



Focus on Energy Evaluated Deemed Savings Changes

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Public Service Commission of Wisconsin

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Deemed Savings Analysis: Residential

This report contains measure-specific findings from the evaluation of the 2013 Focus on Energy programs. Some of these findings are the result of individual project level evaluation activities derived from the analysis of site visits, phone interviews, documentation reviews, independent calculations of savings, and data from secondary sources. Additional findings are a result of the Baseline Market Study 2013¹.

Over the course of the 2013 evaluation effort, the Evaluation Team reviewed each of the programs active in 2013, many of the projects that were completed under the programs, and many of the measures that were installed through the programs. Because thousands of individual projects have been completed, the Evaluation Team used a sampling approach to select a random population of projects and measures to evaluate in greater detail.

The Evaluation Team completed two main studies—onsite metering in a large two-year single family residential electronically commutated motor (ECM) study and a six-month lighting hours-of-use (HOU) metering study on multifamily homes. Both projects were sampled on a random and stratified basis. Stratification of projects/measures sorts participants into groups based upon the savings reported. This approach ensures that the random sampling process results in an evaluation that does not miss, by random chance, the largest projects and measures.

The results of those studies identified the following values for key input variables:

1. ECM savings calculations:
 - a. Hours of heat, 1,158;
 - b. Change in demand for heat, 0.116;
 - c. Hours of circulation, 1,020;
 - d. Change in demand for circulation, 0.207
 - e. Updated source for coincidence factor (Illinois TRM 2014), 0.68.
2. Hours-of-use per day for multifamily lighting, 2.01.
3. Coincidence factor for multifamily lighting, 0.055.

The Evaluation Team recommends that savings calculations for key ECM and multifamily lighting measures be updated in CY 2015 to reflect these assumptions. In addition, baseline wattages for CFL measures should be updated to reflect changing EISA baselines. This report identifies the measures affected; the *ex ante* savings assumptions in place for those measures in the SPECTRUM database during CY 2013; and the revised savings figures calculated based on those recommended savings updates. Table 1 lists the current measures affected by the Evaluation Team's recommendations. The Evaluation

¹ Focus on Energy, Baseline Market Study 2013. May 14, 2014.
https://focusonenergy.com/sites/default/files/FOC_XC_Baseline%20Evaluation%20Report%20CY%202013.pdf

Team also recommends that any new measures proposed by program implementers use the same, updated assumptions.

Table 1. Measures Requiring an Update

Measure Category	SPECTRUM Name and ID
Residential	
Furnace with ECM	LP or Oil Furnace with ECM, 90%+ AFUE (Existing), 2023 NG Furnace with ECM, ≥ 95%+ AFUE (Existing), 3441, 3443 NG Furnace with ECM, 97% AFUE ⁽¹⁾ , 3440, 3442 NG Furnace with ECM, 90%+ AFUE (Existing), 1977, 1980 New or Replacement, 2989
Direct Install, Compact Fluorescent Lights (CFLs)	CFL, Direct Install, 9 Watt, 2132, 2811 CFL, Direct Install, 13 Watt, 2732 CFL, Direct Install, 14 Watt, 2133 CFL, Direct Install, 18 Watt, 2740, 2816, 2862 CFL, Direct Install, 23 Watt, 2135
Upstream Lighting	CFL, Retail Store Markdown, 2959 LED, Retail Store Markdown, 2980

(1) These measures became active July 1, 2014; however, the savings assumptions and methodologies are the same and therefore are represented here.

Additional measures use the relevant savings inputs; the full list of these measures can be found in Appendix A. However, the Evaluation Team did not recommend updated savings values for those additional measures due to one of the following reasons:

1. Updating the savings assumptions above would not result in a material change to the current ex ante savings figure.
2. Due to low usage or likelihood of expiration, the Evaluation Team does not expect the measures to have a material impact on savings in future years.
3. The Evaluation Team lacked data on other key inputs affecting the savings calculation. The CFL measures affected by this finding are discussed on p. 15.

