate change tool.
3. To examine the impacts of current calculation choices on the ability of programs to capture carbon reductions.
4. To stimulate professional discussion about our benefit cost approaches.

Avoided Costs

- Does it make sense to set avoided cost at the cost of the supply approach the climate change program is trying to avoid?
- Setting avoided cost at the cost of burning carbon means that programs must be less expensive than the supply which they are trying to avoid.
- Should we set avoided cost for the energy supply system at the cost of the energy that the climate change programs are trying to avoid. (carbon supplies)

Impact of Avoided Cost Value

CFL Direct Install Program



Assumptions:

Discount	4%
EUL	7yrs
Carbon	$0.00
First cost	$7.00
Saving	$75.00

$$NPV = \sum_{t=0}^{t} \frac{V_t}{(1+r)^t}$$

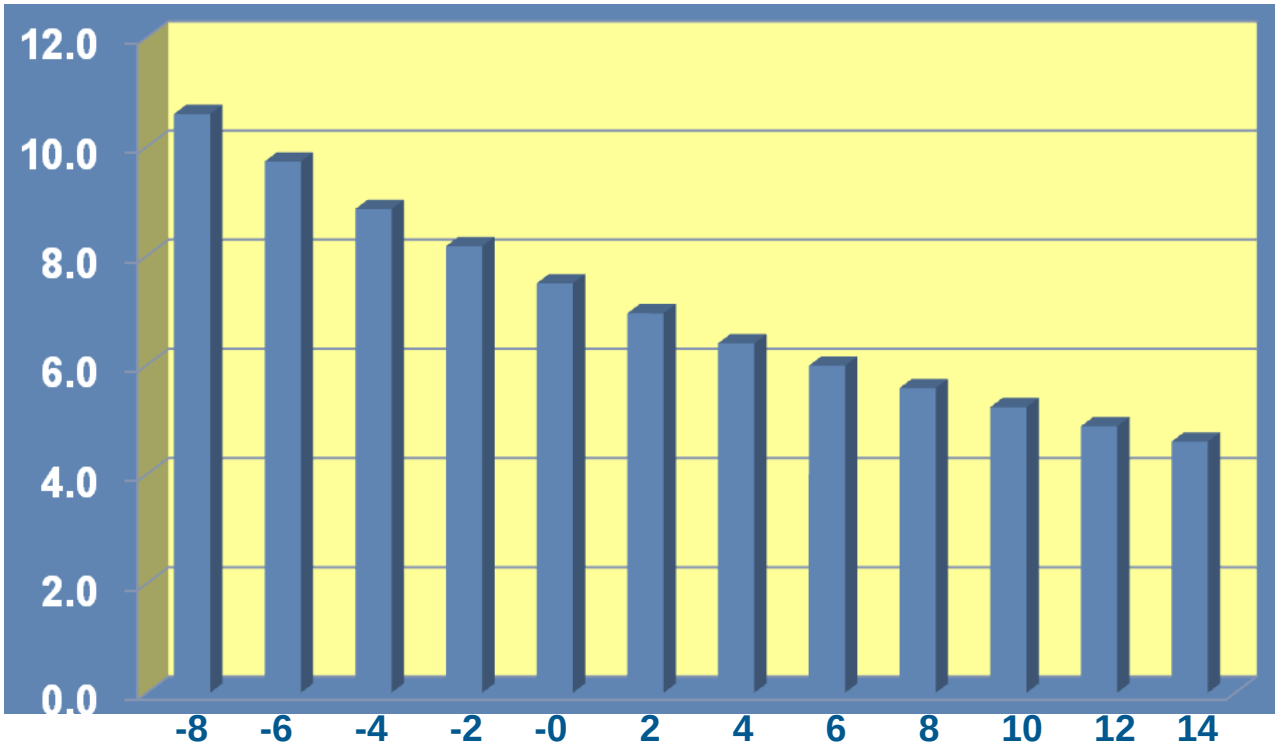
Discounting

1. Carbon objectives are about the future; should a carbon-based kWh saved in year 25 be worth more, less or the same as a kWh today?
2. What is the purpose of discounting if future costs and benefits are not valued, or are valued via a policy decision, rather than a financial impact calculation?
3. If the damage from carbon is expected to increase each year, are we discounting our future health and safety?
4. If discounting prevents us from reaching our national policy objectives, is that okay?
5. What other national policy decision of such magnitude was made via a NPV discounting approach?

