

LIEE Program 2009 Impact Evaluation

Final Report Public Workshop

Presented by

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Meeting Objectives

- Provide overview of data collection and impact analysis methods
- Present impact estimates and other key findings
- Answer questions
- Discuss next steps for finalizing report

Evaluation Team

- ECONorthwest (prime contractor)
- Kathryn Parlin / West Hill Energy
- Robert Wirtshafter
- Phil Willems
- Michaels Engineering
- John Stevenson (University of Wisconsin)
- Quantum Market Research (Surveys)

Major Analysis Tasks

1. Analysis dataset
2. Phone surveys
3. On-sites
4. Billing Regressions
5. Impact Calculation / Analysis
6. Reporting

Phone Surveys

- Focused on collecting data that might be useful in billing regressions (demographics, changes in home, energy use)
- Similar survey conducted for both parts and nonparts (used PY2009 participants as a comparison group)
- Targeted selected measures (evap coolers, furnace repair/replace, weatherization)
- Over-sampled customers in more extreme climate zones

On-site Surveys

On-sites done to collect information on the following:

- Evaporative coolers and furnace repair/replace
- Quality of installations
- Measure retention and reasons for removal
- Use of installed measures
- Post-installation behavior changes due to program

On-site process included an interview followed by a detailed walk-through of the home

Also targeted customers in more extreme climates

Data Collection

Data Collection Method	Planned Sample	Actual Sample
Participant Survey	1200	1,502
Non-participant Survey	1200	1,503
On-sites	400	400

Billing Regression Models

1. Population Model
2. Phone Survey Model
3. On-site Model

Billing Analysis Overview

- Fixed effects model
 - Energy use is the dependent variable
 - Incorporates features of the home that do not change over time
 - Time, weather and other effects that changes over time added as variables
- Analysis dataset used PY2008 participants
 - Allowed for 12 months of post-period data
 - Attempted using comparison group of PY2009 as nonparts (were eligible, but not yet parts in 2008)

Impact Calculations

- Impacts calculated based on coefficient estimates from billing regression for kWh and therms.
- Calculated impacts at the measure-level where possible
- kW impacts determined from kWh impact estimates and load profile information available from the DEER database (same method used in 2005)
- **NOTE:** Total impact numbers for utilities are incorrect in draft report, will be fixed in final version.

Billing Analysis Challenges

- Household savings small relative to usage
- Some measures may improve efficiency, but also increase usage
- Some measures commonly installed together (collinearity)
- Mild heating and cooling climates

Other Confounding Factors

- Economic downturn
- Delivery varies by utility and contractor
- Possible changes in behavior due to LIEE education efforts



Analysis Results

Final Impact Results

- Population Model was used as the final model
- Phone Survey Model did not produce reliable results (poor model fit, coefficients wrong sign)
- On-site Model provided some estimates of evap coolers, but did not produce reliable estimates of other targeted measures.

Average Household Savings (kWh)