2013 Deemed Savings Values

The deemed savings values that were applied during CY13 are listed in Table 2.

Table 2. Residential Deemed Savings Values

Measure		Deemed	Units
Furnace with ECM	90%+ AFUE;	500	kWh per year
	≥ 95%+ AFUE;	-	kW
	90%+ AFUE; New or Replacement	30.96	therms per year
Direct Install, Compact Florescent Lights (CFLs)	9 Watt	25.79	kWh per year
		0.0042	kW
	13 Watt	38.25	kWh per year
		0.0042	kW
	14 Watt	38.25	kWh per year
		0.0042	kW
	18 Watt	46.52	kWh per year
		0.0042	kW
	23 Watt	64.04	kWh per year
		0.0042	kW
Upstream Lighting	CFL	40.0	kWh per year
		0.0031	kW
	LED	35.0	kWh per year
		0.0030	kW

Evaluation Savings Analysis: Residential

Methodology

During CY13, the Evaluation Team used engineering reviews, supplemental studies, and metering to create *ex post* savings assumptions. The methodology for each of these activities is explained here.

- **Engineering Reviews.** Through these reviews, the Evaluation Team calculated *ex post* savings, using observed baseline conditions to inform adjustments to the engineering algorithm inputs, and applied this approach for measures with small per-unit energy savings or when isolated savings could be measured using reliable data.
- **Supplemental Studies.** The Evaluation Team relied on recent studies to obtain the current variables relevant to the Wisconsin population. These studies included previous research and fieldwork that members of the Evaluation Team have conducted in the Midwest.
- **Metering.** The Evaluation Team installed data loggers on furnaces and compact fluorescent lamps (CFL) and incandescent lights throughout Wisconsin. On/off lighting loggers produced data for assessing the hours of use for residential customers. Additional loggers collected data regarding power draw and runtime for furnaces with ECMs.

Calculation of Evaluated Savings Values

The algorithms presented in this section show how the Evaluation Team applied these data to generate evaluated deemed savings values for specific measures. Additional measures, not defined here, may require the same algorithms or updates based on the use of revised assumptions from the studies mentioned above.

Furnace with ECM

Following a two-year site-metering study, the Evaluation Team developed savings for furnaces with an ECM. The adjusted savings apply to these furnace measures in SPECTRUM:

- LP or Oil Furnace with ECM, 90%+ AFUE (Existing)
- LP or Oil Furnace with ECM, 90%+ AFUE (Existing)
- NG Furnace with ECM, 95%+ AFUE (Existing)
- ECM, Furnace, New or Replacement

The Evaluation Team adjusted the savings calculation for these measures using the algorithms that follow. The savings has decreased for the furnace with ECM measures based on some of the following reasons:

- Five participants heated their homes for less than 200 total hours because they were gone for a significant portion of the winter. These participants also had lower circulation mode hours. Both of these factors decreased savings. According to the 2010 U.S. Census, the representation of these participants in the study sample is consistent with the proportion of seasonal home ownership in Wisconsin.²
- Air filter restriction causes fan power to increase. Approximately 25% of homeowners need to change their filters more regularly to avoid this issue.

$$Cooling\ mode\ savings = tons * EFLH_{cooling} * 12 \frac{kBTU}{ton} * \left(\frac{1}{SEER_{base}} - \frac{1}{SEER_{ECM}} \right) * \%AC$$

$$Heating\ mode\ savings = hours_{heat} * \Delta kW_{heat}$$

$$Circulation\ mode\ savings = hours_{circ} * \Delta kW_{circ}$$

$$kWhsavings = Cooling\ mode\ savings + Heating\ mode\ savings + Circulation\ mode\ savings$$

Summer Coincident Peak Savings Algorithm:

$$kW savings = tons * 12 \frac{kBTU}{ton} * \left(\frac{1}{EER_{base}} - \frac{1}{EER_{ECM}} \right) * CF * \% AC$$

The following tables define the variables used in these algorithms (see Table 3 and Table 4).

