CHAPTER V
DSM MEASURES USED IN THE STUDY

A. CALIFORNIA MEASURES

1. Residential Sector

The technologies available for the California model were developed by SCE and its contractors, notably XENERGY of Oakland, California, and Regional Economic Research, Inc., of San Diego, California. Much of the building, lighting, and appliance data for UECs, EUIs, measure cost, and efficiencies were gleaned from the Federal Residential Energy Consumption Survey (RECS) reports, and work done at the Electric Power Research Institute (EPRI), LBL, Oak Ridge National Laboratories, California Energy Commission (CEC), and personal contact with energy conservation equipment manufacturers and marketers.

The residential measures in the California model are shown in Table V-1, which contains the UECs, cost data, and the TRCs as calculated for the District region, including environmental damage avoidance benefits, using a 2 percent real discount rate. As is evident from the organization of the table, residential measures are differentiated in two ways in the California model: by single- or multi-family home and by existing homes or new homes. UECs for multi-family households were no higher than the corresponding UECs for the same technology applied to single-family homes. With the exception of space cooling, UECs for new residential space conditioning and appliance ESCs were lower, reflecting the new Title 24 and NAECA standards for new buildings.

As Table V-1 shows, less than half of the listed technologies pass TRC (103 out of a possible 238 non-base technology/building class combinations). Furthermore, of the 238 new measure/building classes, only about 10 fell within the 0.7 to 1.0 range of TRC, thus being eligible for the Technology Forcing extra incentive package. These were as follows:

Measure	Existing or New Building	Multi-Family or Single-Family
Window upgrade to double pane	Both	Multi
Window upgrade to low emissivity	Existing	Multi
Duct leakage maintenance	New	Multi
Refrigerator maintenance package	Existing	Both
Hot water saver	Existing	Single
Heat pump clothes dryer, replace on burnout	Existing	Single
High-eff. direct hot water heater (EF=0.61)	New	Multi
High-eff. vertical axis clothes washer	New	Single

Table V-1 California Residential Model DSM Measures

EXISTING - SPACE COOLING/HEATING		SINGLE-FAMILY UEC		MULTI-FAMILY UEC		SINGLE-FAMILY ADJ ENERGY SAVINGS		MULTI-FAMILY ADJ ENERGY SAVINGS		TRC TEST @ 2 percent		SIMPLE PAYBACK (Years)		CSE PRIMARY $/MBTU		MEASURE INCREMENTAL COST (1992 $)		MEASURE LIFE
MEAS #	MEASURE DESCRIPTION	ELEC kWh	GAS Therm	ELEC kWh	GAS Therm	ELEC	GAS	ELEC	GAS	SINGLE	MULTI	SINGLE	MULTI	SINGLE	MULTI	SINGLE	MULTI	
100	Base CAC (SEER=10, AFUE = 0.78)	980	336	810	198	0.000	0.000	0.000	0.000	n/a	n/a	n/a	n/a	n/a	n/a	2000	1500	15
113	Light Colored Roof (Abs. = 0.2 vs 0.5 Base)	882	336	765	198	0.100	0.000	0.055	0.000	9582.5	4356.1	0.0	0.0	0.00	0.00	0	0	10
108	Vegetation/Tree Planting	794	336	689	198	0.100	0.000	0.100	0.000	3.7	4.3	5.2	0.0	3.17	0.40	50	38	25
121	Ceiling Insulation (R-4.9 To R-19)	579	265	503	156	0.270	0.210	0.270	0.210	1.8	1.8	7.1	0.6	3.62	1.76	464	344	20
103	Duct Leakage	533	234	463	138	0.080	0.120	0.080	0.120	1.5	1.0	8.3	14.7	3.97	3.36	200	200	20
230	Window Upgrade (Dbl.)	469	196	407	116	0.120	0.160	0.120	0.160	1.3	1.2	16.2	7.1	4.69	3.49	475	353	40
231	Window Upgrade (Low-E)	399	155	346	91	0.150	0.210	0.150	0.210	1.0	0.9	21.0	11.3	6.07	4.53	677	503	40
105	Improved CAC ,SEER=11.9	335	155	291	91	0.160	0.000	0.160	0.000	0.4	0.5	29.0	84.1	26.61	3.37	200	150	15
110	Whole House Residential Fans	167	155	145	91	0.500	0.000	0.500	0.000	0.3	0.2	50.3	9.6	46.08	5.84	909	909	15
131	Wall Insulation (R-4 To R-11)	154	110	134	65	0.080	0.290	0.080	0.290	0.2	0.2	47.9	32.3	21.47	60.13	1358	1007	20
104	AC/Furnace Maintenance	145	99	126	58	0.060	0.100	0.060	0.100	0.1	0.1	15.8	135.2	41.53	54.07	120	120	3
102	Indirect/Direct Evap. Cooling (SEER = 25)	69	99	60	58	0.524	0.000	0.524	0.000	0.1	0.1	102.7	16.9	94.19	11.94	842	632	15
226	Weatherization Reduce Infiltration	69	87	60	51	0.000	0.120	0.000	0.120	0.1	0.0	42.2	88.8	64.26	584.16	300	300	5
232	Window Upgrade (Low-E Vinyl)	41	83	35	49	0.408	0.053	0.408	0.053	0.1	0.1	275.5	55.6	90.86	28.13	1598	1187	40
202	Condensing Furnace (AFUE = 0.9)	41	72	35	42	0.000	0.130	0.000	0.130	0.0	0.0	354.5	184.9	155.59	1414.43	2275	2275	20
106	Improved CAC ,SEER=12.4	39	72	34	42	0.040	0.000	0.040	0.000	0.0	0.0	562.9	14756.6	516.16	65.42	100	75	15
109	Evaporative Precooler	36	72	31	42	0.075	0.000	0.075	0.000	0.0	0.0	851.0	272.4	780.30	98.90	270	203	15
101	Superefficient AC (VSD, SEER=16.9)	27	72	23	42	0.260	0.000	0.260	0.000	0.0	0.0	1376.1	229.3	1261.74	159.92	1400	1050	15
112	Sunscreen	25	72	22	42	0.050	0.000	0.050	0.000	0.0	0.0	2921.6	8356.4	3832.05	485.71	423	317	10
140	Base RAC (EER=8.7)	465	0	450	0	0.000	0.000	0.000	0.000	n/a	n/a	n/a	n/a	n/a	n/a	374	374	15
141	Improved RAC (SEER=10.2, 0.75 Tons)	395	0	383	0	0.150	0.000	0.150	0.000	2.8	2.7	4.6	0.0	4.26	0.48	35	35	15
142	Improved RAC (SEER=12.0, 0.75 Tons)	336	0	325	0	0.150	0.000	0.150	0.000	1.6	1.6	8.0	5.6	7.30	0.83	51	51	15
200	Base Electric Resistance Heating	2250	0	1595	0	0.000	0.000	0.000	0.000	n/a	n/a	n/a	n/a	n/a	n/a	2500	1875	15
201	High Eff. Heat Pump HSPF=8.0 (Ret)	968	0	686	0	0.570	0.000	0.570	0.000	1.2	1.1	5.4	0.0	4.96	0.77	750	563	15
202	Condensing Furnace (AFUE = 0.9)	97	85	69	60	0.900	0.130	0.900	0.130	0.1	0.1	52.6	35.5	154.84	2.75	2275	1706	20

NEW - SPACE COOLING/HEATING		SINGLE-FAMILY UEC		MULTI-FAMILY UEC		SINGLE-FAMILY ADJ ENERGY SAVINGS		MULTI-FAMILY ADJ ENERGY SAVINGS		TRC TEST		SIMPLE PAYBACK		CSE PRIMARY $/MBTU		MEASURE INCREMENTAL COST (1992 $)		MEASURE LIFE
MEAS #	MEASURE DESCRIPTION	ELEC kWh	GAS Therm	ELEC kWh	GAS Therm	ELEC	GAS	ELEC	GAS	SINGLE	MULTI	SINGLE	MULTI	SINGLE	MULTI	SINGLE	MULTI	
100	Base Cac (SEER=10.0, AFUE = 0.78)	1375	190	605	115	0.000	0.000	0.000	0.000	n/a	n/a	n/a	n/a	n/a	n/a	2000	1500	15
113	Light Colored Roof (Abs.=0.2 vs. Base=0.5)	1279	190	572	115	0.070	0.000	0.055	0.000	9411.4	3253.6	0.0	0.0	0.00	0.00	0	0	10
108	Vegetation/Tree Planting	1151	190	515	115	0.100	0.000	0.100	0.000	5.4	3.2	3.6	0.0	2.18	0.54	50	38	25
103	Duct Leakage	1059	167	473	101	0.080	0.120	0.080	0.120	1.6	0.8	8.5	2.1	4.46	3.36	200	200	20
105	Improved CAC ,SEER=11.9	889	167	398	101	0.160	0.000	0.160	0.000	1.2	0.7	10.9	24.4	10.02	2.47	200	150	15
151	Window Upgrade (Low-E)	685	146	306	89	0.230	0.125	0.230	0.125	1.2	0.8	19.6	6.7	6.84	3.17	677	503	40
107	Duct Insulation (R-4 To R-8)	664	143	297	87	0.030	0.020	0.030	0.020	0.6	0.3	24.5	183.5	13.76	7.50	97	83	20
110	Whole House Residential Fans	332	143	149	87	0.500	0.000	0.500	0.000	0.5	0.2	25.3	5.2	23.24	5.72	909	909	15
150	Window Upgrade (Dbl.)	312	116	140	70	0.060	0.190	0.060	0.190	0.8	0.6	25.7	52.7	7.08	17.49	475	353	40
102	Indirect/Direct Evap. Cooling (Seer = 25)	149	116	66	70	0.524	0.000	0.524	0.000	0.3	0.1	47.7	44.6	43.70	10.75	842	842	15
104	AC/Furnace Maintenance	132	105	59	63	0.110	0.100	0.110	0.100	0.2	0.1	13.8	108.9	37.23	58.15	120	120	3
131	Wall Insulation (R-13 To R-19)	126	95	56	58	0.050	0.090	0.050	0.090	0.2	0.1	72.8	20.2	33.44	84.89	462	342	20
106	Improved CAC ,SEER=12.4	121	95	54	58	0.036	0.000	0.036	0.000	0.1	0.0	206.3	1580.0	189.19	46.55	100	75	15
152	Window Upgrade (Low-E Vinyl)	120	83	54	50	0.010	0.123	0.010	0.123	0.1	0.1	224.2	10.6	59.24	383.31	1598	1187	40
109	Evaporative Precooler	114	83	51	50	0.050	0.000	0.050	0.000	0.0	0.0	416.8	4097.8	382.20	94.03	270	203	15
101	Superefficient AC (VSD, SEER=16.9)	84	83	38	50	0.260	0.000	0.260	0.000	0.0	0.0	437.5	141.5	401.17	98.70	1400	1050	15
201	Condensing Furnace (AFUE = 0.9)	84	73	38	44	0.000	0.130	0.000	0.130	0.0	0.0	350.8	161.9	153.97	1399.69	2275	2275	20
121	Ceiling Insulation (R-30 To R-38)	83	72	37	43	0.013	0.013	0.013	0.013	0.0	0.0	451.1	3686.6	212.36	380.44	308	228	20
140	Base RAC (EER=8.7)	390	0	320	0	0.000	0.000	0.000	0.000	n/a	n/a	n/a	n/a	n/a	n/a	374	281	15
141	Improved RAC (SEER=10.2, 0.75 Tons)	332	0	272	0	0.150	0.150	0.150	0.150	2.3	2.5	5.5	0.0	5.08	0.68	35	26	15
142	Improved RAC (SEER=12.0, 0.75 Tons)	281	0	230	0	0.153	0.153	0.153	0.153	1.4	1.5	9.3	5.8	8.54	1.14	51	38	15

Table V-1 California Residential Model DSM Measures (continued)

EXISTING - RESIDENTIAL APPLIANCES NON WEATHER SENSITIVE MEASURES		SINGLE-FAMILY UEC		MULTI-FAMILY UEC		SINGLE-FAMILY ADJ ENERGY SAVINGS		MULTI-FAMILY ADJ ENERGY SAVINGS		TRC TEST		SIMPLE PAYBACK		CSE PRIMARY $/MBTU		MEASURE INCREMENTAL COST (1992 $)		MEASURE LIFE
MEAS #	Measure Description	ELEC kWh	GAS Therm	ELEC kWh	GAS Therm	ELEC	GAS	ELEC	GAS	SINGLE	MULTI	SINGLE	MULTI	SINGLE	MULTI	SINGLE	MULTI	
400	Baseline Refrigerator- Man Defrost,	739		739		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	396	396	20
401	High Eff, Man. Defrost Refrigerator	539		539		0.270		0.270		5.6	5.6	1.6	0.0	1.17	0.13	35	35	20
402	Near Term, Man. Defrost Refrigerator	270		270		0.500		0.500		2.9	2.9	3.2	1.2	2.28	0.25	92	92	20
410	Baseline Refrigerator- Auto Defrost,	1395		1315		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	522	522	20
411	High Eff Auto Defrost Refrigerator	1018		960		0.270		0.270		6.8	6.4	1.4	0.0	0.97	0.11	55	55	20
413	Near Term, Auto Defrost Refrigerator	509		480		0.500		0.500		2.3	2.2	3.9	1.1	2.84	0.33	217	217	20
412	Refrigerator Maintenance	484		456		0.050		0.050		0.9	0.8	10.5	83.7	7.54	0.88	29	29	20
420	Baseline Freezer - Man Defrost, AV=26.1	993		1009		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	380	380	20
421	High Eff. Freezer, Upright, Man. Defrost/	854		868		0.140		0.140		13.7	14.0	0.7	0.0	0.48	0.05	10	10	20
422	Near Term Freezer, Upright Man. Defrost	512		521		0.400		0.400		3.9	3.9	2.4	0.3	1.70	0.18	87	87	20
500	Base Electric Cooking	819		690		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	584	584	15
501	High Eff Oven (Insulation, Seals, Reduced M	696		587		0.150		0.150		3.2	2.7	2.7	0.0	2.49	0.32	36	36	15
503	Bi-Radiant Oven	473		399		0.320		0.320		3.2	2.7	2.7	1.8	2.43	0.32	64	64	15
502	Cooktop Reflector Pans	445		375		0.060		0.060		1.4	1.2	6.3	24.7	5.73	0.75	19	19	15
600	Base Electric Dhw Heater (EF=0.864)	4497		3225		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	150	150	15
601	High Efficiency Showerheads	4182		2999		0.070		0.070		24.5	17.6	0.3	0.0	0.27	0.04	10	10	15
602	Water Heater Insulation	4057		2909		0.030		0.030		9.8	7.0	0.7	1.0	0.68	0.10	10	10	15
604	Heat Pump Water Heater	1176		844		0.710		0.710		3.2	2.3	2.3	0.0	2.06	0.32	700	700	15
603	Hot Water Saver	941		675		0.200		0.200		0.7	0.5	9.8	38.4	9.02	1.38	250	250	15
605	Solar Water Heater	207		148		0.780		0.780		0.2	0.1	35.9	4.4	32.96	5.06	2850	2850	15
620	Base Dishwasher	888		708		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	300	300	10
621	High Efficiency Dishwashers	710		566		0.200		0.200		3.3	2.6	1.6	0.0	2.05	0.28	30	30	10
640	Base Clotheswasher	1234		933		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	380	380	10
641	High Efficiency Clotheswashers - Vert. Axis	901		681		0.270		0.270		5.3	4.0	0.9	0.0	1.24	0.18	34	34	10
642	High Efficiency Clotheswashers - Horiz. Axis	333		252		0.630		0.630		1.9	1.4	2.7	0.7	3.55	0.52	166	166	10
700	Base Dryer Electric Resistance	982		981		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	300	300	10
701	Microwave Dryer	589		589		0.400		0.400		2.2	2.2	2.4	0.0	3.09	0.34	100	100	10
702	Heat Pump Dryer-Rob	177		177		0.700		0.700		0.7	0.7	7.9	2.2	10.31	1.13	350	350	10
800	Base Incandescent Lighting - 75W	926		771		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	12	10	10
801	Halogen-Ir - 55W	676		563		0.270		0.270		8.2	8.2	0.6	0.0	0.82	0.11	17	14	10
802	Compact Fluorescent-18W	214		178		0.684		0.684		2.0	2.0	2.5	0.3	3.30	0.44	126	105	10
900	Base Pool Pump	2397		2397		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	277	277	10
901	Two-Speed Pool Pump	1558		1558		0.350		0.350		4.6	4.6	1.1	0.0	1.49	0.16	103	103	10
600-G	Base Gas Dhw Heater EF=0.54		221		144		0.000		0.000	n/a	n/a	n/a	n/a	n/a	n/a	150	150	15
601-G	High Efficiency Showerheads		197		128		0.110		0.110	17.5	11.4	0.5	0.0	0.28	2.51	7	7	15
608-G	Pipe Insulation		189		123		0.040		0.040	9.0	5.9	1.0	1.5	0.53	4.86	5	5	15
609-G	Faucet Aerators		183		119		0.030		0.030	7.3	4.8	1.2	1.3	0.66	6.00	4	4	15
602-G	Water Heater Insulation		172		112		0.060		0.060	5.7	3.7	1.5	0.6	0.85	7.73	10	10	15
606-G	High Efficiency Dhw (EF = 0.61)		153		100		0.110		0.110	0.8	0.5	10.6	0.9	5.92	53.80	120	120	15
641-G	High Efficiency Clotheswashers - Vert. Axis		149		97		0.030		0.030	0.5	0.3	12.4	43.7	9.88	89.83	34	34	10
603-G	Hot Water Saver		126		82		0.150		0.150	0.5	0.3	18.8	2.6	10.47	95.20	250	250	15
605-G	Solar Water Heater		63		41		0.500		0.500	0.1	0.1	75.4	6.6	42.14	383.05	2850	2850	15
607-G	Super Efficiency Dhw (EF = 0.71)		54		35		0.140		0.140	0.1	0.1	83.2	538.9	46.46	422.41	440	440	15
610-G	Heat Trap		53		35		0.020		0.020	0.1	0.1	84.7	677.2	47.28	429.77	55	55	15
642-G	High Efficiency Clotheswashers - Horiz. Axis		50		32		0.070		0.070	0.1	0.1	74.5	24.7	59.51	540.96	166	166	10
608-G	Flue Damper		48		31		0.030		0.030	0.1	0.0	135.1	186.9	75.45	685.90	120	120	15
700-G	Base Gas Dryer		40		20		0.000		0.000	n/a	n/a	n/a	n/a	n/a	n/a	300	300	10
703-G	High Efficiency Dryer		35		18		0.120		0.120	0.2	0.1	34.8	0.0	27.83	253.01	100	100	10
900-G	Base Gas Pool Heater (CE = 0.80)		100		0		0.000		0.000	n/a	n/a	n/a	n/a	n/a	n/a	1600	1600	15
903-G	Pool Cover (Plastic Bubble)		50		0		0.500		0.500	1.8	0.0	3.4	n/a	2.75	n/a	103	103	10
905-G	Solar Pool Heater		25		0		0.500		0.500	0.0	0.0	256.9	n/a	205.20	n/a	3840	3840	10
904-G	High Efficiency Pool Heater (CE = 0.97)		21		0		0.180		0.180	0.0	0.0	1114.8	n/a	622.60	n/a	3000	3000	15

Table V-1 California Residential Model DSM Measures (continued)

NEW - RESIDENTIAL APPLIANCES NON WEATHER SENSITIVE MEASURES		SINGLE-FAMILY UEC		MULTI-FAMILY UEC		SINGLE-FAMILY ADJ ENERGY SAVINGS		MULTI-FAMILY ADJ ENERGY SAVINGS		TRC TEST		SIMPLE PAYBACK		CSE PRIMARY $/MBTU		MEASURE INCREMENTAL COST (1992 $)		MEASURE LIFE
		ELEC	GAS	ELEC	GAS													
MEAS #	Measure Description	kWh	Therm	kWh	Therm	ELEC	GAS	ELEC	GAS	SINGLE	MULTI	SINGLE	MULTI	SINGLE	MULTI	SINGLE	MULTI	
400	Baseline Refrigerator- Man Defrost,	614		614		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	396	396	20
401	High Eff, Man. Defrost Refrigerator	448		448		0.270		0.270		4.7	4.7	2.0	0.0	1.41	0.15	35	35	20
402	Near Term, Man. Defrost Refrigerator	224		224		0.500		0.500		2.4	2.4	3.8	1.4	2.74	0.30	92	92	20
410	Baseline Refrigerator- Auto Defrost,	1118		1118		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	522	522	20
411	High Eff Auto Defrost Refrigerator	816		816		0.270		0.270		5.4	5.4	1.7	0.0	1.22	0.13	55	55	20
412	Refrigerator Maintenance	775		775		0.050		0.050		1.4	1.4	6.5	12.5	4.71	0.52	29	29	20
413	Near Term, Auto Defrost Refrigerator	388		388		0.500		0.500		1.8	1.8	5.2	0.7	3.73	0.41	217	217	20
420	Baseline Freezer - Man Defrost, AV=26.1	706		706		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	380	380	20
421	High Eff. Freezer, Upright, Man. Defrost	607		607		0.140		0.140		9.8	9.8	0.9	0.0	0.67	0.07	10	10	20
422	Near Term Freezer, Upright Man. Defrost	364		364		0.400		0.400		2.8	2.8	3.3	0.4	2.39	0.26	87	87	20
500	Base Electric Cooking	808		690		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	584	584	15
501	High Eff Oven (Insulation, Seals, Reduced M	687		587		0.150		0.150		3.1	2.7	2.8	0.0	2.52	0.32	36	36	15
502	Cooktop Reflector Pans	646		551		0.060		0.060		2.0	1.7	4.3	9.5	3.95	0.51	19	19	15
503	Bi-Radiant Oven	439		375		0.320		0.320		3.0	2.6	2.9	1.0	2.62	0.34	64	64	15
600	Base Electric DHW Heater (EF=0.864)	4481		3216		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	150	150	15
603	Hot Water Saver	3585		2573		0.200		0.200		2.8	2.0	2.6	0.0	2.37	0.36	250	250	15
604	Heat Pump Water Heater	1040		746		0.710		0.710		2.8	2.0	2.5	1.3	2.33	0.36	700	700	15
605	Solar Water Heater	229		164		0.780		0.780		0.2	0.2	32.5	11.1	29.84	4.57	2850	2850	15
620	Base Dishwasher	888		708		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	300	300	10
621	High Efficiency Dishwashers	710		566		0.200		0.200		3.3	2.6	1.6	0.0	2.05	0.28	30	30	10
640	Base Clotheswasher	1234		933		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	380	380	10
641	High Efficiency Clotheswasher - Vert. Axis	901		681		0.270		0.270		5.3	4.0	0.9	0.0	1.24	0.18	34	34	10
642	High Efficiency Clotheswasher - Horiz. Axis	333		252		0.630		0.630		1.9	1.4	2.7	0.7	3.55	0.52	166	166	10
700	Base Dryer Electric Resistance	930		930		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	300	300	10
701	Microwave Dryer	558		558		0.400		0.400		2.1	2.1	2.5	0.0	3.26	0.36	100	100	10
702	Heat Pump Dryer-Rob	167		167		0.700		0.700		0.6	0.6	8.3	2.4	10.88	1.20	350	350	10
800	Base Incandescent Lighting - 75W	926		771		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	12	10	10
801	Halogen-Ir - 55W	676		563		0.270		0.270		8.2	8.2	0.6	0.0	0.82	0.11	17	14	10
802	Compact Fluorescent-18W	214		178		0.684		0.684		2.0	2.0	2.5	0.3	3.30	0.44	126	105	10
900	Base Pool Pump	2397		2397		0.000		0.000		n/a	n/a	n/a	n/a	n/a	n/a	277	277	10
901	Two-Speed Pool Pump	1558		1558		0.350		0.350		4.6	4.6	1.1	0.0	1.49	0.16	103	103	10
600-G	Base Gas Dhw Heater EF=0.54		224		150		0.000		0.000	n/a	n/a	n/a	n/a	n/a	n/a	150	150	15
608-G	Pipe Insulation		215		144		0.040		0.040	10.3	6.9	0.8	0.0	0.47	4.26	5	5	15
606-G	High Efficiency Dhw (EF = 0.61)		191		128		0.110		0.110	1.0	0.7	8.5	0.3	4.74	43.07	120	120	15
641-G	High Efficiency Clotheswasher - Vert. Axis		186		124		0.030		0.030	0.6	0.4	9.9	35.0	7.91	71.92	34	34	10
603-G	Hot Water Saver		158		106		0.150		0.150	0.6	0.4	15.0	2.0	8.38	76.22	250	250	15
605-G	Solar Water Heater		79		53		0.500		0.500	0.1	0.1	60.4	5.3	33.73	306.68	2850	2850	15
607-G	Super Efficiency Dhw (EF = 0.71)		68		45		0.140		0.140	0.1	0.1	66.6	431.5	37.20	338.19	440	440	15
610-G	Heat Trap		66		45		0.020		0.020	0.1	0.1	67.8	542.2	37.85	344.09	55	55	15
642-G	High Efficiency Clotheswasher - Horiz. Axis		62		41		0.070		0.070	0.1	0.1	59.6	19.8	47.64	433.11	166	166	10
608-G	Flue Damper		60		40		0.030		0.030	0.1	0.1	108.2	149.6	60.41	549.15	120	120	15
700-G	Base Gas Dryer		40		20		0.000		0.000	n/a	n/a	n/a	n/a	n/a	n/a	300	300	10
703-G	High Efficiency Dryer		35		18		0.120		0.120	0.2	0.1	34.8	0.0	27.83	253.01	100	100	10
900-G	Base Gas Pool Heater (CE = 0.80)		100		0		0.000		0.000	n/a	n/a	n/a	n/a	n/a	n/a	1600	1600	15
903-G	Pool Cover (Plastic Bubble)		50		0		0.500		0.500	1.8	0.0	3.4	n/a	2.75	n/a	103	103	10
905-G	Solar Pool Heater		25		0		0.500		0.500	0.0	0.0	256.9	n/a	205.20	n/a	3840	3840	10
904-G	High Efficiency Pool Heater (CE = 0.97)		21		0		0.180		0.180	0.0	0.0	1114.8	n/a	622.60	n/a	3000	3000	15

2. *Commercial Sector*

Table V-2 shows the measures for a representative subset of commercial buildings in the District model (for the Technology Forcing scenario), showing the data and TRC calculations for existing large office buildings. New measure data are similar for each building category, but with generally lower base UECs, which are shown as the applicable EUIs -- measures of energy use intensity -- on a per-square-foot basis. The new, non-baseline measures in table number 112, representing 17 ESCs organized into 6 broad end use categories:

- space conditioning,
- ventilation,
- miscellaneous,
- lighting,
- refrigeration, and
- hot water, pool heating, and cooking.

The long-term market share was for a Technology Forcing run of the model. Several measures are given a differentiation as to "R-o-b" or "RET" in the tables, for replace on burnout or retrofit (prior to burnout), the latter being generally more expensive. The base for lighting is on a fixture basis, requiring the stock to be divided into average mix of base fixture per building classification.

3. *Industrial Measures*

As discussed in the previous chapter, it was found that the industrial sites and their energy usage were too diverse to support the detailed, technology-oriented approach that has become almost routine in utility DSM program analysis for the residential and commercial sectors. Such concepts such as "the UEC for lighting" cannot be developed easily because of the diversity of the types of industries and lack of data. In addition, the distribution of industrial energy usage is known to be "bi-modal," or skewed towards large sites like petroleum refineries, so that even if data were available, issues of confidentiality for public policy research become much more problematic in the industrial sector than in the residential and commercial sectors.

California/District industrial technologies were analyzed using the LIEF model, in which the representation of technology/DSM measure selection is in terms of mathematical representations of broad capital/energy tradeoff decisions, not unlike the representations used in the Vermont ENERGY2020 model, and development of broad, industry-class specific conservation supply curves (CSC). A CSC was developed for each of the scenarios, using several policy "handles," the final result of which is found in Table V-3.

