

DOCKETED

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FORM 6**Sacramento Municipal Utility District
Uncommitted Demand-Side Program Methodology****Efficiency Program Costs and Impacts***Program* **PLUG LOAD***Sector:***Residential***Program Year:***2016-2026**

Program Year	Total Net Savings*	
	MW	GWh
2016	0.86	8.61
2017	2.29	6.00
2018	1.53	4.00
2019	1.53	4.00
2020	1.53	4.00
2021	4.54	14.00
2022	4.54	14.00
2023	4.21	13.00
2024	3.89	12.00
2025	1.91	5.00
2026	1.91	5.00

Notes: Used to be "Appliance Efficiency" but now combines refrigerators with other plug-load appliances

Savings are expected to peak in 2018 then steadily decline as standards are improved and baseline rise

Program **EQUIPMENT EFFICIENCY***Sector:***Residential***Program Year:***2016-2026**

Program Year	Total Net Savings*	
	MW	GWh
2016	2.98	3.18
2017	2.68	3.00
2018	2.51	3.00
2019	2.51	3.00
2020	2.51	3.00
2021	3.49	3.37
2022	3.36	3.25
2023	3.24	3.13
2024	3.11	3.01
2025	3.35	4.00
2026	3.35	4.00

Notes: GWh savings are expected to peak ahead of 2016/2017 standards changes, then decline to a lower annual rate thereafter.

MW increasing due to new tool for counting demand reduction

Program **Retail Lighting**

(was missing to I added Retail Lighting Title based on Notes- DR)

Program Year	Total Net Savings*	
	MW	GWh
2016	5.27	53.37
2017	3.00	27.50
2018	1.67	21.38
2019	6.49	8.30
2020	-	-
2021	-	-
2022	-	-
2023	-	-
2024	-	-
2025	-	-
2026	-	-

Notes: As LEDs begin to be adopted more widely savings will steadily decline from 2015-2018.

In 2018, federal standards will change making future savings still possible as older lights are retired, but on a much smaller scale.

Program **SHADE TREE***Sector:***Residential***Program Year:***2016-2026**

Year Planted	Projected Participation (Trees Planted)
2016	13,000
2017	13,000
2018	13,000
2019	13,000
2020	13,000
2021	13,000
2022	13,000
2023	13,000
2024	13,000
2025	13,000
2026	13,000

Notes: Forecast has not changed from last year

Program **Multifamily Retrofit**

Sector:

Residential

Program Year: **2016-2026**

Program Year	Total Net Savings*	
	MW	GWh
2016	0.80	1.00
2017	1.00	1.10
2018	1.10	1.20
2019	1.10	1.20
2020	1.10	1.20
2021	1.10	1.20
2022	1.10	1.20
2023	1.10	1.20
2024	1.10	1.20
2025	1.10	1.20
2026	1.10	1.20

Program **Whole House Performance**

Sector:

Residential

Program Year: **2016-2026**

Program Year	Participation	Total Net Savings*	
		MW	GWh
2016		1.75	1.77
2017		1.86	1.90
2018		2.00	2.02
2019		2.00	2.02
2020		2.00	2.02
2021		2.00	2.02
2022		2.00	2.02
2023		2.00	2.02
2024		2.00	2.02
2025		2.00	2.02
2026		2.00	2.02

Program **NEW CONSTRUCTION**

Sector:

Residential

Program Year: **2016-2026**

Program Year	Solar Smart EE Homes	Total Net Savings*	
		MW	GWh
2016	500	-	-
2017	400	-	-
2018	500	-	-
2019	500	-	-
2020	0	-	-
2021	0	-	-
2022	0	-	-
2023	0	-	-
2024	0	-	-

Notes: In 2015 program moved in an IDSM model, so no savings are being forecast from 2015 onward.

Program expected to end in 2020 when ZNE becomes code

2025	0	-	-
2026	0	-	-

Program **CUSTOMIZED INCENTIVES** Sector: **Commercial/Industrial** Program Year: **2016-2019**

Measure	Participatio	Ref.	Unit Savings			Total Gross Savings*			Total Net Savings*		
			KW	KWh	Ref.	MW	GWh	NTG	Ref.	MW	GWh
Retrofit	# of projects				1	9.05	93.65	0.9	c	8.15	84.29
Various											
TOTAL						9.05	93.65			8.15	84.29

References are attached. *Unit savings include T&D line-loss savings of 1.0766 for capacity and 1.060 for energy. Used the average actuals + forecasts from 2016-2019.

