The Market for CFLs in Connecticut

Key Findings from Telephone and Onsite Surveys and Multistate Modeling

Presented to the DPUC
April 14, 2010
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Agenda

- Research Objectives
- Research Methods
- Telephone vs. Onsite Self-Reports
- Results
- Conclusion and Recommendations
- Looking Forward

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Research Objectives

- To understand the state of spiral and specialty CFL markets in Connecticut
- To estimate net effect of CFL program activity on CFL use, sales
- To measure awareness and use of LEDs and other energy efficient lighting
- To assess public knowledge of and response to new federal lighting standards

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Data Collection

- Random digit dial (RDD) survey
  - Assess awareness, familiarity, satisfaction
  - Determine awareness of LEDs, other energy efficient lighting technologies, and new federal lighting standards
  - Explore lighting purchase behaviors
  - Estimate CFLs in use and storage
  - Collect demographic and housing data
  - Recruit onsite survey participants
- Survey of 2008 intercept study participants
  - Objectives similar to RDD survey
- Onsite (In-home) Saturation Survey
  - Inventory all lighting in use and storage
  - Identify CFL model numbers, purchase dates and stores
  - Identify program-supported CFLs

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Sample Sizes and Sampling Error

Data Collection Method	Population	Sample Size	Sampling Error*
RDD of general population	1,323,431	500	3.7%
Onsite Visits	1,323,431	95	8.4%
Intercept Participants	102	17	18.3%

- Sampling error at the 90% confidence level (how much error associated with talking to only some people in the population)
- Not the same as “margin of error” for a confidence interval, which is related to the potential error surrounding a single estimate
- The RDD and on-site survey data were weighted to reflect the population proportions for home ownership and education from the American Community Survey (ACS)

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Analysis Methods

- Descriptive statistical summaries
  - Weighted analysis to estimate awareness, satisfaction, current and potential use, and purchases, among others
- Multistate Modeling
  - Entered data collected in RDD and onsite surveys into statistical model to estimate program effect on CFL use, saturation, sales
  - Provided data to estimate net-to-gross (NTG)

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Why Multistate Modeling

- Reliable and representative sales data still not available at market level
  - Participating stores share only program sales
  - Non-participating stores rarely share data
  - Spillover effects – program activity affects non-participating stores too
- Lack of reliability in self-report methods, especially for upstream programs
  - Participants aren't aware of program
  - Free ridership built into the design

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Why Multistate Modeling (cont.)

- Limitations of comparison area approach
  - No perfect non-program comparison area
  - Cannot control for household level variation
  - Limited sample size for budgetary reasons
- Multistate effort
  - No need for perfect comparison area
  - Model controls for household level variation
  - Pooling resources gives large sample sizes
  - Similar RDD and onsite survey procedures

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Sponsors of Multistate Effort

- California: California Public Utilities Commission
- Colorado: Xcel Energy
- Connecticut: Connecticut Energy Efficiency Board, Connecticut Light and Power, and The United Illuminating Company
- Massachusetts: Cape Light Compact, National Grid, NSTAR, Unitil, and Western Massachusetts Electric
- Michigan: Consumers Energy
- New York State and New York City: New York State Energy Research and Development Authority
- Wisconsin: Public Service Commission of Wisconsin

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Included Areas: 9,325 RDD, 1,444 Onsite

State	Program Status	RDD Sample Size	Onsite Sample Size
CA	Long-standing program	699	77
CO	Recently expanded	600	70
CT	Long-standing program	500	95
DC	No program	500	97
GA	Small program	579	62
IN	No program	600	88
KS	No program	525	71
MD	New program	500	57
MA	Long-standing program	500	100
MI	No program in 2008	657	86
NYS	Long-standing program	1,000	203
NYC	Long-standing program	502	100
OH	No program	501	98
PA	No program in 2008	653	59
Houston	No program	503	99
WI	Long-standing program	503	82