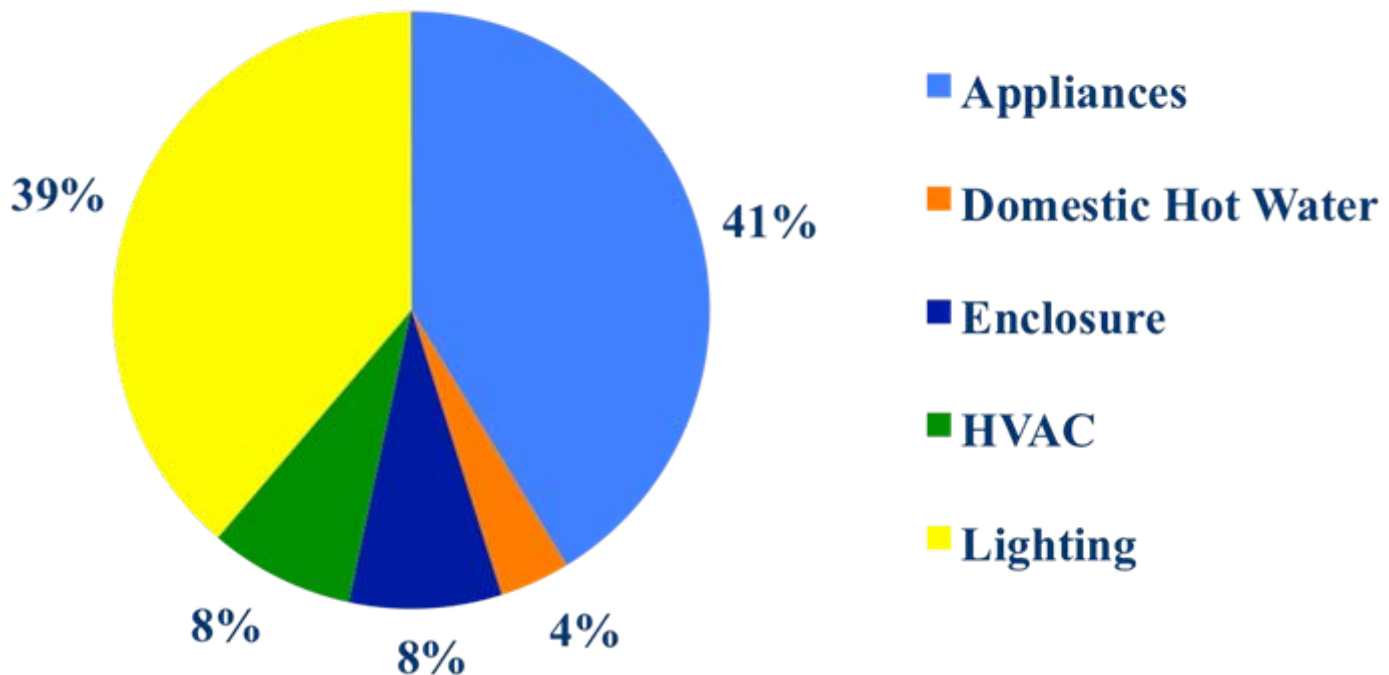
Utility	2009 Evaluation	2005 Evaluation	2002 Evaluation
Combined	344	423	366
PG&E	411	433	399
SCE	245	435	286
SDG&E	392	342	370

Impact Results – kWh Comparison by Measure

Measure	2009 Evaluation	2005 Evaluation
CFL	16	11
Refrigerator	711	755
Attic Insulation (cooling)	103	257
Attic Insulation (heating)	0	70
Evap Cooler	504	245

Impact Results – Share of kWh Savings by Measure

Total Program Savings (kWh)



Average Household Savings (Therms)

