

Energy Efficiency Concerns

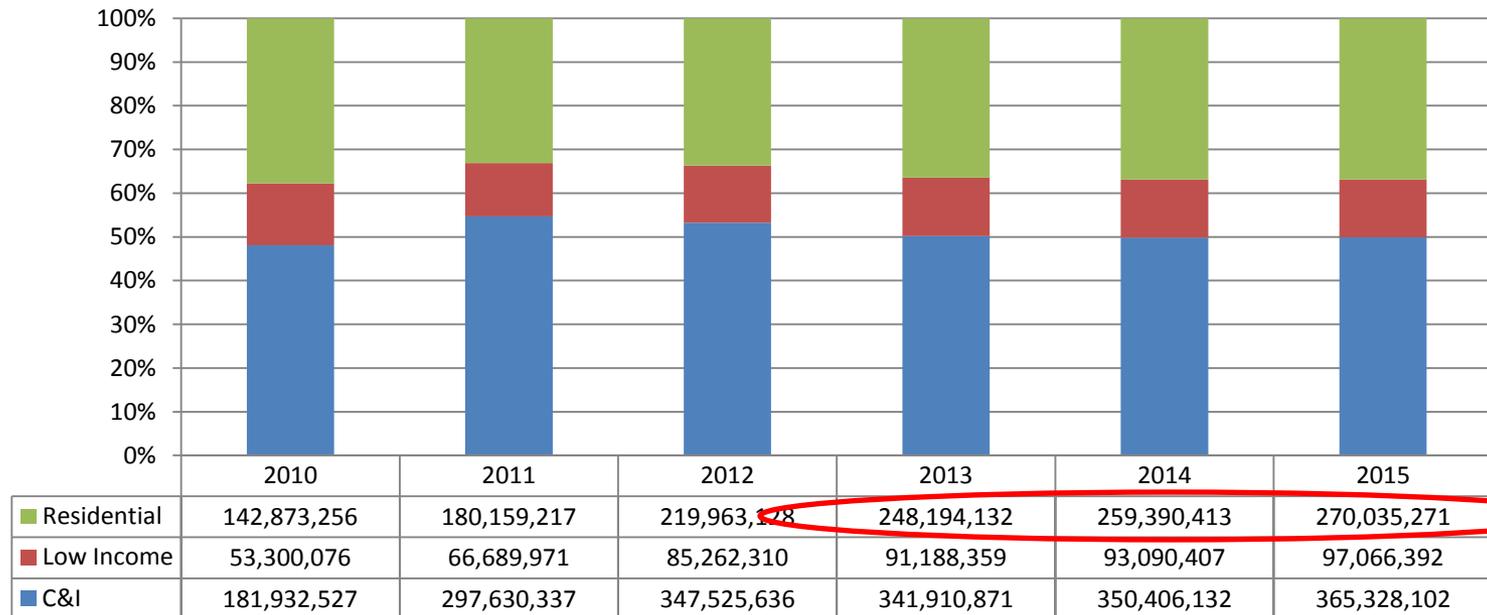
Presented to the Energy Policy Review Commission

1 May 2013

Tom Regh, Progressive Energy Services, LLC

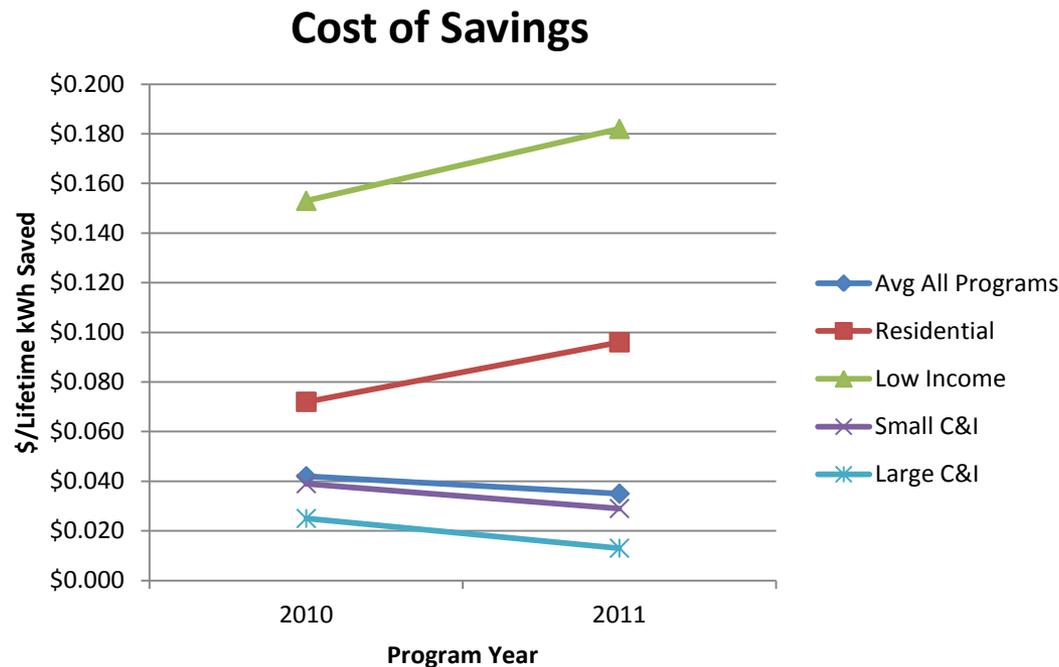
Why do we need to keep talking about Residential?