² U.S. Census Bureau. 2010 Census Summary File 1. <http://www.census.gov/prod/cen2010/briefs/c2010br-07.pdf>. Table 2, Page 4.

Table 5 lists the recommended evaluated savings for furnaces with ECM.

Table 3. Description of Variables for Furnaces with ECM

Variable Name	Inputs	Units	Description	Source
tons	2.425			Focus on Energy Evaluation, Residential Programs: CY09 Deemed Savings Review. March 26, 2010.
EFLH_{cooling}	See Table			Cadmus metering study
SEER_{base}	12			
SEER_{ECM}	13			This is a conservative estimate. Many air conditioners were not replaced when the furnace was replaced and were installed before the federal minimum efficiency standard increased to 13 SEER.
12 kBTU/ton	12	kBTU/ton	Conversion factor	
EER_{base}	10.5			Review of AHRI combination ratings found systems with no ECM have EER approximately 0.5 less than systems with ECM.
EER_{ECM}	11			Review of AHRI combinations ratings found EER rating is approximately 2 less than SEER.
CF	68	%		Illinois TRM June 1, 2014.
%AC	92.5	%		5 of 67 participants in Cadmus metering study did not have central cooling systems associated with ECM furnace installed
hours_{heat}	1,158	hours	Averaged of all metering participants	Cadmus metering study
ΔkW_{heat}	0.116	kW		Cadmus metering study
hours_{circ}	1,020	Hours		Cadmus metering study
ΔkW_{circ}	0.207	kW		Cadmus metering study

Table 4. Effective Full Load Hours by Location

Location	EFLH _{cooling}	Weighting by Participant
Green Bay	344	22%
Lacrosse	323	3%
Madison	395	18%
Milwaukee	457	48%
Wisconsin Average	380	9%
Overall	410	

Table 5. Final Recommended Evaluated Savings for Furnaces with ECM

Unit Energy Savings	Evaluation Results ⁽¹⁾	Units
kWh savings	415	kWh per year
kW savings	0.0792	kW
therm savings	0	therms per year

(1) Savings are based on evaluated results and analysis from the Wisconsin ECM metering study.

Direct Install, Compact Fluorescent Lights (CFLs)

Based on the results of its metering studies in the multifamily sector, the Evaluation Team adjusted the savings for these measures (listed by their Master Measure Names from SPECTRUM):

- CFL, Direct Install, 9 Watt
- CFL, Direct Install, 13 Watt
- CFL, Direct Install, 14 Watt
- CFL, Direct Install, 18 Watt
- CFL, Direct Install, 23 Watt

Evaluated values are slightly lower than SPECTRUM values due to the following:

- The Evaluation Team assumes a direct install HOU of 2.01, versus SPECTRUM’s assumption of 2.27 (SPECTRUM value is not cited).
- The Evaluation Team assumes a direct install CF of 0.055, versus SPECTRUM’s unknown assumption.
- These assumptions are based on the Evaluation Team’s recent metering study. While direct-install programs tend to target high-use areas, this granularity of information is not captured in the current database. Therefore, the overall average hours-of-use for multifamily homes has been applied, using these algorithms:

$$\Delta kWh = (W_{BASE} - W_{EFF}) / 1000 * HOU * 365$$

$$\Delta kW = (W_{BASE} - W_{EFF}) / 1000 * CF$$

- Baseline wattages are updated to reflect the EISA baselines

Table 6 defines the variables used in these algorithms. Table 7 lists the recommended evaluated savings for direct install CFLs.