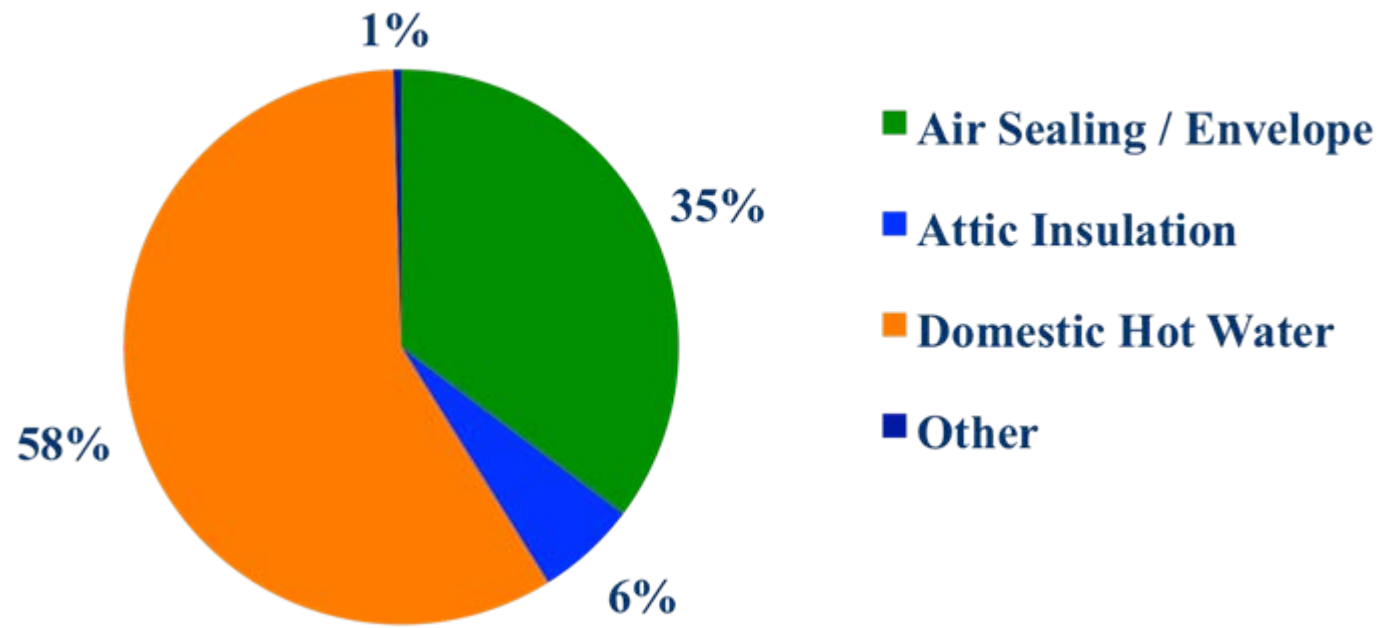
Utility	2009 Evaluation	2005 Evaluation	2002 Evaluation
Combined	10	18	8
PG&E	11	19	9
SDG&E	8	14	4
SoCalGas	11	17	8

Impact Results – Therm Comparison by Measure

Measure	2009 Evaluation	2005 Evaluation
Air Sealing	4.6	6.1
Attic Insulation	10.1	47.2
Furnace Replace / Repair	0	2.4
DHW Package	7.5	13.5
DHW Replacement	0	12.1

Impact Results – Share of Therm Savings by Measure

Total Program Savings (thm)



Average Household Usage Comparison (kWh)

Utility	2009 Evaluation	2005 Evaluation	% Change from 2005
Combined	5,752	5,431	6%
PG&E	5,933	5,778	3%
SCE	5,819	5,306	10%
SDG&E	4,580	4,240	8%

Average Household Usage Comparison (Therms)

Utility	2009 Evaluation	2005 Evaluation	% Change from 2005
Combined	318	421	-24%
PG&E	331	459	-28%
SDG&E	260	397	-35%
SoCal Gas	317	323	-2%