Program Budget By Sector



Buildings account for 40% of total energy consumption, with 22% residential and 18% commercial!!

Residential Programs are Costly



- 33% increase in Residential program costs despite overall 17% decrease in average of all programs.
- 2011: Residential program cost of savings was 174% higher than average of all programs, and 433% higher than weighted average of small and large C&I programs.

Program Administrators and Consultants have acknowledged that “C&I is where we have spent our money cost-effectively”.

Cost-Effectiveness and the TRC Test

Non-Resource Benefit	Electric Programs	Gas Programs
Thermal Comfort	\$125/yr	\$25/yr
Noise Reduction	\$31/yr	\$11.22/yr
Home Durability	\$149/yr	\$9.57/yr
Equipment Maintenance	\$124/yr	N/A
Health Benefits	\$4/yr	\$0.79/yr
Property Value Increase	\$1,998	\$381.28
National Security (oil savings only)	\$1.83/measure/yr	N/A

- Cost-effectiveness is mandated by the GCA, and is important, but there are several different ways to calculate.
- TRC test is biased. It includes all costs but not necessarily all benefits.
- Non-resource benefit values are intangible and subjective, and can only be determined by the program participant themselves.
- Benefits are not consistent between electric and gas programs. Why?
- Many national experts agree that it is more sensible to use Program Administrator Cost Test (PACT).

Cost Benefit Screening Model

Example: NGRID 2013 Electric Program

Measures, National Grid 2013 Electric Program	Participants	Measure Life (Years)	TRC Cost (\$)	Incentive Cost (\$)	Participant Cost (\$)	Gross Annual Energy Savings (kWh)	Gross Annual Oil Savings (MMBTU)	Total Gross Annual Savings (MMBTU)	Annual Non-Resource Benefits (\$)	One-Time Non-Resource Benefits (\$)	Total Lifetime Savings (MMBTU)	Total Lifetime Non-Resource Benefits (\$)	Measure Cost per MMBTU Saved (\$)	Total Lifetime Program Savings (MMBTU)
MassSave HEA	18,500	19	\$0	\$0	\$0	0	0	0.00000	\$129.90	\$599.40	0.0	\$3,067.50	N/A	0
CFL, Screw-In	296,000	6	\$9	\$9	\$0	35	0	0.11942	\$0.00	\$3.00	0.7	\$3.00	\$12.56	212,090
Thermostat, Oil	1,551	15	\$92	\$25	\$67	0	3.4	3.40000	\$0.00	\$0.00	51.0	\$0.00	\$1.80	79,101
Boiler Reset Control	1,034	15	\$300	\$200	\$100	0	4.7	4.70000	\$0.00	\$0.00	70.5	\$0.00	\$4.26	72,897
Duct Sealing, Oil	0	20	\$950	\$400	\$550	0	4.1	4.10000	\$0.00	\$0.00	82.0	\$0.00	\$11.59	0
Duct Insulation, Oil	0	20	\$550	\$413	\$138	0	7.7	7.70000	\$0.00	\$0.00	154.0	\$0.00	\$3.57	0
Air Sealing, Oil	2,068	15	\$730	\$730	\$0	0	5.6	5.60000	\$0.00	\$0.00	84.0	\$0.00	\$8.69	173,712
Insulation, Oil	4,808	25	\$2,000	\$1,568	\$432	224	12.2	12.96429	\$0.00	\$0.00	324.1	\$0.00	\$6.17	1,558,307
Heating System Replacement, Oil	4,136	18	\$765	\$475	\$290	0	7.2	7.20000	\$0.00	\$0.00	129.6	\$0.00	\$5.90	536,026
Oil Boiler FHW, Early Retirement	590	10	\$766	\$750	\$16	0	25.4	25.40000	\$0.00	\$0.00	254.0	\$0.00	\$3.02	149,860
Deep Energy Retrofit	56	25	\$26,428	\$22,464	\$3,964	290	53.92	54.90948	\$0.00	\$0.00	1372.7	\$0.00	\$19.25	76,873

A number of anomalies will be described in subsequent slides.