Table 6. Description of Variables for Direct Install, Compact Fluorescent Lights (CFLs)

Variable Name	Inputs	Units	Description	Source
CFL _{wattage}	9	watts	CFL wattage	Wattage for CFL in MFDI ¹
CFL _{wattage}	13	watts	CFL wattage	Wattage for CFL in MFDI
CFL _{wattage}	14	watts	CFL wattage	Wattage for CFL in MFDI
CFL _{wattage}	18	watts	CFL wattage	Wattage for CFL in MFDI
CFL _{wattage}	23	watts	CFL wattage	Wattage for CFL in MFDI
Equivalent incandescent baseline wattage for 9 W	29	watts	EISA-compliant halogen baseline wattage	Calculated using equivalent lumens method
Equivalent incandescent baseline wattage for 13 W	43	watts	EISA-compliant halogen baseline wattage	Calculated using equivalent lumens method
Equivalent incandescent baseline wattage for 14 W	43	watts	EISA-compliant halogen baseline wattage	Calculated using equivalent lumens method
Equivalent incandescent baseline wattage for 18 W	53	watts	EISA-compliant halogen baseline wattage	Calculated using equivalent lumens method
Equivalent incandescent baseline wattage for 23 W	72	watts	EISA-compliant halogen baseline wattage	Calculated using equivalent lumens method
HOU	2.01	hours/day	Hours of use per CFL bulb per day	2014 Wisconsin multifamily light metering study
Day _{Year}	365	days/year	Days per year	Assumed
CF	5.5	percent	Coincidence Factor	2014 Wisconsin multifamily light metering study

¹ MFDI = Multifamily Direct Install Program

Table 7. Final Recommended Evaluated Savings for Direct Install, Compact Fluorescent Lights (CFLs)

Unit Energy Savings	Evaluation Results	Units
kWh savings		
9 watt	15	kWh per year
13 watt	22	kWh per year
14 watt	21	kWh per year
18 watt	26	kWh per year
23 watt	36	kWh per year
kW savings		
9 watt	0.0010	kW
13 watt	0.0020	kW
14 watt	0.0020	kW
18 watt	0.0020	kW
23 watt	0.0030	kW
Therm savings		
N/A	0	therms per year

CFLs and LEDs for Retail Store Markdown

Based on the results from the metering study in the multifamily sector, the Evaluation Team adjusted the savings for RLAP Upstream lighting savings using the algorithm and variables below:

$$\Delta kWh = (W_{BASE} - W_{EFF}) / 1000 * HOU * 365$$

- $\Delta kW = (W_{BASE} - W_{EFF}) / 1000 * CF$

Table 8 and Table 9 define the variables used in these algorithms for CFLs and LEDs respectively.

Due to the fact that upstream lighting is purchased by multiple end user types, weighted averages were applied to hours-of-use and coincidence factors in order to better represent the measure use patterns.

The weighting for these variables are:

- Single Family Weighting, 74.7%³
- Multifamily Weighting, 25.3%⁴
- Single Family HOU, 2.27 hours per day⁵
- Multifamily HOU, 2.01 hours per day⁶
- Residential Weighting 93%⁷
- Commercial Weighting 7%⁸
 - Residential HOU Average, 2.20
 - Commercial HOU Average, 10.2⁹
- Single Family Coincidence Factor 7.5%¹⁰
- Multifamily Coincidence Factor 5.5%¹¹
 - Residential, Averaged, Coincidence Factor 6.99%
 - Commercial Coincidence Factor 77%¹²

³ U.S. Census Bureau, 2013 Estimates. Percent of WI Housing Stock that is single family.

⁴ U.S. Census Bureau, 2013 Estimates. Percent of WI Housing Stock that is multi-family.

⁵ Cadmus SF light logger study 2013.

⁶ Cadmus MF light logger study 2013.

⁷ Cadmus in-store intercept survey 2012.

⁸ Ibid.

⁹ Wisconsin TRM version 26, 2014.

¹⁰ U.S. Census Bureau, 2013 Estimates. Percent of WI Housing Stock that is single family.

¹¹ U.S. Census Bureau, 2013 Estimates. Percent of WI Housing Stock that is multi-family.