Table V-2 California Commercial Model DSM Measures

LG-OFF EXISTING - SPACE COOLING EXISTING - SPACE HEATING		UEC		ENERGY SAVINGS		SYSTEM PEAK SAVINGS FACTOR		TRC TEST	SIMPLE PAYBACK	CSE PRIMARY	LONG-RUN MARKET SHARE	MEASURE COST		MEAS
MEAS #	MEASURE DESCRIPTION	ELEC kWh/st	GAS Therm/st	ELEC	GAS	ELEC	GAS		Years	$/MMBtu		$/UNIT	$/SF	LIFE
100	**Base (Chiller COP=5.0, Boiler eff=0.7)**	**4.07**	**0.10**	**0.00**	**0.00**	0.22	**0.00**	**n/a**	**n/a**	**n/a**	**0.000**	**0.00**	**0.00**	**20**
105	ROB Two-Speed Motor for Cooling Tower	3.93	0.10	0.03	0.00	0.22	0.00	9.1	0.00	0.87	1.000	7.00	0.02	20
120	Pipe Insulation	3.93	0.10	0.00	0.03	0.22	0.00	5.8	0.00	0.83	1.000	3.20	0.00	20
101	ROB HE Cent Chiller (COP=6.0)	3.38	0.10	0.14	0.00	0.22	0.00	5.2	0.00	1.52	1.000	50.00	0.13	20
113	Window DBL-NTB (SC=0.44, u=0.652)	2.83	0.06	0.16	0.33	0.22	0.00	3.5	0.00	1.96	1.000	4.71	0.53	60
109	EMS-Chiller	2.48	0.06	0.12	0.00	0.22	0.00	2.3	0.00	3.48	1.000	40.00	0.10	10
114	Window Low-E-NTB (SC=0.29, u=0.553)	1.83	0.03	0.26	0.50	0.22	0.00	2.0	0.00	3.43	1.000	9.10	1.02	60
108	Chilled Water Reset	1.80	0.03	0.02	0.00	0.22	0.00	1.1	0.00	7.05	1.000	7.00	0.02	10
115	High Efficiency Boiler (eff. = 0.82)	1.80	0.03	0.00	0.18	0.22	0.00	0.8	0.00	5.71	1.000	3.12	0.04	20
112	Wall Insulation (R-11)	1.74	0.02	0.04	0.15	0.22	0.00	0.8	0.00	8.48	1.000	1.00	0.13	20
102	ROB VSD HE Cent Chiller	1.57	0.02	0.10	0.00	0.22	0.00	0.8	0.00	10.20	1.000	105.00	0.26	20
103	RET Window Film-Chiller	1.45	0.02	0.08	0.00	0.22	0.00	0.5	17.15	17.29	0.012	2.00	0.17	10
116	Condensing Boiler (eff. = 0.91)	1.45	0.02	0.00	0.25	0.22	0.00	0.4	28.59	12.55	0.004	6.67	0.10	20
107	Economizer-Chiller	1.15	0.02	0.21	0.00	0.22	0.00	0.3	23.90	24.10	0.006	236.50	0.59	10
119	Boiler Insulation	1.15	0.02	0.00	0.03	0.22	0.00	0.2	49.48	21.71	0.001	2.50	0.01	20
122	Electronic Pilot Retrofit	1.15	0.02	0.00	0.02	0.22	0.00	0.2	51.61	22.65	0.001	500.00	0.01	20
104	ROB VSD for Cooling Tower	1.13	0.02	0.02	0.00	0.22	0.00	0.2	67.43	37.34	0.001	53.00	0.13	20
106	Cooling Maintenance-Chiller	1.04	0.02	0.08	0.00	0.22	0.00	0.2	4.87	44.99	0.164	15.00	0.04	1
111	Ceiling/Roof Insulation (R-19)	1.03	0.02	0.00	0.02	0.22	0.00	0.2	79.31	40.79	0.000	0.27	0.04	20
121	Tune Boiler	1.03	0.02	0.00	0.02	0.22	0.00	0.0	32.08	234.80	0.003	300.00	0.01	1
110	EMS-Boiler	1.03	0.01	0.00	0.15	0.22	0.00	0.0	843.79	370.31	0.000	1.16	1.16	20
117	Heat Recovery	1.03	0.01	0.00	0.00	0.22	0.00	0.0	n/a	n/a	0.000	1.00	0.00	20
118	Refrig. Heat Recovery	1.03	0.01	0.00	0.00	0.22	0.00	0.0	n/a	n/a	0.000	0.50	0.00	20
150	**Base (DX EER=8.5, Furnace eff=0.7)**	**6.42**	**0.10**	**0.00**	**0.00**	**0.22**	**0.00**	**n/a**	**n/a**	**n/a**	**0.000**	**610.00**	**1.53**	**20**
163	Window DBL-NTB (SC=0.44, u=0.652)	5.36	0.07	0.16	0.33	0.22	0.00	5.9	0.00	1.23	1.000	4.71	0.53	60
164	Window Low-E-NTB (SC=0.29, u=0.553)	3.97	0.03	0.26	0.50	0.22	0.00	3.9	0.00	1.89	1.000	9.10	1.02	60
151	DX AC to High Eff DX (EER=11)-ROB (Not Ava	3.25	0.03	0.18	0.00	0.22	0.00	2.0	0.00	4.07	1.000	175.00	0.44	20
158	EMS-DX	2.85	0.03	0.12	0.00	0.22	0.00	1.3	0.00	6.06	1.000	80.00	0.20	10
162	Wall Insulation (R-11)	2.75	0.03	0.04	0.15	0.22	0.00	1.2	0.00	5.79	1.000	1.00	0.13	20
154	Air Cooled to Water Cooled DX (EER=12)	2.54	0.03	0.07	0.00	0.22	0.00	0.9	0.00	8.90	1.000	108.21	0.27	20
153	Window Film DX-RET	2.35	0.03	0.08	0.00	0.22	0.00	0.7	0.03	10.65	1.000	2.00	0.17	10
152	Evaporative Precooler	2.06	0.03	0.12	0.00	0.22	0.00	0.6	12.86	12.96	0.022	123.90	0.31	10
155	Indirect Evaporative Cooler (EER=26.5)	1.21	0.03	0.41	0.00	0.22	0.00	0.5	21.01	14.81	0.008	591.72	1.48	15
159	Cooling Maintenance-DX	1.11	0.03	0.08	0.00	0.22	0.00	0.2	4.52	41.77	0.188	15.00	0.04	1
165	Efficient Gas Furnace (AFUE = 0.82)	1.11	0.02	0.00	0.13	0.22	0.00	0.2	59.31	26.03	0.001	9.00	0.13	20
157	Economizer (10-15 ton system)	0.89	0.02	0.21	0.00	0.22	0.00	0.2	45.08	45.44	0.001	343.00	0.86	10
161	Ceiling/Roof Insulation (R-19)	0.88	0.02	0.00	0.02	0.22	0.00	0.2	75.38	37.56	0.000	0.27	0.04	20
156	Indirect Evap with DX Backup	0.72	0.02	0.19	0.00	0.22	0.00	0.1	149.25	105.17	0.000	826.72	2.07	15
160	EMS-Furnace	0.72	0.02	0.00	0.10	0.22	0.00	0.0	812.66	356.64	0.000	1.16	1.16	20
170	**Base Elec Resist. w. AC**	**4.00**	**0.10**	**0.00**	**0.00**	**0.22**	**0.00**	**n/a**	**n/a**	**n/a**	**0.000**	**0.00**	**0.00**	**20**
171	Air-to-Air Heat Pump - 10 ton unit (COP=2.5)	2.03	0.10	0.49	0.00	0.22	0.00	6.1	0.00	1.31	1.000	155.00	0.39	20

LG-OFF EXISTING - VENTILATION		UEC		ENERGY SAVINGS		SYSTEM PEAK SAVINGS FACTOR		TRC TEST	SIMPLE PAYBACK	CSE PRIMARY	LONG-RUN MARKET SHARE	MEASURE INCREMENTAL COST		MEAS
MEAS #	MEASURE DESCRIPTION	ELEC kWh/st	GAS Therm/st	ELEC	GAS	ELEC	GAS		Years	$/MMBtu		$/UNIT	$/SF	LIFE
500	**Base Ventilation Fan Motor-20 HP, 1800 RPI**	**2.36**	**0.00**	**0.00**	**0.00**	**0.15**	**0.00**	**n/a**	**n/a**	**n/a**	**0.000**	**0.00**	**0.00**	**15**
503	VSD Control w. VIV Base	1.77	0.00	0.25	0.00	0.15	0.00	15.1	0.00	0.48	1.000	25.00	0.03	15
502	HE Ventilation Fan Motor-20 HP, 1800 RPM	1.67	0.00	0.06	0.00	0.15	0.00	7.9	0.00	0.92	1.000	8.05	0.01	15
504	Motor On/Off Control (EMS)	1.50	0.00	0.10	0.00	0.15	0.00	0.2	35.38	35.66	0.002	366.00	0.49	10

Table V-2 California Commercial Model DSM Measures (continued)

LG-OFF EXISTING -MISCELLANEOUS		UEC		ENERGY SAVINGS		SYSTEM PEAK SAVINGS FACTOR		TRC TEST	SIMPLE PAYBACK	CSE PRIMARY	LONG-RUN MARKET SHARE	MEASURE INCREMENTAL COST		MEAS LIFE
MEAS #	MEASURE DESCRIPTION	ELEC kWh/sf	GAS Therm/sf	ELEC	GAS	ELEC	GAS		Years	$/MMBtu		$/UNIT	$/SF	
800	**Base copier**	0.70	0.00	0.00	0.00	0.07	0.00	n/a	n/a	n/a	0.000	0.00	0.00	5
801	Copier Standby	0.42	0.00	0.40	0.00	0.07	0.00	12.8	0.00	0.51	1.000	25.00	0.01	5
810	**Base laser**	0.17	0.00	0.00	0.00	0.07	0.00	0.0	n/a	n/a	0.000	0.00	0.00	5
811	Laser/Inkjet	0.01	0.00	0.95	0.00	0.07	0.00	999.0	0.00	-31.18	1.000	-1000.00	-0.22	5
820	**Base PC**	1.87	0.00	0.00	0.00	0.07	0.00	0.0	n/a	n/a	0.000	0.00	0.00	5
821	PC notebook/standby	0.19	0.00	0.90	0.00	0.07	0.00	0.3	10.75	20.66	0.033	500.00	1.50	5

LG-OFF EXISTING - LIGHTING		UEC		ENERGY SAVINGS		SYSTEM PEAK SAVINGS FACTOR		TRC TEST	SIMPLE PAYBACK	CSE PRIMARY	LONG-RUN MARKET SHARE	MEASURE INCREMENTAL COST		MEAS LIFE
MEAS #	MEASURE DESCRIPTION	ELEC kWh/sf	GAS Therm/sf	ELEC	GAS	ELEC	GAS		Years	$/MMBtu		$/UNIT	$/SF	
300	**Base Fluorescent fixture, 4-4' lamps (34w/40**	8.64	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	9.2
302	ROB 2-T8 lamps, 1 elect ballast, reflector	4.69	0.00	0.46	0.00	0.10	0.00	4.1	0.00	1.66	1.000	49.50	0.50	9.2
310	Occupancy Sensor Fluor -4-4' fixtures	3.75	0.00	0.20	0.00	0.10	0.00	2.7	0.00	2.53	1.000	18.00	0.18	9.2
311	Stepped Dimming - 5-4' fixtures, 1/2 stepped sv	3.18	0.00	0.15	0.00	0.10	0.00	0.9	0.00	7.22	1.000	38.00	0.39	11.5
301	ROB 4-T8 lamps, 1elect ballast	3.02	0.00	0.05	0.00	0.10	0.00	0.3	21.12	22.91	0.008	26.86	0.27	9.2
303	ROB 4-34 watt lamps, 1 elect. ballast	3.02	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	23.00	0.23	9.2
304	ROB 3-34 watt lamps, 1 elect ballast, reflector	3.02	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	9.2
305	ROB 2-34 watt lamps, 1 elect ballast, reflector	3.02	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	9.2
306	RET 4-T8 lamps, 1elect ballast	3.02	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	9.2
307	RET 2-T8 lamps, 1 elect ballast, reflector	3.02	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	9.2
308	RET 3-34 watt lamps, 1 elect ballast, reflector	3.02	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	9.2
309	RET 2-34 watt lamps, 1 elect ballast, reflector	3.02	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	9.2
312	RET 4-34 watt lamps, 1 elect. ballast	3.02	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	9.2
320	**Base Fluorescent fixture, 2-8' lamps (75w),**	8.64	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	11.5
322	ROB 2-8' T12 (60W), 1 elect ballasts	6.92	0.00	0.20	0.00	0.10	0.00	173.4	0.00	0.04	1.000	0.60	0.01	11.5
323	ROB 1-8' T12 (75W), 1 elect ballast	4.36	0.00	0.37	0.00	0.10	0.00	7.9	0.00	0.86	1.000	19.65	0.21	11.5
327	Occupancy Sensor Fluor -4-8' fixtures	3.48	0.00	0.20	0.00	0.10	0.00	2.4	0.00	2.81	1.000	18.00	0.19	9.2
321	ROB 2-8' T12(75W), 1 elect ballast	3.10	0.00	0.11	0.00	0.10	0.00	1.2	0.00	5.47	1.000	18.16	0.19	11.5
328	Stepped Dimming - 5-8' fixtures, 1/2 stepped sv	2.63	0.00	0.15	0.00	0.10	0.00	0.8	0.00	9.09	1.000	38.00	0.40	11.5
324	RET 2-8' T12(75W), 1 elect ballast	2.63	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	11.5
325	RET 2-8' T12 (60W), 1 elect ballasts	2.63	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	11.5
326	RET 1-8' T12 (75W), 1 elect ballast	2.63	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	11.5
340	**Base 60W incandescent**	16.60	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	0.6
341	13W compact fluorescent screw in, base 60W	4.15	0.00	0.75	0.00	0.10	0.00	5.1	0.00	1.34	1.000	6.42	0.34	2.3
350	**Base 75W incandescent**	16.60	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	0.6
351	18W compact fluorescent screw in, base 75W	4.43	0.00	0.73	0.00	0.10	0.00	3.7	0.00	1.83	1.000	10.69	0.46	2.3
360	**Base 100W PAR incandescent flood**	16.60	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	0.6
361	28W compact fluorescent screw in, base 100W	4.98	0.00	0.70	0.00	0.10	0.00	2.4	0.00	2.83	1.000	21.03	0.67	2.3
370	**Base 150W PAR incandescent flood (4 lifetir**	16.60	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	0.00	0.00	0.6
371	90W Halogen PAR flood	9.96	0.00	0.40	0.00	0.10	0.00	3.2	0.00	2.16	1.000	3.50	0.07	0.6

Table V-2 California Commercial Model DSM Measures (continued)

LG-OFF EXISTING - REFRIGERATION		UEC		ENERGY SAVINGS		SYSTEM PEAK SAVINGS FACTOR		TRC TEST	SIMPLE PAYBACK	CSE PRIMARY	LONG-RUN MARKET SHARE	MEASURE INCREMENTAL COST		MEAS LIFE
MEAS #	MEASURE DESCRIPTION	ELEC kWh/sf	GAS Therm/sf	ELEC	GAS	ELEC	GAS		Years	$/MMBtu		$/UNIT	$/SF	
400	**Base Refrigeration System**	**0.13**	**0.00**	**0.00**	**0.00**	0.00	**0.00**	**n/a**	**n/a**	**n/a**	**0.000**	**0.00**	**0.00**	**10**
417	Demand Defrost Electric	0.12	0.00	0.08	0.00	0.00	0.00	30.0	0.00	0.20	1.000	25.00	0.00	10
423	Vinyl Curtains for Medium Temp Walk-Ins	0.12	0.00	0.03	0.00	0.00	0.00	8.7	0.00	0.68	1.000	3.00	0.00	5
416	Demand Hot Gas Defrost	0.12	0.00	0.03	0.00	0.00	0.00	8.7	0.00	0.68	1.000	25.00	0.00	10
422	Vinyl Curtains for Low Temp Walk-ins	0.11	0.00	0.01	0.00	0.00	0.00	7.7	0.00	0.76	1.000	3.00	0.00	5
419	Anti-Sweat Controls	0.11	0.00	0.06	0.00	0.00	0.00	4.7	0.00	1.25	1.000	485.00	0.00	10
414	Hot Gas Multiplex	0.10	0.00	0.04	0.00	0.00	0.00	2.8	0.00	2.09	1.000	833.00	0.00	10
402	Balanced Port Expansion Valves	0.09	0.00	0.11	0.00	0.00	0.00	2.1	0.00	2.76	1.000	93.00	0.00	5
415	Hot Gas Stand-Alone	0.09	0.00	0.04	0.00	0.00	0.00	2.0	0.00	2.92	1.000	1000.00	0.00	10
405	Low Temp External Liquid-Suction Heat Exchar	0.09	0.00	0.04	0.00	0.00	0.00	1.9	0.00	3.17	1.000	1117.00	0.00	10
420	Low Temp Doors	0.08	0.00	0.09	0.00	0.00	0.00	1.5	0.00	3.98	1.000	77.00	0.00	5
409	Low Temp Remote Evaporative Subcoolers	0.08	0.00	0.01	0.00	0.00	0.00	1.3	0.00	4.49	1.000	80.00	0.00	10
403	Electronic Expansion Valves	0.07	0.00	0.11	0.00	0.00	0.00	1.1	0.00	5.57	1.000	139.00	0.00	5
418	High Efficiency Display Case Fan Motors	0.06	0.00	0.06	0.00	0.00	0.00	0.8	0.00	7.47	1.000	5.00	0.00	5
421	Med Temp Doors	0.06	0.00	0.10	0.00	0.00	0.00	0.7	4.65	8.94	0.179	77.00	0.00	5
401	Oversize Evaporative Condenser	0.05	0.00	0.07	0.00	0.00	0.00	0.6	9.24	9.31	0.045	221.00	0.00	10
404	Ambient Subcoolers	0.05	0.00	0.01	0.00	0.00	0.00	0.5	12.00	12.09	0.026	34.00	0.00	10
410	High Efficiency Stand Alone Compressors	0.05	0.00	0.08	0.00	0.00	0.00	0.4	14.48	14.60	0.017	369.00	0.01	10
411	High Efficiency Multiplex Compressors	0.05	0.00	0.05	0.00	0.00	0.00	0.4	16.33	16.46	0.013	213.00	0.00	10
407	Low Temp Mechanical Subcoolers	0.05	0.00	0.01	0.00	0.00	0.00	0.3	18.95	19.10	0.010	163.00	0.00	10
412	Single VSD for Multiplex Rack	0.05	0.00	0.01	0.00	0.00	0.00	0.1	59.05	59.53	0.001	105.00	0.00	10
413	Full VSD for Multiplex Rack	0.05	0.00	0.02	0.00	0.00	0.00	0.1	61.59	62.08	0.001	333.00	0.00	10
406	Med. Temp External Liquid-Suction Heat Excha	0.04	0.00	0.01	0.00	0.00	0.00	0.0	135.66	136.75	0.000	3167.00	0.01	10
408	Med Temp Mechanical Subcoolers	0.04	0.00	0.00	0.00	0.00	0.00	0.0	166.22	167.55	0.000	191.00	0.00	10

LG-OFF EXISTING - DHW, POOL HEATING, COOKING		UEC		ENERGY SAVINGS		SYSTEM PEAK SAVINGS FACTOR		TRC TEST	SIMPLE PAYBACK	CSE PRIMARY	LONG-RUN MARKET SHARE	MEASURE INCREMENTAL COST		MEAS LIFE
MEAS #	MEASURE DESCRIPTION	ELEC kWh/sf	GAS Therm/sf	ELEC	GAS	ELEC	GAS		Years	$/MMBtu		$/UNIT	$/SF	YRS
600	**Base Water Heating**	**0.00**	**0.06**	**0.00**	**0.00**	**0.00**	**0.00**	**n/a**	**n/a**	**n/a**	**0.000**	**0.00**	**0.00**	**20**
621	Faucet Aerators	0.00	0.04	0.00	0.24	0.00	0.00	18.6	0.00	0.26	1.000	12.00	0.00	10
615	Water Heater Insulation	0.00	0.04	0.00	0.06	0.00	0.00	11.9	0.00	0.41	1.000	12.00	0.00	15
616	Water Heater Pipe Insulation	0.00	0.04	0.00	0.02	0.00	0.00	4.5	0.00	1.08	1.000	1.00	0.00	15
611	Boiler Pipe Insulation - Water	0.00	0.04	0.00	0.03	0.00	0.00	2.5	0.00	1.96	1.000	3.20	0.00	20
603	Efficient Water Heater	0.00	0.04	0.00	0.11	0.00	0.00	1.9	0.00	2.50	1.000	2.70	0.01	15
601	High Efficiency Boiler - Water	0.00	0.03	0.00	0.05	0.00	0.00	1.7	0.00	2.88	1.000	5.00	0.01	20
602	Condensing Boiler - Water	0.00	0.03	0.00	0.12	0.00	0.00	1.6	0.00	3.03	1.000	12.00	0.02	20
604	Super Efficient Water Heater	0.00	0.02	0.00	0.23	0.00	0.00	0.7	13.30	7.43	0.021	12.50	0.06	15
605	Condensing Water Heater	0.00	0.01	0.00	0.37	0.00	0.00	0.5	18.30	10.22	0.010	21.30	0.09	15
630	Efficient Warewasher (Dishwash)	0.00	0.01	0.00	0.02	0.00	0.00	0.4	21.50	12.01	0.007	50.00	0.00	15
606	Solar Water Heat	0.00	0.01	0.00	0.50	0.00	0.00	0.2	47.15	26.33	0.001	45.80	0.20	15
610	Boiler Insulation - Water	0.00	0.01	0.00	0.03	0.00	0.00	0.1	115.63	50.74	0.000	2.50	0.01	20
620	Low Flow Showers	0.00	0.01	0.00	0.00	0.00	0.00	0.0	n/a	n/a	0.000	15.00	0.00	10
625	Horizontal Axis Washers	0.00	0.01	0.00	0.00	0.00	0.00	0.0	n/a	n/a	0.000	170.00	0.00	15
700	**Base Pool Heat**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**n/a**	**n/a**	**n/a**	**0.000**	**0.00**	**0.00**	**15**
701	Solar Pool Heater	0.00	0.00	0.00	0.34	0.00	0.00	0.0	n/a	n/a	0.000	12.70	0.00	10
702	Pool Cover	0.00	0.00	0.00	0.50	0.00	0.00	0.0	n/a	n/a	0.000	0.28	0.00	10
800	**Base Cooking**	**0.00**	**0.05**	**0.00**	**0.00**	**0.00**	**0.00**	**n/a**	**n/a**	**n/a**	**0.000**	**0.00**	**0.00**	**15**
805	Convection Oven	0.00	0.04	0.00	0.30	0.00	0.00	1063.3	0.00	0.00	1.000	1.00	0.00	15
804	Instantaneous Infrared Broiler	0.00	0.04	0.00	0.01	0.00	0.00	0.5	17.43	9.73	0.011	50.00	0.00	15
801	Catalytic Infrared Fryer	0.00	0.03	0.00	0.08	0.00	0.00	0.2	50.83	28.39	0.001	1155.00	0.09	15
802	Infrared Griddle	0.00	0.03	0.00	0.07	0.00	0.00	0.2	56.86	31.76	0.001	1040.00	0.08	15
803	Power Burner Range	0.00	0.03	0.00	0.01	0.00	0.00	0.0	508.23	283.83	0.000	1235.00	0.09	15

Table V-3
LIEF Model Scenario Variables

Scenario	Capital Recovery Factor (%)	20-Year Penetration of Advanced Technology Programs (%)
Frozen Efficiency (CEC Forecast)	33 (3-year payback)	16
Market Potential	19 (5-year payback)	35
Utility Incentives	19 (5-year payback)	60
Technology Forcing	19 (5-year payback)	68

B. VERMONT DSM MEASURES

The primary source of DSM technologies investigated by Vermont for this project were obtained from *America's Energy Choices*, published in 1992 by the Union of Concerned Scientists in cooperation with the Alliance to Save Energy, the American Council for an Energy-Efficient Economy and the Natural Resources Defense Council.[5] The specific technologies considered and screened are listed in Tables V-4 through V-7. Included in these tables are the assumed baseline and savings along with the costs of the technologies and results of the benefit/cost screening using the 2 percent social discount rate.

Vermont is characterized by cold winters and moderate summers. These weather patterns naturally bear on end use saturations and past and future fuel selection. Air conditioning in the State is still not a substantial demand, except for large commercial office structures, which are not common in Vermont. The relatively high costs of electricity, along with the large number of heating degree days, seasonal rates, and effective State regulation over new construction, have served to all but rule out electric space heating since about 1983. Consequently, DSM technologies targeting electric space heating and air conditioning have only a minor influence on energy demand in Vermont and were not screened in this analysis.

Another feature of Vermont relevant to the potential impacts of the technologies selected in the natural gas sector is the fairly limited scope of the service in the State. The State's sole natural gas distribution utility serves only a small fraction of the State by geography and about one-third of the State by population. The potential savings through measures targeting natural gas customers is therefore limited.

[5] Residential technologies screened were taken from *America's Energy Choices; Investing in a Strong Economy and a Clean Environment*, Technical Appendixes, Union of Concerned Scientists, Cambridge MA, 1992. The technologies used for commercial and industrial screening were taken from the Wisconsin Power and Light, Advance Plan 5 in conjunction with the Wisconsin Public Service Commission.

Table V-4
Vermont Residential Electric Technologies

End Use Category	Seq#	Measure	kWh/ Year	Incremental kWh/Year	Total Cost	Total Incremental Cost	TRC Test
Lighting							
	1	Base	1,000		64		
	2	Compact Fluorescent	240	240	160	115	2.86
Hot Water Heating							
	1	Base	4,048		230		
	2	Water-Saving Showerhead and Aerators	3,233	3,233	276	276	9.75
	3	Reduce Standby Losses	2,873	3,688	326	280	3.98
	4	Horiz. axis clothes washer	2,543	3,718	426	330	1.82
	5	Add on Heat Pump	1,017	2,522	1,126	930	1.20
	6	Passive Solar	1,270	2,775	2,901	2,705	0.28
Refrigerators - Freezers							
	1	Base	955		535		
	2	Foam refrigerator door & 5.05 EER comp	787				
	3	Condenser anti-sweat heater	682				
	4	Demand defrost sensor and microprocessor	597	870	605	580.6	1.40
	5	Increased insulation and high efficiency fans	487	845	664	605.8	1.16
	6	5.3 EER compressor	466	934	684	559	0.64
	7	R-24 compact vacuum insulation	374	863	777	646.6	0.62
	8	R-58 vacuum insulation	228	809	917	703	0.65
	9	Two compressor system					
Clothes Dryers							
	1	Base	1,059		346		
	2	Increase washer spin speed (600 to 1200 rpm)	530	530	446	466	5.85
	3	Insulation	490	1,019	461	364	2.93
	4	Microwave Dryer	324	893	535	435	2.48
	5	Moisture Termination	466	995	476	364	4.7
	6	Insulation	431	1,024	491	364	2.57
	7	Heat-Pump Dryer	151	779	756	664	1.17

Table V-4 (continued)

End Use Category	Seq#	Measure	kWh/ Year	Incremental kWh/Year	Total Cost	Total Incremental Cost	TRC Test
Cooking							
	1	Base	745		600		
		Oven	346		240		
		Cooktop	399		360		
	2	Low Technology	600	600	620	624	5.64
		Oven	246	246	260	264	
		Cooktop	354	354	360	360	
	3	High Technology	455	56	955	1,074	
		Bi-Radiant Oven	101	101	335	354	
		Induction Cooktop	306	306	660	720	
Clothes Washer							
	1	Base - Vertical axis washer (standard capacity)	631		420		
	2	Horizontal axis (standard capacity)	218	218	520	520	8.11

Table V-5
Vermont Residential Natural Gas Technologies

End Use Category	Seq#	Measure	kWh/ Year	Incremental kWh/Year	Total Cost	Total Incremental Cost	TRC Test
Hot Water Heating							
	1	Base	22.5		200		
	2	Water-Saving Showerhead and Aerators	18	18	246	246	3.57
	3	Reduce Standby Losses	16.7	21.2	296	250	0.93
	4	Horizontal axis clothes washer	14.7	20.5	396	300	0.75
	5	Submerged combustion plus flue baffle	13.8	21.6	446	250	0.63
	6	Electronic Ignition	11.9	19.7	686	490	0.35
	7	Condensing	10	18.7	1,086	840	
	8	Passive Solar (downward pumping)	4.5	15.1	3,561	3,075	0.28
Clothes Dryers							
	1	Base	3.62		346		
	2	Increase washer spin speed (600 to 1200 rpm)	1.81	1.8	446	466	4.75
	3	Insulation	1.67	3.5	461	364	2.44
	4	Moisture Termination	1.47	3.4	491	482	1.8
Cooking							
	1	Base	2.05		600		
		Oven	0.94		240		
		Cooktop	1.11		360		
	2	Infrared burner	1.13	1.1	620	624	3.14
		Oven (convection with IR burner)	0.39	0.4	260	264	
		Cooktop (Ceramic IR burner)	0.74	0.7	360	360	

Table V-6
Vermont Residential
Mixed Electric and Natural Gas Measures

Seq #	Measure Description	Site Heating MMBtu/ Year	Site Cooling MMBtu/ Year	Primary MMBtu/ Year	Incre-mental MMBtu/ Year	Total Cost	Total Incre-mental Cost	Gas Heating TRC Test	Elec. Cooling TRC Test
1	Base	70.3	1,021.3	81.6		2,000			
2	Electronic thermostat	63.3	919.1	73.4	73.4	2,035	2,035	9.534	3.91
3	White surfaces and shade trees or vines	63.3	735.3	71.4	79.5	2,110	2,090		2.843
4	Infiltration, from 0.59 to 0.4 ACH	51.2	705.9	59	69.1	2,421	2,373.2	1.607	0.11
5	Windows, from 2 to Low-E(R-3.1)	46.1	667.8	53.5	76.1	2,677	2,307.2	0.83	0.18
6	Walls, From R-13 to R-19	39.2	634.4	46.2	74.3	3,012	2,402	0.85	0.1
7	Floor insul., from R-11.7 to R-19	36.8	624.9	43.7	79	3,206	2,232.8	0.57	0.06
8	Ceiling insul., from R-26.3 to R-38	34.4	606.1	41				0.49	0.1
9	Windows, from R-3.1 to R-5.5	30.5	454	35.5	76.1	4,354	3,104	0.18	0.2
10	Condensing furnace (92% AFUE)	26	454	31	77	4,725	2,445.2	0.51	
12	Ceiling, R-38 to R-60	24.4	375.9	28.6	79.9	5,804	2,434.4		0.108
13	Walls, from R-19 to R-30	19.9	349.1	23.7	76.7	7,060	3,507.2	0.16	0.32
								0.15	0.027

Table V-7
Vermont Commercial and Industrial Measures

	Seq #	Measure Description	Efficiency Ratio	Cost Ratio	TRC Test
Commercial Measures					
Air Conditioning					
	1	High Efficiency A/C	1.27	1.18	1
Lighting					
	1	Reflectors	2	1.05	46
	2	Efficient Lamp	1.14	1.19	7.9
	3	Occupancy Sensors	1.08	1.12	7
	4	Daylight Dimmer	1.17	1.7	2.5
	5	Efficient Ballasts	1.07	1.83	0.9
Water Heating					
	1	Efficient Water Heating	1.13	1.07	5.8
Industrial Measures					
Motors					
	1	Efficient 3 HP Motor	1.07	1.58	
	2	Efficient 15 HP Motor	1.05	1.53	0.4
	3	Efficient 50 HP Motor	1.03	1.71	
	4	Efficient 150 HP Motor	1.02	1.64	

While the screening of technologies can be accomplished fully endogenously using the dispatch and expansion capabilities within the ENERGY2020 model, the avoided costs used in screening technologies consuming electricity were obtained from another model designed specifically for electric dispatch and generation expansion. The emissions coefficients and costs of emissions subsumed in the avoided costs calculations were taken from a prior study in Vermont (Energy Systems, 1989). As a simplifying assumption, the avoided costs for purposes of screening natural gas DSM technologies was developed using the price of fuel to the end user.

Retrofit opportunities were not included as part of the Vermont analysis. Consideration of such opportunities would bear primarily on the shorter term opportunities for realizing savings.

CHAPTER VI
CALIFORNIA SOUTH COAST REGION RESULTS

A. ORGANIZATION OF MODEL OUTPUT

This section provides detailed baseline and scenario output from the District models used for the project. Results were developed for the six utilities with service territory covering the District. Grouping the three small municipals, Burbank, Glendale, and Pasadena (BGP), together resulted in four utility classes for which data on building square footage and end-use stock, unit energy consumption patterns, and expected stock growth were developed and utilized in the models.

The residential and commercial spreadsheet models used for the District are technology/end-use market penetration models. As such, they are extremely detailed and create copious amounts of output data. For example, the electric utility section of the commercial model has seven "savings" categories for the four utility classes (three electric utilities, each with load as well as energy savings, and the gas utility's energy savings). A commercial model run covered 12 building types, 5 end-use categories, existing and new stock, and 4 scenarios, for a total number of output information data classes of (7 x 12 x 5 x 2 x 4) 3,360, each with *yearly* data for the 1992 to 2011 forecast period. For each such utility/scenario/building type/existing-new/end-use category, the model selected among the available technologies, estimated market penetration, and generated a time-series forecast which was output to computer tables for further analysis and data reduction.

In addition, output reporting requires additional post-model-run data reduction to cover special impact analysis, such as emissions or financial effects. A major benefit of using the "micro" level approach of the California spreadsheet models is that it allows analysis of the relative economics of individual technologies within the scenario/end-use subclasses not available in other models. Such analysis, however, must target individual technologies and end uses to keep output volume at manageable levels.

Given the massive quantity of model output that is available, the approach taken for the results analysis was to organize the tables and charts of results into several aggregation levels judged to be of the most immediate interest:

- emissions impacts for NO_x and CO_2 by scenario;
- utility-level reports for the residential, commercial, and industrial sectors, by scenario;

- a single, detailed, technology/end-use table, showing an example of the internal model structure, analysis components, and results at the scenario/utility/sector/building type/end-use level; and

- cost impacts by sector and scenario, for both utilities and participants.

The results for the District utilities are discussed in the following sections as they apply to these four classes of information requirements.

B. EMISSIONS RESULTS

Tables VI-1A, 1B, and 1C summarize the emissions impacts of DSM for the California regions investigated. The tables show CO_2 and NO_x emissions as net incremental reduction differences between scenarios for years 2000 and 2011, by sector. Table VI-1A shows the total emissions for both electric and natural gas utilities. Table VI-1B contains the corresponding totals for electric utilities (generation-oriented emissions), and Table VI-1C shows the natural gas utility totals (burn site emissions).