Impact of Discounting

CFL Direct Install Program

TRC Test - Results



Assumptions:

Avoided cost	$.10
EUL	7yrs
Carbon	$0.00
First cost	$7.00
Saving	$75.00

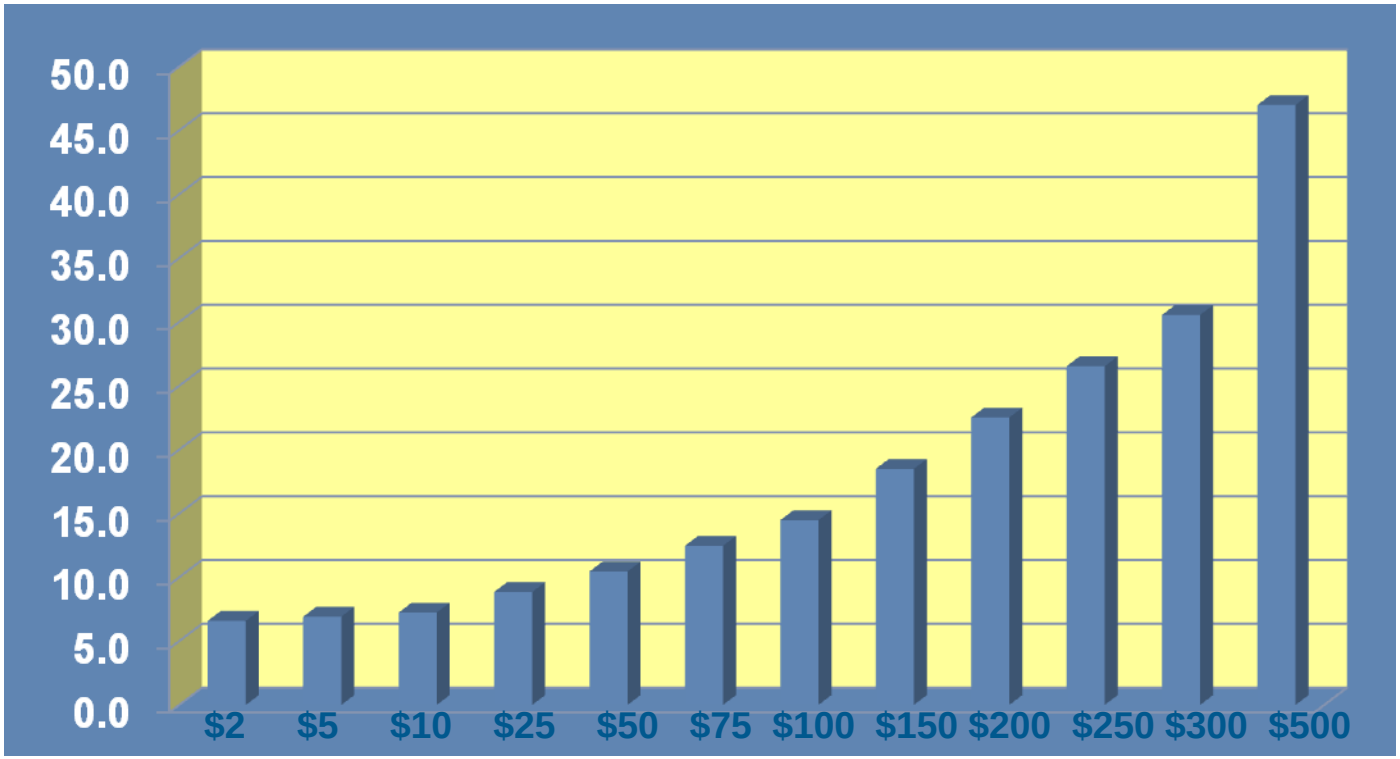
Value of Carbon

1. If climate change is a national objective, should the value of the carbon saved be included in B/C tests?
2. The Stern and Plan B reports suggest that cost of climate change damage will be greater than the cost of the energy purchased.
3. Damage costs estimates run from about $100 per ton to $300 per ton.
4. Traded values run from $2 per ton to $50 per ton.
5. What value should be set for carbon?