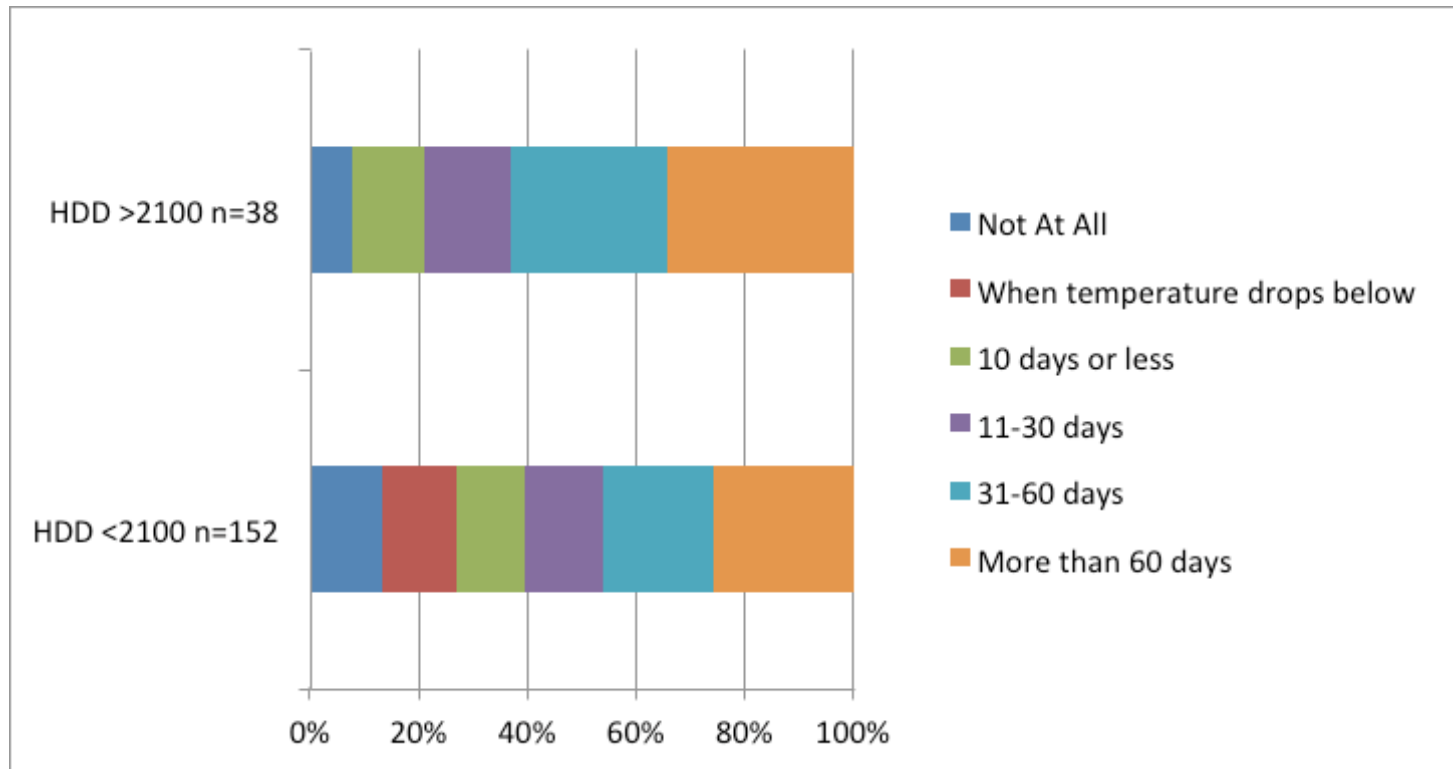
Survey and On-site Findings

- Most furnace repair participants did not have a working system before participating (63%)
- Fair amount of evaporative cooler use done without opening windows (25% never, 19% sometimes)
- Limited effect from education