Program **EXPRESS EFFICIENCY INCENTIV** Sector: **Commercial/Industrial** Program Year: **2016-2019**

Measure	Participatio	Ref.	Unit Savings			Total Gross Savings*			Total Net Savings*		
			KW	KWh	Ref.	MW	GWh	NTG	Ref.	MW	GWh
Various	# of projects				1	####	58.15	0.9	3	9.30	52.34
TOTAL						####	58.15			9.30	52.34

References are attached. *Unit savings include T&D line-loss savings of 1.0766 for capacity and 1.060 for energy.

Program **Complete Energy Solution (CES)** Sector: **Commercial/Industrial** Program Year: **2016-2019**

Measure	Participatio	Ref.	Unit Savings			Total Gross Savings*			Total Net Savings*		
			KW	KWh	Ref.	MW	GWh	NTG	Ref.	MW	GWh
Various	# of projects				1	####	74.34	0.9	3	9.65	66.91
TOTAL						####	74.34			9.65	66.91

References are attached. *Unit savings include T&D line-loss savings of 1.0766 for capacity and 1.060 for energy.

Program **NEW CONSTRUCTION SAVINGS BY DESIGN** Sector: **Commercial/Industrial** Program Year: **2016-2019**

Measure	Participatio	Ref.	Unit Savings			Total Gross Savings*			Total Net Savings*		
			KW	KWh	Ref.	MW	GWh	NTG	Ref.	MW	GWh
Projects Completed						5.20	39.62	0.9	3	4.68	35.66
TOTAL						5.20	39.62			4.68	35.66

References are attached. *Unit savings include T&D line-loss savings of 1.0766 for capacity and 1.060 for energy.

FORM 5 -- REFERENCES

Sacramento Municipal Utility District Demand-Side Program Methodology

¹ SMUD engineering estimates.
² Based on products for which rebates were paid in 2002. Model EER from Energy Star website compared to NAECA minimum standard, the difference of which is the kW savings. Energy savings based on 804 hrs/yr, from SMUD
³ $NTG = (1 - \text{free rider rate}) \times (1 + \text{spillover rate})$. Either no information for either rate is available, or information for just one rate, but not the other, may be available. Recent evaluations indicate that the free-rider effect is nearly, completely, or more than compensated by market spillover (e.g., NYSEDA 2004). One evaluator of a CA statewide program commented that "in many cases when both effects are measured, spillover can actually be greater than free ridership...[In some cases] the assumption that free ridership and spillover negate each other actually provides a conservative estimate of program savings." (Quantec LLC, 2004) Another study, of the CA IOUs' non-residential new-construction program, noted that "inclusion of both free-ridership and non-participant spillover savings at the measure level...provides the more accurate measure of actual program savings" than just free ridership. (RLW Analytics, 2003) Consequently, except for measures and/or programs in which both free-rider and spillover rates have been determined
⁴ Avg. unit savings based on DEER 2004-05, v. 2.0, adjusted for avg. size (cu.ft.) of CW sold 1st half 2005 by tier, and on new baseline based on 2007 fed. min. std. of MEF 1.26.
⁵ Participation projected for 2009 is program target on which program savings goals and budgets were set.
⁶ Energy savings from ADM Assoc., Inc., "Duct Sealing Program Evaluation Services: Final Report on Energy Savings Estimation," prepared for SMUD, Oct. 2005. Peak savings from LBNL fact sheet.
⁷ Unit savings vary by type of heating and cooling equipment and the amount of insulation installed, and are based on engineering estimates. Unit savings shown are averages weighted by actual sales in 2007 and 2008.
⁸ Unit savings based on DEER 2004-05, v.2.0; avg. U-factor, SG coefficient, and sq. ft. from actual program sales; SMUD engineering estimates; weighted by housing vintage and heat and cooling type, from 2001 RASS.
⁹ Unit savings based on DEER 2001, PG&E PY2004/PY2005 EE Program Proposal, and SCE 2002 CPUC program filing.
¹⁰ For 2007, unit savings based on DEER 2004-05, v.2.0; SMUD engineering estimates; assumed 80% duct sealing; compliance w/ T24 requirements for TXV/RCA and sizing. For 2008 and beyond, unit savings based on results from RLW Analytics, "Residential HVAC Program Evaluation," 2008.
¹¹ The "Annual Performance of OG-300 Certified Systems in California Climate Zone 12," by Solar Rating & Certification Corp., May 2002, provides estimates of annual kWh savings by brand and model number. Ann. kWh savings based on this source and models installed. Unit peak savings based on SMUD engineering estimate. For 2007, savings based on
¹² Unit savings vary by type of product and wattage sold, and are based on both engineering estimates and a host of evaluations. Unit savings shown are averages weighted by actual sales. Gross wattage savings is the difference between the CFL wattage and the incandescent with equivalent light output being replaced. Peak-coincidence factor and installation/retention rate based on recent evaluations of CA and NW programs (KEMA-XENERGY and Quantum, PG&E, Rasmussen et al., Grover et al, ECONorthwest, Seattle City Light); avg. daily operating hrs. based on several
¹³ Unit savings, peak-coincidence load factor, installation/retention rate, NTG based on evaluation of SMUD's Residential Energy Star Lighting Program, 2006.
¹⁴ Avg. unit savings based on SMUD evaluation study, Nov. 2005.
¹⁵ Savings based on typical pro forma energy savings estimates for zero energy home subdivision plan types. Correlated with 2005-2006 monitoring data from the Premier Gardens subdivision.
¹⁶ Avg. unit savings are 0.064 kW and 153 kWh after approx. 25 yrs (near full maturity of tree). Growth rate applied to these unit savings such that savings in first 2-3 yrs. are 0.0, as trees don't yet shade homes, and 90% in year 20. Survivability/retention rate is also applied, such that in year 20, survivability/retention is 70%. Therefore, first-year savings are 0, but increasing savings from trees planted this year show up in succeeding years, as indicated in Form 3.2, Cumulative Impacts, as well as savings from trees planted in succeeding years. Savings estimates developed through engineering modeling by U.S. Forest Service, and represent averages weighted for the proportion of trees planted at given distances and compass directions from homes and by tree size. Shading of adjacent homes also included. Growth and mortality rates also from U.S. Forest Service, with SMUD Q.A. inspections verifying/adjusting first-year