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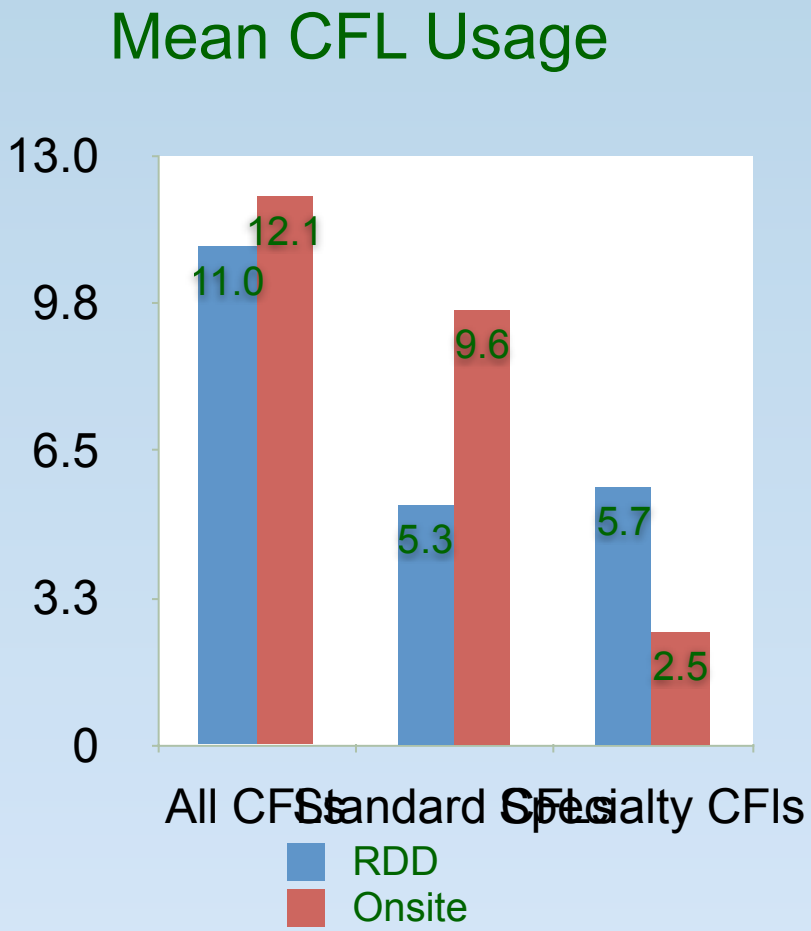
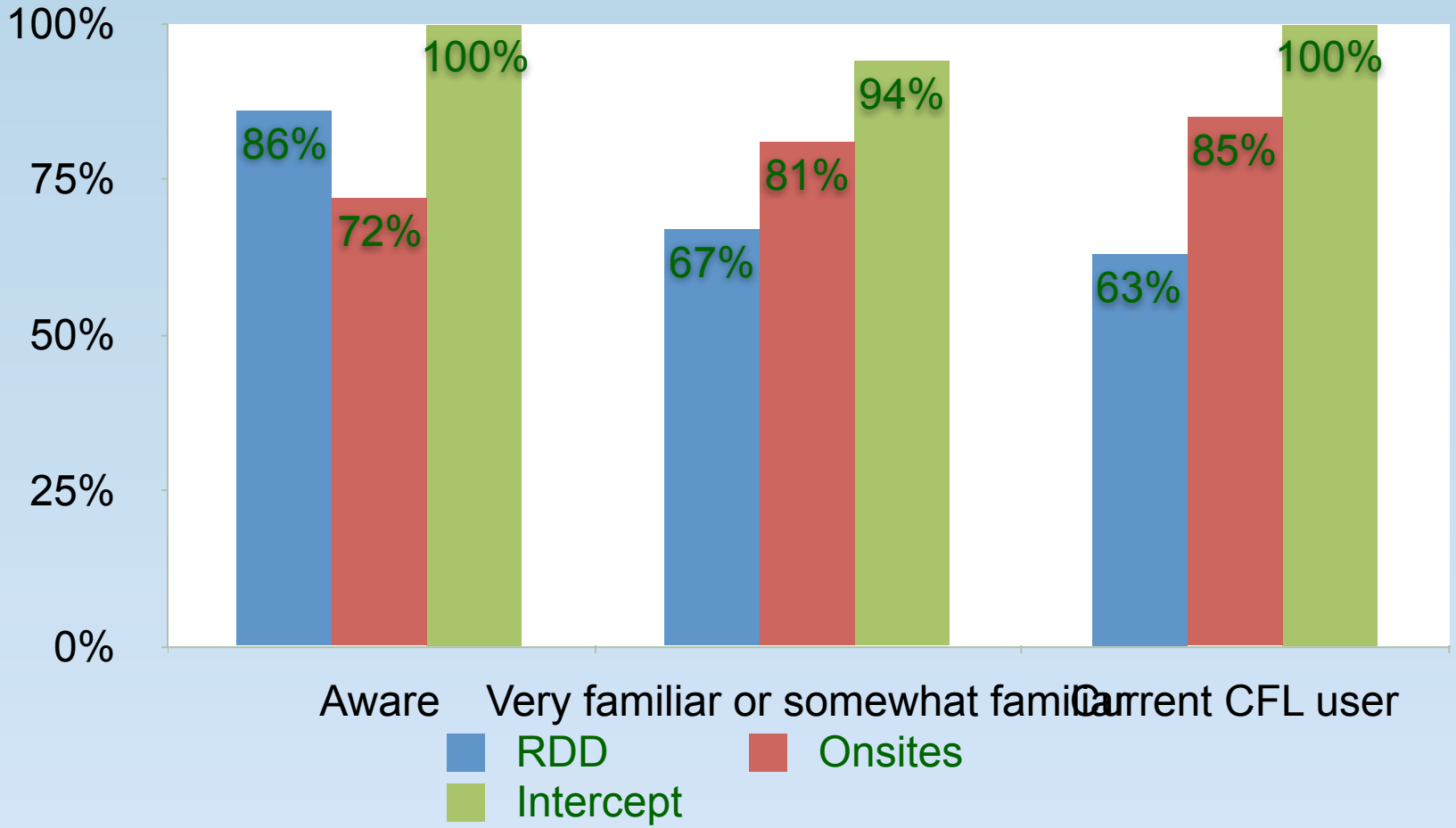
Telephone Self-reported Data vs. Onsite CFL Count Data