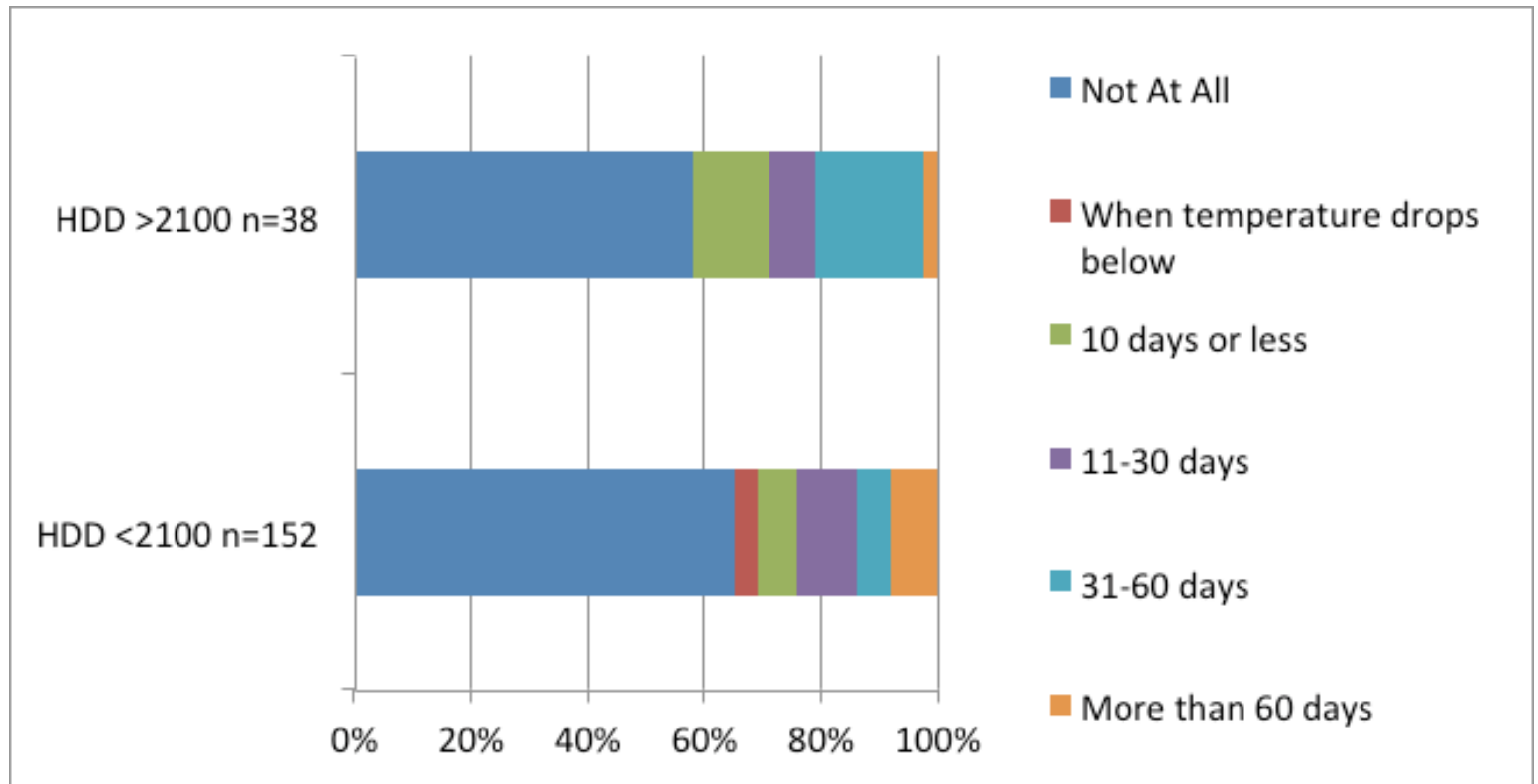
Heating Findings From On-site Surveys

- Limited heating use, particularly in milder climates
- Significant number (24%) that received furnace repair do not use this as their primary heating source
- About a third (37%) use a supplemental heating source other than gas

Heating Use Over Season (On-site Data)



Supplemental Heating Use (On-site Data)



Conclusions and Recommendations

- Lack of heating savings resulting from low heating loads and supplemental heating sources
- Some snap back evident with furnace participants
- Gas use decreased generally relative to 2005 evaluation
- More education needed for evaporative coolers to encourage proper operation.

Conclusions and Recommendations

- Surveys and on-sites provided some useful information, but had limited applicability for billing regressions.
- Continue targeting evaporative coolers in hottest climates and improve education.
- Consider restricting furnace repairs and replacements to homes with large, weather-dependent loads and have furnace as primary heat.

Next Steps

- Fix 2009 participation numbers in report
- Collect comments on Draft Report
- Produce Final Report that addresses comments