California Energy Commission

Refinement of CEC Forecasting Models to Better Incorporate Energy Efficiency Impacts

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Types of Model Refinement

- Developing a new end use from the existing model end uses. (residential lighting)
- Refining historic and forecast end use inputs (saturation and UEC estimates)
- Decision on treatment of DSM savings to eliminate double counting (capture impacts with model or subtract after the fact)

Creation of Specific Residential Lighting End use

- Lighting was previously part of the miscellaneous end use.
- Current residential model has separate lighting and miscellaneous end uses
- Lighting has been essentially subtracted from miscellaneous
- Sum of lighting and miscellaneous energy is the same as previous forecast through 2004.

Residential Lighting Assumptions

- Lighting UEC values over time is based on data supplied from ITRON and other sources.
- Historic estimates (prior to 1990) were adjusted to conform with actual household use and remaining end use estimates.
- Utility reported savings and program plans were used to provide reductions to lighting UEC from 2005 – 2011.

Assumptions (cont.)

- It is assumed that lighting levels will remain at 2011 levels through 2020 (caused by market transformation)
- Projections of incrementally lower lighting levels after 2011 are going to be treated as uncommitted savings.
- 2004 lighting levels were subtracted from miscellaneous UEC from 2005-2020.

Lighting Calculation Method

- 2004 starting point:
  - 1800 kWh per year for single family
  - 1000 kWh per year for multi family
- Values back to 1980 were based on information provided by ITRON adjusted to be consistent with total miscellaneous use.
- 2005 -2011 reductions were from utility program filings.

Annual Lighting UEC Normalized to 2004 Values

	1970	1980	1990	1995	2000	2004	2008	2011	2012+
PG&E	0.455	0.607	0.887	0.955	0.980	1.000	0.849	0.735	0.735
SCE	0.455	0.607	0.887	0.955	0.980	1.000	0.814	0.674	0.674
SDG&E	0.455	0.607	0.887	0.955	0.980	1.000	0.902	0.829	0.829

Annual Lighting UEC
kWh per household

	1970	1980	1990	1995	2000	2004	2008	2011	2012+
PG&E sfam	819	1093	1597	1719	1764	1800	1527	1323	1323
PG&E mfam	455	607	887	955	980	1000	849	735	735
SCE sfam	819	1093	1597	1719	1764	1800	1465	1213	1213
SCE mfam	455	607	887	955	980	1000	814	674	674
SDG&E sfam	819	1093	1597	1719	1764	1800	1624	1492	1492
SDG&E mfam	455	607	887	955	980	1000	902	829	829

Annual Reduction in Use per Household Compared to 2007 Forecast
(from lighting savings)

	2004	2005	2006	2007	2008	2009	2010	2011	2012+
PG&E sfam	0	68	136	204	273	341	409	477	477
PG&E mfam	0	38	76	114	151	189	227	265	265
SCE sfam	0	84	168	251	335	419	503	587	587
SCE mfam	0	47	93	140	186	233	279	326	326
SDG&E sfam	0	44	88	132	176	220	264	308	308
SDG&E mfam	0	24	49	73	98	122	147	171	171

Future Considerations

- Additional mining of existing surveys to refine differences in use by service area and housing type.
- Incorporation of new information as it becomes available (new lighting surveys and RASS)
- Refine interaction among standards (federal and state) and utility programs to better account for potential double counting of savings.