Anomaly #1: Non-Resource Benefits

Measures, National Grid 2013 Electric Program	Participants	Measure Life (Years)	TRC Cost (\$)	Incentive Cost (\$)	Participant Cost (\$)	Gross Annual Energy Savings (kWh)	Gross Annual Oil Savings (MMBTU)	Total Gross Annual Savings (MMBTU)	Annual Non-Resource Benefits (\$)	One-Time Non-Resource Benefits (\$)	Total Lifetime Savings (MMBTU)	Total Lifetime Non-Resource Benefits (\$)	Measure Cost per MMBTU Saved (\$)	Total Lifetime Program Savings (MMBTU)
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The HEA results in no electricity or resource savings, so how can it have non-resource savings? Does a participant experience greater thermal comfort, noise reduction, home durability, equipment maintenance, health benefits, or property value increase simply by having an HEA?

Anomaly #2: HEA Measure Life

Measures, National Grid 2013 Electric Program	Participants	Measure Life (Years)	TRC Cost (\$)	Incentive Cost (\$)	Participant Cost (\$)	Gross Annual Energy Savings (kWh)	Gross Annual Oil Savings (MMBTU)	Total Gross Annual Savings (MMBTU)	Annual Non-Resource Benefits (\$)	One-Time Non-Resource Benefits (\$)	Total Lifetime Savings (MMBTU)	Total Lifetime Non-Resource Benefits (\$)	Measure Cost per MMBTU Saved (\$)	Total Lifetime Program Savings (MMBTU)
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Why does the HEA, which has no electricity or resource savings, have a measure life of 19 years? Are we double counting non-resource savings for participants who have another HEA within 19 years?

Anomaly #3: Measure Cost per MMBTU Saved

Measures, National Grid 2013 Electric Program	Participants	Measure Life (Years)	TRC Cost (\$)	Incentive Cost (\$)	Participant Cost (\$)	Gross Annual Energy Savings (kWh)	Gross Annual Oil Savings (MMBTU)	Total Gross Annual Savings (MMBTU)	Annual Non-Resource Benefits (\$)	One-Time Non-Resource Benefits (\$)	Total Lifetime Savings (MMBTU)	Total Lifetime Non-Resource Benefits (\$)	Measure Cost per MMBTU Saved (\$)	Total Lifetime Program Savings (MMBTU)
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Despite the false assumption that an HEA has \$0 TRC Cost, CFL bulbs are just about the least cost effective measure? Why is the HEA so heavily focused on bulbs when the real opportunities (in terms of both amount and cost of savings) seem to be elsewhere?

Anomaly #4: Lost Opportunities

Measures, National Grid 2013 Electric Program	Participants	Measure Life (Years)	TRC Cost (\$)	Incentive Cost (\$)	Participant Cost (\$)	Gross Annual Energy Savings (kWh)	Gross Annual Oil Savings (MMBTU)	Total Gross Annual Savings (MMBTU)	Annual Non-Resource Benefits (\$)	One-Time Non-Resource Benefits (\$)	Total Lifetime Savings (MMBTU)	Total Lifetime Non-Resource Benefits (\$)	Measure Cost per MMBTU Saved (\$)	Total Lifetime Program Savings (MMBTU)
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Why are cost effective measures such as duct sealing and insulating not approved measures? Doesn't the GCA mandate the implementation of ALL cost-effective energy efficiency that costs less than supply?

Anomaly #5: Depth of Savings

Measures, National Grid 2013 Electric Program	Participants	Measure Life (Years)	TRC Cost (\$)	Incentive Cost (\$)	Participant Cost (\$)	Gross Annual Energy Savings (kWh)	Gross Annual Oil Savings (MMBTU)	Total Gross Annual Savings (MMBTU)	Annual Non-Resource Benefits (\$)	One-Time Non-Resource Benefits (\$)	Total Lifetime Savings (MMBTU)	Total Lifetime Non-Resource Benefits (\$)	Measure Cost per MMBTU Saved (\$)	Total Lifetime Program Savings (MMBTU)
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Average insulation project:

- Only 11% implementation rate for air sealing, a “free” service
- Only 26% implementation rate for insulation
- Annual oil savings of just 86 gallons for insulation
- Incentive only \$1,568, less than the max incentive amount of \$2,000

Breakdown of Benefits

TOTAL BENEFITS	Electric Benefits (capacity and energy)	Gas Benefits	Resource benefits (oil, water, propane)	Non Resource benefits	Total Benefits
Electric Plan	\$6,070,508,898	\$(431,740,166)	\$671,033,530	\$1,261,864,939	\$7,571,667,203
% of total	80%	-6%	9%	17%	100%
Gas Plan	\$73,785,518	\$851,566,091	\$34,236,614	391,165,139	\$1,350,853,362
% of total	5%	63%	3%	29%	100%

Examples of non resource benefits:

Residential: thermal comfort, noise reduction, home durability, reduced equipment costs, reduced arrearage (low income)

C&I: Avoided O&M costs, avoided administrative costs, increase in rent revenue

MassSave HES is effectively a light bulb exchange program. Existing program model cannot deliver deep energy savings through weatherization.

property value, benefits,



Cost Effectiveness of Insulation

Inputs from B/C Screening Model

TRC Cost: \$2,000

Measure Life: 25 yrs

Annual Electricity Savings: 224 kWh

Annual Oil Savings: 12.2 MMBTU (86.5 gals)

Other Factors

Discount rate would lower calculated BCR.