Impact of Carbon Value

CFL Direct Install Program

TRC Test - Results



Value of Carbon $/ton

Assumptions:

Avoided costs	$.10
Discount	4%
EUL	7yrs
First cost	$7.00
Saving	$75.00

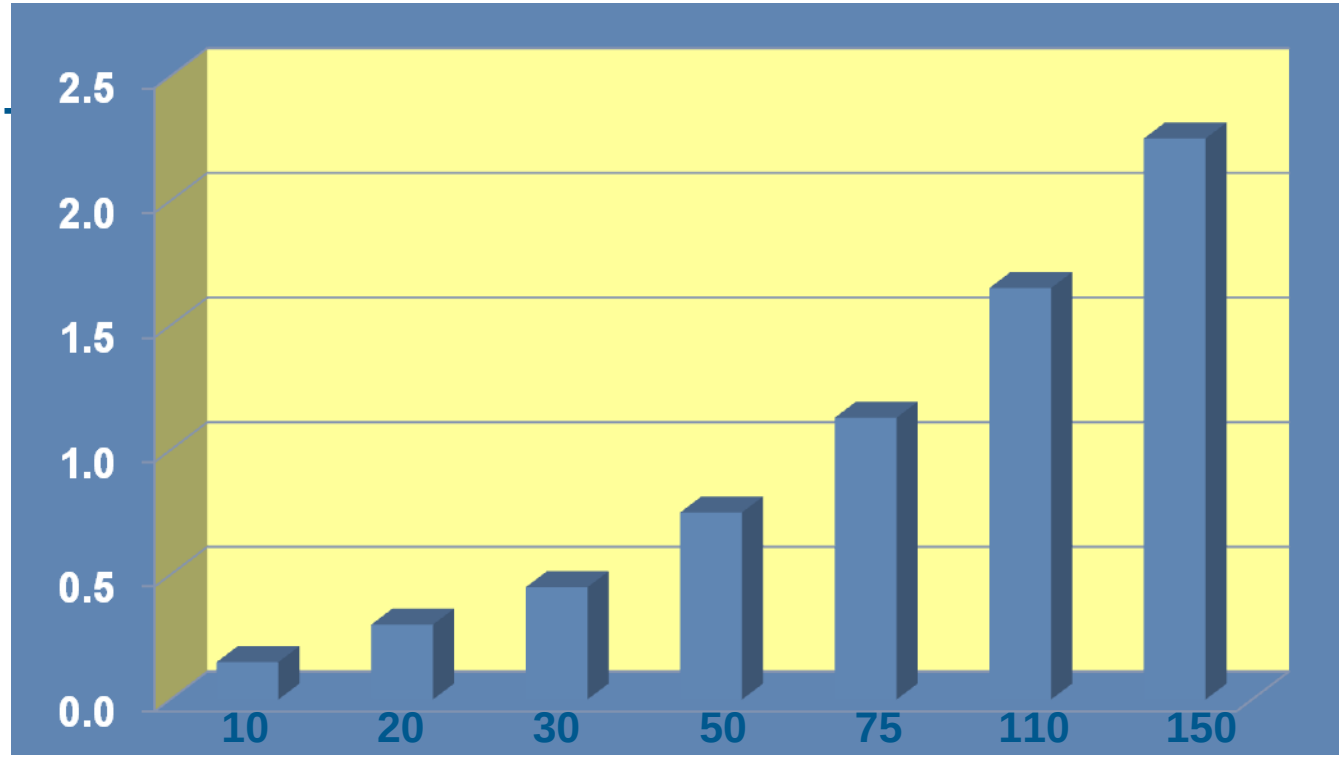
Effective Useful Life

1. Should we count the full EUL of the measures we consider?
2. Is the majority of carbon reduction captured in the first 20 years for long life measures?
3. Do insulation, vapor barriers, windows, shell changes, stop functioning at the 20th year?
4. Does setting a policy limit of 20 years impact the B/C?