With relatively few exceptions (such as gas field and compressor station emissions), most avoided emissions due to DSM measures would have occurred at electricity generation sites and natural gas customer burn sites. For the electric utilities serving the District, these sites include generating facility emissions that will occur outside the District's area of jurisdiction. To differentiate these variations, Tables VI-1A, 1B, and 1C contain both the *total* and *District-only* emission reductions, in their upper and lower sections, respectively. To break out the DSM effects on the District region proper, an estimate must be made of the percentage of total avoided emissions which (if not for the DSM measures) would have occurred in the District. Such estimates are extremely difficult to make for electric utilities, since they represent future (unknown) generation locations and/or emergency purchased power arrangements. Ideally, such estimates would be provided using a comprehensive integrated modeling approach, estimating future capacity, capacity siting, and likely emission rates with and without the incremental demand which would be avoided by DSM. Since such a comprehensive analysis was beyond the scope of this project, estimates of in-District electricity generation percentages were made by project staff using California ER-90 projections augmented by discussions with SCE and LADWP analysts. The assumed percentages, representing the fraction of utility avoided emissions which would be derived from in-District generating plants or natural gas burning installations, were as follows for all sectors and years:

Southern California Edison	22 percent
LADWP	25 percent
Burbank, Glendale, and Pasadena	25 percent
Southern California Gas	78 percent

Emission reduction effects for NO_x and CO_2 were calculated as a direct result of the energy savings of energy conservation and DSM in the District. As previously discussed, emissions impacts for natural gas savings were assumed to be entirely at the burn site, at a rate of 11.9 lbs CO_2 and 0.0097 lb NO_x per therm avoided. Electricity sales reductions

Table VI-1A California/District Model DSM CO2 and NOx Emissions Reductions by Sector, Scenario, and Year for both Electric and Gas Utilities (tons per year avoided)

Emissions Reductions from all Generation or Burn Sites

	Year = 2000 Scenario Difference (see key below)				Year = 2011 Scenario Difference			
	MP - FE	UI - MP	TF - UI	Total (TF-FE)	MP - FE	UI - MP	TF - UI	Total (TF-FE)
CO2 Reductions								
Residential	2,050,134	1,779,349	362,284	4,191,767	4,499,268	3,345,699	652,153	8,497,120
Commercial	2,023,517	1,734,802	220,157	3,978,476	3,893,573	2,419,757	492,485	6,805,816
Industrial	1,289,034	2,368,964	728,861	4,386,860	4,138,517	4,319,658	1,250,535	9,708,710
Total	5,362,685	5,883,115	1,311,303	12,557,103	12,531,358	10,085,115	2,395,174	25,011,647
NOx Reductions								
Residential	690	569	268	1,527	1,286	908	480	2,673
Commercial	597	494	62	1,153	967	582	110	1,660
Industrial	717	1,237	398	2,352	2,229	2,281	670	5,179
Total	2,004	2,299	728	5,031	4,482	3,771	1,260	9,512

Estimated District-only Emissions Reductions

	Year = 2000 Scenario Difference				Year = 2011 Scenario Difference			
	MP - FE	UI - MP	TF - UI	Total (TF-FE)	MP - FE	UI - MP	TF - UI	Total (TF-FE)
CO2 Reductions								
Residential	637,666	522,503	256,025	1,416,194	1,386,665	980,451	462,506	2,829,621
Commercial	550,678	454,577	56,982	1,062,238	1,075,204	650,483	125,025	1,850,712
Industrial	676,221	1,163,114	374,933	2,214,268	2,200,911	2,256,190	661,516	5,118,617
Total	1,864,565	2,140,194	687,940	4,692,700	4,662,779	3,887,124	1,249,047	9,798,950
NOx Reductions								
Residential	296	226	203	725	588	389	365	1,342
Commercial	297	160	20	387	371	212	35	618
Industrial	476	792	262	1,530	1,537	1,561	461	3,559
Total	980	1,178	484	2,642	2,496	2,162	861	5,519

Scenario key:
FE Frozen Efficiency
MP Market Potential
UI Utility Incentives
TF Technology Forcing

Table VI-1B California/District Model DSM CO2 and NOx Emissions Reductions by Sector, Scenario, and Year for Electric Utilities Only (tons per year avoided)

Emissions Reductions from all Generation or Burn Sites

	Year = 2000 Scenario Difference (see key below)				Year = 2011 Scenario Difference			
	MP - FE	UI - MP	TF - UI	Total (TF-FE)	MP - FE	UI - MP	TF - UI	Total (TF-FE)
CO2 Reductions								
Residential	1,741,173	1,564,832	48,111	3,354,116	3,844,885	2,937,528	83,811	6,866,224
Commercial	1,867,546	1,632,098	208,272	3,707,916	3,562,000	2,243,969	469,931	6,275,899
Industrial	592,408	1,232,015	348,326	2,172,749	1,847,808	2,002,544	564,709	4,415,061
Total	4,201,127	4,428,944	604,709	9,234,781	9,254,693	7,184,041	1,118,450	17,557,185
NOx Reductions								
Residential	438	394	12	844	752	575	16	1,344
Commercial	470	411	52	933	697	439	92	1,228
Industrial	149	310	88	547	362	392	392	1,145
Total	1,057	1,114	152	2,324	1,811	1,406	500	3,718

Estimated District-only Emissions Reductions

	Year = 2000 Scenario Difference				Year = 2011 Scenario Difference			
	MP - FE	UI - MP	TF - UI	Total (TF-FE)	MP - FE	UI - MP	TF - UI	Total (TF-FE)
CO2 Reductions								
Residential	396,676	355,180	10,970	762,826	876,245	662,078	19,199	1,557,522
Commercial	429,021	374,468	47,713	851,202	816,576	513,368	107,432	1,437,377
Industrial	132,853	276,293	78,115	487,261	414,159	448,840	126,571	989,570
Total	958,550	1,005,941	136,798	2,101,289	2,106,981	1,624,286	253,202	3,984,469
NOx Reductions								
Residential	100	89	3	192	171	130	4	305
Commercial	108	94	12	214	160	100	21	281
Industrial	33	70	20	123	81	88	25	194
Total	241	253	34	529	412	318	50	780

Scenario key:
FE Frozen Efficiency
MP Market Potential
UI Utility Incentives
TF Technology Forcing

Table VI-1C California/District Model DSM CO2 and NOx Emissions Reductions by Sector, Scenario, and Year for Natural Gas Utilities Only (tons per year avoided)

Emissions Reductions from all Generation or Burn Sites

	Year = 2000 Scenario Difference(see key below)				Year = 2011 Scenario Difference			
	MP - FE	UI - MP	TF - UI	Total (TF-FE)	MP - FE	UI - MP	TF - UI	Total (TF-FE)
CO2 Reductions								
Residential	308,961	214,517	314,173	837,651	654,384	408,170	568,342	1,630,896
Commercial	155,971	102,704	11,884	270,560	331,573	175,789	22,555	529,917
Industrial	696,626	1,136,950	380,535	2,214,111	2,290,708	2,317,114	685,827	5,293,650
Total	1,161,558	1,454,171	706,593	3,322,322	3,276,665	2,901,074	1,276,724	7,454,462
NOx Reductions								
Residential	252	175	256	683	533	333	463	1,329
Commercial	127	84	10	221	270	143	18	432
Industrial	568	927	310	1,805	1,867	1,889	559	4,315
Total	947	1,185	576	2,708	2,671	2,365	1,041	6,076

Estimated District-only Emissions Reductions

	Year = 2000 Scenario Difference				Year = 2011 Scenario Difference			
	MP - FE	UI - MP	TF - UI	Total (TF-FE)	MP - FE	UI - MP	TF - UI	Total (TF-FE)
CO2 Reductions								
Residential	240,990	167,323	245,055	653,368	510,419	318,373	443,307	1,272,099
Commercial	121,657	80,109	9,270	211,037	258,627	137,115	17,593	413,335
Industrial	543,368	886,821	296,817	1,727,007	1,786,753	1,807,349	534,945	4,129,047
Total	906,015	1,134,253	551,143	2,591,411	2,555,799	2,262,837	995,844	5,814,481
NOx Reductions								
Residential	196	136	200	533	416	260	361	1,037
Commercial	99	65	8	172	211	112	14	337
Industrial	443	723	242	1,408	1,456	1,473	436	3,366
Total	739	925	449	2,112	2,083	1,844	812	4,740

Scenario key:
FE Frozen Efficiency
MP Market Potential
UI Utility Incentives
TF Technology Forcing

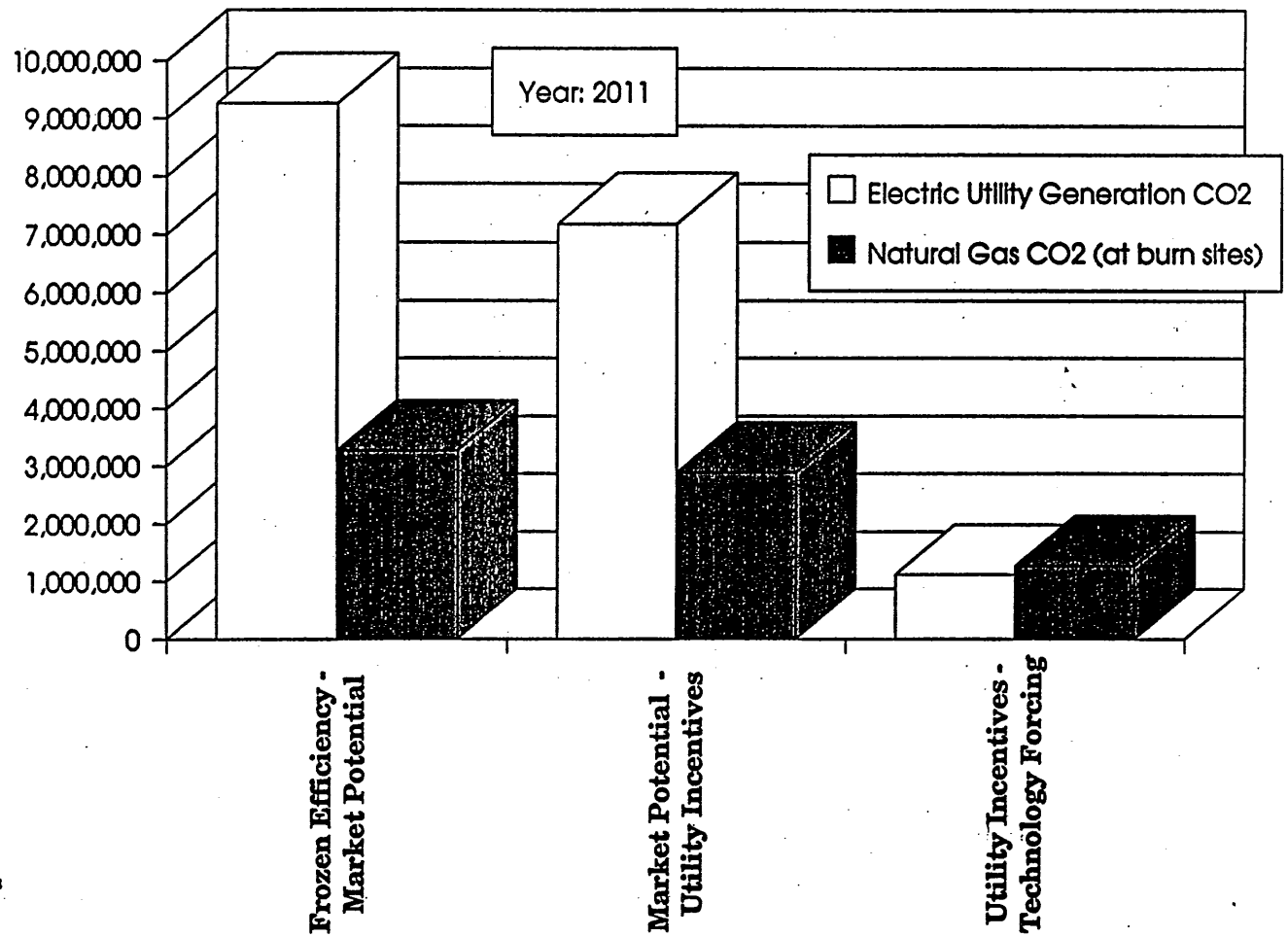
were translated into generation avoidance assuming 7.7 percent T&D losses (Edison's reported loss rate from ER90) for all utilities. The emissions effects of electricity generation avoided were calculated as follows: CO_2 reductions were assumed to be 1,073 lbs per megawatt-hour avoided. NO_x emissions reductions calculated for the avoided increment of generation affected by the DSM reductions for the District, assumed to be from both in-District and out-of-District fossil units, were calculated using yearly emissions factors, shown in Table VI-2. These rates were estimated based on recent SCE filings of their NO_x control expectations, both within and outside the District, including the effects of planned and in-progress NO_x controls, and were developed using SCE's integrated system planning models. The same rates were assumed to apply to LADWP and BGP in developing the in-District emission impacts.

As Table VI-1A shows, only about 38 percent of the avoided CO_2 emissions (in year 2011) from DSM efforts of utilities serving the District occur within the District's area of jurisdiction, whereas over half (58 percent) of the NO_x reductions occur in the District, due to the high impact of natural gas DSM measures of SCG. While CO_2 emissions do not directly affect the air quality of the District, they are of interest indirectly in terms of their effects on global climate change. NO_x effects, on the other hand, directly offset the air quality of the District. Figures VI-1 through VI-4 show the CO_2 and NO_x equivalent emissions impacts graphically. These figures dramatize one significant finding: that CO_2 reductions from DSM will be mostly available from electric utility DSM, whereas the NO_x reductions will become increasingly supplied by natural gas DSM measures. The NO_x emissions impacts in 2011 are probably to a large extent the result of the very low (0.21 lb/MWh) emissions rate estimate for electric utility peaking unit avoided generation, a direct result of the District's Rule 1135.

Table VI-2
Assumed NO_x Rates for District Avoided Generation

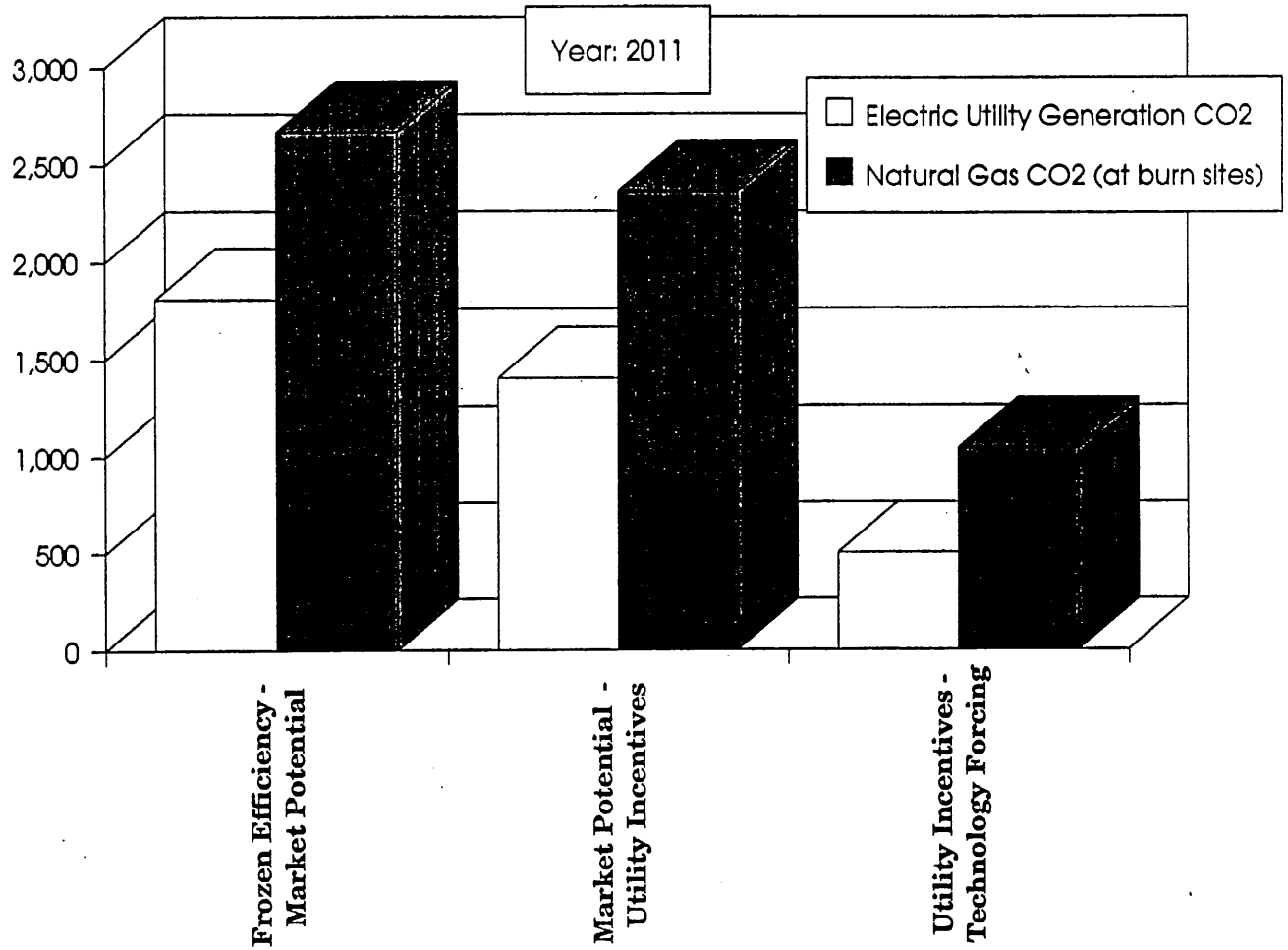
Year	Avoided NO_x Rate (lbs/MWh)	Year	Avoided NO_x Rate (lbs/MWh)
1992	0.80	1999	0.28
1993	0.65	2000	0.27
1994	0.66	2001	0.25
1995	0.58	2002	0.24
1996	0.44	2003	0.23
1997	0.29	2004 through 2011	0.21

Figure VI-1 Potential CO2 Emissions Reduction Effects of DSM for All District Utilities Including Out-of-Basin Emissions



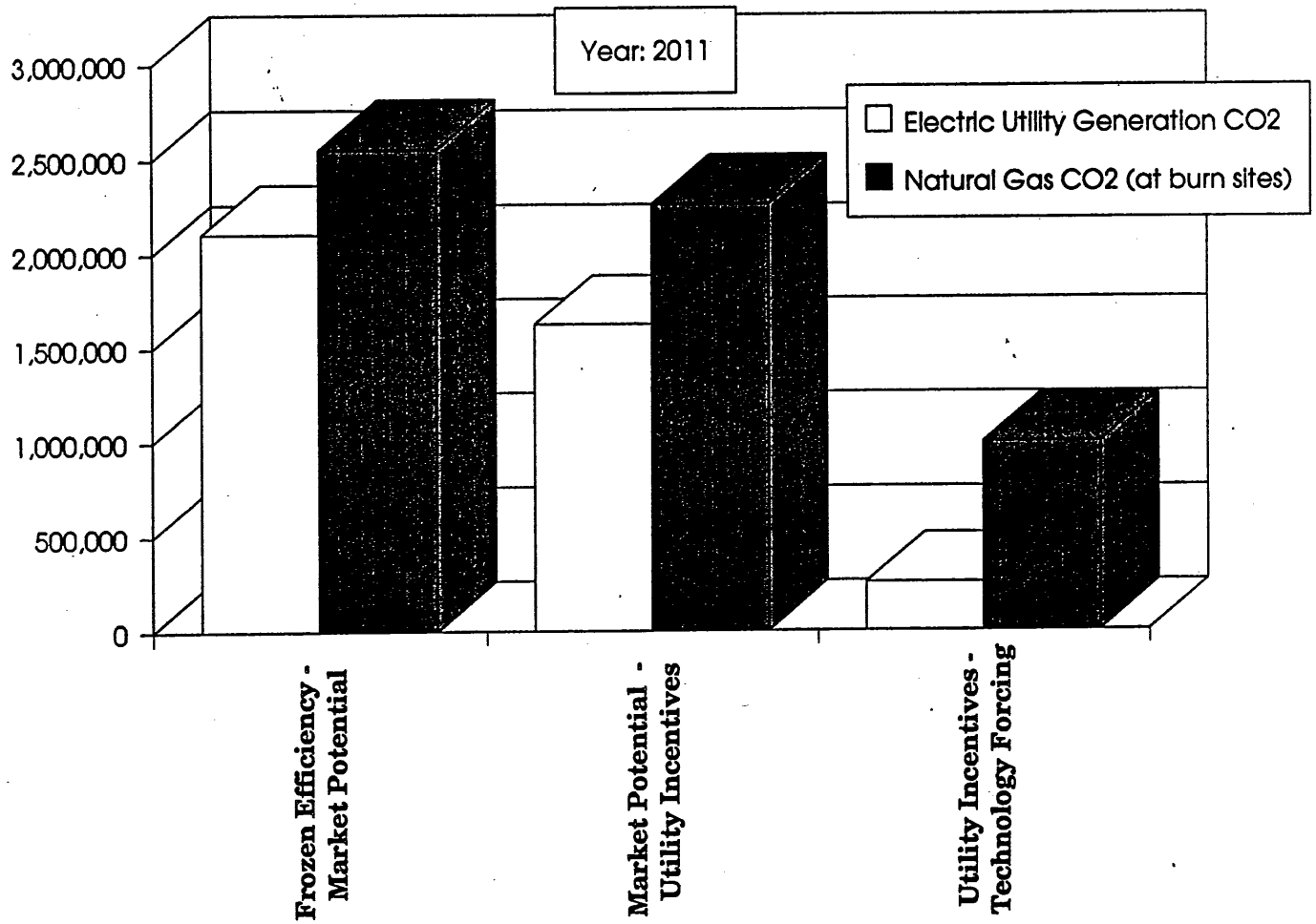
Note: reductions are incremental and therefore additive.

Figure VI-2 Potential NOx Emissions Reduction Effects of DSM for All District Utilities Including Out-of-Basin Emissions



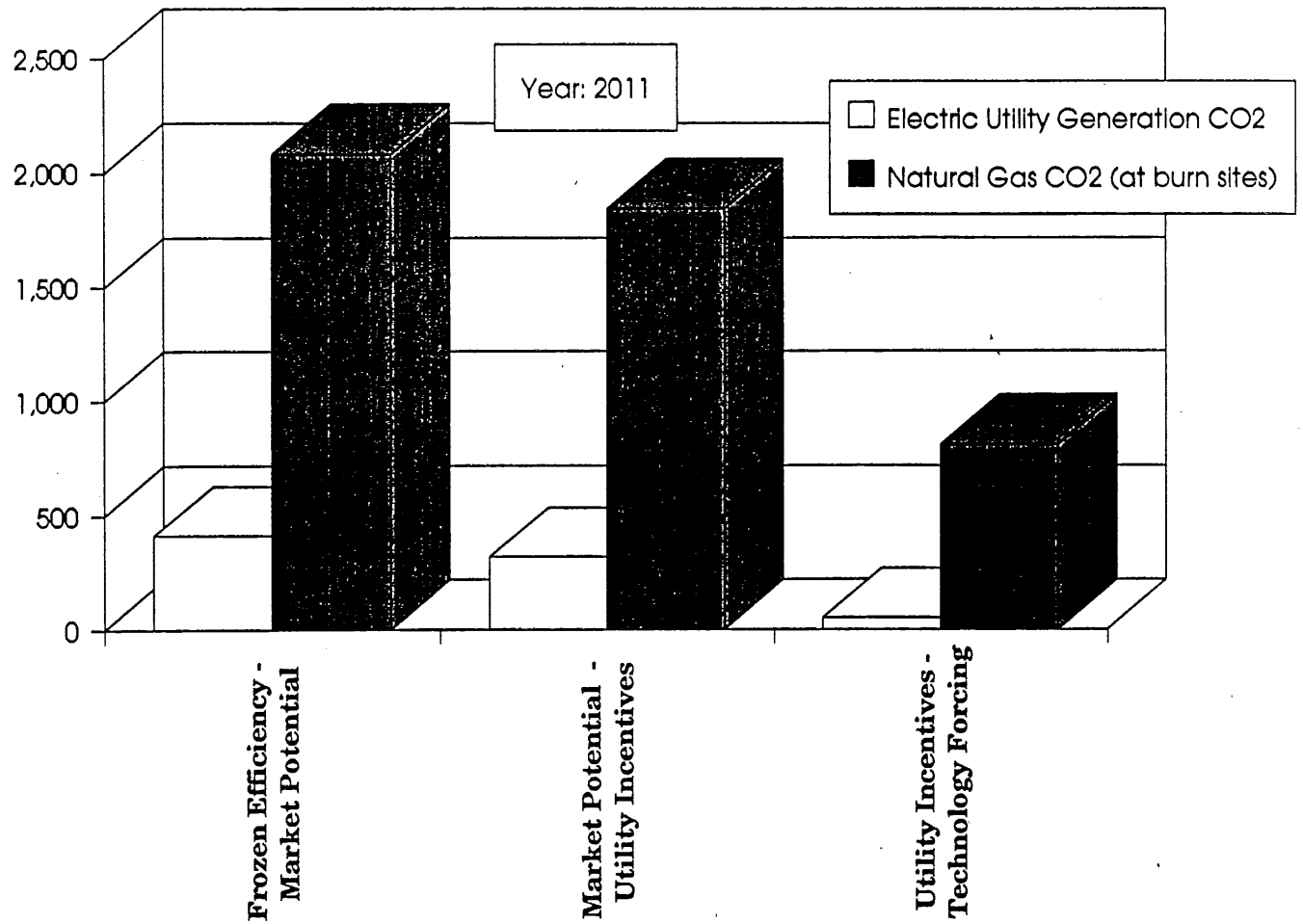
Note: reductions are incremental and therefore additive.

Figure VI-3 Potential CO2 Emissions Reduction Effects of DSM for All District Utilities: District Emissions Only



Note: reductions are incremental and therefore additive.

Figure VI-4 Potential NOx Emissions Reduction Effects of DSM for All District Utilities: District Emissions Only



Note: reductions are incremental and therefore additive.

C. UTILITY-LEVEL DSM SAVINGS BY SECTOR

1. Residential Sector DSM Savings

By far the most extreme conservation potential found in the study was the residential electrical energy (GWh, not load) savings, which in the two action scenarios (Utility Incentives and Technology Forcing) approached a level 41 percent below the Frozen Efficiency baseline by 2011. These savings were found to be fairly uniform across the electric utilities. In contrast, electrical load savings from the Frozen Efficiency baseline were less -- about 29 percent. Tables VI-3 through VI-6 and Figures VI-5 through VI-11 show these detailed results for the utilities, by scenario and year, for electrical energy, electricity demand, and natural gas therms.

Differences between the action scenarios and the Market Potential baseline were much less extreme than from the Frozen Efficiency baseline -- about 24 percent instead of 41 percent. Since the two baselines were considered to bracket the future without extreme DSM, a half-way point baseline would be a plausible future BAU energy use trajectory. From this half-way point, electrical energy reductions for Technology Forcing would approach 33 percent by 2011, a figure which is within the range of published electric utility DSM targets for the California residential sector by 2011.

The difference in electrical energy savings by 2011 between the Utility Incentives scenario and Technology Forcing in the residential sector is only about 1-2 percent -- a surprisingly low value. The low differential between these scenarios, especially for the residential sector, appears to be due to the relatively low number of efficient new technologies which fail a 1.0 TRC test but just pass the 0.70 threshold, and are thus subject to special utility and government incentives under the Technology Forcing scenario. While this effect may be considered a modeling anomaly, it results from the apparent fact that there are few such "fringe" technologies (those almost, but not quite passing TRC) available for the relatively low energy consumption levels found in Southern California housing stock.

In contrast to the high (41 percent) savings for electric utility residential measures, the natural gas DSM possibilities appear to be far less. As may be seen in Table VI-6, Technology Forcing is only 12 percent below the Frozen Efficiency baseline, and 9 percent below the Market Potential baseline by 2011.