Notable differences between RDD and onsite data

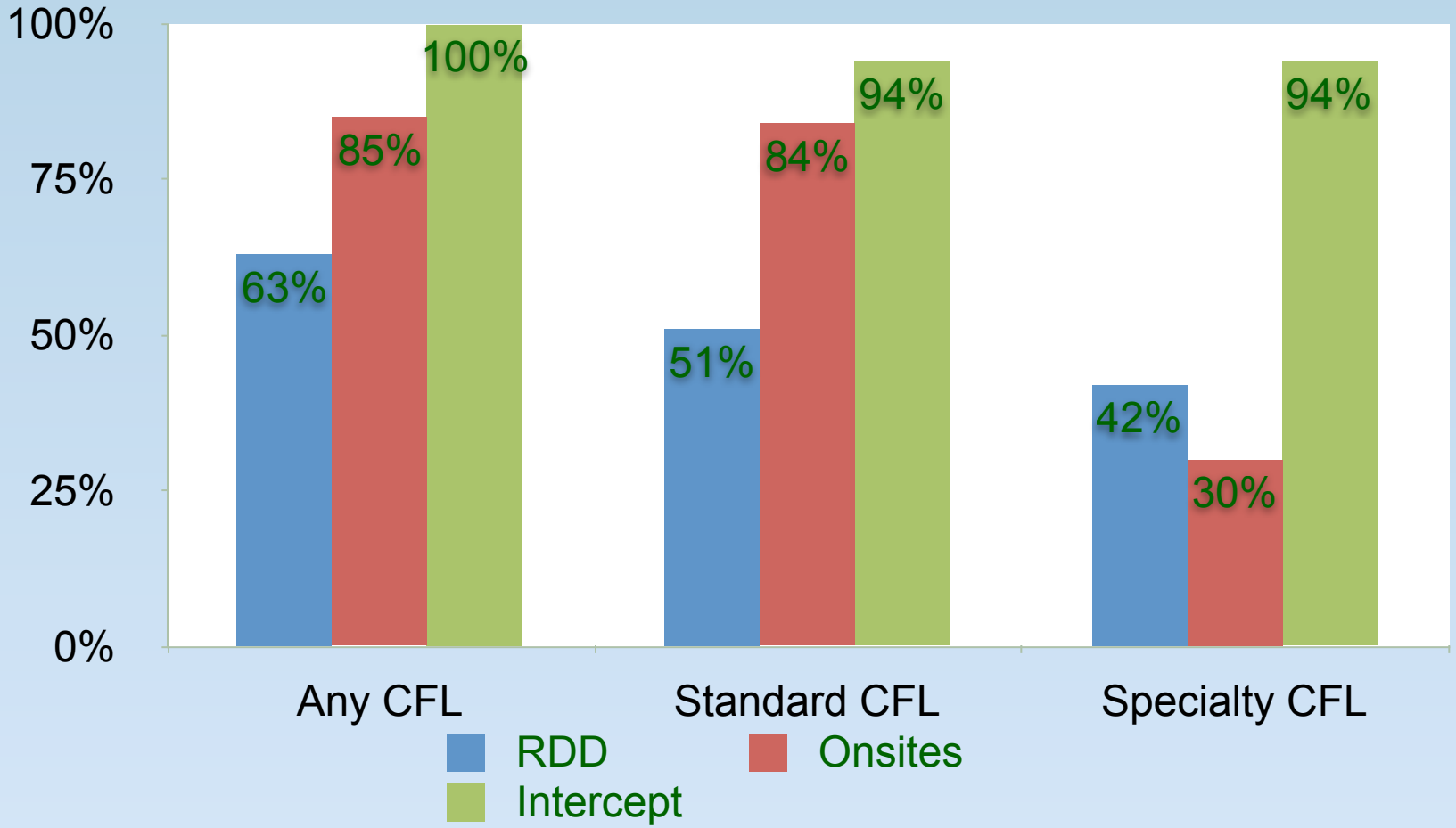
- Current Usage of CFLs
  - RDD respondents not able to accurately estimate the number of CFLs currently installed
  - RDD respondents over-reported current usage of specialty CFLs
- Storage of CFLs
  - RDD respondents over-reported number of CFLs in storage
- Purchases of CFLs
  - Reported purchases in past three months similar in both methods, but
  - Greater variability in reported purchases since January 2009 and during 2008