Impact of the Effective Useful Life

Window Replacement Program

TRC Test - Results



Effective Useful Live

Assumptions:

Avoided Cost	$.10
Discount	2%
Carbon	$0.00
First cost	$200.00
Saving	$30.00

The Four Changes

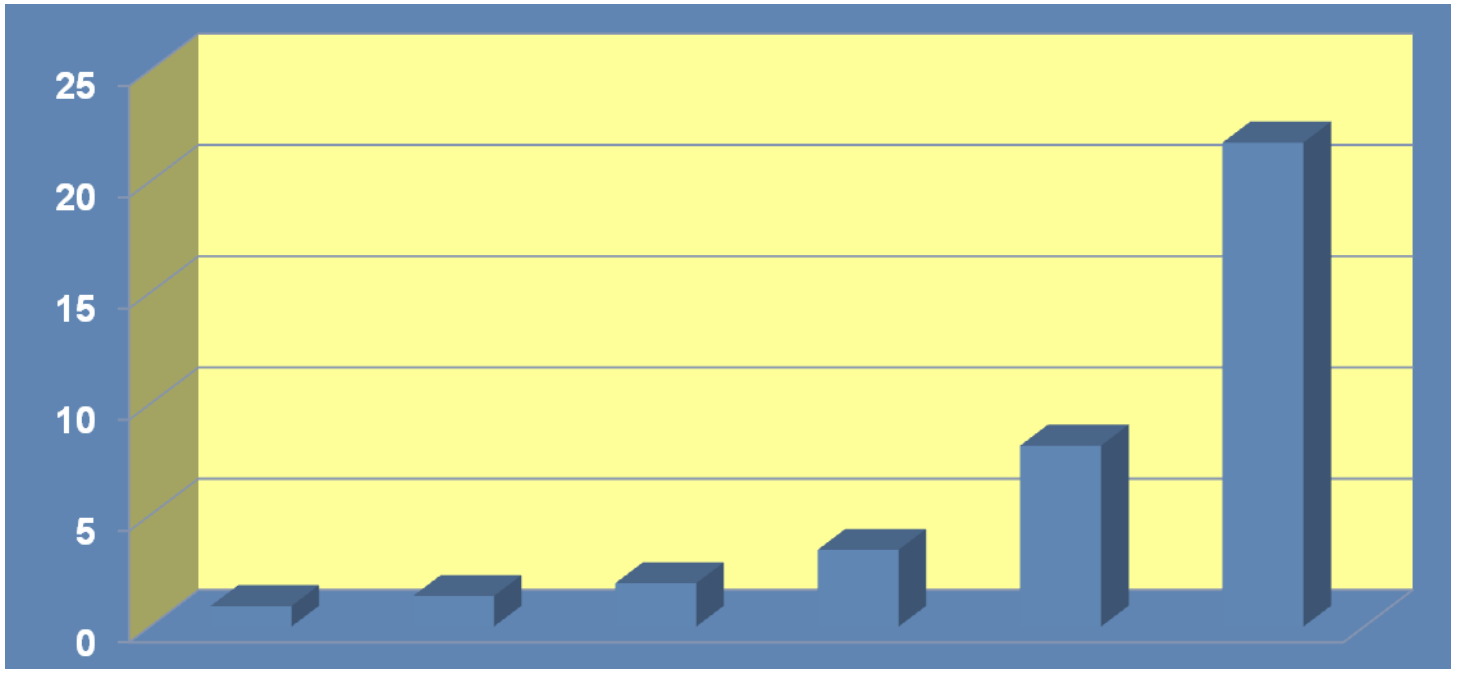
1. What are the differences in the programs we can design with the various changes noted above?
2. Would programs be able to capture the energy and carbon potential needed to reduce consumption enough to meet climate objectives?

Making a Typical Home Super Efficient

Spending $30,000 per home to save about $2,000 per year
To achieve about a 70% reduction in carbon

Dis 4%	Dis 3%	Dis 2%	Dis 1%	Dis 0%	Dis -1%
EUL 20	EUL 30	EUL 40	EUL 50	EUL 75	EUL 100
CO_2 $0	CO_2 $3	CO_2 $5	CO_2 $25	CO_2 $50	CO_2 $75

TRC



TRC	.92	1.37	1.95	3.34	8.13	21.46

Really Rebuilding America?

1. If the United States was serious about this what would it take....
   1. On a national scale 4,000,000 jobs for 20 years to up-grade most every home?
   2. Spending $3 trillion to save $15 trillion in energy?
   3. Reduce carbon emissions by about 70-75%

…..And this is just in residential homes.

Q. Where should we set these values?. . . . . .
A. How much carbon & energy do you want to save? A lot, or a little?