Table VI-3 Residential DSM Results for the Southern California Edison Service Area by Scenario and Year

SCE - RESIDENTIAL
FROZEN EFFICIENCY AT 1992 EUI's

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH	15,130.4	15,484.3	15,838.5	16,197.2	16,538.2	16,855.3	17,168.7	17,478.0	17,804.6	18,181.9	18,584.4	18,986.8	19,315.8	19,653.5	20,142.6	20,639.8	21,067.7	21,401.4	21,641.0	21,877.2
TOTAL MW	4,678.6	4,800.5	4,922.8	5,046.3	5,165.0	5,276.2	5,386.5	5,495.7	5,611.1	5,744.1	5,885.9	6,028.0	6,146.0	6,267.1	6,439.1	6,614.1	6,766.2	6,887.1	6,976.7	7,065.5

SCE - RESIDENTIAL
MARKET POTENTIAL (DR = 10%, TRC = 1, UBC = NO)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVING	0.0	25.9	114.3	280.9	535.2	874.5	1,283.4	1,738.1	2,214.6	2,695.6	3,166.4	3,616.3	4,030.7	4,199.6	4,362.4	4,511.6	4,637.7	4,737.3	4,811.2	4,873.1
TOTAL MW SAVINGS	0.0	5.5	24.4	60.2	114.6	186.0	270.3	362.2	457.3	552.8	646.5	736.7	820.6	855.6	890.1	921.9	948.9	970.4	986.6	1,000.5
TOTAL GWH	15,130.4	15,458.4	15,724.2	15,916.3	16,003.0	15,980.8	15,885.2	15,739.9	15,590.0	15,486.3	15,418.1	15,370.5	15,285.0	15,453.9	15,780.1	16,128.2	16,430.0	16,664.1	16,829.7	17,004.1
TOTAL MW	4,678.6	4,795.0	4,898.4	4,986.1	5,050.4	5,090.2	5,116.2	5,133.5	5,153.8	5,191.4	5,239.4	5,291.2	5,325.3	5,411.5	5,549.1	5,692.3	5,817.3	5,916.6	5,990.1	6,065.0

SCE - RESIDENTIAL
UTILITY INCENTIVES (DR = 2%, TRC = 1, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVING	0.0	48.6	234.6	615.8	1,211.1	1,967.6	2,785.2	3,570.5	4,280.7	4,918.7	5,492.3	6,010.1	6,460.3	6,871.9	7,315.1	7,744.2	8,131.5	8,467.2	8,750.3	9,019.6
TOTAL MW SAVINGS	0.0	11.1	53.6	140.8	276.9	449.9	637.1	817.0	980.0	1,126.4	1,258.3	1,377.6	1,481.8	1,576.8	1,679.2	1,778.4	1,868.1	1,946.0	2,012.0	2,074.8
TOTAL GWH	15,130.4	15,435.7	15,603.9	15,581.3	15,327.2	14,887.7	14,383.5	13,907.6	13,523.9	13,263.2	13,092.2	12,976.7	12,855.5	12,781.6	12,827.4	12,895.6	12,936.1	12,934.3	12,890.6	12,857.6
TOTAL MW	4,678.6	4,789.4	4,869.2	4,905.6	4,888.2	4,826.3	4,749.5	4,678.7	4,631.1	4,617.7	4,627.7	4,650.4	4,664.2	4,690.3	4,760.0	4,835.7	4,898.1	4,941.0	4,964.7	4,990.7

SCE - RESIDENTIAL
TECHNOLOGY FORCING (DR = 2%, TRC = 0.70, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVING	0.0	49.3	238.1	625.0	1,229.1	1,996.7	2,825.8	3,621.9	4,341.3	4,987.0	5,566.9	6,089.8	6,544.1	6,959.5	7,406.1	7,838.1	8,227.8	8,565.3	8,849.9	9,120.1
TOTAL MW SAVINGS	0.0	11.1	53.7	141.1	277.7	451.6	639.7	820.7	984.5	1,131.4	1,263.4	1,382.7	1,486.6	1,581.8	1,684.1	1,783.1	1,872.7	1,950.4	2,016.2	2,078.6
TOTAL GWH	15,130.4	15,434.9	15,600.4	15,572.1	15,309.1	14,858.7	14,342.8	13,856.1	13,463.2	13,194.9	13,017.6	12,897.0	12,771.6	12,694.0	12,736.5	12,801.7	12,839.8	12,836.1	12,791.1	12,757.1
TOTAL MW	4,678.6	4,789.4	4,869.1	4,905.2	4,887.3	4,824.6	4,746.8	4,675.1	4,626.6	4,612.8	4,622.5	4,645.3	4,659.4	4,685.3	4,755.0	4,831.0	4,893.5	4,936.7	4,960.5	4,986.9

PERCENTAGE SAVINGS IN YEAR 2011

	FROZEN EFFICIENCY BASELINE		MARKET POTENTIAL BASELINE	
	GWH	MW	GWH	MW
MARKET POTENTIAL	22.3%	14.2%	N/A	N/A
UTILITY INCENTIVES	41.2%	29.4%	24.4%	17.7%
TECHNOLOGY FORCING	41.7%	29.4%	25.0%	17.8%

Figure VI-5 Southern California Edison Residential Electricity Sales, Gwh/Year

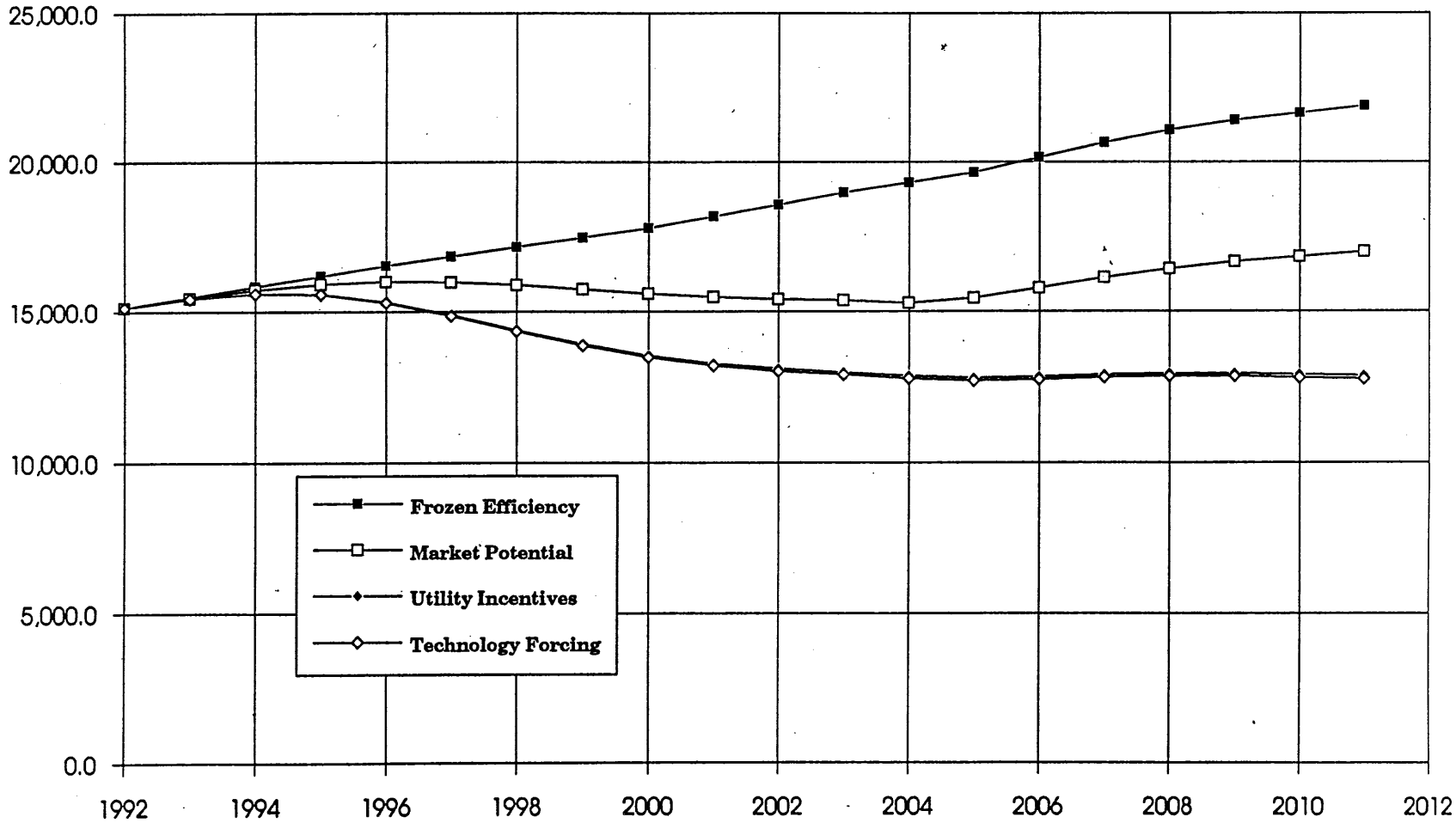


Figure VI-6 Southern California Edison Residential Electricity Demand, Megawatts

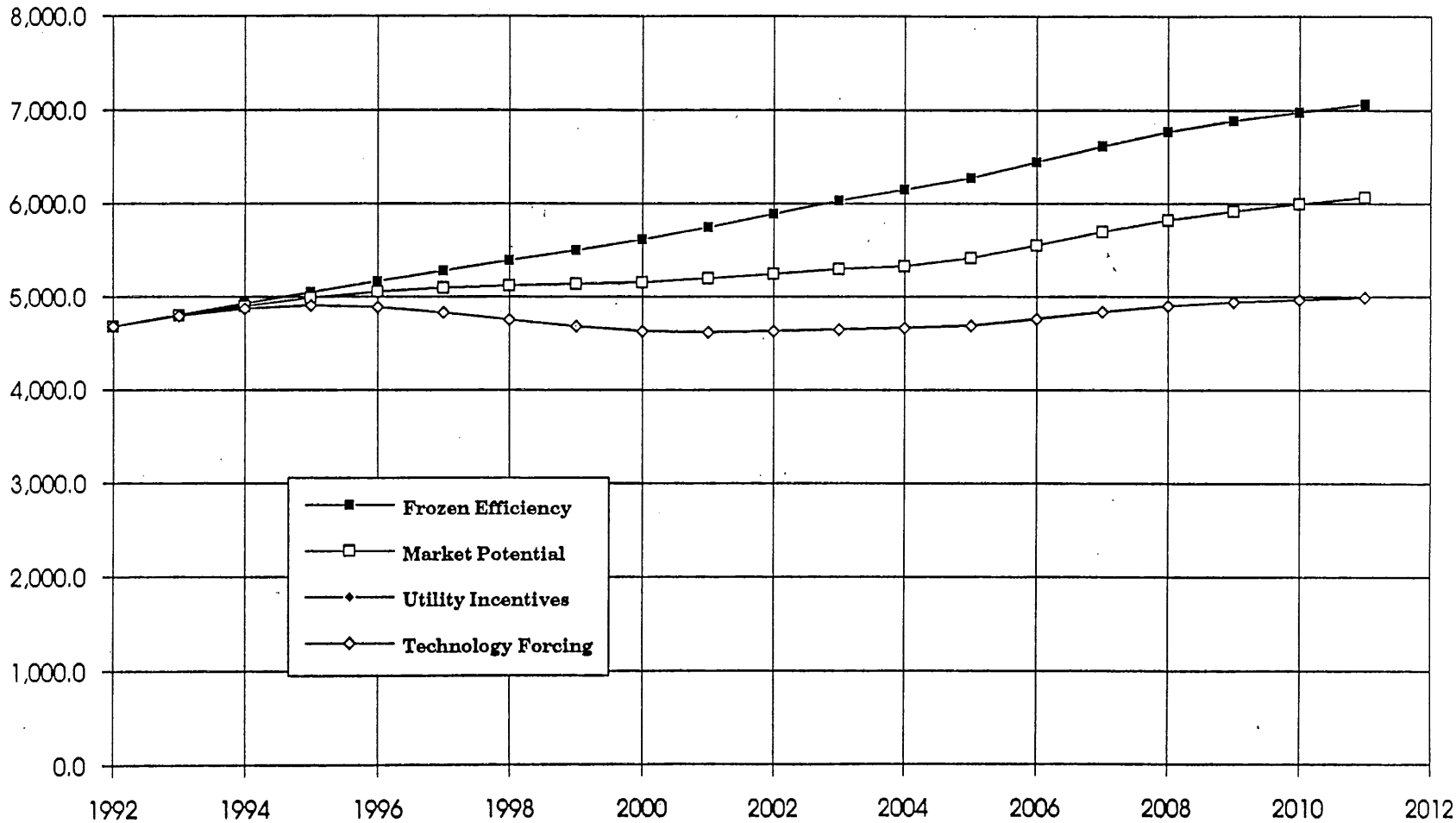


Table VI-4 Residential DSM Results for the Los Angeles Department of Water and Power by Scenario and Year

LADWP - RESIDENTIAL
FROZEN EFFICIENCY AT 1992 EUI's

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH	4,938.8	4,980.7	5,023.5	5,067.2	5,111.9	5,157.5	5,204.1	5,251.7	5,300.2	5,349.8	5,400.3	5,452.0	5,504.6	5,558.4	5,613.2	5,669.1	5,726.1	5,784.3	5,843.6	5,904.1
TOTAL MW	1,543.1	1,558.4	1,574.1	1,590.1	1,606.4	1,623.0	1,639.9	1,657.2	1,674.8	1,692.8	1,711.1	1,729.8	1,748.8	1,768.2	1,788.0	1,808.1	1,828.6	1,849.6	1,870.9	1,892.6

LADWP - RESIDENTIAL
MARKET POTENTIAL (DR = 10%, TRC = 1, UBC = NO)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	8.3	36.2	88.3	167.3	272.8	400.3	542.7	692.6	843.7	990.9	1,131.3	1,262.9	1,317.5	1,364.5	1,407.1	1,446.2	1,482.1	1,515.3	1,546.0
TOTAL MW SAVINGS	0.0	1.7	7.6	18.5	34.9	56.3	81.8	109.7	138.8	168.0	196.6	224.0	250.1	260.5	269.5	277.7	285.1	291.8	298.0	303.7
TOTAL GWH	4,938.8	4,972.4	4,987.3	4,979.0	4,944.6	4,884.7	4,803.8	4,709.0	4,607.6	4,506.1	4,409.4	4,320.7	4,241.7	4,240.9	4,248.7	4,262.0	4,279.9	4,302.2	4,328.3	4,358.1
TOTAL MW	1,543.1	1,556.7	1,566.5	1,571.6	1,571.5	1,566.6	1,558.1	1,547.5	1,536.0	1,524.8	1,514.5	1,505.7	1,498.7	1,507.7	1,518.4	1,530.5	1,543.6	1,557.8	1,572.9	1,588.9

LADWP - RESIDENTIAL
UTILITY INCENTIVES (DR = 2%, TRC = 1, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	15.5	73.7	190.4	369.1	592.5	829.3	1,052.2	1,247.9	1,415.1	1,558.2	1,682.8	1,793.5	1,890.6	1,979.6	2,062.2	2,139.6	2,212.8	2,282.4	2,348.9
TOTAL MW SAVINGS	0.0	3.4	16.3	42.1	81.6	130.7	182.6	231.2	273.7	309.7	340.4	366.8	390.1	410.4	428.9	445.8	461.6	476.4	490.3	503.5
TOTAL GWH	4,938.8	4,965.1	4,949.8	4,876.8	4,742.8	4,565.0	4,374.8	4,199.4	4,052.3	3,934.7	3,842.1	3,769.1	3,711.1	3,667.7	3,633.6	3,606.9	3,586.5	3,571.5	3,561.2	3,555.2
TOTAL MW	1,543.1	1,555.0	1,557.8	1,547.9	1,524.8	1,492.3	1,457.3	1,426.0	1,401.1	1,383.1	1,370.7	1,363.0	1,358.7	1,357.8	1,359.1	1,362.3	1,367.1	1,373.2	1,380.6	1,389.1

LADWP - RESIDENTIAL
TECHNOLOGY FORCING (DR = 2%, TRC = 0.70, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	15.8	74.8	193.2	374.7	601.6	842.2	1,068.6	1,267.5	1,437.4	1,582.9	1,709.5	1,822.1	1,920.9	2,011.5	2,095.6	2,174.5	2,249.0	2,319.9	2,387.7
TOTAL MW SAVINGS	0.0	3.6	17.0	43.9	85.0	136.3	190.7	241.7	286.3	324.3	356.7	384.6	409.4	431.1	450.8	469.1	486.1	502.0	517.1	531.4
TOTAL GWH	4,938.8	4,964.9	4,948.7	4,874.0	4,737.2	4,555.9	4,361.9	4,183.0	4,032.7	3,912.3	3,817.4	3,742.4	3,682.5	3,637.4	3,601.7	3,573.5	3,551.6	3,535.3	3,523.7	3,516.4
TOTAL MW	1,543.1	1,554.9	1,557.1	1,546.2	1,521.4	1,486.7	1,449.3	1,415.5	1,388.5	1,368.5	1,354.5	1,345.1	1,339.4	1,337.1	1,337.1	1,339.0	1,342.6	1,347.5	1,353.8	1,361.2

PERCENTAGE SAVINGS IN YEAR 2011

	FROZEN EFFICIENCY BASELINE		MARKET POTENTIAL BASELINE	
	GWH	MW	GWH	MW
MARKET POTENTIAL	26.2%	16.0%	N/A	N/A
UTILITY INCENTIVES	39.8%	26.6%	18.4%	12.6%
TECHNOLOGY FORCING	40.4%	26.1%	19.3%	14.3%

Figure VI-7 Los Angeles Department of Water and Power Residential Electricity Sales, Gwh/Year

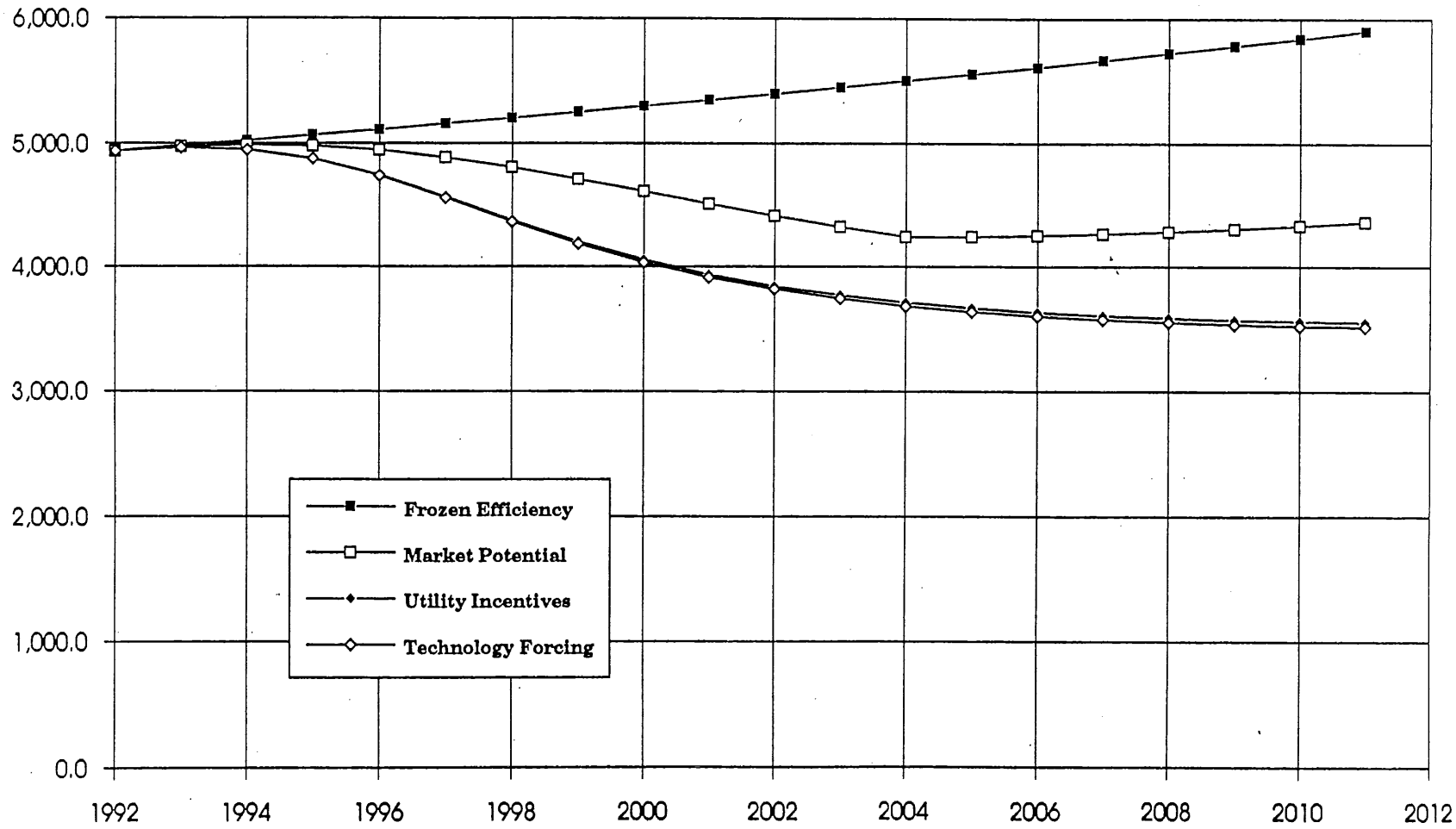


Figure VI-8 Los Angeles Department of Water and Power Residential Electricity Demand, Megawatts

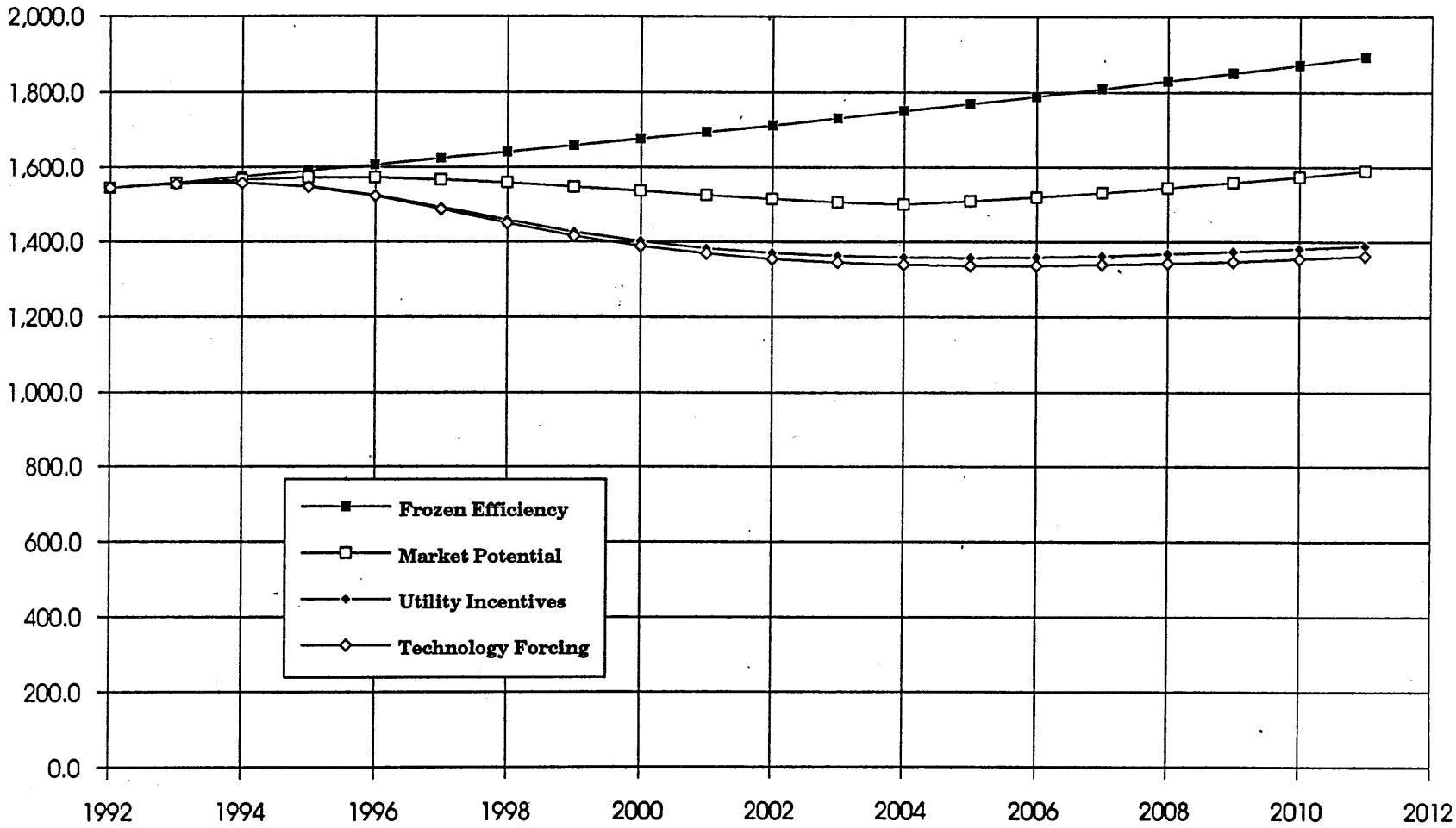


Table VI-5 Residential DSM Results for Burbank, Glendale, and Pasadena Service Areas by Scenario and Year

BGP - RESIDENTIAL
FROZEN EFFICIENCY AT 1992 EUI's

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH	626.1	631.7	637.4	643.2	649.1	655.1	661.2	667.4	673.7	680.1	686.6	693.3	700.0	706.8	713.8	720.9	728.1	735.4	742.8	750.4
TOTAL MW	194.7	196.8	198.8	201.0	203.1	205.3	207.5	209.7	212.0	214.3	216.7	219.1	221.5	224.0	226.5	229.0	231.6	234.2	236.9	239.6

BGP - RESIDENTIAL
MARKET POTENTIAL (DR = 10%, TRC = 1, UBC = NO)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVING	0.0	1.1	4.6	11.3	21.4	34.9	51.2	69.3	88.3	107.5	126.1	143.7	160.3	167.2	173.1	178.4	183.3	187.8	191.9	195.7
TOTAL MW SAVINGS	0.0	0.2	1.0	2.4	4.5	7.3	10.5	14.1	17.8	21.5	25.2	28.6	31.9	33.2	34.4	35.4	36.4	37.2	38.0	38.7
TOTAL GWH	626.1	630.6	632.8	631.9	627.7	620.2	610.1	598.1	585.4	572.7	560.6	549.5	539.7	539.7	540.7	542.5	544.8	547.6	550.9	554.7
TOTAL MW	194.7	196.5	197.9	198.6	198.6	198.0	197.0	195.6	194.2	192.8	191.5	190.5	189.6	190.7	192.1	193.6	195.2	197.0	198.9	200.9

BGP - RESIDENTIAL
UTILITY INCENTIVES (DR = 2%, TRC = 1, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVING	0.0	2.0	9.4	24.2	47.0	75.4	105.7	134.1	159.1	180.5	198.8	214.8	228.9	241.4	252.8	263.4	273.3	282.7	291.6	300.1
TOTAL MW SAVINGS	0.0	0.4	2.1	5.3	10.4	16.6	23.3	29.5	34.9	39.6	43.6	47.0	50.0	52.7	55.1	57.3	59.4	61.4	63.2	65.0
TOTAL GWH	626.1	629.7	628.0	619.0	602.1	579.7	555.6	533.3	514.6	499.6	487.8	478.5	471.1	465.4	461.0	457.5	454.8	452.7	451.2	450.3
TOTAL MW	194.7	196.3	196.8	195.6	192.7	188.7	184.2	180.3	177.1	174.7	173.1	172.1	171.5	171.3	171.4	171.7	172.2	172.9	173.7	174.7

BGP - RESIDENTIAL
TECHNOLOGY FORCING (DR = 2%, TRC = 0.70, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVING	0.0	2.0	9.5	24.6	47.7	76.6	107.3	136.2	161.7	183.4	202.0	218.2	232.6	245.3	256.9	267.6	277.7	287.2	296.3	304.9
TOTAL MW SAVINGS	0.0	0.5	2.2	5.6	10.8	17.3	24.3	30.8	36.5	41.4	45.6	49.2	52.4	55.2	57.8	60.2	62.4	64.5	66.5	68.4
TOTAL GWH	626.1	629.7	627.9	618.6	601.4	578.5	553.9	531.2	512.1	496.7	484.7	475.1	467.4	461.6	456.9	453.2	450.3	448.1	446.5	445.4
TOTAL MW	194.7	196.3	196.7	195.4	192.3	187.9	183.2	178.9	175.5	172.9	171.1	169.9	169.1	168.7	168.7	168.8	169.2	169.7	170.4	171.2

PERCENTAGE SAVINGS IN YEAR 2011

	FROZEN EFFICIENCY BASELINE		MARKET POTENTIAL BASELINE	
	GWH	MW	GWH	MW
MARKET POTENTIAL	26.1%	16.2%	N/A	N/A
UTILITY INCENTIVES	40.0%	27.1%	18.8%	13.1%
TECHNOLOGY FORCING	40.6%	28.5%	19.7%	14.8%

Figure VI-9 Burbank, Glendale, and Pasadena Residential Electricity Sales, Gwh/Year

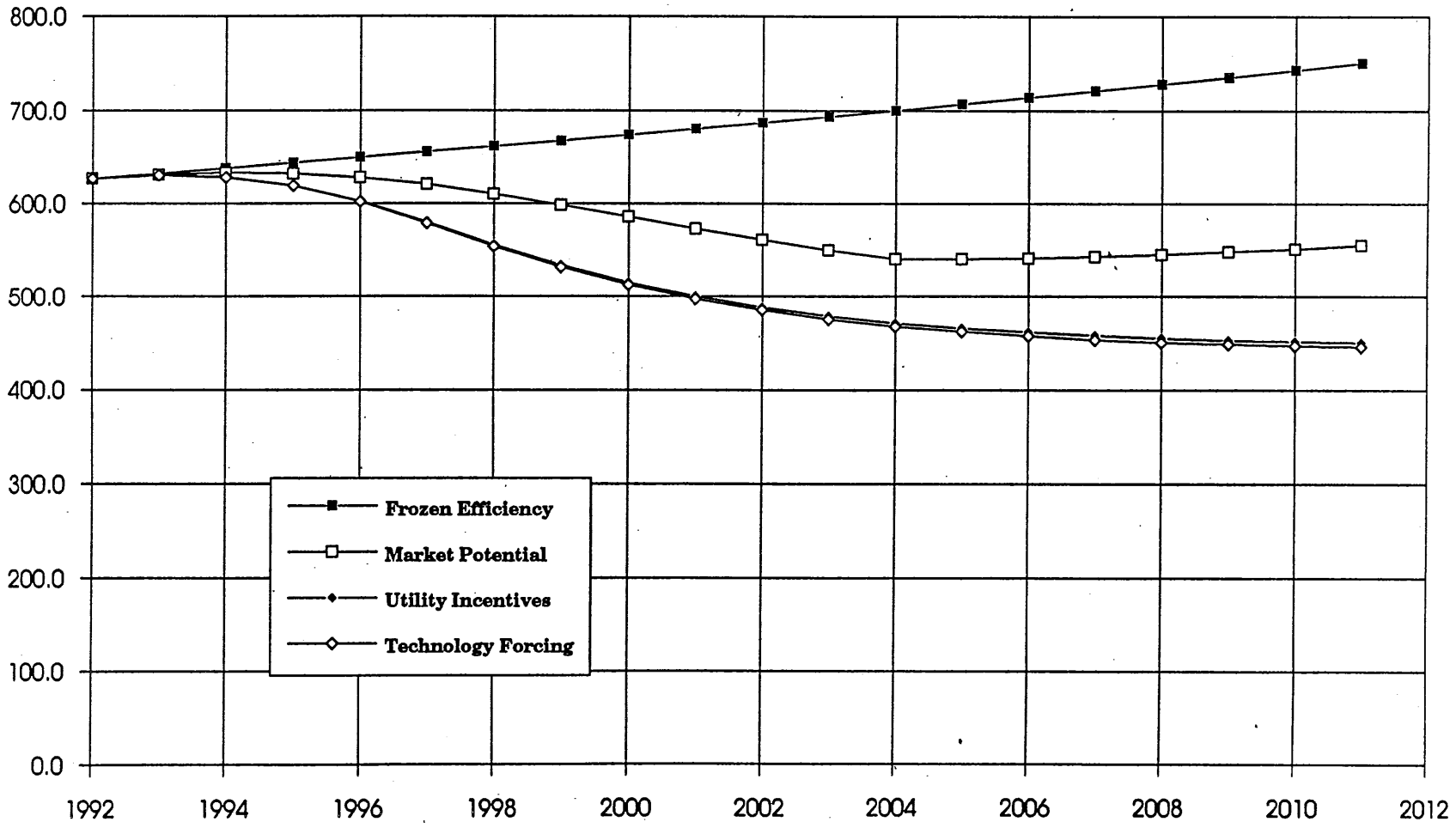


Figure VI-10 Burbank, Glendale, and Pasadena Residential Electricity Demand, Megawatts

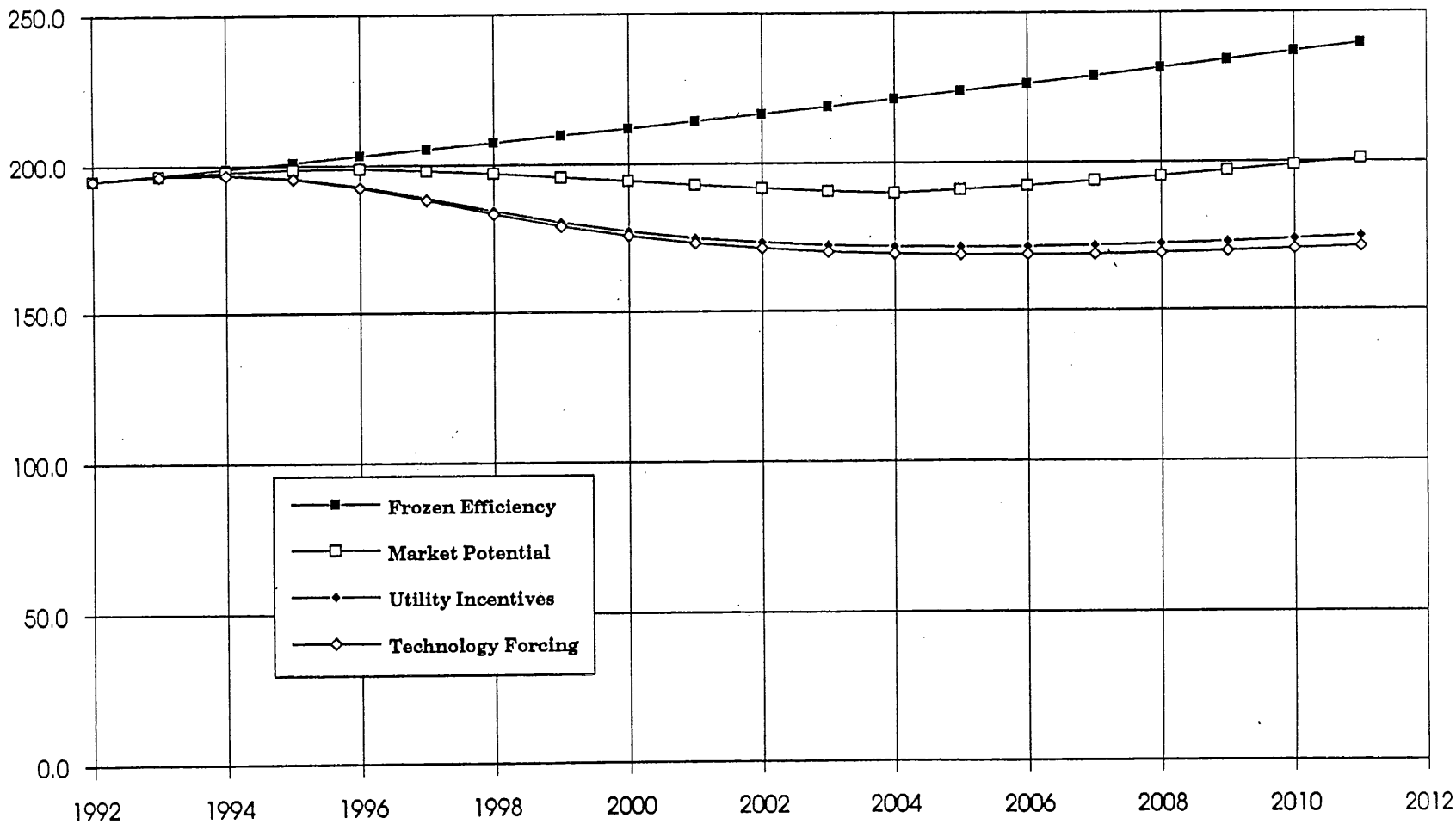


Table VI-6 Residential DSM Results for the Southern California Gas Service Area by Scenario and Year

