Residential Lighting Breakout Session

How to Claim Savings in 2012 and Beyond

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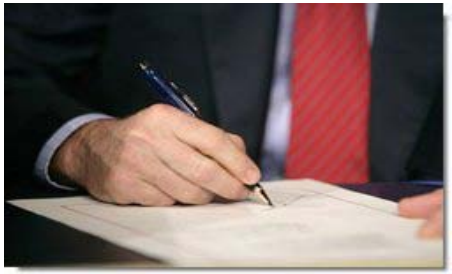
Today's Agenda

- Introductions
- Background Presentation
- Hear from our panelists:
  - Bill Jackson, Tennessee Valley Authority
  - Cheri Davis, Sacramento Municipal Utility District
  - Richard Pulliam, Southern California Edison
- Group discussion

What are the Biggest Challenges Facing Residential Lighting Programs?

- Claiming energy savings
  - New minimum efficiency standards have gone into effect as of January 1, 2012 and more are pending
  - Increased energy efficiency savings targets
  - Talk of market transformation



What Can CEE Do to Support Programs?

- Provide a forum for members to discuss how they are claiming energy savings in their lighting programs including:
  - Calculations and algorithms
  - Key assumptions (e.g. net to gross ratios, hours of use and in-service rates)
  - Reports and studies referenced
  - Approaches to overcoming challenges

Tennessee Valley Authority

$$\text{Annual kWh savings/unit} = \frac{[(\text{Incandescent wattage} - \text{CFL wattage}) * 2.2 \text{ hours/day} * 365 \text{ days/year}] * \text{in-service rate}}{1000 \text{ Watt/kWh}}$$

CFL Wattage	Incandescent Wattage	Savings
10 W	40 W	30 W
13 W	60 W	47 W
19 W	75 W	56 W
24 W	100 W	76 W

- In-service rate of 85% is applied to account for inventory of lamps
- The annual kWh savings/unit is multiplied by the number of units rebated
- Net to Gross ratio = 0.80
- Useful life = 7 years

EM&V Issues facing TVA

- Need to strive for Consistency
- Handling Spillage in Contiguous Service Areas
- Verification – How to Accomplish in a Midstream Retail Model
- Shelving / Inventory

SMUD Gross Savings Estimates

Savings Calculation for CFLs*

Type	Average Watts (CFL)	Delta Watts	Delta Watts Ratio
Twister / A-Line	18.7	46.2	2.5
Globe	9.8	34.7	3.5
Reflector	18.5	51.9	2.8

EISA Standards

Watts	Lumen Ranges	Max Wattage	CA Effective Date
100	1490-2600	72	1/1/2011
75	1050-1489	53	1/1/2012
60	750-1049	43	1/1/2013
40	310-749	29	1/1/2013

Watt Savings is the lesser of:

EISA Max Wattage - CFL Wattage

or

CFL Wattage x Delta Watts Ratio

*Source: Residential ENERGY STAR Lighting Program Evaluation submitted By Nexant In partnership with Advent Consulting DG Technologies, 2010

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SMUD Other Parameters

Program Savings Factors as Reported in Program Evaluation

Variable	M&V Findings
Wattage Reduction	43.2*
Daily Hours of Use	1.9
Peak Coincidental Factor	7.2%
Installation rate	61%
Program Net-to-Gross	48%

*Based on lamp distributions for 2008 and 2009
**Based on SMUD's former peak period definition

This is because consumers are starting to put CFLs in less-used sockets.

This is because consumers purchase packs of CFLs & store the excess in their closets.

Savings Calculations for Bare Spirals

Gross: kWh Saved = Installation Rate x Watts Saved x Annual Hrs x T&D avoided losses. Note that I use a higher installation rate these days!

Net kWh = Gross x Net-to-Gross

Unlike TVA, SMUD does not worry about WHEN the product was purchased.

