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Analyses in Support of the Proposed ACEEE/NEMA Compromise On Standards for Incandescent Reflector Lamps

American Council for an Energy-Efficient Economy
Washington, DC

Nov. 30, 2005

Energy Savings from CEC Reflector Lamp Standards -- Exempt 65BR30&40, 45R20

	Residential	Commercial	Wtd. Avg.
CA reflector stock (millions)	22.8	3.6	26.4
Avg. daily op. hrs.	2.3	10	4.225
Peak coincidensce	7%	78%	24.75%

	% of Total Refl. Lamps	% of Sales	Watts Saved	Percent Residential	Op. Hrs. Per year	Annual kWh saved (millions)	Peak Coincidence Factor	Peak MW saved
Replacements for 65BR30	55.9%			75%				
Improved 65BR		100%	0		1542	0	25%	0
50PAR30 halogen		0%	3		1542	0	25%	0
75PAR30 halogen		In above	-10		1542	In above	25%	In above
60 Halogena		In above	5		1542	In above	25%	In above
45PAR30 IR		In above	20		1542	In above	25%	In above
50ER		In noise	15		1542	In noise	25%	In noise
CFL		0%	46		1542	0	25%	0
Incandescent		0%	-2		1542	0	25%	0
Subtotal		100%				0		0
Replace. for 75&85BR40	7.7%			20%				
60PAR halogen		13%	20		3088	16	64%	3
75PAR halogen		23%	5		3088	7	64%	1
65BR40		60%	15		3088	57	64%	12
Incandescent		5%	1.7		3088	1	64%	0
Subtotal		100%				80		17
Replacements for 100BR40	2.8%			20%				
75PAR halogen		64%	25		3088	100	64%	21
90PAR halogen		31%	10		3088	20	64%	4
Incandescent		5%	12.5		3088	4	64%	1
Subtotal		100%				124		26
Replacements for 120BR40	4.1%			20%				
75PAR halogen		64%	45		3088	96	64%	20
90&100 PAR38 halogen		31%	25		3088	26	64%	5
Incandescent		5%	20		3088	3	64%	1
		100%				126		26
Replacements for 75BPAR	3.6%			50%				
50PAR halogen		15%	25		2245	8	43%	2
60PAR halogen		35%	15		2245	11	43%	2
75PAR halogen		25%	0		2245	0	43%	0
65BR40		20%	10		2245	4	43%	1
Incandescent		5%	-3.3		2245	0	43%	0
		100%				23		4
Replacements for 100BPAR	1.5%			50%				
60PAR halogen		25%	40		2245	21	43%	4
75PAR halogen		45%	25		2245	24	43%	5
90PAR halogen		25%	10		2245	5	43%	1
Incandescent		5%	12.5		2245	1	43%	0
		100%				52		10
Replacements for 150BPAR	5.2%			25%				
90PAR halogen		85%	60		2947	205	60%	42
120PAR halogen		10%	30		2245	9	60%	2
Incandescent		5%	25		2947	5	60%	1
		100%				219		45
Replacements for R20	16.5%			50%				
35PAR20 halogen		10%	15		2245	15	43%	3
45R		85%	5		2245	42	43%	8
Incandescent		5%	-10		2245	-5	43%	-1
		100%				51		10
GRAND TOTAL	97.3% (rest niche)					676		138
Reduction relative to original CEC proposal						8.0%		6.8%

Notes:

* Lamps that are already halogen are not included in these figures.
* Operating hours per year and peak coincidence for a lamp varies as the relative residential and commercial market

State Regulated Incandescent Reflector Lamps

This category of lamp is designed to direct light in an arc that measures less than 180 degrees. These lamps are commonly used as "downlights" in recessed lighting fixtures and in other applications where light is required to be aimed in a particular direction.

- There are approximately 10.9 million incandescent reflector lamps covered by the proposed standard in service throughout California.
- The annual sales of incandescent reflector lamps in California covered by the proposed standard are approximately 11.75 million.
- The annual per-unit energy use for covered incandescent reflector lamps is approximately 112 kWh.
- The proposed standards require minimum efficacy levels for different lamp wattage ranges.
- The proposed standards will result in an annual average per-unit energy savings of 61 kWh.
- Statewide first-year energy savings will be 626 million kWh. Once the full lamp stock turns over, annual savings will be 676 million kWh.

Table 14A - Present Value of Energy Savings for Incandescent Reflector Lamps

Base Lamp Type	Design Life (years)*	Annual Unit Energy Savings (kWh)	Annual Unit Energy Cost Savings ($) @ $.115/kWh	Annual Sales (units)	First-year Statewide Energy Savings (million kWh)	Incremental Cost of Improvement per unit ($)	Reduced Total Cost over the Design Life of the Appliance ($)
75&85 BR40	0.76	39	4.48	3.15	75	0.97	2.46
100BR40	0.96	171	19.66	1.12	116	2.26	16.51
120BR40	0.96	116	13.34	1.68	118	2.03	10.68
75BPAR	1.23	16	1.84	1.07	20	1.50	0.74
100BPAR	1.31	128	14.72	0.46	44	2.59	16.71
150BPAR	1.00	161	18.51	2.01	202	2.31	16.19
R20	0.91	12	1.38	4.89	51	0.58	0.65
TOTAL or WTD AVG	0.93	61	7.01	14.39	626	1.28	

* = Varies based on average annual operating hours and life of lamps used to comply with proposed standards.

Table 14B - Simple Payback for Incandescent Reflector Lamps (see Appendix A, endnote vii)

Base Lamp Type	Added First Cost per unit	Annual Unit Energy Savings (kWh)	Annual Unit Energy Cost Savings ($) @ $.115/kWh	Design Life (years)	Simple Payback Period
75&85 BR40	0.97	39	4.48	0.76	0.22
100BR40	2.26	171	19.66	0.96	0.11
120BR40	2.03	116	13.34	0.96	0.15
75BPAR	1.50	16	1.84	1.23	0.82
100BPAR	2.59	128	14.72	1.31	0.18
150BPAR	2.31	161	18.51	1.00	0.13
R20	0.58	12	1.38	0.91	0.43
TOTAL or WTD AVG	1.28	61	7.01	0.93	0.18

Note: In addition to energy savings, the more efficacious lamps typically have longer lives, reducing relamping costs, particularly for commercial customers where changing bulbs usually involves labor costs. This chart only shows savings and the resulting payback period resulting from energy savings.