SCG - RESIDENTIAL
FROZEN EFFICIENCY AT 1992 EUI's

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Million THERMS	1,977	2,127	2,149	2,172	2,196	2,223	2,251	2,280	2,309	2,339	2,368	2,397	2,426	2,456	2,485	2,514	2,543	2,573	2,602	2,638

SCG - RESIDENTIAL
MARKET POTENTIAL (DR = 10%, TRC = 1, UBC = NO)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
MM THERM SAVINGS	0.0	0.6	2.6	6.4	12.1	19.5	27.8	36.2	44.4	52.0	59.1	65.6	71.8	75.1	77.8	80.2	82.4	84.3	86.0	87.6
Million THERMS	1976.9	2126.5	2146.2	2165.2	2184.1	2203.5	2223.7	2244.1	2265.1	2286.6	2308.8	2331.5	2354.6	2380.6	2407.2	2434.0	2461.0	2488.3	2515.8	2549.9

SCG - RESIDENTIAL
UTILITY INCENTIVES (DR = 2%, TRC = 1, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
MM THERM SAVINGS	0.0	1.2	5.7	14.9	29.1	47.2	66.8	85.7	102.9	118.0	131.4	143.4	154.4	163.8	172.5	180.6	188.2	195.5	202.3	209.3
Million THERMS	1976.9	2125.9	2143.1	2156.7	2167.2	2175.8	2184.7	2194.7	2206.6	2220.6	2236.4	2253.7	2272.0	2292.0	2312.5	2333.7	2355.2	2377.1	2399.4	2428.3

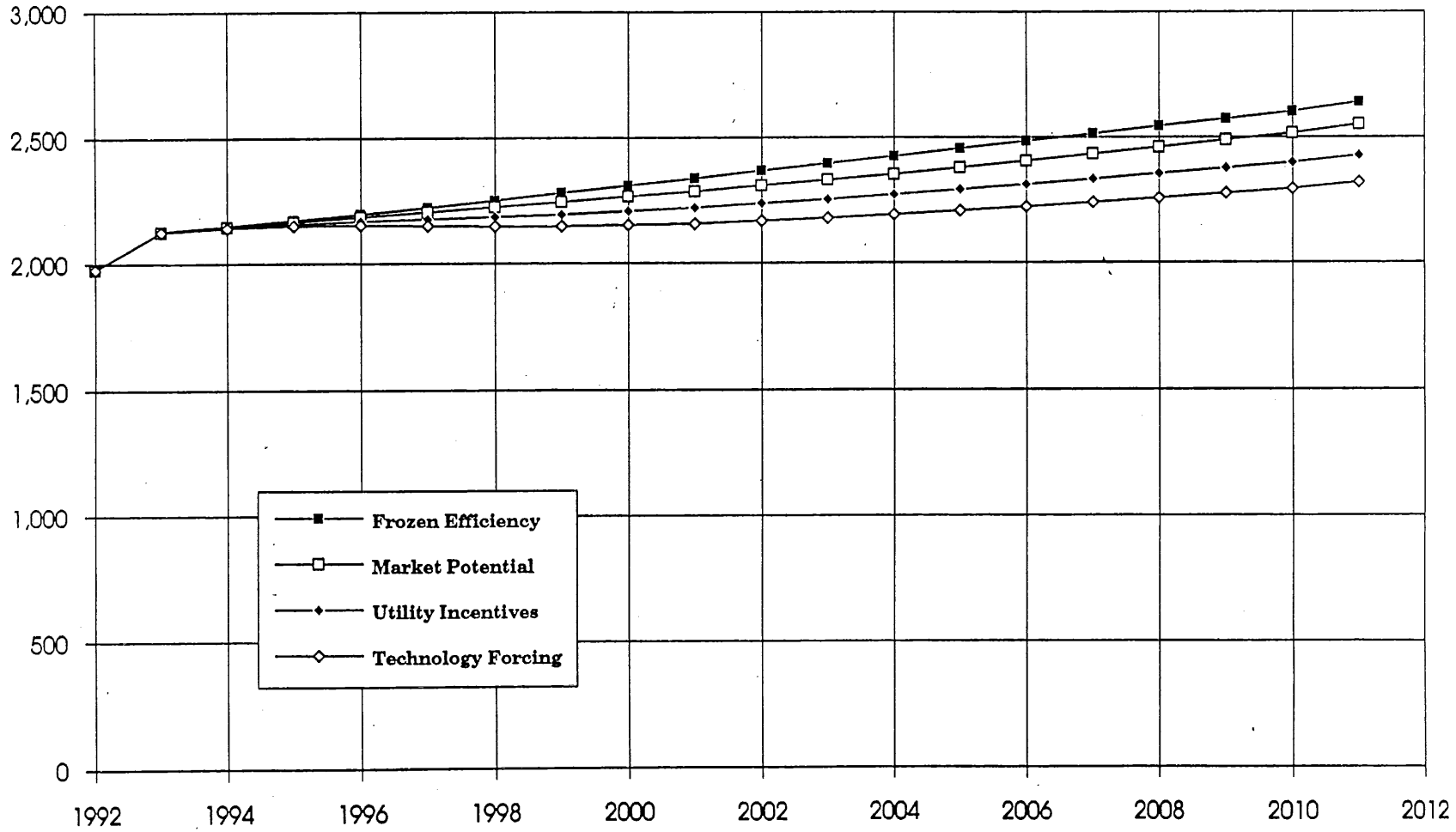
SCG - RESIDENTIAL
TECHNOLOGY FORCING (DR = 2%, TRC = 0.70, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
MM THERM SAVINGS	0.0	1.8	8.8	22.9	44.9	72.9	103.1	132.1	158.2	180.9	200.8	218.4	234.3	248.5	261.7	274.0	285.6	296.5	306.9	317.4
Million THERMS	1976.9	2125.2	2140.0	2148.6	2151.3	2150.1	2148.3	2148.2	2151.3	2157.7	2167.0	2178.7	2192.2	2207.2	2223.3	2240.2	2257.8	2276.0	2294.8	2320.1

PERCENTAGE SAVINGS IN YEAR 2011

	FROZEN EFFICIENCY BASELINE		MARKET POTENTIAL BASELINE	
	MM THERMS		MM THERMS	
MARKET POTENTIAL	3.3%	N/A	N/A	N/A
UTILITY INCENTIVES	7.9%	N/A	4.8%	N/A
TECHNOLOGY FORCING	12.0%	N/A	9.0%	N/A

Figure VI-11 Southern California Gas Residential Natural Gas Sales (Million Therms per Year)



2. *Commercial Sector DSM Savings*

Tables VI-7 through VI-10 and Figures VI-12 through VI-18 show the results for each of the six utilities and four scenarios for commercial sector conservation. By the year 2011, the percentage reduction in electricity use in GWh with the Technology Forcing scenario would be about 15 percent assuming the Market Potential baseline and 29.5 percent assuming the Frozen Efficiency baseline, or about 22 percent from a hypothetical half-way baseline. Load (MW) effects for the electric utilities paralleled the energy impacts, with savings ranging from about 16 percent using the Market Potential baseline to about 29 percent under the Frozen Efficiency baseline by 2011, or an average baseline savings of 23 percent.

The extra DSM savings offered by the Technology Forcing measures over the Utility Incentives measures in the electric utility commercial sector is again a surprisingly low value: only about 2 percent to 3 percent, probably again due to the few "borderline" (with TRC in the 0.7 to 1.0 range) measures in the commercial sector.

Commercial natural gas DSM percentage savings were found to be much less than for electricity, ranging from 4.0 percent to 10.1 percent for the 2011 Technology Forcing scenario for the SCG service territory, as shown in Table VI-10 and Figure VI-18.

Table VI-7 Commercial DSM Results for the Southern California Edison Service Area by Scenario and Year

SCE.XLS

SCE - COMMERCIAL FROZEN EFFICIENCY		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH	ALL	18,711	19,048	19,387	19,729	20,075	20,424	20,776	21,131	21,487	21,844	22,202	22,562	22,923	23,285	23,648	24,013	24,379	24,749	25,123	25,502
TOTAL MW	ALL	4,644	4,724	4,806	4,888	4,971	5,054	5,140	5,226	5,313	5,399	5,484	5,570	5,656	5,741	5,825	5,908	5,991	6,074	6,156	6,243

SCE - COMMERCIAL MARKET POTENTIAL		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	ALL	0	46	172	378	660	1,004	1,385	1,780	2,171	2,550	2,911	3,253	3,578	3,692	3,796	3,893	3,984	4,072	4,157	4,239
TOTAL MW SAVINGS	ALL	0	9	35	77	134	203	281	363	446	528	606	682	754	780	802	823	843	862	880	897
TOTAL GWH	ALL	18,711	19,002	19,215	19,352	19,415	19,420	19,391	19,351	19,316	19,294	19,291	19,309	19,347	19,592	19,852	20,120	20,394	20,678	20,966	21,263
TOTAL MW	ALL	4,644	4,715	4,771	4,811	4,837	4,851	4,858	4,863	4,867	4,871	4,878	4,888	4,902	4,962	5,023	5,085	5,148	5,213	5,279	5,346

SCE - COMMERCIAL UTILITY INCENTIVES		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	ALL	0	77	323	766	1,395	2,134	2,876	3,540	4,096	4,552	4,930	5,252	5,536	5,781	6,006	6,216	6,415	6,606	6,791	6,970
TOTAL MW SAVINGS	ALL	0	17	72	172	315	484	654	809	939	1,047	1,137	1,215	1,283	1,342	1,396	1,446	1,493	1,537	1,580	1,622
TOTAL GWH	ALL	18,711	18,971	19,064	18,964	18,681	18,290	17,900	17,591	17,391	17,292	17,272	17,309	17,357	17,504	17,643	17,797	17,964	18,143	18,332	18,532
TOTAL MW	ALL	4,644	4,707	4,734	4,716	4,656	4,571	4,455	4,417	4,373	4,352	4,347	4,356	4,373	4,399	4,429	4,463	4,499	4,537	4,578	4,621

SCE - COMMERCIAL TECHNOLOGY FORCING		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	ALL	0	80	336	801	1,463	2,246	3,035	3,746	4,346	4,840	5,253	5,607	5,919	6,194	6,446	6,686	6,912	7,130	7,341	7,547
TOTAL MW SAVINGS	ALL	0	18	75	180	331	512	696	863	1,006	1,126	1,227	1,314	1,392	1,460	1,523	1,581	1,637	1,690	1,741	1,791
TOTAL GWH	ALL	18,711	18,968	19,051	18,929	18,612	18,178	17,741	17,385	17,141	17,003	16,949	16,955	17,004	17,091	17,200	17,327	17,466	17,619	17,782	17,955
TOTAL MW	ALL	4,644	4,707	4,731	4,708	4,639	4,543	4,444	4,363	4,306	4,273	4,258	4,256	4,264	4,281	4,302	4,327	4,354	4,384	4,417	4,452

PERCENTAGE SAVINGS BY YEAR 2011	FROZEN EFFICIENCY BASELINE		MARKET POTENTIAL BASEINE	
	GWH	MW	GWH	MW
MARKET POTENTIAL	16.6%	14.4%	N/A	N/A
UTILITY INCENTIVES	27.3%	26.0%	12.8%	13.6%
TECHNOLOGY FORCING	29.6%	28.7%	15.6%	16.7%

KEY

BLD. TYPE	BUILDING DESCRIPTION
1	LARGE OFFICE
2	SMALL OFFICE
3	RESTAURANT
4	RETAIL
5	FOOD STORE
6	WAREHOUSE
7	SCHOOL
8	UNIVERSITY/COLLEGE
9	HOSPITAL
10	HOTEL
11	LAUNDRY
12	MISCELLANEOUS

2/18/92

Figure VI-12 Southern California Edison Commercial Electricity Sales, Gwh/Year

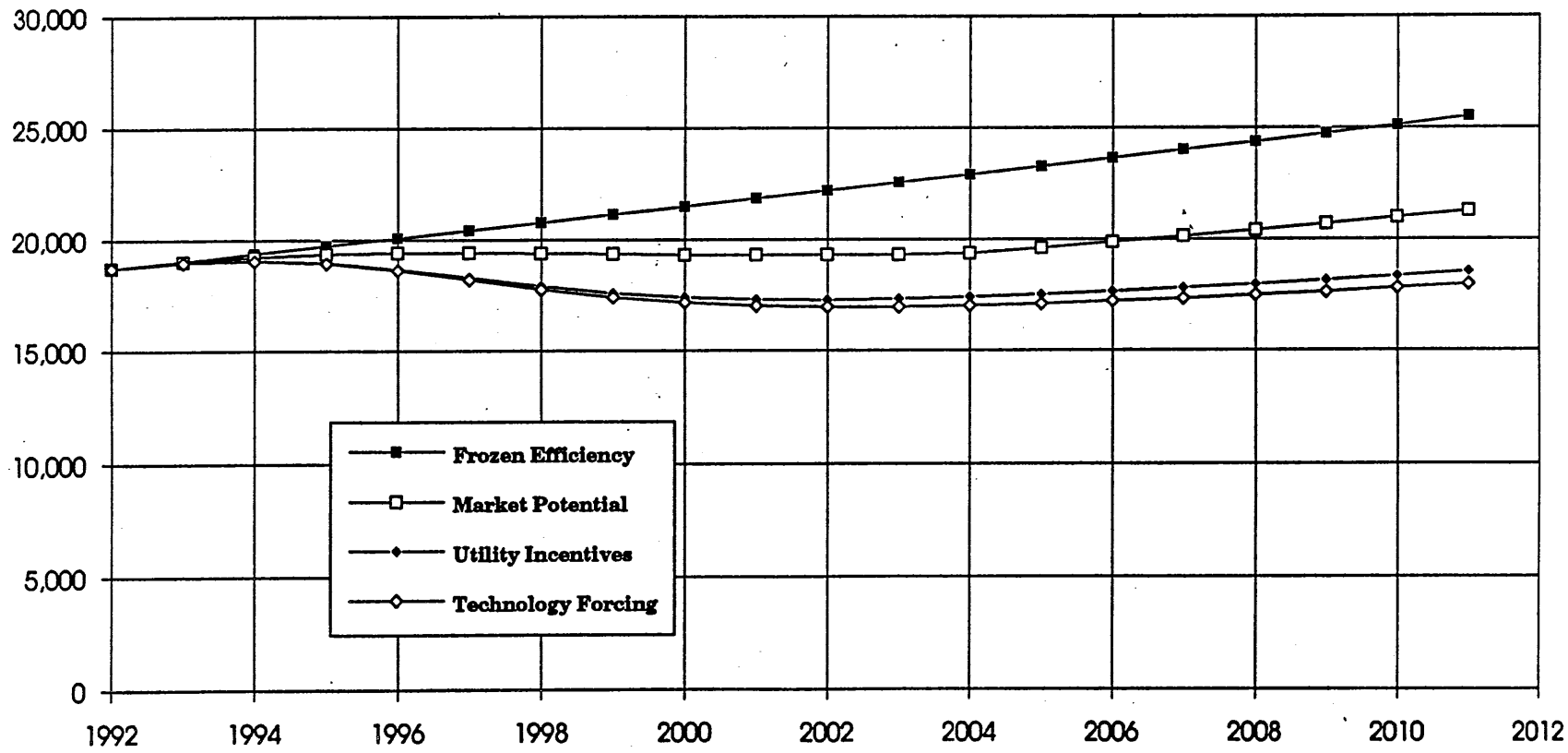


Figure VI-13 Southern California Edison Commercial Electricity Demand, Megawatts

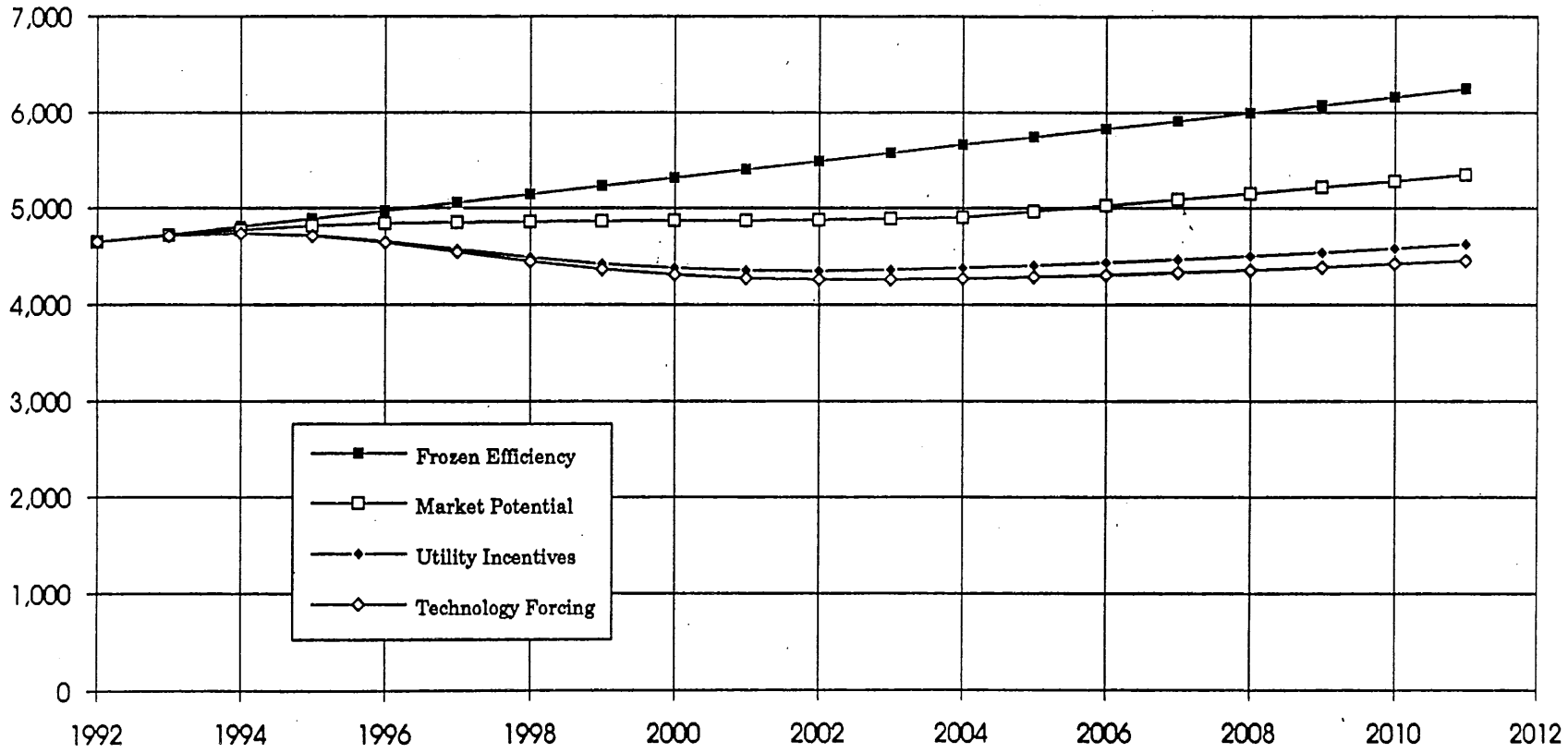


Table VI-8 Commercial DSM Results for the Los Angeles Department of Water and Power by Scenario and Year

LADWP - COMMERCIAL
FROZEN EFFICIENCY AT 1992 EUI=

END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH	ALL	8,145	8,257	8,372	8,482	8,567	8,654	8,734	8,817	8,897	8,974	9,047	9,120	9,192	9,264	9,358	9,452	9,546	9,642	9,737	9,833
TOTAL MW	ALL	2,241	2,271	2,302	2,331	2,354	2,377	2,397	2,419	2,440	2,461	2,480	2,500	2,519	2,539	2,565	2,591	2,617	2,644	2,670	2,697

LADWP - COMMERCIAL
MARKET POTENTIAL (DR = 10%, TRC = 1, UBD = NO)

END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	ALL	0	20	76	166	288	435	597	763	926	1,081	1,226	1,361	1,486	1,523	1,557	1,588	1,616	1,642	1,666	1,688
TOTAL MW SAVINGS	ALL	4	17	36	63	95	132	170	208	246	282	316	349	379	407	434	459	483	506	528	549
TOTAL GWH	ALL	8,145	8,237	8,296	8,316	8,279	8,219	8,137	8,054	7,971	7,893	7,821	7,758	7,706	7,741	7,801	7,864	7,930	8,000	8,071	8,145
TOTAL MW	ALL	2,236	2,255	2,266	2,268	2,259	2,245	2,228	2,211	2,195	2,179	2,164	2,151	2,141	2,132	2,131	2,132	2,134	2,138	2,143	2,148

LADWP - COMMERCIAL
UTILITY INCENTIVES (DR = 2%, TRC = 1, UBD = YES)

END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	ALL	0	34	141	332	600	912	1,219	1,489	1,710	1,885	2,025	2,139	2,236	2,316	2,391	2,460	2,524	2,584	2,640	2,694
TOTAL MW SAVINGS	ALL	8	34	82	150	230	311	382	442	490	529	562	589	614	636	658	679	698	717	735	752
TOTAL GWH	ALL	8,145	8,223	8,231	8,149	7,967	7,743	7,515	7,328	7,187	7,089	7,022	6,980	6,956	6,948	6,967	6,992	7,022	7,058	7,096	7,139
TOTAL MW	ALL	2,233	2,237	2,220	2,181	2,124	2,066	2,015	1,978	1,951	1,932	1,919	1,910	1,905	1,903	1,907	1,913	1,919	1,927	1,935	1,945

LADWP - COMMERCIAL
TECHNOLOGY FORCING (DR = 2%, TRC = 0.70, UBD = YES)

END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	ALL	0	35	146	347	628	957	1,282	1,570	1,807	1,995	2,147	2,272	2,378	2,467	2,553	2,631	2,704	2,774	2,839	2,902
TOTAL MW SAVINGS	ALL	9	36	86	157	242	327	404	468	520	563	599	630	657	682	707	730	752	773	794	814
TOTAL GWH	ALL	8,145	8,222	8,225	8,135	7,939	7,698	7,451	7,247	7,090	6,978	6,900	6,848	6,814	6,797	6,805	6,821	6,842	6,868	6,897	6,931
TOTAL MW	ALL	2,232	2,235	2,216	2,174	2,112	2,049	1,994	1,952	1,920	1,898	1,882	1,870	1,862	1,857	1,859	1,861	1,865	1,871	1,876	1,883

PERCENTAGE SAVINGS IN YEAR 2011

	FROZEN EFFICIENCY BASELINE		SCENARIO 1 BASELINE	
	GWH	MW	GWH	MW
SCENARIO 1	17.2%	20.8%	N/A	N/A
SCENARIO 2	27.4%	27.8%	12.4%	9.5%
SCENARIO 3	29.5%	30.2%	14.9%	12.3%

KEY

BLD. TYPE	BUILDING DESCRIPTION
1	LARGE OFFICE
2	SMALL OFFICE
3	RESTAURANT
4	RETAIL
5	FOOD STORE
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11	LAUNDRY
12	MISCELLANEOUS

Figure VI-14 Los Angeles Department of Water and Power Commercial Electricity Sales, Gwh/Year

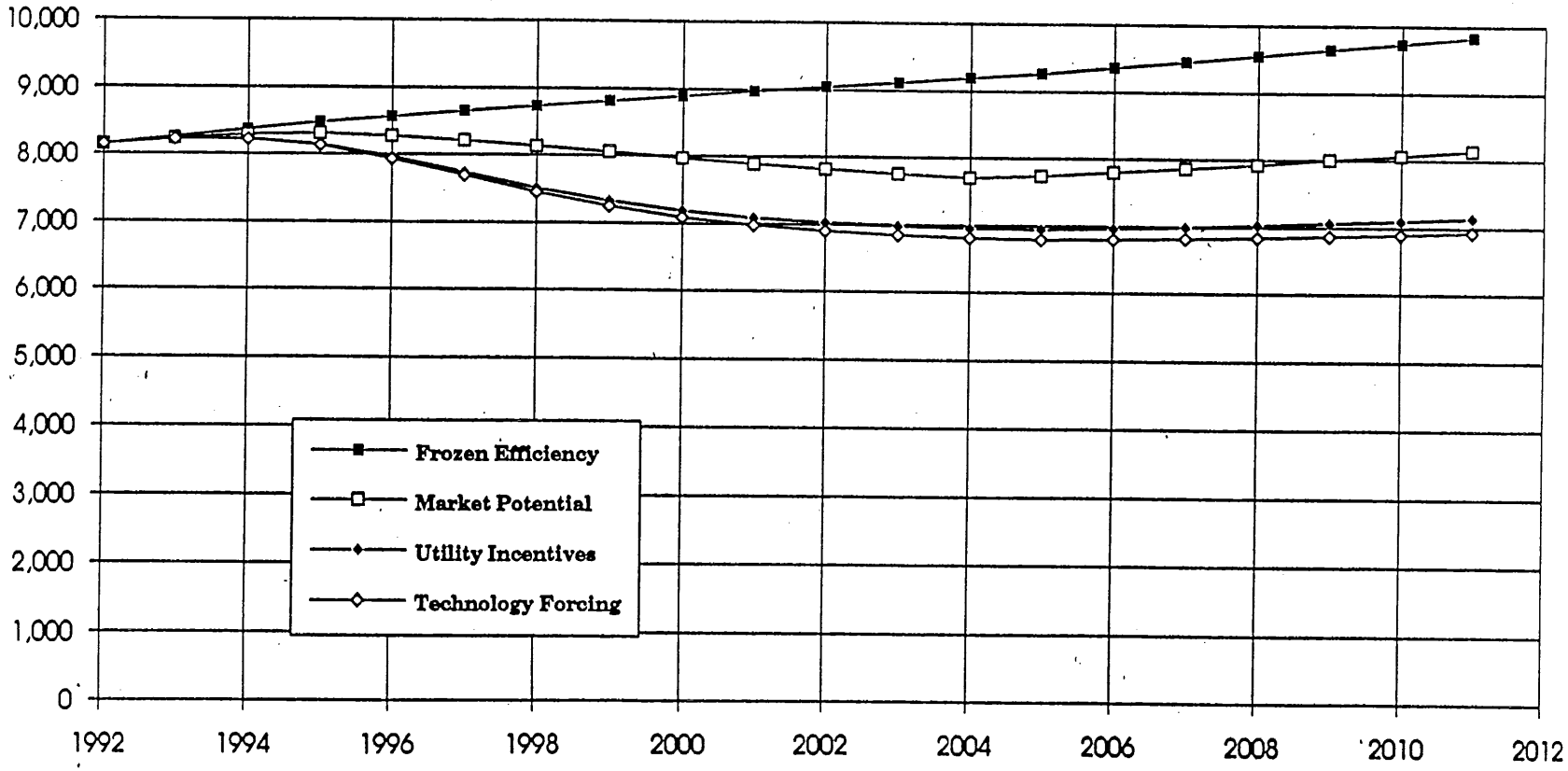


Figure VI-15 Los Angeles Department of Water and Power Commercial Electricity Demand, Megawatts

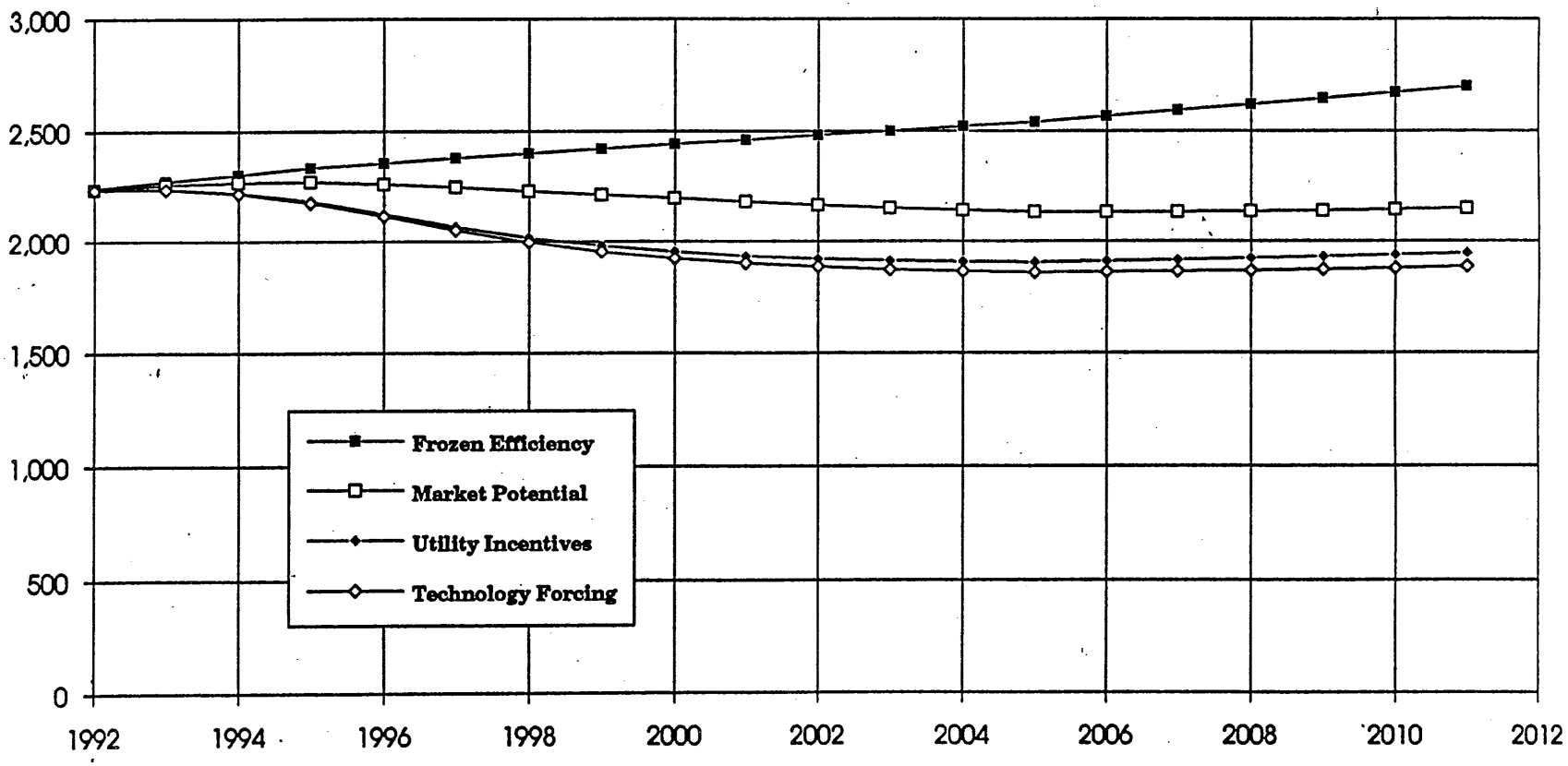


Table VI-9 Commercial DSM Results for the Burbank, Glendale, and Pasadena Service Area