Awareness and Familiarity



CFL Penetration – Percent of Homes



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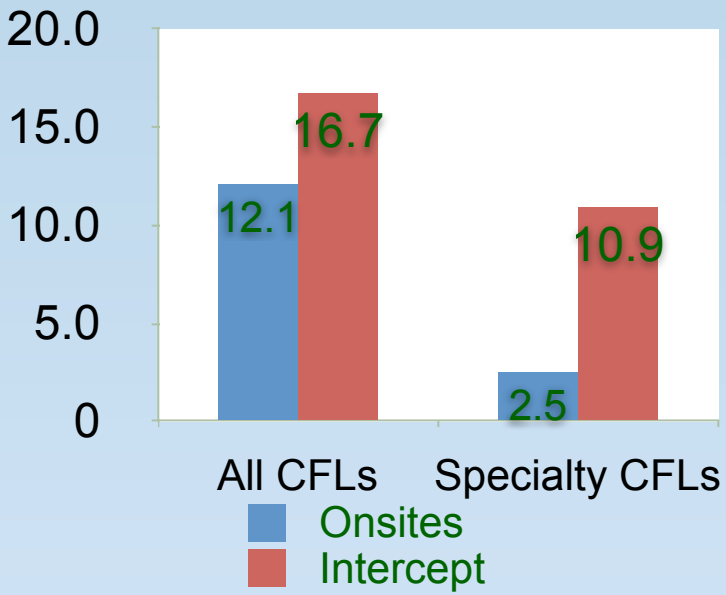
CFLs in Use

Concentration of CFL Use

- Onsites
  - 23% of homes have 16 or more CFLs installed, or 56% of all CFLs observed
  - 25% of homes have between one and five CFLs installed, only 7% of all CFLs observed
- Intercept
  - 41% of homes have 16 or more CFLs installed, or 67% of all CFLs reported
  - 12% of homes have between one and five CFLs installed, only 2% of all CFLs reported