¹² Wisconsin TRM version 26, 2014.

Table 8. Description of Variables for Compact Fluorescent Lights (CFLs)

Variable Name	Inputs	Units	Description	Source
CFL _{wattage}	9	watts	CFL wattage	Predominant CFL wattage in EISA 310-749 lumen bin.
CFL _{wattage}	13	watts	CFL wattage	Predominant CFL wattage in EISA 750-1,049 lumen bin.
CFL _{wattage}	18	watts	CFL wattage	Predominant CFL wattage in EISA 1,050-1,489 lumen bin.
CFL _{wattage}	23	watts	CFL wattage	Predominant CFL wattage in EISA 1,490-2,600 lumen bin.
Equivalent incandescent baseline wattage for 9 W	29	watts	EISA-compliant halogen baseline wattage	Calculated using equivalent lumens method
Equivalent incandescent baseline wattage for 13 W	43	watts	EISA-compliant halogen baseline wattage	Calculated using equivalent lumens method
Equivalent incandescent baseline wattage for 18 W	53	watts	EISA-compliant halogen baseline wattage	Calculated using equivalent lumens method
Equivalent incandescent baseline wattage for 23 W	72	watts	EISA-compliant halogen baseline wattage	Calculated using equivalent lumens method
HOU	2.77	hours/day	Upstream lighting daily hours of use, weighted by residential and commercial end-use splits	Calculated
Days _{year}	365	days/year	Days per year	Assumed
CF	11.89	percent	Upstream lighting peak coincidence factor, weighted by residential and commercial end-use splits	Calculated

Table 9. Description of Variables for Light Emitting Diodes (LEDs)

Variable Name	Inputs	Units	Description	Source
LED _{wattage}	8	watts	LED wattage	Predominant LED wattage in EISA 310-749 lumen bin.
LED _{wattage}	13	watts	LED wattage	Predominant LED wattage in EISA 750-1,049 lumen bin.
LED _{wattage}	16	watts	LED wattage	Predominant LED wattage in EISA 1,050-1,489 lumen bin.
LED _{wattage}	20	watts	LED wattage	Predominant LED wattage in EISA 1,490-2,600 lumen bin.
Equivalent incandescent baseline wattage for 8 W	29	watts	Incandescent baseline wattage	Calculated using equivalent lumens method
Equivalent incandescent baseline wattage for 13 W	43	watts	Incandescent baseline wattage	Calculated using equivalent lumens method
Equivalent incandescent baseline wattage for 16 W	53	watts	Incandescent baseline wattage	Calculated using equivalent lumens method
Equivalent incandescent baseline wattage for 20 W	72	watts	Incandescent baseline wattage	Calculated using equivalent lumens method
HOU	2.77	hours/day	Upstream lighting daily hours of use, weighted by residential and commercial end-use splits	Calculated
Days _{year}	365	days/year	Days per year	Assumed
CF	11.89	percent	Upstream lighting peak coincidence factor, weighted by residential and commercial end-use splits	Calculated

Table 10. Final Recommended Evaluated Savings for Upstream Lighting (CFLs)

Unit Energy Savings	Evaluation Results	Units	Relative Weight ¹
kWh savings			
9 watt	20	kWh per year	6.80%
13 watt	30	kWh per year	72.30%
18 watt	35	kWh per year	5.90%
23 watt	49	kWh per year	14.90%
Overall	32	kWh per year	-
kW savings			
9 watt	0.0024	kW	6.80%
13 watt	0.0036	kW	72.30%
18 watt	0.0042	kW	5.90%
23 watt	0.0058	kW	14.90%
Overall	0.0039	kW	-
Therm savings			
NA	0	therms per year	-

¹ Based on YTD (June) 2012 program sales.