BGP - COMMERCIAL MARKET POTENTIAL END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	ALL	0	3	10	21	37	55	75	96	115	134	152	167	182	185	189	192	195	197	199	201
TOTAL MW SAVINGS	ALL	1	2	5	8	12	17	22	27	32	37	41	45	49	53	56	59	62	65	68	71
TOTAL GWH	ALL	1,071	1,078	1,082	1,080	1,070	1,056	1,042	1,025	1,011	995	982	969	959	957	962	964	969	972	977	981
TOTAL MW	ALL	299	301	302	302	300	298	295	292	289	286	284	281	279	277	276	276	276	275	275	275

BGP - COMMERCIAL UTILITY INCENTIVES END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	ALL	0	4	18	43	77	116	155	188	215	236	253	265	276	285	293	300	307	313	319	324
TOTAL MW SAVINGS	ALL	1	5	11	20	30	41	50	58	64	69	74	77	80	83	86	88	91	93	95	97
TOTAL GWH	ALL	1,071	1,076	1,074	1,058	1,030	995	963	933	911	893	881	870	864	858	857	855	856	855	857	858
TOTAL MW	ALL	299	299	296	290	282	274	267	261	257	253	251	249	248	246	247	246	247	247	248	248

BGP - COMMERCIAL TECHNOLOGY FORCING END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	ALL	0	5	19	44	80	122	163	198	227	249	267	281	294	303	313	321	329	335	342	348
TOTAL MW SAVINGS	ALL	1	5	11	21	32	43	53	61	68	74	78	82	85	88	92	94	97	100	102	105
TOTAL GWH	ALL	1,071	1,076	1,073	1,056	1,027	989	955	923	899	879	866	854	847	839	838	835	834	833	834	834
TOTAL MW	ALL	299	299	296	290	281	272	264	257	253	249	246	244	242	241	241	240	241	241	241	241

PERCENTAGE SAVINGS IN YEAR 2011

	FROZEN EFFICIENCY BASELINE GWH	FROZEN EFFICIENCY BASELINE MW	MARKET POTENTIAL BASELINE GWH	MARKET POTENTIAL BASELINE MW
MARKET POTENTIAL	17.0%	20.4%	N/A	N/A
UTILITY INCENTIVES	27.4%	26.2%	12.6%	9.8%
TECHNOLOGY FORCING	29.5%	30.2%	15.1%	12.4%

KEY

BLD. TYPE	BUILDING DESCRIPTION
1	LARGE OFFICE
2	SMALL OFFICE
3	RESTAURANT
4	RETAIL
5	FOOD STORE
6	WAREHOUSE
7	SCHOOL
8	UNIVERSITY/COLLEGE
9	HOSPITAL
10	HOTEL
11	LAUNDRY
12	MISCELLANEOUS

Figure VI-16 Burbank, Glendale, and Pasadena Commercial Electricity Sales, Gwh/Year

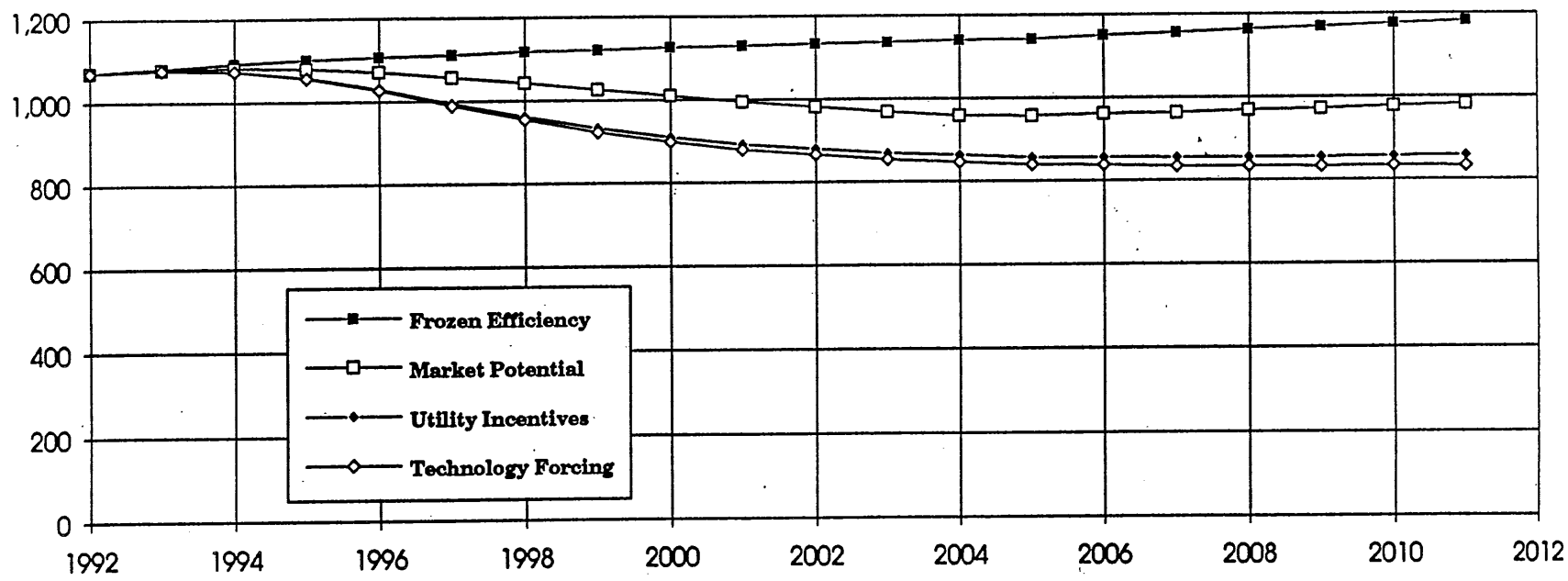


Figure VI-17 Burbank, Glendale and Pasadena Commercial Electricity Demand, Megawatts

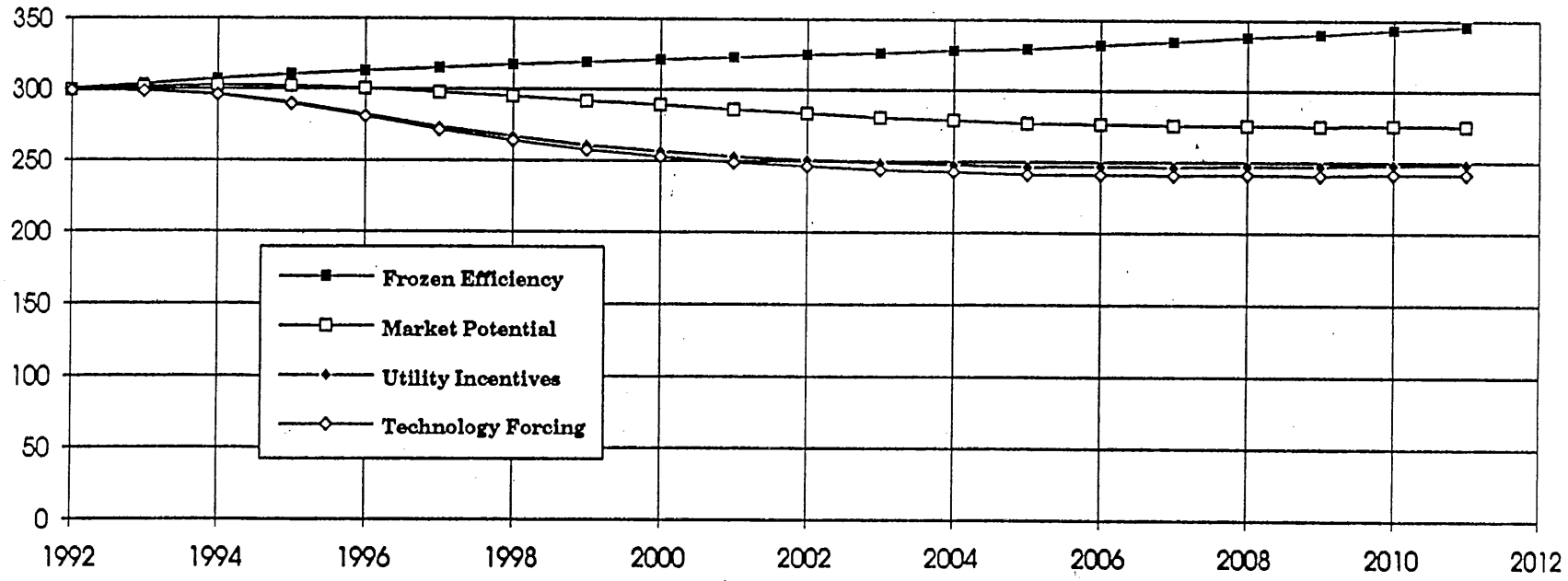


Table VI-10 Commercial DSM Results for the Southern California Gas Service Area by Scenario and Year

SCG
FROZEN EFFICIENCY AT 1992 EUI's
Million THERMS

END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL (MM THERMS)	ALL	668.6	674.6	683.7	693.1	703.1	712.9	722.9	734.3	745.6	757.0	767.4	777.7	789.0	801.6	814.6	828.0	841.6	855.5	869.9	885.8

SCG
SCENARIO 1 (DR = 10%, TRC = 1, UBD = NO)
Million THERMS

END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL (MM THERMS)	ALL	668.6	674.3	682.3	689.5	696.3	701.8	706.9	713.2	719.4	726.0	732.2	738.6	746.3	756.7	767.7	779.2	790.9	803.1	815.8	830.1

SCG - EXISTING
SCENARIO 2 (DR = 2%, TRC = 1, UBD = YES)
Million THERMS

END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL (MM THERMS)	ALL	668.6	674.1	681.2	686.5	690.4	692.4	694.2	697.8	702.2	707.5	712.9	718.7	726.1	735.0	744.5	754.7	765.1	776.1	787.6	800.6

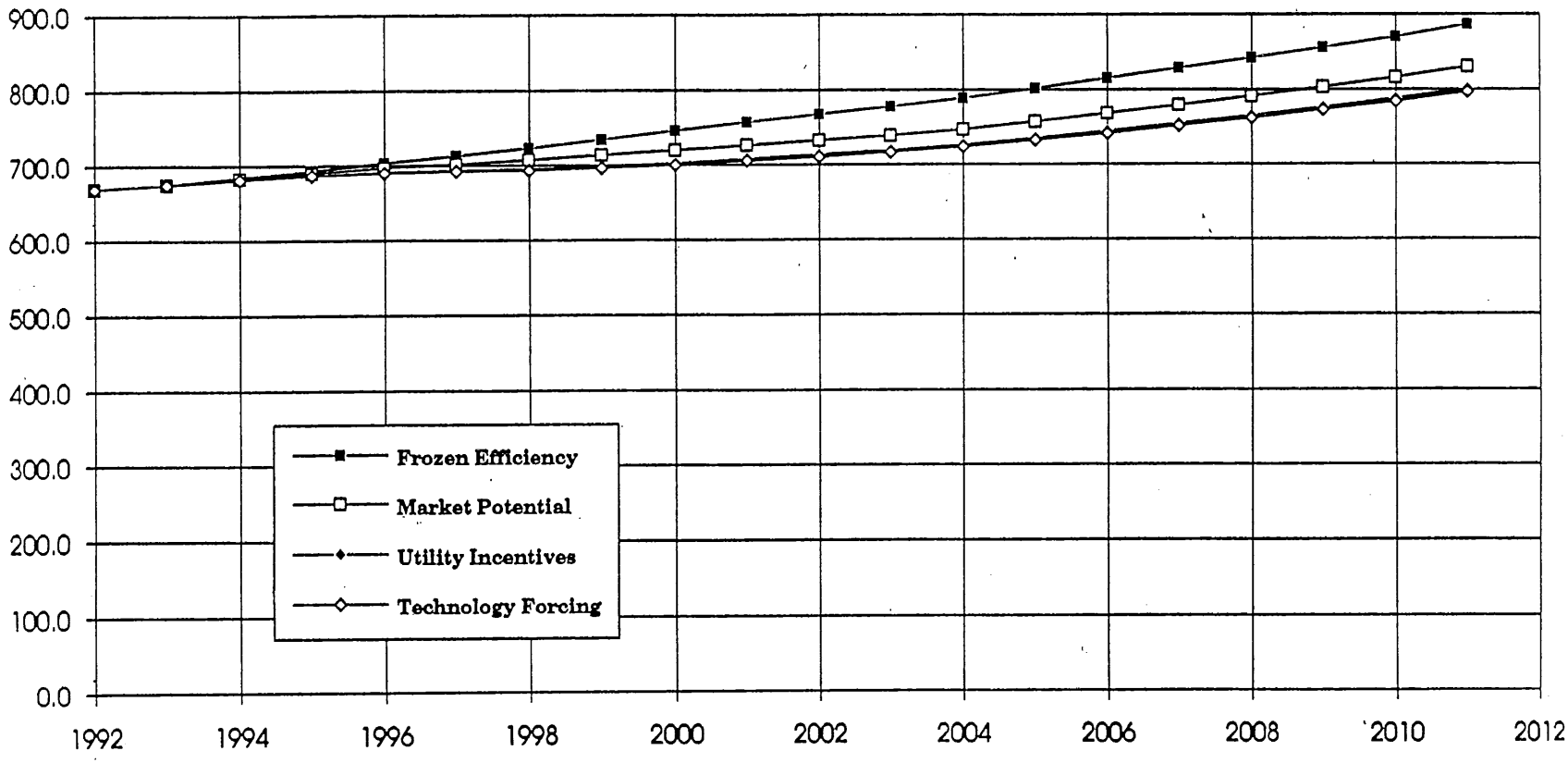
SCG - EXISTING
SCENARIO 3 (DR = 2%, TRC = 0.70, UBD = YES)
Million THERMS

END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL (MM THERMS)	ALL	668.6	674.1	681.1	686.2	689.8	691.5	692.9	696.1	700.2	705.3	710.4	716.1	723.2	732.0	741.4	751.4	761.7	772.5	783.9	796.8

PERCENTAGE SAVINGS IN YEAR 2011

	FROZEN EFFICIENCY BASELINE SAVINGS	MARKET POTENTIAL BASELINE SAVINGS
MARKET POTENTIAL	6.3%	N/A
UTILITY INCENTIVES	9.8%	3.6%
TECHNOLOGY FORCING	10.1%	4.0%

Figure VI-18 Southern California Gas Commercial
Natural Gas Sales (Therms per Year)



3. *Industrial Sector DSM Savings*

Whereas the industrial sector results are presented in the same format as the residential and commercial sectors, care should be taken in interpreting them. As previously discussed, the industrial sector was modeled using an SIC-class aggregated model, and electric utility specific details were derived from the aggregated results by simple pro-rationing of the electricity results, using California Energy Commission ER-92 data on electric utility energy and load demand.

Industrial sector results for natural gas do not distinguish between core and noncore customers. SCG currently does not offer DSM programs to its noncore industrial customers, and it is unlikely that SCG will offer DSM programs to noncore customers in the future. This is because the noncore market is highly competitive and essentially deregulated. In 1992, SCG's core customers used less than 9 percent of total industrial natural gas. Therefore, aggregating core and noncore customers in the model yields savings that are at least 10 times greater than what could be achieved for the core market through utility-sponsored DSM programs. For the industrial natural gas sector, the model implicitly assumes that DSM incentives for noncore customers are provided by Federal, State, and local governments.

Tables VI-11 through VI-14 and Figures VI-19 through VI-25 show the detailed industrial energy results. The maximum electric utility energy impacts are expected to be 18.5 percent for the Technology Forcing scenario from the Frozen Efficiency baseline and 11.7 percent using the Market Potential baseline, for an average of 15.1 percent by 2011. Since the electric utility-specific results were simply prorationed total electricity results, these percentages do not change across utilities. As Table VI-14 shows, the equivalent results for the natural gas sector were only slightly higher than the electric utilities: 21.7 percent and 13.6 percent respectively, resulting with an average (across the two baselines) expected savings of 17.7 percent.

Table VI-11 Industrial DSM Results for the Southern California Edison Service Area by Scenario and Year

SCE - INDUSTRIAL
FROZEN EFFICIENCY AT 1992 EUI's

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH	29,418.9	29,620.8	29,722.4	29,824.1	29,968.3	30,112.5	30,398.7	30,685.0	31,059.3	31,433.5	31,804.1	32,174.7	32,538.7	32,902.7	33,319.1	33,735.5	34,138.2	34,540.8	34,969.0	35,397.1
TOTAL MW	4,522.3	4,512.1	4,552.7	4,593.3	4,644.8	4,696.2	4,755.0	4,813.8	4,881.7	4,949.6	5,015.9	5,082.2	5,144.6	5,207.1	5,283.6	5,360.2	5,434.6	5,509.1	5,572.9	5,636.8

SCE - INDUSTRIAL
MARKET POTENTIAL (DR = 10%, TRC = 1, UBC = NO)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	0.0	0.0	0.0	81.1	172.3	372.9	573.5	874.5	1,175.5	1,462.9	1,750.2	1,960.7	2,171.2	2,304.2	2,437.3	2,507.3	2,577.3	2,659.1	2,740.8
TOTAL MW SAVINGS	0.0	0.0	0.0	0.0	9.5	20.1	43.8	67.5	103.2	138.8	173.1	207.3	232.5	257.7	274.1	290.4	299.4	308.3	317.8	327.3
TOTAL GWH	29,418.9	29,620.8	29,722.4	29,824.1	29,887.2	29,940.2	30,025.8	30,111.5	30,184.7	30,258.0	30,341.3	30,424.5	30,578.0	30,731.5	31,014.9	31,298.2	31,630.9	31,963.5	32,309.9	32,656.3
TOTAL MW	4,522.3	4,512.1	4,552.7	4,593.3	4,635.3	4,676.1	4,711.2	4,746.3	4,778.5	4,810.7	4,842.8	4,874.8	4,912.1	4,949.4	5,009.6	5,069.7	5,135.3	5,200.8	5,255.1	5,309.4

SCE - INDUSTRIAL
UTILITY INCENTIVES (DR = 2%, TRC = 1, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	32.0	290.6	549.3	947.0	1,344.6	1,789.6	2,234.6	2,693.0	3,151.4	3,560.5	3,969.6	4,295.0	4,620.3	4,864.3	5,108.2	5,274.6	5,441.1	5,576.1	5,711.1
TOTAL MW SAVINGS	0.0	3.7	33.6	63.5	110.4	157.3	210.1	262.9	317.5	372.2	421.2	470.3	509.3	548.4	578.6	608.7	629.8	650.9	666.5	682.1
TOTAL GWH	29,418.9	29,588.9	29,431.8	29,274.8	29,021.3	28,767.9	28,609.1	28,450.4	28,366.2	28,282.1	28,243.6	28,205.1	28,243.7	28,282.4	28,454.8	28,627.3	28,863.5	29,099.8	29,392.9	29,686.0
TOTAL MW	4,522.3	4,508.4	4,519.1	4,529.8	4,534.4	4,538.9	4,544.9	4,550.9	4,564.1	4,577.4	4,594.7	4,611.9	4,635.3	4,658.7	4,705.1	4,751.4	4,804.8	4,858.2	4,906.5	4,954.7

SCE - INDUSTRIAL
TECHNOLOGY FORCING (DR = 2%, TRC = 0.70, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	32.0	347.9	663.8	1,056.9	1,450.1	2,017.3	2,584.5	3,207.2	3,829.9	4,349.8	4,869.6	5,214.8	5,560.0	5,771.4	5,982.8	6,135.5	6,288.2	6,418.5	6,548.7
TOTAL MW SAVINGS	0.0	3.7	40.2	76.7	123.1	169.6	236.9	304.1	378.2	452.3	514.6	576.9	618.4	659.9	686.4	712.9	732.6	752.2	767.2	782.1
TOTAL GWH	29,418.9	29,588.9	29,374.6	29,160.3	28,911.3	28,662.3	28,381.4	28,100.5	27,852.1	27,603.6	27,454.3	27,305.1	27,323.9	27,342.7	27,547.7	27,752.7	28,002.7	28,252.7	28,550.5	28,848.4
TOTAL MW	4,522.3	4,508.4	4,512.5	4,516.6	4,521.6	4,526.6	4,518.2	4,509.7	4,503.5	4,497.3	4,501.3	4,505.3	4,526.2	4,547.2	4,597.2	4,647.2	4,702.1	4,756.9	4,805.8	4,854.6

PERCENTAGE SAVINGS IN YEAR 2011

	FROZEN EFFICIENCY BASELINE		MARKET POTENTIAL BASELINE	
	GWH	MW	GWH	MW
MARKET POTENTIAL	7.7%	5.8%	N/A	N/A
UTILITY INCENTIVES	16.1%	12.1%	9.1%	6.7%
TECHNOLOGY FORCING	18.5%	13.9%	11.7%	8.6%

Figure VI-19 Southern California Edison Industrial Electricity Sales, Gwh/Year

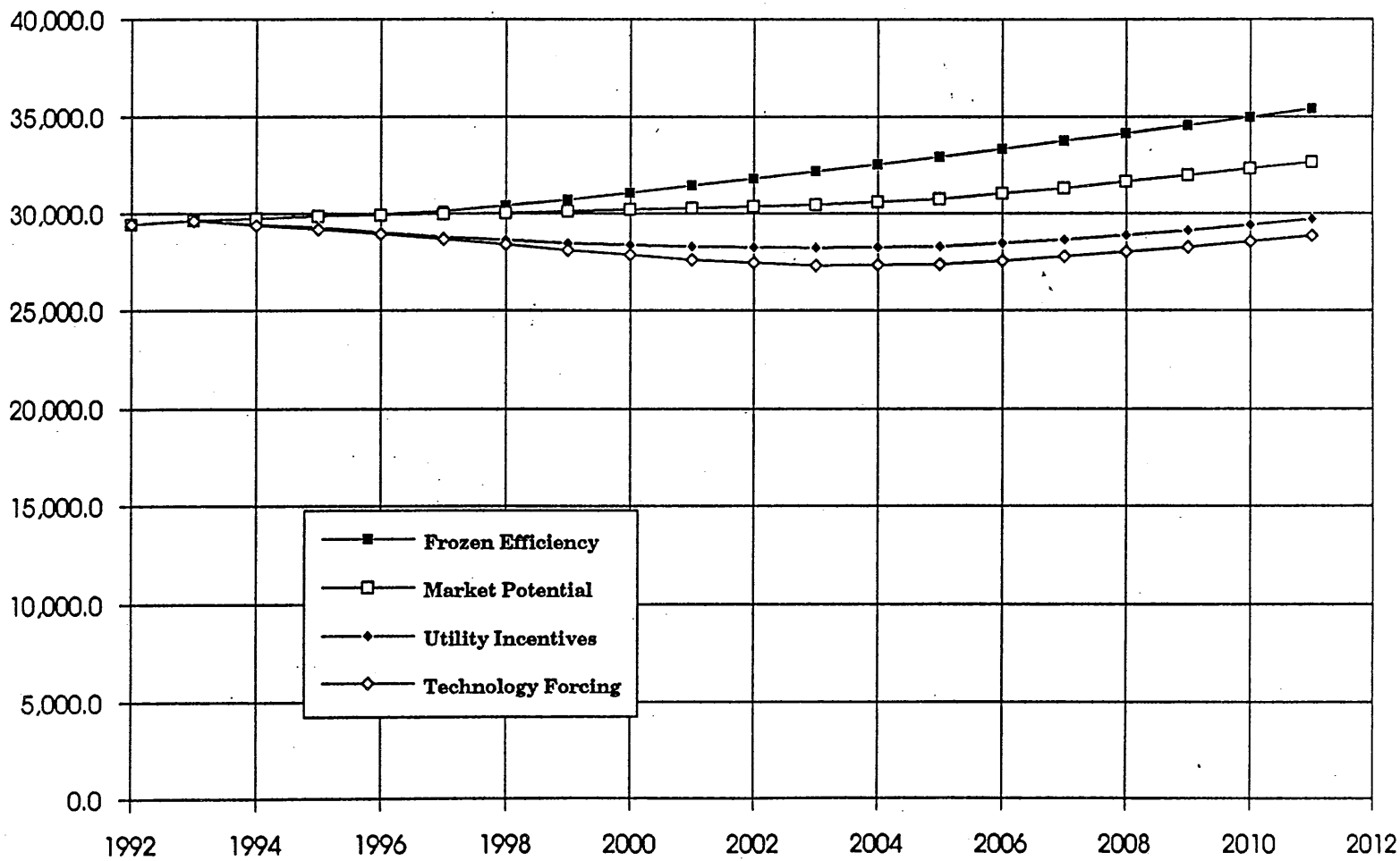


Figure VI-20 Southern California Edison Industrial Electricity Demand, MW

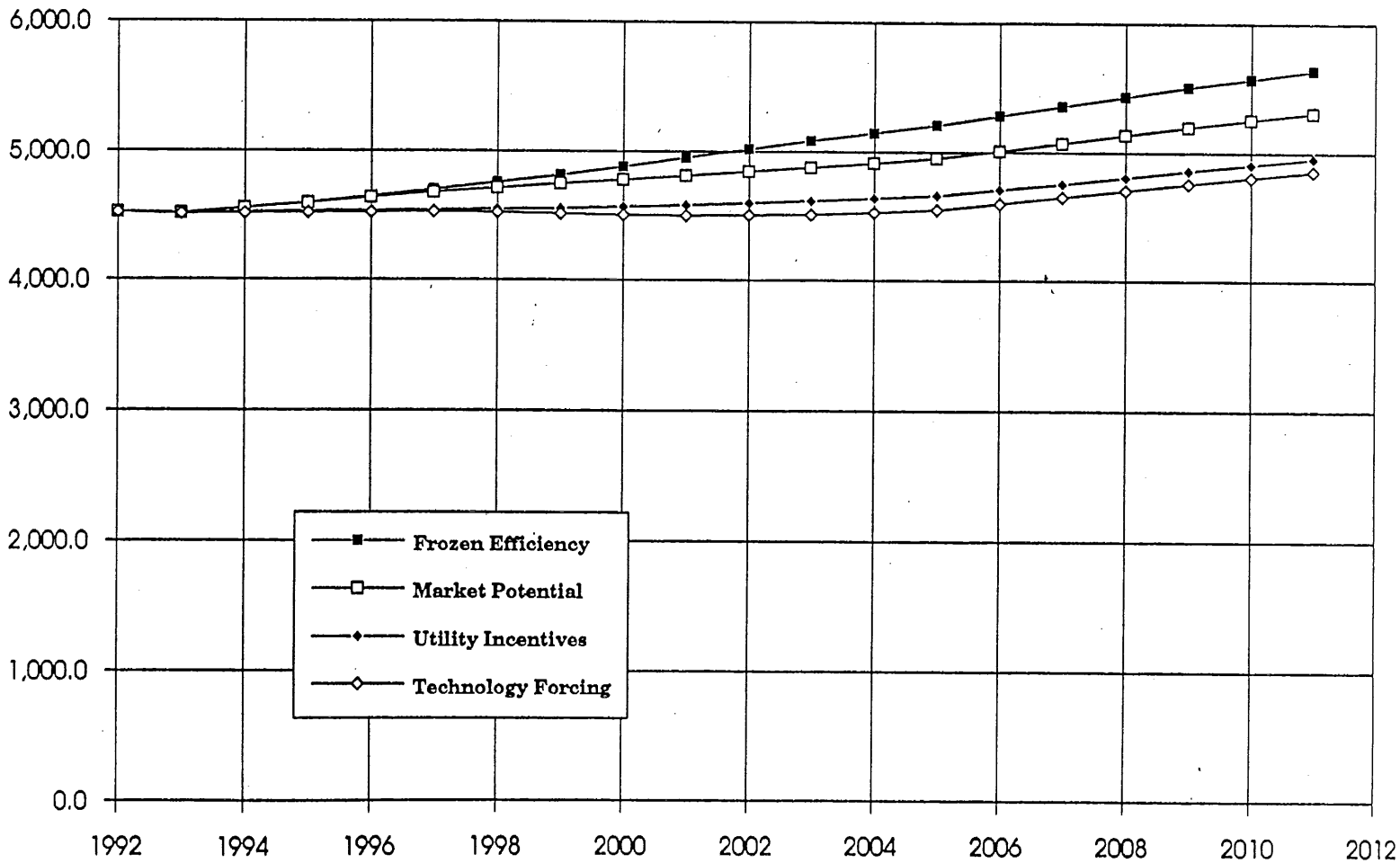


Table VI-12 Industrial DSM Results for the Los Angeles Department of Water and Power Service Area by Scenario and Year

LADWP - INDUSTRIAL FROZEN EFFICIENCY AT 1992 EUrs	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH	4,440.2	4,456.5	4,465.9	4,475.2	4,489.2	4,503.1	4,532.0	4,561.0	4,604.3	4,647.6	4,689.5	4,731.3	4,771.2	4,811.1	4,857.6	4,904.0	4,947.5	4,991.0	5,038.1	5,085.2
TOTAL MW	798.2	800.7	803.8	806.9	809.8	812.6	817.6	822.6	831.6	840.5	844.8	849.0	856.2	863.3	871.5	879.7	887.8	895.9	902.7	909.4

LADWP - INDUSTRIAL MARKET POTENTIAL (DR = 10%, TRC = 1, UBC = NO)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	0.0	0.0	0.0	12.1	25.8	55.5	85.2	129.5	173.8	215.6	257.4	287.4	317.5	335.9	354.3	363.4	372.4	383.1	393.8
TOTAL MW SAVINGS	0.0	0.0	0.0	0.0	1.6	3.5	7.5	11.5	17.6	23.6	29.1	34.6	38.7	42.7	45.2	47.7	48.9	50.1	51.5	52.8
TOTAL GWH	4,440.2	4,456.5	4,465.9	4,475.2	4,477.0	4,477.3	4,476.5	4,475.8	4,474.8	4,473.8	4,473.9	4,473.9	4,483.8	4,493.7	4,521.7	4,549.7	4,584.2	4,618.6	4,655.1	4,691.5
TOTAL MW	798.2	800.7	803.8	806.9	808.1	809.1	810.1	811.1	814.0	817.0	815.7	814.4	817.5	820.6	826.3	832.0	838.9	845.8	851.2	856.6

LADWP - INDUSTRIAL UTILITY INCENTIVES (DR = 2%, TRC = 1, UBC = YES)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	4.8	43.6	82.4	141.8	201.1	266.6	332.1	399.1	466.0	524.8	583.7	629.7	675.6	709.1	742.6	764.4	786.2	803.3	820.5
TOTAL MW SAVINGS	0.0	0.6	5.9	11.1	19.2	27.2	36.1	44.9	54.1	63.2	70.9	78.6	84.7	90.9	95.4	99.9	102.9	105.8	107.9	110.0
TOTAL GWH	4,440.2	4,451.7	4,422.3	4,392.8	4,347.4	4,302.0	4,265.4	4,228.9	4,205.3	4,181.7	4,164.6	4,147.6	4,141.6	4,135.5	4,148.5	4,161.5	4,183.2	4,204.8	4,234.8	4,264.8
TOTAL MW	798.2	800.1	797.9	795.8	790.6	785.4	781.5	777.7	777.5	777.3	773.9	770.5	771.4	772.4	776.1	779.8	784.9	790.1	794.7	799.4

LADWP - INDUSTRIAL TECHNOLOGY FORCING (DR = 2%, TRC = 0.70, UBC = YES)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	4.8	52.2	99.6	158.2	216.9	300.5	384.2	475.2	566.3	641.2	716.1	764.5	813.0	841.4	869.7	889.2	908.6	924.7	940.8
TOTAL MW SAVINGS	0.0	0.6	7.4	17.2	21.6	29.4	40.7	52.0	64.4	76.8	86.6	96.4	102.9	109.4	113.2	117.0	119.7	122.3	124.3	126.2
TOTAL GWH	4,440.2	4,451.7	4,413.7	4,375.6	4,330.9	4,286.2	4,231.5	4,176.9	4,129.1	4,081.3	4,048.3	4,015.2	4,006.7	3,998.1	4,016.2	4,034.3	4,058.4	4,082.4	4,113.4	4,144.4
TOTAL MW	798.2	800.1	796.5	789.7	788.2	783.3	777.0	770.6	767.2	763.7	758.2	752.7	753.3	753.9	758.3	762.7	768.2	773.6	778.4	783.2