Mean CFLs in Use



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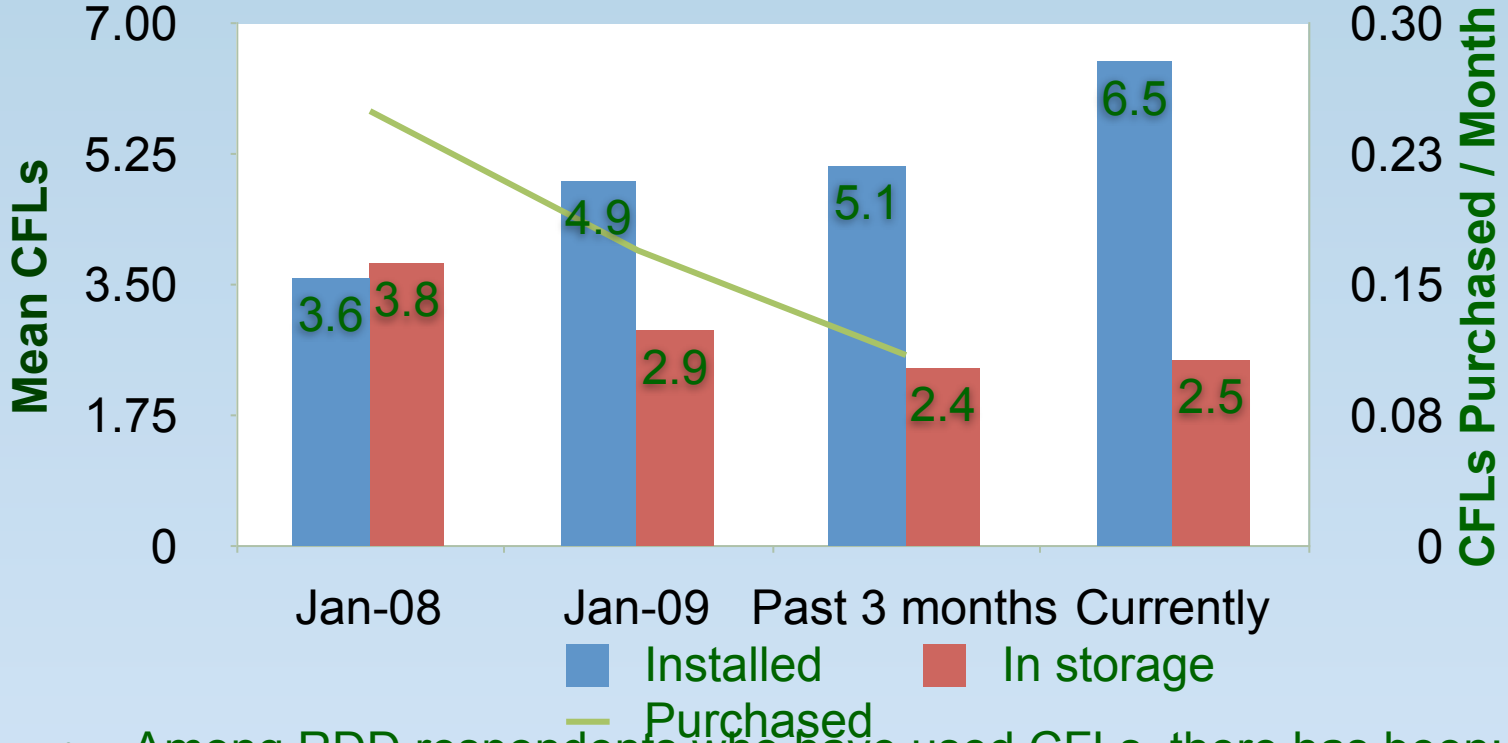
Usage, Storage and Purchases Over Time



- Among RDD respondents who have used CFLs, there has been:
  - a steady increase in CFL usage since January 2008
  - a corresponding decrease in the number of CFLs in storage
  - and a decline in the number of CFLs purchased

