Single Family Gas Air/Duct Impact Work

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Background

- Several billing analysis impact studies conducted over 2005-2007
- Variety of approaches have been used
  - Energy Trust leaning toward consistent approach (Normalized annual consumption)
  - Moving to residential impact work in-house with expert oversight

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Single family impact evaluation history

- 2003-2004, ITRON
- 2005-2006, EcoNW
  - Stellar Processes 2005-06
  - Michael Blasnik & Assoc 2005-06
- 2007, HMG
  - Michael Blasnik & Assoc 2007-June 2008
  - In-house analysis 2006-2007

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2003-2004 Impact evaluation

- Delivered in 2006, covering start-up years
- Estimates became basis for engineering savings up to present:
    - Duct sealing: 21 therms
    - Duct insulation: 12 therms
    - Air sealing: 26 therms
- Basis for all current reportable savings 2003-2009

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2005-2006 Impact evaluation

- Study approach was a replication of 2003-2004 modeling technique
  - Inconsistency in the engineering estimates appears to have sunk the SAE model
- No reliable estimates produced

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Additional 2005-2006 studies

- 2005-2006 revisited as part of billing analysis workshops:
  - Stellar Processes (N=1,321 sites both years)
  - Michael Blasnik (N=615 sites)
- Efficacy of 2005 findings in question due to PMC transition and many program changes
- Therm savings estimate range:
  - Duct insulation 20-45 therms
  - Duct sealing 30-69 therms

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2007 studies

- HMG
  - Fixed effects approach using dummy variables (N= 3000+ sites)
    - Draft indicated negative air sealing savings
    - Duct insulation/sealing were combined
    - Savings: 47 therms
- Blasnik 2007 therm savings estimates:
    - Duct insulation: 31-43
    - Duct sealing: 38-56
    - Air sealing: 0

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In-house analysis 2006-2007

- Examined a ‘census’ of program data
- Combined 06-07 therm savings:
  - Duct insulation: 16-18
  - Duct sealing: 34-59
  - Air sealing: 0

- Indication of substantial changes in duct insulation savings between two years
  - Trend observed in Blasnik studies

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Therm savings estimates by study

Study	Sites	Duct insulation	Duct sealing	Air sealing
Stellar 2005-2006	1321	45	42	-
Blasnik 2006	615	20-28	40-69	-
HMG 2007*	3000+	47	-	0
In-house 2006-2007	8179	16-18	34-59	0
Blasnik 2007-2008	605	31-43	38-56	0

*Study used one measure for both sealing/insulation

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Evaluation adjusted therm savings using 06-07 results

Measure	Total measures	Current total therm savings	06-07 eval RR	Adjusted therms
Air sealing	483	12,558	0%	0
Ceiling insulation	2,657	174,146	64%	111,018
Duct insulation	1,027	12,576	133%	16,768
Duct sealing	705	13,547	281%	38,061
Floor insulation	1,562	112,953	45%	50,829
Wall insulation	1,111	88,251	52%	45,891
Total	**7,545**	**414,032**		**262,567**

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Other findings

- Considerable impacts from interactive effects
  - Decreasing marginal savings
  - Frequent combination of measures
    - Duct insulation/ceiling/floor insulation
    - Contractor influences

Measure	Avg therm savings	Count
Ceiling insulation	115	575
Ceiling and duct insulation	158	24
Duct insulation	134	13

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In sum

- Gas savings are set to increase substantially for duct sealing
  - Incremental bump in duct insulation (potential for further increases depending on 2008 results)
- 2006-2007 air sealing gas savings will be zero

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How can we improve future evaluation results?

- Separate process for residential impact evaluations
  - Use billing analysis specialists for impact work
  - Continue to develop expertise in-house
  - Have identified experts to provide oversight on research design, vetting

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