17	Savings assumed to be 20%, based on previous experience of other utilities conducting similar programs.
18	Savings based on estimates of potential, developed for SMUD by Energy Solutions and by QDI.
19	Savings vary by type of measure installed, and are based on engineering estimates. Savings for 2007/2008 are averages weighted by actual sales; for year 2009 are based on a projected mix of measures; for uncommitted years are based on 2009 mix.
20	
21	Unit savings represent avg. of all homes participating, as measures included within homes vary, and were estimated by using Micropas software to determine the savings beyond Title 24 standards.
22	Savings and NTG based on average savings of CA IOUs as determined by the 2003 Building Efficiency Assessment for the Statewide Savings by Design Program, "An Evaluation of the Savings by Design Program," RLW Analytics, July 2005). NTG of 0.8 included in gross savings.
23	Avg. unit savings based on Itron's SMUD Potential Study, June 2006; Tier 1 \geq EF 0.65, Tier 2 \geq EF 0.68.
24	KWh savings from Estar's website, consumer savings calculator. KW based on kWh/kW ratio in DEER 2001, PG&E, SF. Assumes equal split betw. top-mount freezer and side-by-side.
25	KEMA-XENERGY, "Measurement and Evaluation Study of 2002 Statewide Residential Appliance Recycling Program," for SCE, 2/13/04, pp. 6-16, 7-8 - 7-9. Robert Mowris & Assoc., "Measurement & Verification Report for NCPA SB5X Refrigerator Recycling," 3/7/03, p. 1, Table 1.1 and fn. 1, and p.2. Hescong Mahone Group, "SMUD Refrigerator Recycling Program Impact Analysis," 9/17/02, p. 2. Unit savings include NTG=0.5.
26	Flat roof kWh savings from Estar's website, "roofing calculator." Savings wgt'd by house type and cooling/heating type, from RASS '95. Flat roofs only for SF and mobile homes in 2006 and 2007; sloped roofs added in 2007. KW savings and sloped roof kWh savings from ADM load profiles prepared for SMUD, 2009.
27	Savings based on PG&E staff; Aloha Systems, "RCA Verification Program for New and Existing Residential and Commercial Air Conditioner," CALMAC Study ID RMA 001.01, Aug. 2, 2006; and assumed 80% of tested systems
28	Participation based on program records and projections of high-efficiency lighting-product sales. Savings based on engineering estimates of the energy usage and peak demand of each efficient product rebated relative to that of the