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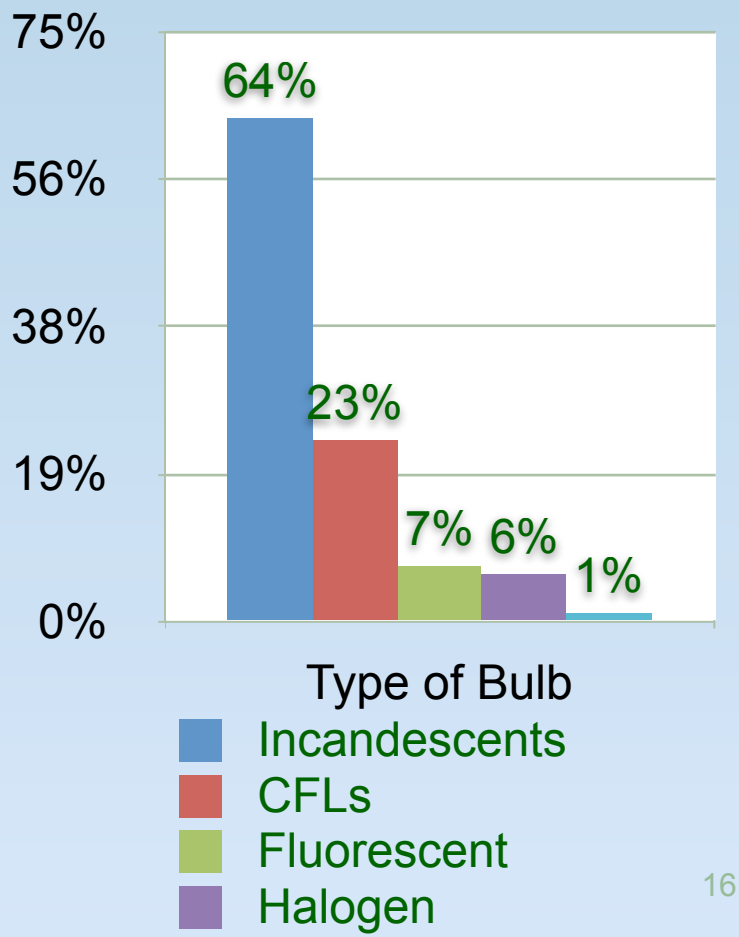
Socket Saturation

Large potential for CFLs

- 23% of residential sockets in Connecticut contain a CFL
- 70% contain incandescent or halogen
- 29% of all sockets contain a specialty bulb of any type
  - 4% contain a specialty CFL

Socket Saturation by Type



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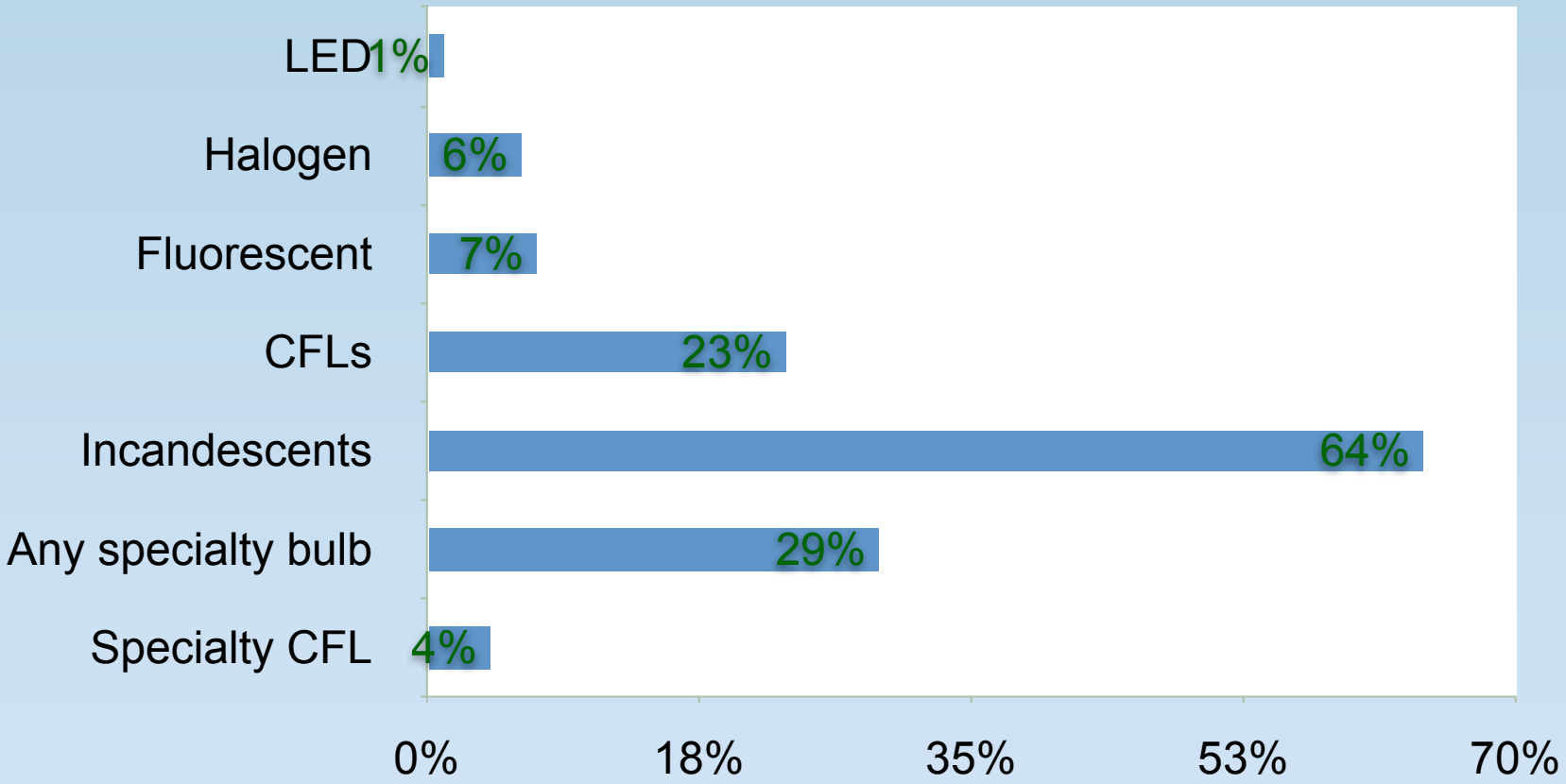
Socket Saturation by Bulb Type