Source: **Residential ENERGY STAR Lighting Program Evaluation submitted By Nexant In partnership with Advent Consulting DG Technologies, 2010**

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LEDs and other exceptions

Installation Rate Modified To Fit Circumstances

	Daily Hrs	Installation Rate	NTG
M&V	1.9	61%	48%
Bare Spirals	1.9	70%	48%
Covered A-Line	1.9	80%	70%
Specialty CFLs	1.9	90%	80%
Fl Fixtures	1.9	100%	80%
LEDs	3.0	100%	80%

We stopped allowing >4packs, so we felt justified in using a higher install rate

- These variations were made in consultation with Nexant, our M&V contractor
- The more expensive and/or more specialized the product, the higher the installation rate and the greater the influence of rebates (we think)
- For LEDs, I assume that most consumers will put the product in the sockets they use the most → Higher daily hours of use
- We will use these values until the next M&V study tells us otherwise!

SMUD Challenges

- Ongoing challenges:
  - Poor signage reduces our net-to-gross, which impacts the cost effectiveness of our program
- New challenges:
  - Our CFL sales dropped off dramatically this past year. Why?
    - Mixed messages in the media are possibly causing customers to be hesitant about purchasing CFLs (?)
    - Phosphor-related price increases (?)
    - Competition from LEDs (?)
  - SMUD is focusing on lighting products that have higher installation rates (specialty CFLs, fixtures, & LEDs), but these products are also more expensive
    - Residential lighting can no longer be counted on for high volume, cheap kWh savings

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Southern California Edison Data

- Inputs to the energy savings calculation are prescribed in the Database for Energy Efficient Resources (DEER), which is managed by the California Public Utilities Commission
- DEER assumes that the CFL purchased – on a Lumen for Lumen basis -- is replacing a “virtual” incandescent A-Lamp that uses 3.53 times more energy
- Based on the assumption, the Wattage number that goes into this “difference in Wattage” section is always the purchased CFL Wattage * 2.53

CFL Wattage	Incandescent Wattage	Watt Savings
13	45.9	32.9
23	81.2	58.2
27	95.3	68.3
42	148.3	106.3

SCE Calculation and Inputs

Annual Per/Unit kWh energy savings for residential CFL's = (Difference in Wattage) / 1000 * (2.18 hrs/ day) * (365 days/ yr) * (ISR %) * (Interactive)

- Hours Per Day/ Burn Rate: 2.18 hours per day, which equals about 800 hours per year. This may be reduced in the future.
- In-Service Rate: the percentage of CFL's that are assumed to be installed in the current year. SCE uses 77% ISR with the remaining CFL's (23%) counted in the following program year.
- Interactive Effects: typically ranges from 2% to 5% for most of Southern California, except in some of the hotter regions where the figure may climb to as much as 21%
- CFL Lifetime/ Effective Useful Life (EUL):
  - CFL Lifetime = 10,000 hours at a constant burn
  - De-rating factor of 0.523 (switching on and off → degradation of useful life)
  - Expected Useful Life (EUL) of CFL = 5,230 hours (6.5 years)
- Net to Gross (NTG): The NTG for residential CFL's varies based on the delivery method, but it ranges from 0.60 to 0.85.

SCE Sample Calculations

- 13 Watt CFL:
  (13 * 2.53)/1000 * (2.18 hrs/day) * (365 days/ yr) (0.77) (1.05) =
  21.16 kWh
- 23 Watt CFL:
  (23 * 2.53)/1000 * (2.18 hrs/day) * (365 days/ yr) (0.77) (1.05) =
  37.44 kWh
- 27 Watt CFL:
  (27 * 2.53)/1000 * (2.18 hrs/day) * (365 days/ yr) (0.77) (1.05) =
  43.95 kWh
- 42 Watt CFL:
  (42 * 2.53)/1000 * (2.18 hrs/day) * (365 days/ yr) (0.77) (1.05) =
  68.36 kWh

The studies and reports generated by the California Investor-Owned Utilities can be found by accessing: www.Calmac.org

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Panel Discussion Questions

- What aspects are most significantly impacting your ability to claim savings?
- What are your primary sources of data to support your calculations?
- Do you see any of your assumptions changing in the near future? If so, how?

Panel Discussion Questions

- How are the EISA regulations impacting your program? (what can be sold and what can you claim?)
- What are the assumptions when developing a formula for calculating 1st year savings?
- What is the level of verification used in retail lighting programs?

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