AESP Brown Bag – January 17, 2008

A Regional Look at DLC Impacts

From Residential Thermostat Programs

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What we will cover . . .

- Introduction – Do DLC impacts vary by region?
- Brief Overview of DLC programs and pilots in this comparison
  - Progress Energy – Carolinas
  - Wisconsin Public Service
  - PSE&G – New Jersey
- Comparison of Load Impacts for 50% Cycling
- Effects on Indoor Temperatures

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Introduction

- An easy question: How much load reduction do you get from load control of residential central air-conditioners?
- The easy answer: 1 kW

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A better answer:
Review of 20 Publicly-Available Studies

Duty Cycle	Average Load Impact kW/Customer
33%	0.74
45%	0.81
50%	1.04
66%	1.36

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But what about . . .

- Outdoor temperatures?
- Actual temps or peak temps?
- Standard or adaptive cycling?
- AC loggers or whole-house?
- Analysis method?
- Weather measurement?
- All hours or peak hours?
- Which hours?
- Customer overrides?
- Non-use of AC?
- Non-receipt of signal?
- Randomized start?
- Day-of Adjustment?
- Single-family vs. Multi-family?
- Local climate?
- Indoor temperatures?
- Size of AC units?
- Insulation levels of homes?

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Best Answer?

Compare your own studies and control for all of these variables.

If we can control for all of these variables, are we really getting the same answer from every study?

Is there really an easy answer to the original question?

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Progress Energy - Carolinas

- Summer 2007 Thermostat Pilot
- 470 Participants; 110 M&V sites
- AC loggers and indoor temperature sensors
- Tested many different control strategies
- 50% cycling used adaptive algorithm
- Typical peak weather: 96 degrees and very humid
- Three regions: coastal, inlands and mountain (cooler)
- Customers could override through Web or phone call
- Synchronized start time of events
- Less than 1% of AC were not running during control events

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Wisconsin Public Service

- HELP program started in 1994; over 20,000 participants
- Hourly whole house meter data for 523 sites (100% AMI)
- All metered participants had a standard switch
- New switches use adaptive algorithm
- Overrides not possible
- Tested 25%, 50%, 67% and 100% cycling
- 4 hour and 7 hour control periods between 11 am and 7 pm
- Many hot days, but normal peak temperatures were not met
- 20% of AC were not running on 4 hottest days of the summer

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PSE&G – New Jersey

- Two summer pilot in 2005 and 2006
- Two-way communicating programmable thermostats
- 110 thermostats with AC run time data (98 customers)
- 21 customers with whole house interval meters
- Overrides allowed, but customers paid $2.50 per each event they did not override up to $50 max per summer
- Tested 25%, 50%, 75% cycling strategies
- Varied number of control hours between Noon and 10 p.m. on weekdays
- Randomized start

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Comparison of Load Impacts for 50% Cycling

	Progress Energy – Carolinas	Wisconsin Public Service	PSE&G New Jersey
Reported Load Impact	-1.1	-0.3	-0.8
'Ideal' Ave Load Impact at Peak Weather	-1.0 *96 degrees*	-1.0 *95 degrees*	-1.1 *95 degrees*

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Conclusions

- Load impacts for 50% cycling are –1 kW for Single-family homes in all regions when you standardize for hours, weather, overrides, non-receipt of signals, and zero use customers.
- When we measure load impacts for a particular program, we should include a focus on understanding these components to explain the overall load impacts that are observed.

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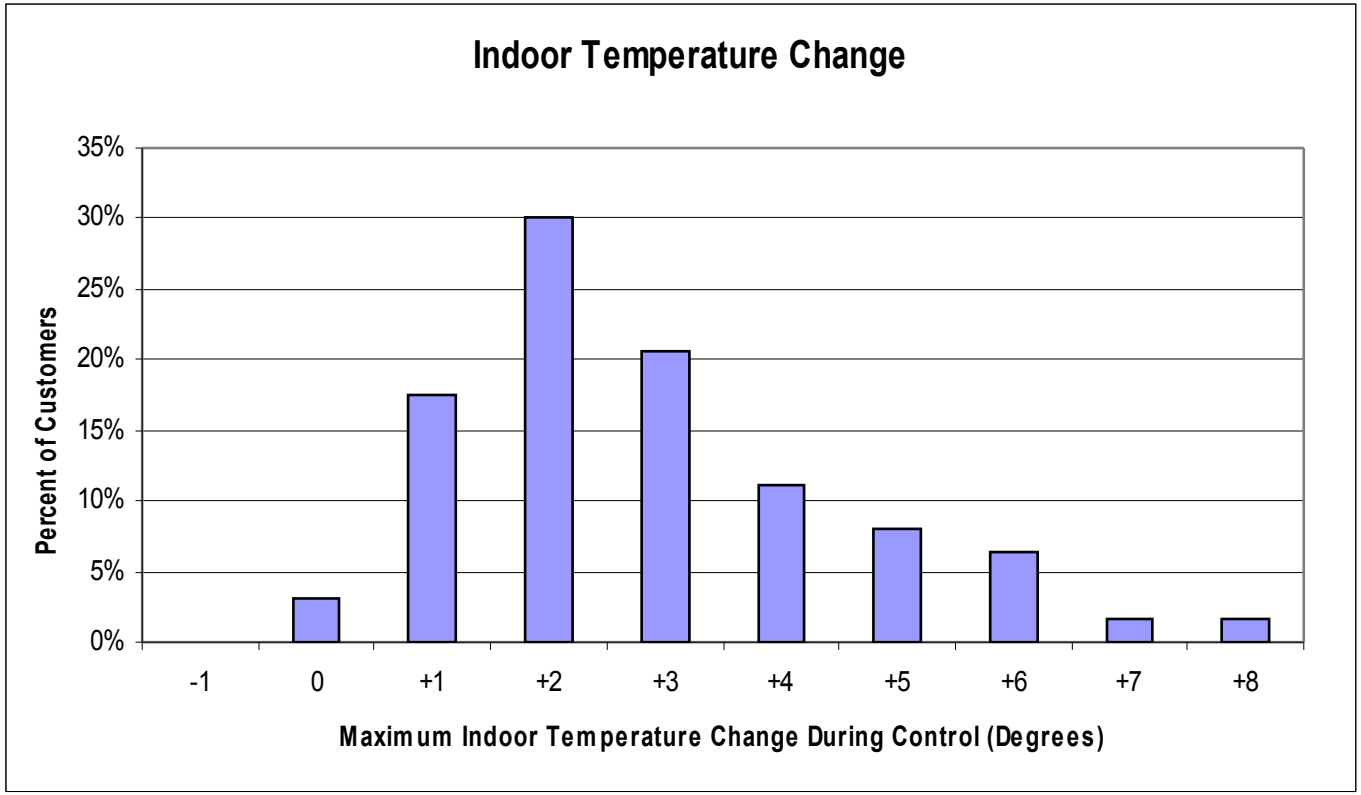
Comparison of Effects on Indoor Temperature

Progress Energy – Carolinas

50% Cycling for Four Hours



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Questions, Comments . . .

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