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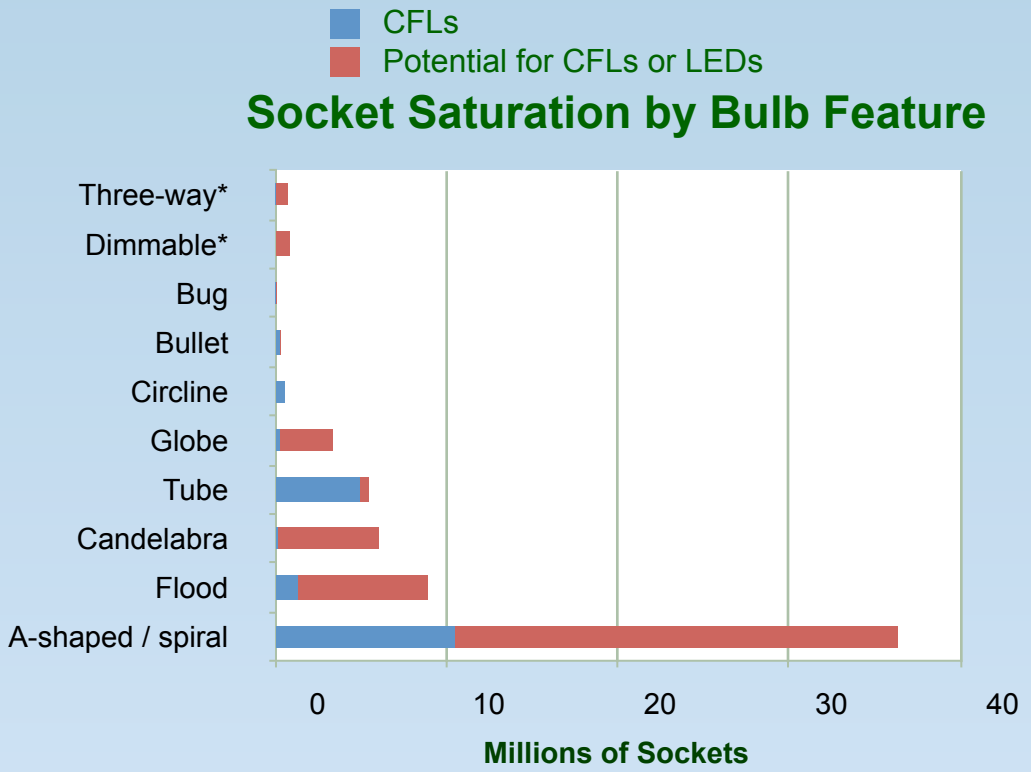
Socket Saturation and Potential for CFLs by Bulb Feature