Table 11. Final Recommended Evaluated Savings for Upstream Lighting (LEDs)

Unit Energy Savings	Evaluation Results	Units	Relative Weight ¹
kWh savings			
8 watt	21	kWh per year	0.00%
13 watt	30	kWh per year	89.00%
16 watt	37	kWh per year	11.00%
20 watt	52	kWh per year	0.00%
Overall	31	kWh per year	-
kW savings			
8 watt	0.0025	kW	0.00%
13 watt	0.0036	kW	89.00%
16 watt	0.0044	kW	11.00%
20 watt	0.0062	kW	0.00%
Overall	0.0037	kW	-
Therm savings			
NA	0	therms per year	-

¹ Based on 2013 sales percentages provided by Applied Proactive.

Compact Fluorescent Lights (CFLs)

Savings for four other Compact Fluorescent Light (CFL) measures are affected by the hours-of-use and coincidence factor findings from the multifamily metering study:

- Fixture, ≤ 100 Watts
- ≤ 32 Watt, In Unit
- 31-115 Watts
- Reflector Flood Lamps, ≤ 32 Watts

Because each of these measures covers a wide range of potential wattages, accuracy assumptions regarding the average wattage of installed measures, and the average wattage of baseline measures, are especially important for determining energy savings. However, the Evaluation Team was unable to identify those wattage mixes from existing program data, or to verify the assumptions used to calculate current savings values.

The Evaluation Team recommends that program implementers review existing savings assumptions for these measures and propose revised savings assumptions through the Focus on Energy workpaper review process. To the extent feasible, this review would benefit from including efforts to collect project-level data on the mix of efficient wattages installed under the measure, as well as the mix of baseline wattages being replaced. Along with incorporating up-to-date information on wattage inputs, the revised savings assumptions should also incorporate the updated hours-of-use and coincidence factor inputs this report recommends for other CFL measures.

Final Recommendations: Residential

Results

Because the assumptions used to generate savings values entered into SPECTRUM are largely unknown, market conditions have changed, and new data has become available, the Evaluation Team recommends updating the savings values for these residential sector measures—furnaces with ECMs, direct install CFLs, CFLs for retail store markdown, and LEDs for retail store markdown. Table 12 compares the evaluated and deemed savings and shows the changes in final savings.

Table 12. Deemed and Evaluated Savings Results for Residential Measures

Measure		Evaluated	Deemed	Difference	Units
Furnace with ECM	90%+ AFUE;	415	500	-85	kWh per year
	≥ 95%+ AFUE;	0.0792	-	0.0792	kW
	90%+ AFUE; New or Replacement	0	30.96	-30.96	Therms per year
Direct Install, Compact Florescent Lights (CFLs)	9 Watt	15	25.79	-10.79	kWh per year
		0.0010	0.0042	-0.0032	kW
	13 Watt	22	38.25	-16.25	kWh per year
		0.0020	0.0042	-0.0022	kW
	14 Watt	21	38.5	-17.5	kWh per year
		0.0020	0.0042	-0.0022	kW
18 Watt	26	46.25	-20.7	kWh per year	
	0.0020	0.0042	-0.0022	kW	
23 Watt	36	64.04	-28.1	kWh per year	
	0.0030	0.0042	-0.0012	kW	
CFL, Retail Store Markdown	9 Watt	20	-	-	kWh per year
		0.0024	-	-	kW
	13 Watt	30	-	-	kWh per year
		0.0036	-	-	kW
	18 Watt	35	-	-	kWh per year
		0.0042	-	-	kW
23 Watt	49	-	-	kWh per year	
	0.0058	-	-	kW	
Overall	32	40	-8	kWh per year	
	0.0039	0.0031	0.0008	kW	
LED, Retail Store Markdown	8 Watt	21	-	-	kWh per year
		0.0025	-	-	kW
	13 Watt	30	-	-	kWh per year
		0.0036	-	-	kW
	16 Watt	37	-	-	kWh per year
		0.0044	-	-	kW
20 Watt	52	-	-	kWh per year	
	0.0062	-	-	kW	
Overall	31	35	-4	kWh per year	
	0.0037	0.0030	0.0004	kW	