Non-resource benefits would increase calculated BCR.

Rising fuel prices would increase calculated BCR.

Calculations

Lifetime Savings: $(224 \times 0.15 + 86.5 \times 3.5) \times 25 = \$8,409$

Benefit-To-Cost Ratio: $8,409 / 2,000 = 4.2$

Assumptions

Electricity Cost: \$0.15/kWh

Oil Cost: \$3.50/gallon



*PA's rationale
for low fixed
contractor
pricing is not
supported by
the data!!*

Costs (including participant expenses) could quadruple and insulation would still be cost-effective!!

Other Considerations

- Unnecessary, unjustified utility monopoly of residential weatherization negatively impacts participants, small businesses, weatherization workers, and program results.
 - Commissioner Cash, 4/17: “Competitive markets can get better, lower costs.”
 - State has not met a reasonable standard for “active supervision”, as required by the two-prong test for anti-trust immunity granted for state action.
- Need for 100% inspection suggests that a new approach is needed
 - Examples of other jobs that impose such intensive oversight?
 - Why so many quality problems???????
 - Contractor training/certification requirements are appropriately rigorous.
 - What has changed? Two years ago, 10% inspection level was satisfactory.
 - Perhaps “You get what you pay for”
 - Better strategy to use majority of inspection budget to compensate contractors at a fair-market rate so they are not coerced into cutting corners just to stay in business
 - Competitive marketplace naturally favors the best contractors.

Case Study

- Homeowner in Townsend, MA arranged MassSave home energy assessment through Unutil.
- Performed by Energy Efficiency Investments, a NH based company.
- Report dated February 28, 2013
- Job number UN-MA-1913
- Blower door test was performed.
- \$10,485.06 total recommendations, with utility rebate of \$3,631.27.

Issues

- Whole house assessment listed at \$1,103.27 with 100% rebate!! No mention of blower door test results in report.
- Bulbs were not installed during the assessment.
- Rebate structure and per square foot prices not explained in report.
- Attic insulation proposed to R65 and R50; payback period 21 years. Does program provide rebates for R values greater than R38?
- Exterior walls already contain fiberglass insulation, confirmed by test hole, yet \$3,569 work proposed with payback period of 37 years!!
- Contractor demanding full payment concurrent with contract acceptance; max 30% deposit allowed by MA law.
- Contract does not specify that permit will be secured for insulation work; required by MA law.
- Contractor will charge additional fees if lead paint present?
- Contract does not specify number of hours of air sealing to be performed.
- Offer expires 10 days after receipt.

Customer was very dissatisfied with the experience, and does not plan to perform any improvements!!

BACKUP SLIDES

Residential Programs are Costly

2010 MassSave Program Results	Total All Programs	Residential	Low Income	Small C&I	Large C&I	Small Municipal
Annual Electricity Savings (GWh) *	610	182	17	71	337	2
Lifetime Electricity Savings (GWh) *	7191	1587	235	864	4475	31
Actual Program Spending (\$M) *	\$301	\$114	\$36	\$34	\$111	\$2
Cost to Savings Ratio (\$/ Lifetime kWh)	\$0.042	\$0.072	\$0.153	\$0.039	\$0.025	\$0.065
Fixed Contractor Pricing		Yes	Yes	No	No	No

* Data source: The 2010 Report of the Massachusetts Energy Efficiency Advisory Council, June 2011

71% higher than total of All Programs,
and 166% higher than weighted average
of Small and Large C&I programs!!

Residential Programs are Costly

2011 MassSave Program Results	Total All Programs	Residential	Low Income	Small C&I	Large C&I	Small Municipal
Annual Electricity Savings (GWh) *	790	227	20	195	348	N/A
Lifetime Electricity Savings (GWh) *	10,503	1,676	280	2,798	5,750	N/A
Actual Program Spending (\$M) *	\$367	\$161	\$51	\$82	\$75	N/A
Cost to Savings Ratio (\$/ Lifetime kWh)	\$0.035	\$0.096	\$0.182	\$0.029	\$0.013	N/A
Fixed Contractor Pricing		Yes	Yes	No	No	No

* Data source: The 2011 Report of the Massachusetts Energy Efficiency Advisory Council, September 2012

174% higher than total of All Programs,
and 433% higher than weighted average
of Small and Large C&I programs!!