PERCENTAGE SAVINGS IN YEAR 2011	FROZEN EFFICIENCY BASELINE		MARKET POTENTIAL BASELINE	
	GWH	MW	GWH	MW
MARKET POTENTIAL	7.7%	5.8%	N/A	N/A
UTILITY INCENTIVES	16.1%	12.1%	9.1%	6.7%
TECHNOLOGY FORCING	18.5%	13.9%	11.7%	8.6%

Figure VI-21 Los Angeles Department of Water and Power
Industrial Electricity Sales, Gwh/Year

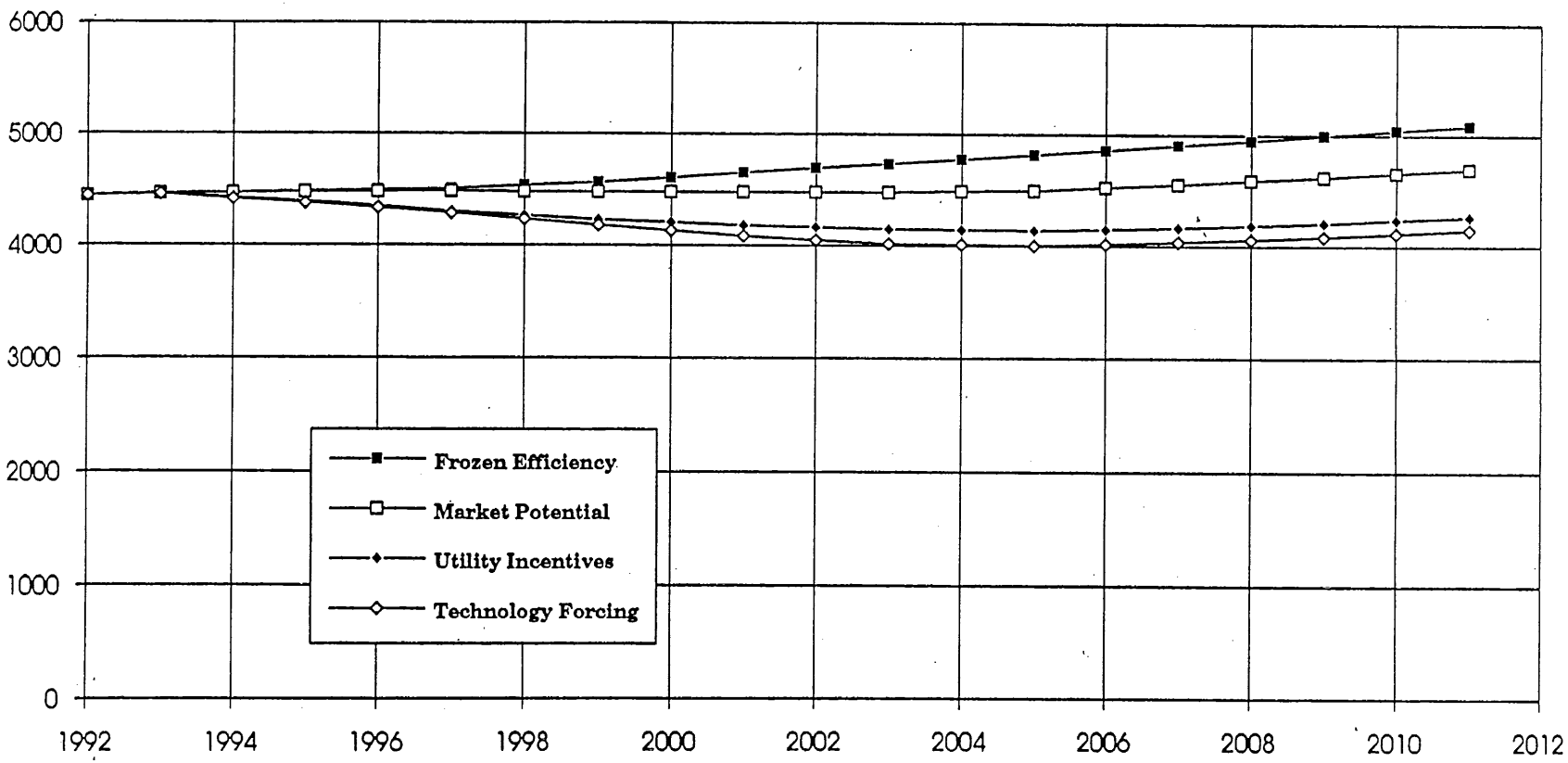


Figure VI-22 Los Angeles Department of Water and Power Industrial Electricity Demand, MW

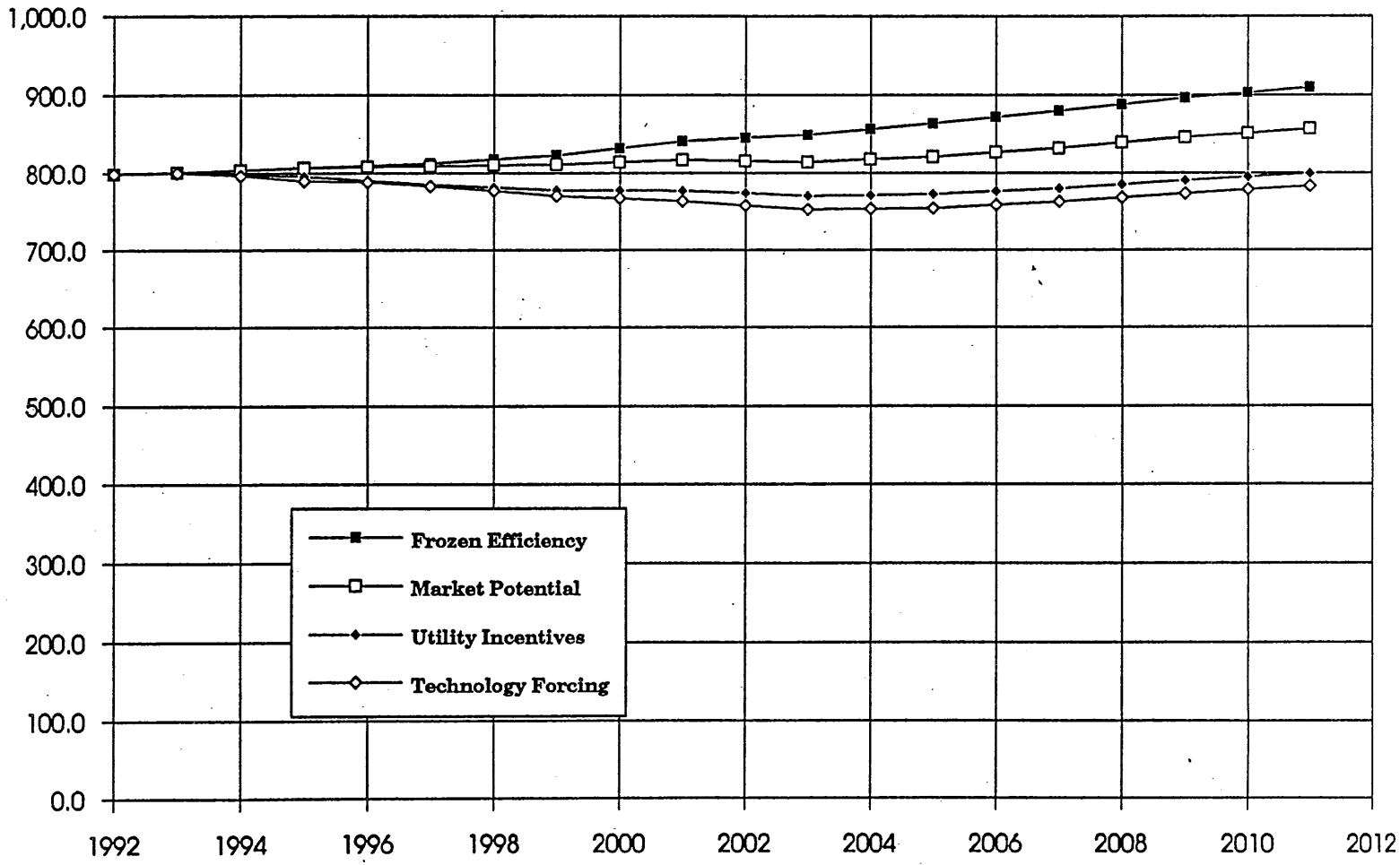


Table VI-13 Industrial DSM Results for the Burbank, Glendale, and Pasadena Service Areas by Scenario and Year

BGP - INDUSTRIAL
FROZEN EFFICIENCY AT 1992 EUIs

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH	533.9	534.1	533.4	532.8	532.6	532.5	534.1	535.8	539.0	542.3	545.4	548.4	551.2	553.9	557.4	560.9	563.9	567.0	570.4	573.9
TOTAL MW	106.0	105.2	105.1	105.0	105.3	105.6	105.3	105.1	105.3	107.5	107.7	107.8	109.3	110.8	110.3	109.8	111.1	112.3	113.2	114.0

BGP - INDUSTRIAL
MARKET POTENTIAL (DR = 10%, TRC = 1, UBC = NO)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	0.0	0.0	0.0	1.4	3.0	6.5	10.0	15.1	20.3	25.1	29.8	33.2	36.6	38.5	40.5	41.4	42.3	43.4	44.4
TOTAL MW SAVINGS	0.0	0.0	0.0	0.0	0.2	0.5	1.0	1.5	2.2	3.0	3.7	4.4	4.9	5.5	5.7	5.9	6.1	6.3	6.5	6.6
TOTAL GWH	533.9	534.1	533.4	532.8	531.2	529.5	527.6	525.8	523.9	522.0	520.3	518.6	518.0	517.4	518.9	520.3	522.5	524.7	527.1	529.4
TOTAL MW	106.0	105.2	105.1	105.0	105.1	105.1	104.4	103.6	104.1	104.5	104.0	103.4	104.4	105.3	104.6	103.8	104.9	106.0	106.7	107.4

BGP - INDUSTRIAL
UTILITY INCENTIVES (DR = 2%, TRC = 1, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	0.6	5.2	9.8	16.8	23.8	31.4	39.0	46.7	54.4	61.0	67.7	72.7	77.8	81.4	84.9	87.1	89.3	91.0	92.6
TOTAL MW SAVINGS	0.0	0.1	0.8	1.5	2.5	3.5	4.6	5.7	6.9	8.1	9.0	10.0	10.8	11.7	12.1	12.5	12.9	13.3	13.5	13.8
TOTAL GWH	533.9	533.5	528.2	523.0	515.8	508.7	502.7	496.8	492.3	487.9	484.3	480.7	478.4	476.1	476.0	475.9	476.8	477.7	479.5	481.3
TOTAL MW	106.0	105.1	104.3	103.5	102.8	102.0	100.7	99.4	99.4	99.4	98.7	97.9	98.5	99.1	98.2	97.3	98.2	99.0	99.6	100.2

BGP - INDUSTRIAL
TECHNOLOGY FORCING (DR = 2%, TRC = 0.70, UBC = YES)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL GWH SAVINGS	0.0	0.6	6.2	11.9	18.8	25.6	35.4	45.1	55.6	66.1	74.5	83.0	88.3	93.6	96.5	99.5	101.3	103.2	104.7	106.2
TOTAL MW SAVINGS	0.0	0.1	0.9	1.8	2.8	3.8	5.2	6.6	8.2	9.8	11.0	12.2	13.1	14.0	14.3	14.6	15.0	15.3	15.6	15.8
TOTAL GWH	533.9	533.5	527.2	520.9	513.9	505.9	498.8	490.6	483.4	476.2	470.8	465.4	462.9	460.3	460.9	461.4	462.6	463.8	465.7	467.7
TOTAL MW	106.0	105.1	104.2	103.2	102.5	101.7	100.1	98.5	98.1	97.7	96.7	95.6	96.2	96.7	96.0	95.2	96.1	97.0	97.6	98.2

PERCENTAGE SAVINGS IN YEAR 2011

	FROZEN EFFICIENCY BASELINE		MARKET POTENTIAL BASELINE	
	GWH	MW	GWH	MW
MARKET POTENTIAL	7.7%	5.8%	N/A	N/A
UTILITY INCENTIVES	16.1%	12.1%	9.1%	6.7%
TECHNOLOGY FORCING	18.5%	13.9%	11.7%	8.6%

Figure VI-23 Burbank, Glendale, and Pasadena Industrial Electricity Sales, Gwh/Year

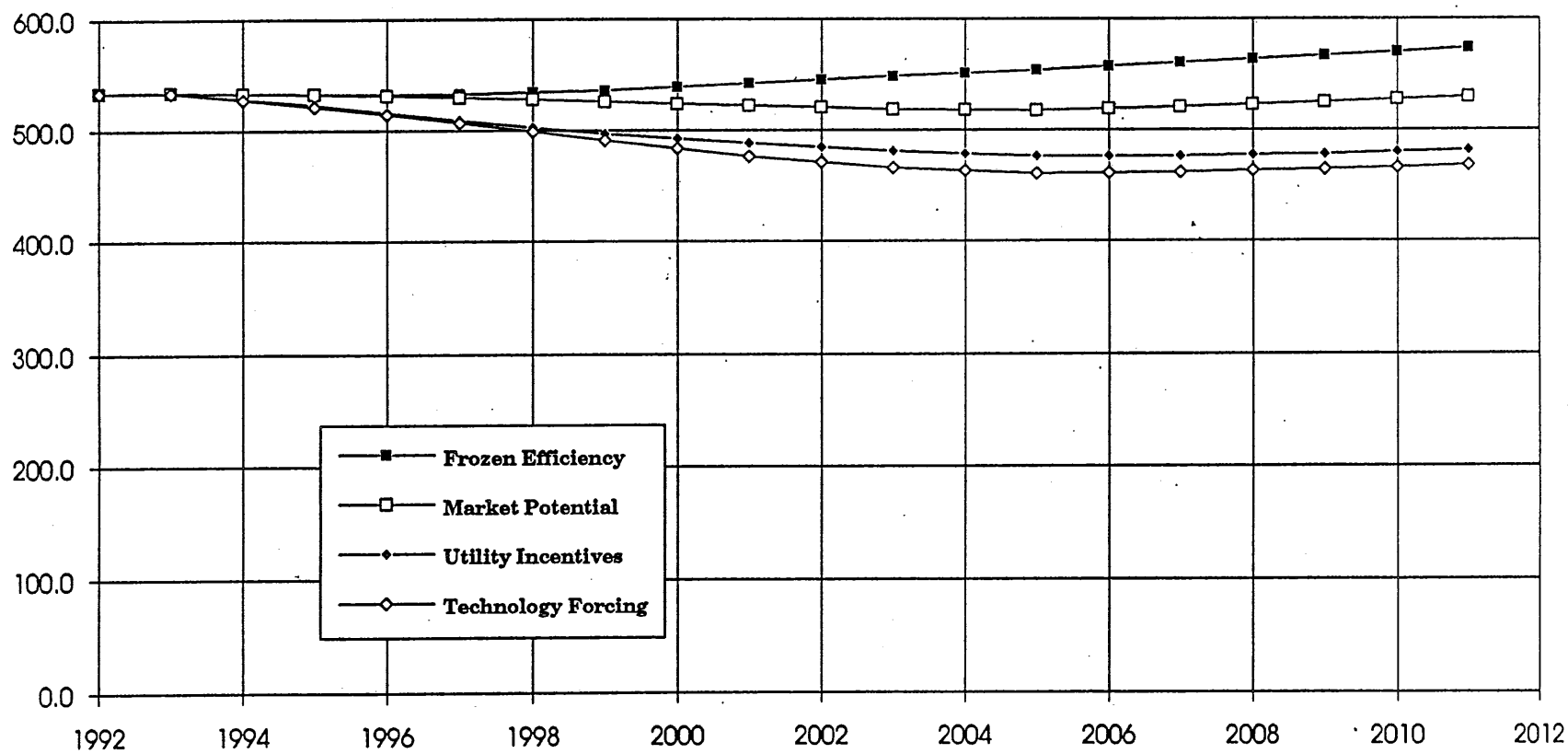


Figure VI-24 Burbank, Glendale, and Pasadena
Industrial Electricity Demand, MW

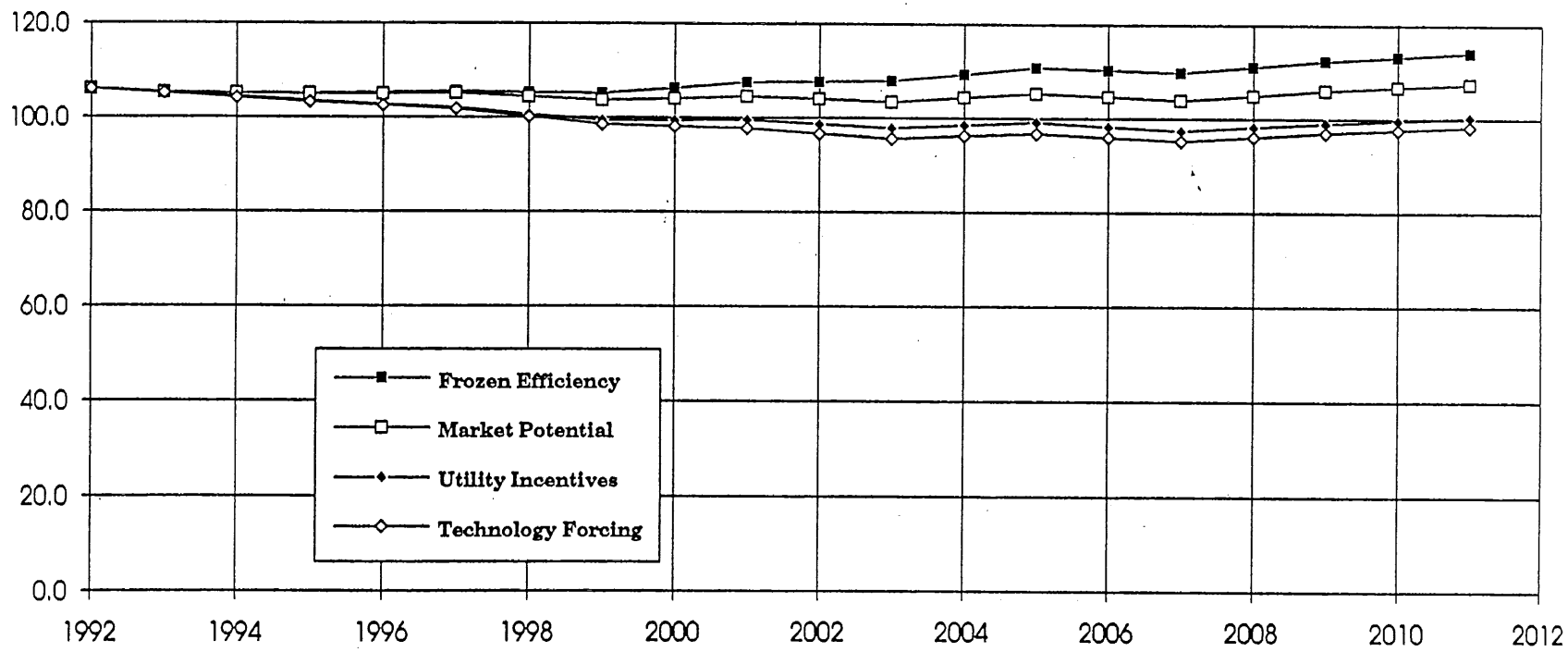


Table VI-14 Industrial DSM Results for the Southern California Gas Service Area by Scenario and Year

SCG - INDUSTRIAL FROZEN EFFICIENCY AT 1992 EUFs Million THERMS END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL (MM THERMS)	ALL	3,713	3,752	3,787	3,822	3,843	3,864	3,873	3,882	3,892	3,902	3,917	3,931	3,952	3,973	3,990	4,006	4,026	4,046	4,072	4,097

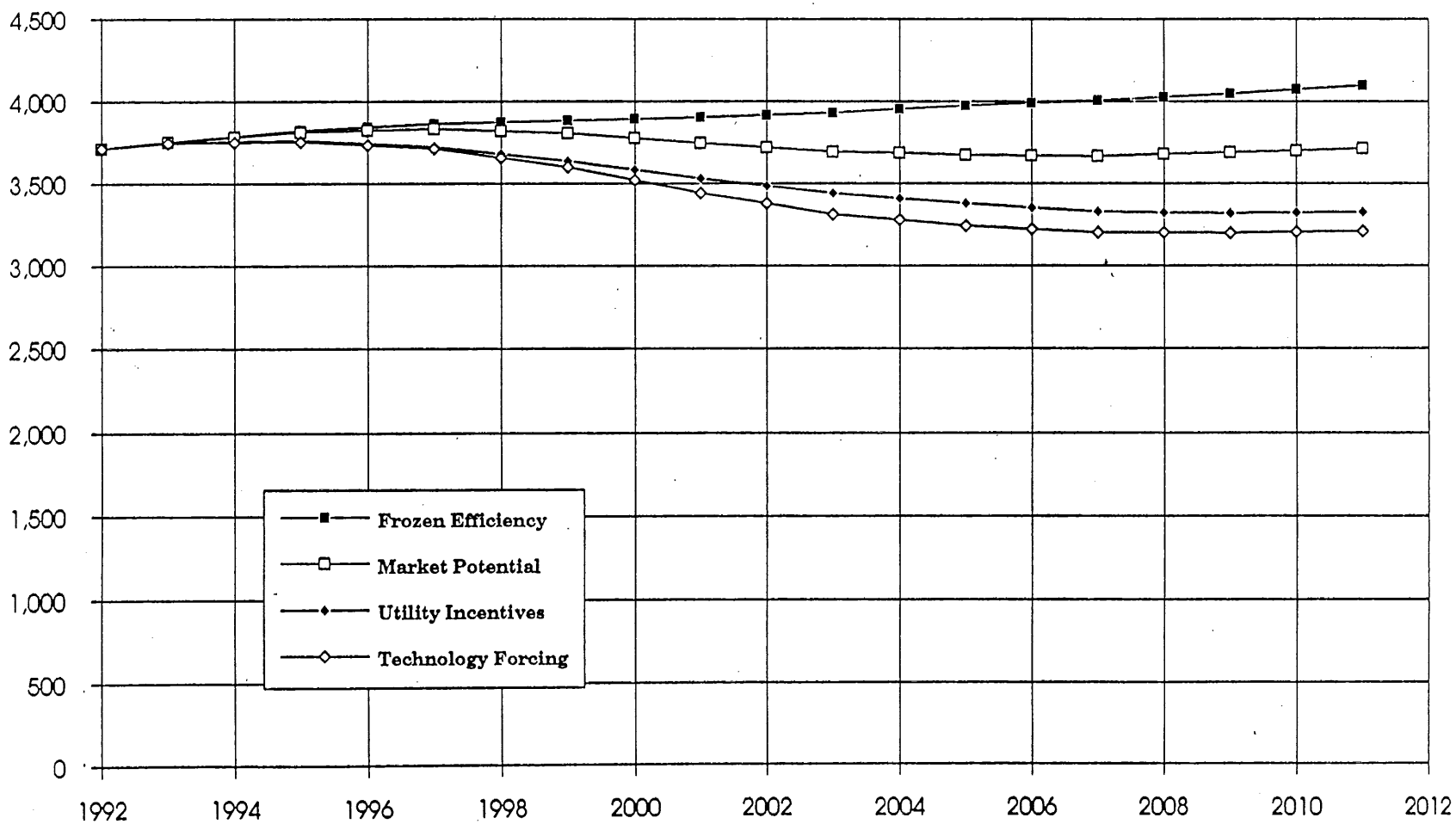
SCG - INDUSTRIAL MARKET POTENTIAL Million THERMS END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL SAVINGS (MM THERMS)	ALL	0	0	3	9	20	32	54	77	117	157	197	236	268	299	319	339	348	356	371	385
TOTAL (MM THERMS)	ALL	3,713	3,752	3,783	3,813	3,823	3,833	3,819	3,805	3,775	3,745	3,720	3,695	3,685	3,674	3,671	3,667	3,679	3,690	3,701	3,712

SCG - INDUSTRIAL UTILITY INCENTIVES Million THERMS END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL SAVINGS (MM THERMS)	ALL	0	5	31	57	99	141	193	244	308	372	432	492	544	596	638	680	705	730	752	774
TOTAL (MM THERMS)	ALL	3,713	3,746	3,755	3,765	3,744	3,723	3,680	3,638	3,584	3,530	3,485	3,439	3,406	3,377	3,351	3,326	3,321	3,316	3,319	3,322

SCG - INDUSTRIAL TECHNOLOGY FORCING Million THERMS END USE	BLD TYPE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TOTAL SAVINGS (MM THERMS)	ALL	0	5	36	67	109	150	217	283	372	461	540	619	676	732	769	805	827	849	869	890
TOTAL (MM THERMS)	ALL	3,713	3,746	3,750	3,754	3,734	3,714	3,656	3,599	3,520	3,441	3,377	3,312	3,276	3,241	3,221	3,202	3,200	3,198	3,202	3,207

PERCENTAGE SAVINGS IN YEAR 2011	FROZEN EFFICIENCY BASELINE SAVINGS	MARKET POTENTIAL BASELINE SAVINGS
MARKET POTENTIAL	9.4%	N/A
UTILITY INCENTIVES	18.9%	10.5%
TECHNOLOGY FORCING	21.7%	13.6%

Figure VI-25 Southern California Gas Industrial
Natural Gas Sales (Therms per Year)



D. TECHNOLOGY SELECTION DETAILS

Tables VI-15 and VI-16 show a "snapshot" of the internal workings of the District model, to demonstrate the internal structure and procedural base of the modeling approach. The results were taken from the commercial model, for SCE's "large offices" building stock computational spreadsheet under the Technology Forcing scenario. The commercial model's data hierarchy and run-time organization are as follows:

- -Scenario
  - -Utility
    - -Building type
      - -Existing/New stock
        - -Energy service class
          - -Base technology
            - -New technologies

The tables are divided into two similar sections -- one for existing and one for new stock. Within this classification, horizontal lines separate the technologies by ESC, within which the technologies are ranked by declining TRC test results. Base technology EUIs and new technology costs and efficiencies are translated into incremental (versus the base technology) costs and incremental energy savings within each ESC. For this scenario, 100 percent buydown and a resulting long-term market share of 1.0 are applied to all technologies with TRC greater than 0.7; technologies with TRC below 0.7 are not eliminated. However, those technology's not passing TRC also generally have long payback periods and thus very low penetration rates, affecting the results minimally.

E. FINANCIAL IMPACTS

1. Overview

The financial and overall economic effects of DSM, as applied to specific end-use sectors in the District region are illustrated in Tables VI-17, VI-18 and VI-19, representing savings for the residential, commercial, and industrial sectors, respectively. The tables show the differences in energy savings and efficiency investment between the Frozen Efficiency baseline and the other three scenarios. They are arranged into three sections of increasing intensity of DSM activity, representing the effects of the Market Potential, Utility Incentives, and Technology Forcing, and summarize the key economic impacts of DSM for the service areas of the six utilities investigated using the District model.

In the tables, technologies are aggregated into broad energy service classes, covering all building types (such as single-family residential, or offices and schools), in order to show the relative economics of DSM measures in the major end-use categories. The tables show total investment summed from 1992 through 2011, in constant 1990 dollars, with corresponding savings in electrical energy (GWh), electric load (MW), and natural gas energy (therms). Average cost of saved energy (CSE, in $/kWh for electricity and $/therm for natural gas), and cost of saved power (CSP, $/MW for electricity only) are shown to illustrate where the most economic savings appear to be.