Appendix A. Measure List

Measure Master ID	Program Measure Name
Multifamily Lighting	
2238	Ceramic Metal Halide (CMH) Lamp, <= 25 Watts
2239	CFL Fixture, <=100 Watts
2243	CFL, 31-115 Watts
2246	CFL, Reflector Flood Lamps, <= 32 Watts
2276	Delamping, T12 to T8
2277	Delamping, T8 to T8
2455	LED, Not Otherwise Specified
2458	LED, Recessed Downlight, Energy Star
2556	T8 1L 4', 25W, CEE, BF <= 0.78
2557	T8 1L 4', 28W, CEE, BF <= 0.78
2558	T8 1L 4', 28W, CEE, BF > 0.78
2559	T8 1L 4', HPT8, CEE, BF > 0.78
2560	T8 1L, 4', 25W, CEE, BF > 0.78
2561	T8 1L, 4', HPT8, CEE, BF <= 0.78
2562	T8 2L 4', 25W, CEE, BF <= 0.78
2563	T8 2L 4', 25W, CEE, BF > 0.78
2564	T8 2L 4', 28W, CEE, BF <= 0.78
2565	T8 2L 4', 28W, CEE, BF > 0.78
2566	T8 2L 4', HPT8, CEE, BF <= 0.78
2567	T8 2L 4', HPT8, CEE, BF > 0.78
2571	T8 3L 4', 25W, CEE, BF <= 0.78
2572	T8 3L 4', 25W, CEE, BF > 0.78
2573	T8 3L 4', 28W, CEE, BF <= 0.78
2574	T8 3L 4', 28W, CEE, BF > 0.78
2575	T8 3L 4', HPT8, CEE, BF <= 0.78
2576	T8 3L 4', HPT8, CEE, BF > 0.78
2577	T8 4L 4', 25W, CEE, BF <= 0.78
2578	T8 4L 4', 25W, CEE, BF > 0.78
2579	T8 4L 4', 28W, CEE, BF <= 0.78
2580	T8 4L 4', 28W, CEE, BF > 0.78
2581	T8 4L 4', HPT8, CEE, BF <= 0.78
2582	T8 4L 4', HPT8, CEE, BF > 0.78
2590	T8, Low Watt Relamp, 25 Watts, 4'
2591	T8, Low Watt Relamp, 28 Watts, 4'
2665	T8, Reduced Wattage, Relamp 8'
2704	T8 2L 4', Recessed Indirect Fixture, HPT8, replacing 3 or 4L - T8 or T12
2736	LED, Direct Install, Exit Sign, Retrofit
2753	CFL, <= 32 Watts, Common Area
2754	CFL, <=32 Watt, In Unit
2767	LED, Common Area
2768	LED, Exit Sign, Retrofit