- Most installed CFLs are A-shaped or spiral, but this bulb shape also has greatest potential for CFLs
- 90% of remaining potential for CFLs rests in:
  - Incandescent bulb (26 million)
  - Flood shaped bulb (8 million),
  - Candelabra bulb (6 million)
- Dimmable and three-way sockets are 4% of remaining potential (1.6 million)



*Dimmable and three-way bulbs also fall within shape categories and therefore are not additive

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Modeling Results

- Isolated effect of program activity on CFL use, saturation, purchases
  - Program existence related to demographic, economic factors
  - CFL use could be related to same factors
  - Modeling indentified unique program effects
- Developed two 2008 purchase models
  - Recommended model – best fit but excludes saturation at beginning of 2008
  - Alternative model – fit not as good but includes saturation at beginning of 2008

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Models Explaining Number of Purchases in 2008

Variables	Recommended Model	Alternative Model
Composite Program	0.09	0.07
Years using CFLs	0.10	0.14
2008 saturation	n/a	-0.03
# sockets in home	0.01	0.01
# household members	0.13	n/a
Identify as white	0.59	0.53
Conducted in fall	0.54	n/a
Lean democratic	n/a	-0.01

- Multiply value in table by score for house for each variable, then sum to get estimated household purchases

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Calculation of Net-to-Gross: Recommended Model

Input	Recommended	Alternative
A. Observed purchases	247	247
B. Predicted w/o program	89	69
C. Onsite sample size (useable responses)	92	92
D. Per-household observed (A/C)	2.68	2.68
E. Per-household no program (B/C)	0.97	0.75
F. Net purchases (D – E)	1.71	1.93
G. Incented per household	2.12	2.12
H. Estimated NTG observed (F/G)	**0.81**	**0.91**
I. Predicted with program	165	112
J. Per-household predicted (I/C)	1.79	1.22
K. Net program purchases predicted (J – E)	0.82	0.47
L. Estimated NTG predicted (K/G)	**0.39**	**0.22**

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Other Key Findings from Modeling

- New households reached
  - Programs induce new households to try CFLs
- Duration of CFL use as a predictor variable
  - Strongly associated with number of CFLs installed, purchased, and with saturation
- Saturation and purchase rates
  - Purchase rates seem to drop when saturation nears approximately 20%, where Connecticut is now

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Overall Conclusions

- Substantial opportunity remains
  - Awareness (86%) and familiarity (67%) are high, but
  - CFLs are installed in only 23% of sockets
  - 70% of sockets contain incandescent or halogen bulbs
  - A-shaped incandescent , flood, and candelabra bulbs account for 91% of the remaining potential for CFLs or LEDs
- The market is rapidly changing
  - CFLs more widely available and in use nationally, even in non-program areas
  - National CFL shipments down in 2008 and 2009 from 2007 peak
  - Programs have accomplished much, but still more to do
  - Program revision—not cessation—may be needed to boost saturation and keep NTG from falling

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Overall Conclusions(cont.)

- Changes to upstream approaches could include
  - Incentivize stores to increase sales or market share
  - Seek to target other retail outlets such as grocery stores, drug stores, dollar stores, and ethnic markets
  - Increased—but not exclusive—focus on specialty CFLs
- Emphasize a segmented approach to downstream marketing
  - Direct installations of CFLs in low-income households
  - Promotions to motivate early replacement (prior to burn out) of incandescent bulbs
  - Promotional messages should emphasize monetary and energy savings potential
- Increased outreach to help consumers make the connection between CFLs, financial savings and environmental benefits

Looking Forward: EISA

- The Energy Independence and Security Act (EISA) effective in 2012
- Phased in over time, with products covered and required efficiency levels increasing through 2020
- Lighting market will change but, incandescent bulbs will still be available for some time
- Still substantial savings to be gained from CFLs through – and even beyond – 2012

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