2769	LED, In Unit
2984	LED Fixture, Downlights, Accent Lights and Monopoint, ≤18 Watts, Common Area
3031	CFL, Reduced Wattage, Pin Based, 18 Watt, Replacing CFL
3032	CFL, Reduced Wattage, Pin Based, 26 Watt, Replacing CFL
3033	CFL, Reduced Wattage, Pin Based, 32 Watt, Replacing CFL
3034	CFL, Reduced Wattage, Pin Based, 42 Watt, Replacing CFL
3098	LED Fixture, Downlights, Accent Lights and Monopoint, > 18 Watts, Common Area
3111	LED Troffer, 2x4, Replacing 4' 3-4 Lamp T8 Troffer
3122	T8 2L 4', HPT8 or RWT8, Replacing T12 1L 8', 0.78 < BF < 1.00
3123	T8 2L 4', HPT8 or RWT8, Replacing T12 1L 8', BF ≤ 0.78
3124	T8 2L 4', HPT8 or RWT8, Replacing T12HO 1L 8', 0.78 < BF < 1.00
3125	T8 2L 4', HPT8 or RWT8, Replacing T12HO 1L 8', BF ≤ 0.78
3126	T8 2L 4', HPT8 or RWT8, Replacing T12HO 1L 8', BF > 1.00
3127	T8 4L 4', HPT8 or RWT8, Replacing T12 2L 8', 0.78 < BF < 1.00
3128	T8 4L 4', HPT8 or RWT8, Replacing T12 2L 8', BF ≤ 0.78
3129	T8 4L 4', HPT8 or RWT8, Replacing T12HO 2L 8', 0.78 < BF < 1.00
3130	T8 4L 4', HPT8 or RWT8, Replacing T12HO 2L 8', BF ≤ 0.78
3131	T8 4L 4', HPT8 or RWT8, Replacing T12HO 2L 8', BF > 1.00
3132	T8 4L 4', HPT8 or RWT8, Replacing T12VHO 2L 8', 0.78 < BF < 1.00
3133	T8 4L 4', HPT8 or RWT8, Replacing T12VHO 2L 8', BF ≤ 0.78
3134	T8 4L 4', HPT8 or RWT8, Replacing T12VHO 2L 8', BF > 1.00
3157	LED, Porch Fixture, Energy Star
3158	LED Fixture, Downlights, Accent Lights and Monopoint, ≤ 18 Watts, In Unit
3159	LED, Energy Star, Replacing Incandescent > 40W, In Unit
3160	LED, Energy Star, Replacing Incandescent > 40W, Common Area
3161	LED, Energy Star, Replacing Incandescent ≤ 40W, In Unit
3162	LED, Energy Star, Replacing Incandescent ≤ 40W, Common Area
3178	T8 4L 4', HPT8, CEE, BF ≤ 0.78, Parking Garage
3197	CFL Fixture, Interior or Exterior, 24 Hours, CALP
3198	CFL Fixture, Interior, 12 Hours, CALP
3199	CFL Fixture, Exterior, 12 Hours, CALP
3200	LED, Exit Sign, Retrofit, CALP
3279	LED, Direct Install, 9.5 Watt
3394	LED Fixture, Downlights, ≤18 Watts, Replacing 1 lamp pin based CFL Downlight
3395	LED Fixture, Downlights, >18 Watts, Replacing 2 lamp pin based CFL Downlight
3396	LED Fixture, Downlights, ≤100 Watts, ≥4000 Lumens, Interior
3397	LED Fixture, Downlights, ≤100 Watts, ≥4000 Lumens, Exterior
3398	LED Fixture, Downlights, ≥6000 Lumens, Interior
3399	LED Fixture, Downlights, ≥6000 Lumens, Exterior
3400	LED Fixture, 2x2, Low Output, DLC Listed
3401	LED Fixture, 2x2, High Output, DLC Listed
3402	LED Lamp, Energy Star, Replacing Incandescent Lamp ≤40 Watts, Exterior
3403	LED Lamp, Energy Star, Replacing Incandescent Lamp >40 Watts, Exterior
3404	LED Fixture, Downlights, >18 Watts, Replacing Incandescent Downlight, Exterior
3405	LED Fixture, Downlights, ≤18 Watts, Replacing Incandescent Downlight, Exterior
Residential Furnaces	
2989	ECM, Furnace, New or Replacement

2990	Furnace And A/C, ECM, 95% + AFUE, >= 16 SEER
2023	LP or Oil Furnace with ECM, 90%+ AFUE (Existing)
3189	LP or Oil Furnace with ECM, 95% AFUE, DOA
1977	NG Furnace with ECM, 90% AFUE
1980	NG Furnace with ECM, 90%+ AFUE (Existing)
1981	NG Furnace with ECM, 95%+ AFUE (Existing)
3443	NG Furnace with ECM, 95+ AFUE (Existing), Enhanced Rewards
3440	NG Furnace with ECM, 97%+ AFUE
3442	NG Furnace with ECM, 97+ AFUE, Enhanced Rewards