Table VI-15 California/District Commercial Model Scenario Variables and Controls

TBLZZ15.XLS

Avoided cost coefficients	
ACGAS ($/THERM)	0.483
ACKWH ($/KWH)	0.065
ACKW ($/KW-yr)	55.65
SPHOUR	640.00
DR	0.02
COM ($/KWH)	0.083
COM ($/THERM)	0.598
Electric Utility (edr)	0.080

Market penetration coefficients

name	code	AA	BB
Commercial & industrial	CIALL	0.43	2.22
Residential appliances	RAPP	0.52	3.83
Residential HVAC	RHVAC	0.22	2.58
Residential other	ROTH	0.32	2.62

Miscellaneous parameters	
DSM program admin. cost:	1.20
HVAC Factors for TRC:	0.00
Appliance factors for TRC:	0.00

MKTSEG =	CIALL			
MKTAPP =	CIALL	Market sector code, for A&B table l	MKTA	RAPP
AA	0.427	A-parameter, market penetration e	AAR	0.52
BB	2.22	B-parameter, market penetration e	BBR	3.83
SS	0.1	Shape parameter, diffusion model		

Scenario coefficients

TRC	0.70	MX 12.00
Utility?	SCE	
Scenario name?	TECHNOLOGY FORCING (TRC=0.7)	
Utility 'Buy-down'? (1 = yes, 0 = no)	1	
Natural efficiency rate	0.01255	
Replace on Burnout? (1 = yes, 0 = no)	1	
Retrofit rate as percent of r-o-b?	0.5	
Building efficiency (BTYPE)?	1	

Cost of saved energy constants

CKWH?	0.01
CBTU?	0.10

Table VI-16 California/District Commercial Model Details for New Large Offices

LQ-OFF NEW - SPACE COOLING NEW - SPACE HEATING MEAS #	MEASURE DESCRIPTION	UEC ELEC kWh/yr	UEC GAS Therm/yr	ENERGY SAVINGS ELEC	ENERGY SAVINGS GAS	SYSTEM PEAK SAVINGS FACTOR ELEC	SYSTEM PEAK SAVINGS FACTOR GAS	TRC TEST	SIMPLE PAYBACK Years	CSE PRIMARY $/MMBtu	LONG-RU MARKET SHARE	MEASURE COST $/UNIT	MEASURE COST $/SF	MEAS LIFE	UTILITY BUY-DOWN AMOUNT	MEASURE COST W/ UBD $/SF	NOT COMPLETE FACTORS	FEASIBIL FACTORS	TITLE-24 NAECA FACTORS	TECH. UNITS/SF	APPLICABILITY FACTORS ELEC	APPLICABILITY FACTORS GAS
100	Base (Chiller COP=6.0, Boiler eff=0.7)	2.25	0.10	0.00	0.00	0.22	0.00	n/a	n/a	n/a	0.000	0.00	0.00	20	0	0.00	1.000	1.000	1.000	0.002	0.285	0.210
105	Two-Speed Motor for Cooling Tower	2.16	0.10	0.04	0.00	0.22	0.00	6.5	0.00	0.94	1.000	7.00	0.01	20	0.01	0.00	0.700	0.500	1.000	0.002	0.285	0.000
120	Pipe Insulation	2.16	0.10	0.00	0.03	0.22	0.00	5.8	0.00	0.83	1.000	3.20	0.00	20	0.00	0.00	0.010	1.000	1.000	0.001	0.000	0.192
101	HE Cent Chiller (COP=6.0)	1.79	0.10	0.17	0.00	0.22	0.00	4.9	0.00	1.64	1.000	50.00	0.09	20	0.09	0.00	0.900	1.000	1.000	0.002	0.285	0.000
109	EMS-Chiller	1.53	0.10	0.15	0.00	0.22	0.00	2.4	0.00	3.26	1.000	40.00	0.07	10	0.07	0.00	0.800	0.500	1.000	0.002	0.285	0.000
113	Window DBL-NTB (SC=0.44, u=0.652)	1.44	0.05	0.06	0.46	0.22	0.00	1.6	0.00	3.41	1.000	4.71	0.53	60	0.53	0.00	0.672	0.590	1.000	0.112	0.285	0.124
108	Chilled Water Reset	1.41	0.05	0.02	0.00	0.22	0.00	1.5	0.00	5.34	1.000	7.00	0.01	10	0.01	0.00	0.500	0.950	1.000	0.002	0.285	0.000
115	High Efficiency Boiler (eff=0.83)	1.41	0.04	0.00	0.18	0.22	0.00	1.4	0.00	3.51	1.000	3.12	0.04	20	0.04	0.00	0.650	0.990	1.000	0.014	0.000	0.192
102	VSD HE Cent Chiller	1.24	0.04	0.12	0.00	0.22	0.00	1.1	0.00	7.49	1.000	105.00	0.19	20	0.19	0.00	1.000	0.500	1.000	0.002	0.285	0.000
116	Condensing Boiler (eff=0.91)	1.24	0.03	0.00	0.25	0.22	0.00	0.7	0.00	6.58	1.000	6.67	0.10	20	0.10	0.00	0.720	0.900	1.000	0.014	0.000	0.073
103	High Perf. Tinted Glass (SC=0.26, VLT=0.05)-Chiller	1.10	0.03	0.11	0.00	0.22	0.00	0.6	22.37	12.39	0.007	3.00	0.25	20	0.00	0.25	0.800	0.750	1.000	0.084	0.285	0.000
119	Boiler Insulation	1.10	0.03	0.00	0.03	0.22	0.00	0.4	26.00	11.41	0.005	2.50	0.01	20	0.00	0.01	0.380	0.990	1.000	0.006	0.000	0.158
114	Window Low-E-NTB (SC=0.29, u=0.553)	1.06	0.01	0.04	0.66	0.22	0.00	0.4	64.67	14.01	0.001	9.10	1.02	60	0.00	1.02	0.672	0.590	1.000	0.112	0.285	0.124
112	Wall Insulation (R-11 to R-19)	1.05	0.01	0.01	0.06	0.22	0.00	0.4	34.04	16.89	0.003	0.23	0.03	20	0.00	0.03	0.567	0.980	1.000	0.127	0.285	0.300
104	VSD for Cooling Tower and Pumps	1.03	0.01	0.03	0.00	0.22	0.00	0.3	43.74	24.22	0.002	53.00	0.10	20	0.00	0.10	1.000	0.900	1.000	0.002	0.285	0.000
106	Cooling Maintenance-Chiller	0.93	0.01	0.10	0.00	0.22	0.00	0.3	3.17	29.31	0.337	15.00	0.03	1	0.00	0.03	0.330	0.500	1.000	0.002	0.285	0.000
110	EMS-Boiler	0.79	0.01	0.15	0.10	0.22	0.00	0.1	95.63	52.40	0.000	1.16	1.16	20	0.00	1.16	0.518	0.970	1.000	1.000	0.285	0.288
122	Electronic Pilot Retrofit	0.79	0.01	0.00	0.02	0.22	0.00	0.1	94.94	41.67	0.000	500.00	0.01	20	0.00	0.01	0.359	0.990	1.000	0.000	0.000	0.192
111	Ceiling/Roof Insulation (Add R-11 to R-19)	0.79	0.01	0.00	0.02	0.22	0.00	0.0	292.41	137.01	0.000	0.25	0.05	20	0.00	0.05	0.154	1.000	1.000	0.143	0.285	0.303
121	Tune Boiler	0.79	0.01	0.00	0.02	0.22	0.00	0.0	59.50	435.48	0.001	300.00	0.01	1	0.00	0.01	0.050	1.000	1.000	0.000	0.000	0.192
117	Heat Recovery	0.79	0.01	0.00	0.00	0.22	0.00	0.0	n/a	n/a	0.000	1.00	0.00	20	0.00	0.00	0.828	1.000	1.000	0.000	0.000	0.063
118	Refrig. Heat Recovery	0.79	0.01	0.00	0.00	0.22	0.00	0.0	n/a	n/a	0.000	0.50	0.00	20	0.00	0.00	0.870	0.840	1.000	0.000	0.000	0.011
150	Base (DX EER=8.5, Furnace eff=0.7)	4.00	0.10	0.00	0.00	0.22	0.00	n/a	n/a	n/a	0.000	0.00	0.00	20	-6.48	6.48	1.000	1.000	1.000	0.002	0.506	0.560
151	DX AC to High Eff DX (EER=11) (Not Available)	3.12	0.10	0.22	0.00	0.22	0.00	3.3	4.33	2.40	0.204	175.00	0.32	20	0	0.32	1.000	1.000	1.000	0.002	0.506	0.000
154	Air Cooled to Water Cooled DX (EER=12)	2.84	0.10	0.09	0.00	0.22	0.00	2.2	0.00	3.58	1.000	83.21	0.15	20	0.15	0.00	0.900	0.750	1.000	0.002	0.506	0.000
163	Window DBL-NTB (SC=0.44, u=0.652)	2.67	0.05	0.06	0.46	0.22	0.00	2.0	0.00	2.89	1.000	4.71	0.53	60	0.53	0.00	0.672	0.590	1.000	0.112	0.506	0.220
153	High Perf. Tinted Glass (SC=0.26, VLT=0.05)-DX	2.38	0.05	0.11	0.00	0.22	0.00	1.4	0.00	5.74	1.000	3.00	0.25	20	0.25	0.00	0.800	0.750	1.000	0.084	0.506	0.000
152	Evaporative Precooler	2.02	0.05	0.15	0.00	0.22	0.00	1.0	0.00	7.61	1.000	123.90	0.22	10	0.22	0.00	0.962	0.750	1.000	0.002	0.501	0.000
155	Indirect Evaporative Cooler (EER=26.5)	1.01	0.05	0.50	0.00	0.22	0.00	0.9	0.00	5.97	1.000	501.72	1.07	15	1.07	0.00	0.950	0.750	1.000	0.002	0.506	0.000
158	EMS-DX	0.88	0.05	0.15	0.00	0.22	0.00	0.7	11.47	11.56	0.029	80.00	0.14	10	0.00	0.14	0.800	0.950	1.000	0.002	0.501	0.000
164	Window Low-E-NTB (SC=0.29, u=0.553)	0.83	0.02	0.04	0.66	0.22	0.00	0.6	42.91	9.08	0.002	9.10	1.02	60	0.00	1.02	0.672	0.590	1.000	0.112	0.506	0.220
162	Wall Insulation (R-11 to R-19)	0.82	0.02	0.01	0.06	0.22	0.00	0.4	28.44	13.49	0.004	0.23	0.03	20	0.00	0.03	0.567	0.980	1.000	0.127	0.506	0.534
159	Cooling Maintenance-DX	0.74	0.02	0.10	0.00	0.22	0.00	0.2	3.97	36.67	0.236	15.00	0.03	1	0.00	0.03	0.330	1.000	1.000	0.002	0.501	0.000
165	Efficient Gas Furnace (eff=0.82)	0.74	0.01	0.00	0.13	0.22	0.00	0.1	88.04	43.03	0.000	9.00	0.13	20	0.00	0.13	0.600	0.820	1.000	0.014	0.000	0.073
156	Indirect Evap with DX Backup	0.57	0.01	0.23	0.00	0.22	0.00	0.1	105.72	74.50	0.000	828.72	1.49	15	0.00	1.49	0.950	0.750	1.000	0.002	0.506	0.000
161	Ceiling/Roof Insulation (Add R-11 to R-19)	0.57	0.01	0.00	0.02	0.22	0.00	0.1	209.01	94.84	0.000	0.35	0.05	20	0.00	0.05	0.154	1.000	1.000	0.143	0.506	0.538
160	EMS-Furnace	0.57	0.01	0.00	0.10	0.22	0.00	0.0	1356.51	595.32	0.000	1.16	1.16	20	0.00	1.16	0.518	0.970	1.000	1.000	0.506	0.512
170	Base Elec Resist. w. AC	2.35	0.10	0.00	0.00	0.22	0.00	0.0	n/a	n/a	0.000	0.00	0.00	20	0.00	0.00	1.000	1.000	1.000	0.002	0.065	0.000
171	Air-to-Air Heat Pump - 10 ton unit (COP=2.5)	1.34	0.10	0.80	0.00	0.22	0.00	8.6	0.00	0.93	1.000	155.00	0.28	20	0.28	0.00	0.820	0.950	1.000	0.002	0.065	0.000

LQ-OFF NEW - VENTILATION MEAS #	MEASURE DESCRIPTION	UEC ELEC kWh/yr	UEC GAS Therm/yr	ENERGY SAVINGS ELEC	ENERGY SAVINGS GAS	SYSTEM PEAK SAVINGS FACTOR ELEC	SYSTEM PEAK SAVINGS FACTOR GAS	TRC TEST	SIMPLE PAYBACK Years	CSE PRIMARY $/MMBtu	LONG-RU MARKET SHARE	MEASURE INCREMENTAL COST $/UNIT	MEASURE INCREMENTAL COST $/SF	MEAS LIFE	UTILITY BUY-DOWN AMOUNT	MEASURE COST W/ UBD $/SF	NOT COMPLETE FACTORS	FEAS. FACTORS	TITLE-24 NAECA FACTORS	TECH. UNITS/SF	APPLICABILITY FACTORS ELEC	APPLICABILITY FACTORS GAS
500	Base Ventilation Fan Motor-20 HP, 1800 RPM	2.22	0.00	0.00	0.00	0.15	0.00	n/a	n/a	n/a	0.000	0.00	0.00	15	0	0.00	1.000	1.000	1.000	0.001	0.826	0.000
502	HE Ventilation Fan Motor-20 HP, 1800 RPM	2.09	0.00	0.06	0.00	0.15	0.00	9.9	0.00	0.74	1.000	8.05	0.01	15	0.01	0.00	0.830	0.950	1.000	0.001	0.826	0.000
504	Motor On/Off Control (EMS)	1.88	0.00	0.19	0.00	0.15	0.00	3.7	0.00	1.94	1.000	25.00	0.03	10	0.03	0.00	0.480	0.950	1.000	0.001	0.826	0.000
503	VSD Control w. VIV Base	1.41	0.00	0.25	0.00	0.15	0.00	0.8	0.00	8.84	1.000	366.00	0.49	15	0.49	0.00	0.950	0.800	1.000	0.001	0.826	0.000

LQ-OFF NEW - MISCELLANEOUS MEAS #	MEASURE DESCRIPTION	UEC ELEC kWh/yr	UEC GAS Therm/yr	ENERGY SAVINGS ELEC	ENERGY SAVINGS GAS	SYSTEM PEAK SAVINGS FACTOR ELEC	SYSTEM PEAK SAVINGS FACTOR GAS	TRC TEST	SIMPLE PAYBACK Years	CSE PRIMARY $/MMBtu	LONG-RU MARKET SHARE	MEASURE INCREMENTAL COST $/UNIT	MEASURE INCREMENTAL COST $/SF	MEAS LIFE	UTILITY BUY-DOWN AMOUNT	MEASURE COST W/ UBD $/SF	NOT COMPLETE FACTORS	FEAS. FACTORS	TITLE-24 NAECA FACTORS	TECH. UNITS/SF	APPLICABILITY FACTORS ELEC	APPLICABILITY FACTORS GAS
800	Base copier	0.70	0.00	0.00	0.00	0.07	0.00	n/a	n/a	n/a	0.000	0.00	0.00	5	0	0.00	1.000	1.000	1.000	0.000	1.000	0.000
801	Copier Standby	0.42	0.00	0.40	0.00	0.07	0.00	12.8	0.00	0.61	1.000	25.00	0.01	5	0.01	0.00	0.800	0.500	1.000	0.000	1.000	0.000
810	Base laser	0.17	0.00	0.00	0.00	0.07	0.00	n/a	n/a	n/a	0.000	0.00	0.00	5	0.00	0.00	1.000	1.000	1.000	0.000	1.000	0.000
811	Laser/Inkjet	0.01	0.00	0.95	0.00	0.07	0.00	999.0	0.00	-31.16	1.000	-1000.00	-0.22	5	-0.22	0.00	0.900	0.500	1.000	0.000	1.000	0.000
820	Base PC	1.87	0.00	0.00	0.00	0.07	0.00	n/a	n/a	n/a	0.000	0.00	0.00	5	0.00	0.00	1.000	1.000	1.000	0.003	1.000	0.000
821	PC notebook/standby	0.19	0.00	0.90	0.00	0.07	0.00	0.3	10.75	20.66	0.033	500.00	1.50	5	0.00	1.50	0.900	0.800	1.000	0.003	1.000	0.000

LG-OFF NEW > LIGHTING		UEC		ENERGY SAVINGS		SYSTEM PEAK SAVINGS FACTOR		TRC TEST	SIMPLE PAYBACK	CSE PRIMARY	LONG-RU MARKET SHARE	MEASURE INCREMENTAL COST		MEAS	UTILITY BUY-DOW AMOUNT	MEASUR COST W/ UBD	NOT COMPLET FACTORS	FEAS. FACTORS	TITLE-24 NAECA FACTORS	TECH. UNITS/SF	APPLICABILITY FACTORS	
MEAS #	MEASURE DESCRIPTION	ELEC kWh/yr	GAS Therm/yr	ELEC	GAS	ELEC	GAS		Years	$/MMBtu		$/UNIT	$/SF	LIFE		$/sf					ELEC	GAS
300	Base Fluorescent, 3-4' lamps (2-40W & 1-34W), 2 ee mag ballasts	6.65	0.00	0.00	0.00	0.10	0.00	n/a	n/a	n/a	0.000	0.00	0.00	12.8	0	0.00	1.000	1.000	1.000	0.011	0.801	0.000
310	Occupancy Sensor Fluor -4-4' fixtures	5.32	0.00	0.20	0.00	0.10	0.00	4.6	0.00	1.47	1.000	18.00	0.20	12.8	0.20	0.00	0.900	0.800	1.000	0.011	0.801	0.000
302	2-T8 lamps, 1 elect ballast, reflector	3.88	0.00	0.31	0.00	0.10	0.00	2.0	0.00	3.41	1.000	51.47	0.58	12.8	0.58	0.00	1.000	0.800	1.000	0.011	0.801	0.000
311	Stepped Dimming - 5-4' fixtures, 1/2 stepped switched retrofit	3.13	0.00	0.16	0.00	0.10	0.00	1.1	0.00	6.16	1.000	38.00	0.42	16.0	0.42	0.00	1.000	0.400	1.000	0.011	0.801	0.000
305	2-34 watt lamps, 1 elect ballast, reflector	3.13	0.00	0.06	0.00	0.10	0.00	0.0	n/a	n/a	0.000	46.25	0.52	12.8	0.00	0.52	1.000	0.700	1.000	0.011	0.801	0.000
306	3-T8 lamps, 1 elect ballast	3.13	0.00	0.00	0.00	0.10	0.00	0.0	n/a	n/a	0.000	26.83	0.30	12.8	0.00	0.30	1.000	1.000	1.000	0.011	0.801	0.000
320	Base Fluorescent fixture, 2-8' lamps (75w), 1 ee. mag ballast	6.65	0.00	0.00	0.00	0.10	0.00	n/a	n/a	n/a	0.000	0.00	0.00	16.0	0.00	0.00	1.000	1.000	1.000	0.009	0.089	0.000
323	1-8' T12 (75W), 1 elect ballast, reflector	4.19	0.00	0.37	0.00	0.10	0.00	11.8	0.00	0.58	1.000	19.65	0.18	16.0	0.18	0.00	1.000	0.900	1.000	0.009	0.089	0.000
322	2-8' T12 (60W), 1 elect ballast	3.36	0.00	0.20	0.00	0.10	0.00	4.2	0.00	1.62	1.000	18.75	0.17	16.0	0.17	0.00	1.000	1.000	1.000	0.009	0.089	0.000
327	Occupancy Sensor Fluor -4-8' fixtures	2.69	0.00	0.20	0.00	0.10	0.00	2.9	0.00	2.35	1.000	18.00	0.16	12.8	0.16	0.00	0.900	0.800	1.000	0.009	0.089	0.000
321	2-8' T12(75W), 1 elect ballast	2.40	0.00	0.11	0.00	0.10	0.00	1.5	0.00	4.54	1.000	18.16	0.16	16.0	0.16	0.00	1.000	1.000	1.000	0.009	0.089	0.000
328	Stepped Dimming - 5-8' fixtures, 1/2 stepped switched retrofit	2.04	0.00	0.15	0.00	0.10	0.00	0.9	0.00	7.63	1.000	38.00	0.34	16.0	0.34	0.00	1.000	0.400	1.000	0.009	0.489	0.000
340	Base 60W Incandescent	13.12	0.00	0.00	0.00	0.10	0.00	n/a	n/a	n/a	0.000	0.00	0.00	0.8	0.00	0.00	1.000	1.000	1.000	0.047	0.010	0.000
341	13W compact fluorescent screw in, base 60W	3.28	0.00	0.75	0.00	0.10	0.00	6.3	0.00	1.08	1.000	6.42	0.30	3.2	0.30	0.00	1.000	0.900	1.000	0.047	0.010	0.000
350	Base 75W Incandescent	13.12	0.00	0.00	0.00	0.10	0.00	n/a	n/a	n/a	0.000	0.00	0.00	0.8	0.00	0.00	1.000	1.000	1.000	0.037	0.030	0.000
351	18W compact fluorescent screw in, base 75W	3.50	0.00	0.73	0.00	0.10	0.00	4.6	0.00	1.47	1.000	10.69	0.40	3.2	0.40	0.00	1.000	0.900	1.000	0.037	0.030	0.000
360	Base 100W PAR Incandescent flood	13.12	0.00	0.00	0.00	0.10	0.00	n/a	n/a	n/a	0.000	0.00	0.00	0.8	0.00	0.00	1.000	1.000	1.000	0.028	0.040	0.000
361	26W compact fluorescent screw in, base 100W	3.94	0.00	0.70	0.00	0.10	0.00	3.0	0.00	2.28	1.000	21.03	0.59	3.2	0.59	0.00	1.000	0.900	1.000	0.028	0.040	0.000
370	Base 150W PAR Incandescent flood (4 lifetimes)	13.12	0.00	0.00	0.00	0.10	0.00	n/a	n/a	n/a	0.000	0.00	0.00	0.8	0.00	0.00	1.000	1.000	1.000	0.019	0.020	0.000
371	90W Halogen PAR flood	7.87	0.00	0.40	0.00	0.10	0.00	3.9	0.00	1.73	1.000	3.50	0.07	0.8	0.07	0.00	1.000	1.000	1.000	0.019	0.020	0.000

LG-OFF NEW > REFRIGERATION		UEC		ENERGY SAVINGS		SYSTEM PEAK SAVINGS FACTOR		TRC TEST	SIMPLE PAYBACK	CSE PRIMARY	LONG-RU MARKET SHARE	MEASURE INCREMENTAL COST		MEAS	UTILITY BUY-DOW AMOUNT	MEASUR COST W/ UBD	NOT COMPLET FACTORS	FEAS. FACTORS	TITLE-24 NAECA FACTORS	TECH. UNITS/SF	APPLICABILITY FACTORS	
MEAS #	MEASURE DESCRIPTION	ELEC kWh/yr	GAS Therm/yr	ELEC	GAS	ELEC	GAS		Years	$/MMBtu		$/UNIT	$/SF	LIFE		$/sf					ELEC	GAS
400	Base Refrigeration System	0.13	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a	0.000	0.00	0.00	10	0	0.00	1.000	1.000	1.000	0.000	0.000	0.000
417	Demand Defrost Electric	0.12	0.00	0.08	0.00	0.00	0.00	30.0	0.00	0.20	1.000	25.00	0.00	10	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
419	Anti-Sweat Controls	0.11	0.00	0.08	0.00	0.00	0.00	25.1	0.00	0.24	1.000	97.00	0.00	10	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
423	Vinyl Curtains for Medium Temp Walk-Ins	0.11	0.00	0.03	0.00	0.00	0.00	12.3	0.00	0.48	1.000	2.00	0.00	5	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
422	Vinyl Curtains for Low Temp Walk-Ins	0.11	0.00	0.01	0.00	0.00	0.00	11.2	0.00	0.53	1.000	2.00	0.00	5	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
405	Low Temp External Liquid-Suction Heat Exchangers	0.11	0.00	0.04	0.00	0.00	0.00	8.6	0.00	0.69	1.000	300.00	0.00	10	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
416	Demand Hot Gas Defrost	0.10	0.00	0.03	0.00	0.00	0.00	7.8	0.00	0.76	1.000	25.00	0.00	10	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
418	High Efficiency Display Case Fan Motors	0.10	0.00	0.06	0.00	0.00	0.00	3.0	0.00	1.98	1.000	2.00	0.00	5	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
409	Low Temp Remote Evaporative Subcoolers	0.10	0.00	0.01	0.00	0.00	0.00	2.9	0.00	2.06	1.000	46.00	0.00	10	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
401	Oversize Evaporative Condenser	0.09	0.00	0.07	0.00	0.00	0.00	2.4	0.00	2.43	1.000	95.00	0.00	10	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
421	Med Temp Doors	0.08	0.00	0.10	0.00	0.00	0.00	1.8	0.00	3.27	1.000	39.00	0.00	5	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
404	Ambient Subcoolers	0.08	0.00	0.01	0.00	0.00	0.00	0.7	0.21	8.10	0.995	34.00	0.00	10	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
412	Single VSD for Multiplex Rack	0.08	0.00	0.01	0.00	0.00	0.00	0.2	34.26	34.53	0.003	105.00	0.00	10	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
413	Full VSD for Multiplex Rack	0.08	0.00	0.02	0.00	0.00	0.00	0.2	35.73	36.01	0.002	333.00	0.00	10	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000
406	Med. Temp External Liquid-Suction Heat Exchangers	0.08	0.00	0.01	0.00	0.00	0.00	0.1	78.70	79.33	0.000	3167.00	0.01	10	0.00	0.01	1.000	1.000	1.000	0.000	0.000	0.000
408	Med Temp Mechanical Subcoolers	0.08	0.00	0.00	0.00	0.00	0.00	0.1	96.43	97.20	0.000	191.00	0.00	10	0.00	0.00	1.000	1.000	1.000	0.000	0.000	0.000

Table VI-16 California/District Commercial Model Details for New Large Offices (continued)

LG-OFF NEW - DHW, POOL HEATING, COOKING		UEC		ENERGY SAVINGS		SYSTEM PEAK SAVINGS FACTOR		TRC TEST	SIMPLE PAYBACK	CSE PRIMARY	LONG-RU MARKET SHARE	MEASURE INCREMENTAL COST		MEAS LIFE	UTILITY BUY-DOW AMOUNT	MEASURE COST W/ USD	NOT COMPLET FACTORS	FEAS. FACTORS	TITLE-24 NAECA FACTORS	TECH. UNITS/SF	APPLICABILITY FACTORS	
MEAS #	MEASURE DESCRIPTION	ELEC kWh/sf	GAS Therm/sf	ELEC	GAS	ELEC	GAS		Years	$/MMBtu		$/UNIT	$/SF	YRS		$/sf					ELEC	GAS
600	Base Water Heating	0.00	0.06	0.00	0.00	0.00	0.00	n/a	n/a	n/a	0.000	0.00	0.00	20	0	0.00	1.000	1.000	1.000	0.004	0.000	0.790
615	Water Heater Insulation	0.00	0.06	0.00	0.06	0.00	0.00	15.7	0.00	0.31	1.000	12.00	0.00	15	0.00	0.00	0.473	0.980	1.000	0.000	0.000	0.832
616	Water Heater Pipe Insulation	0.00	0.05	0.00	0.02	0.00	0.00	5.9	0.00	0.82	1.000	1.00	0.00	15	0.00	0.00	0.335	1.000	1.000	0.001	0.000	0.832
611	Boiler Pipe Insulation - Water	0.00	0.05	0.00	0.03	0.00	0.00	3.2	0.00	1.49	1.000	3.20	0.00	20	0.00	0.00	0.002	0.980	1.000	0.001	0.000	0.150
603	Efficient Water Heater	0.00	0.05	0.00	0.11	0.00	0.00	2.5	0.00	1.90	1.000	2.70	0.01	15	0.01	0.00	0.267	0.990	1.000	0.004	0.000	0.832
601	High Efficiency Boiler - Water	0.00	0.04	0.00	0.05	0.00	0.00	2.2	0.00	2.19	1.000	5.00	0.01	20	0.01	0.00	0.850	0.990	1.000	0.001	0.000	0.150
602	Condensing Boiler - Water	0.00	0.04	0.00	0.12	0.00	0.00	2.1	0.00	2.30	1.000	12.00	0.02	20	0.02	0.00	0.720	0.900	1.000	0.001	0.000	0.071
604	Super Efficient Water Heater	0.00	0.03	0.00	0.23	0.00	0.00	0.9	0.00	5.64	1.000	12.50	0.08	15	0.08	0.00	0.267	0.990	1.000	0.004	0.000	0.832
605	Condensing Water Heater	0.00	0.02	0.00	0.37	0.00	0.00	0.6	13.90	7.77	0.019	21.30	0.09	15	0.00	0.09	0.585	0.840	1.000	0.004	0.000	0.150
630	Efficient Warewasher (Dishwash)	0.00	0.02	0.00	0.02	0.00	0.00	0.5	16.34	9.12	0.013	50.00	0.00	15	0.00	0.00	0.950	0.500	1.000	0.000	0.000	0.047
610	Boiler Insulation - Water	0.00	0.02	0.00	0.03	0.00	0.00	0.3	43.94	19.28	0.001	2.50	0.01	20	0.00	0.01	0.110	0.950	1.000	0.006	0.000	0.150
606	Solar Water Heat	0.00	0.01	0.00	0.50	0.00	0.00	0.2	38.94	20.63	0.002	45.80	0.20	15	0.00	0.20	1.000	0.800	1.000	0.004	0.000	0.198
625	Horizontal Axis Washers	0.00	0.01	0.00	0.00	0.00	0.00	0.0	n/a	n/a	0.000	170.00	0.00	15	0.00	0.00	0.000	1.000	1.000	0.000	0.000	0.000
700	Base Pool Heat	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a	0.000	0.00	0.00	15	0	0.00	1.000	1.000	1.000	0.000	0.000	0.000
702	Pool Cover	0.00	0.00	0.00	0.50	0.00	0.00	0.0	n/a	n/a	0.000	0.28	0.00	10	0.00	0.00	0.000	0.000	1.000	0.000	0.000	0.000
701	Solar Pool Heater	0.00	0.00	0.00	0.34	0.00	0.00	0.0	n/a	n/a	0.000	12.70	0.00	10	0.00	0.00	0.000	0.000	1.000	0.000	0.000	0.000
800	Base Cooking	0.00	0.05	0.00	0.00	0.00	0.00	n/a	n/a	n/a	0.000	0.00	0.00	15	0	0.00	0.000	1.000	1.000	0.000	0.000	0.080
805	Convection Oven	0.00	0.04	0.00	0.30	0.00	0.00	1063.3	0.00	0.00	1.000	1.00	0.00	15	0.00	0.00	0.900	0.500	1.000	0.000	0.000	0.005
804	Instantaneous Infrared Broiler	0.00	0.04	0.00	0.01	0.00	0.00	0.5	17.43	9.73	0.011	50.00	0.00	15	0.00	0.00	1.000	0.500	1.000	0.000	0.000	0.014
802	Infrared Griddle	0.00	0.03	0.00	0.07	0.00	0.00	0.2	52.31	29.21	0.001	1040.00	0.08	15	0.00	0.08	1.000	0.500	1.000	0.000	0.000	0.009
801	Catalytic Infrared Fryer	0.00	0.03	0.00	0.08	0.00	0.00	0.2	54.66	30.53	0.001	1155.00	0.09	15	0.00	0.09	1.000	0.500	1.000	0.000	0.000	0.009
803	Power Burner Range	0.00	0.03	0.00	0.01	0.00	0.00	0.0	508.23	283.83	0.000	1235.00	0.09	15	0.00	0.09	1.000	0.500	1.000	0.000	0.000	0.003

Table VI-17 Residential Financial Impacts by Utility and Energy Service Class

Residential efficiency investment 1992-2011
Energy savings and cost of saved energy in 2011.
Differences from Frozen Efficiency baseline
Constant 1990 dollars

MARKET POTENTIAL SCENARIO

SCE	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	130.24	412.72	57.96	118.45	6.43	32.62	129.26	255.33	45.68	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.092	0.040	0.054	0.040	0.029	0.039	0.066	0.039	0.037	N/A	N/A	N/A	N/A
CSE Including Heating Benefit (/kWh)	0.060	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	231.03	1,682.84	184.00	418.45	33.92	147.66	372.44	1,431.50	371.27	N/A	N/A	N/A	N/A
CSP ($/KW)	84.48	290.38	140.10	287.05	187.08	299.16	367.44	243.67	196.60	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	250.87	229.16	71.43	58.80	5.20	19.39	66.52	229.42	69.67	N/A	N/A	N/A	N/A

LADWP	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	47.33	150.58	22.44	50.76	2.18	13.07	54.80	79.83	7.38	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.062	0.028	0.035	0.022	0.013	0.024	0.041	0.027	0.030	N/A	N/A	N/A	N/A
CSE Including Heating Benefit (/kWh)	0.031	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	61.90	575.46	68.75	170.11	10.77	51.58	151.27	396.04	60.13	N/A	N/A	N/A	N/A
CSP ($/KW)	59.71	204.23	89.80	155.65	82.85	179.85	230.60	171.19	161.55	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	64.56	78.36	26.69	23.91	1.65	6.77	27.02	63.47	11.28	N/A	N/A	N/A	N/A

BGP	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	5.80	18.91	2.77	6.02	0.26	1.56	6.61	10.11	1.12	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.074	0.033	0.041	0.027	0.017	0.029	0.050	0.033	0.033	N/A	N/A	N/A	N/A
CSE Including Heating Benefit (/kWh)	0.039	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	8.13	72.73	8.61	20.62	1.30	6.31	18.30	50.52	9.15	N/A	N/A	N/A	N/A
CSP ($/KW)	70.82	240.58	106.80	193.74	113.13	223.72	281.48	206.77	176.75	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	8.49	9.90	3.34	2.90	0.20	0.83	3.27	8.10	1.72	N/A	N/A	N/A	N/A

SCG	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	192.32	83.36	0.51	2.63
Total Utility Incentives & Admin. (MM$)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00	0.00	0.00	0.00
CSE ($/therm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.261	0.163	3.609	0.336
CSE Including Cooling Benefit ($/therm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.475	N/A	N/A	N/A
Energy Savings in 2011 (MMtherm/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.46	67.83	0.02	1.27

Table VI-17, Continued

UTILITY INCENTIVES SCENARIO

SCE	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	853.44	1,181.16	151.13	298.06	9.39	71.53	204.68	483.43	49.59	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	827.80	1,181.12	151.13	293.83	9.39	71.53	157.43	483.43	49.59	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.145	0.035	0.037	0.025	0.021	0.034	0.048	0.038	0.030	N/A	N/A	N/A	N/A
CSE Including Heating Benefit (/kWh)	0.063	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	586.27	3,370.46	454.96	959.55	48.91	265.34	655.18	2,274.98	403.91	N/A	N/A	N/A	N/A
CSP ($/KW)	133.60	254.54	96.26	177.00	136.14	259.96	267.58	235.40	161.44	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	634.64	458.97	176.63	134.85	7.50	34.85	117.02	364.61	75.79	N/A	N/A	N/A	N/A

LADWP	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	210.56	287.77	42.14	96.62	2.95	23.25	69.42	116.56	7.68	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	202.08	287.75	42.14	94.64	2.95	23.25	46.46	116.56	7.68	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.080	0.017	0.020	0.011	0.008	0.016	0.028	0.021	0.025	N/A	N/A	N/A	N/A
CSE Including Heating Benefit (/kWh)	0.027	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	143.39	890.80	121.60	297.73	14.46	79.75	206.74	531.87	62.59	N/A	N/A	N/A	N/A
CSP ($/KW)	78.29	127.09	50.68	76.10	55.01	121.33	156.14	130.91	131.78	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	146.54	121.30	47.21	41.84	2.22	10.47	36.93	85.24	11.74	N/A	N/A	N/A	N/A

BGP	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	27.98	37.18	5.26	11.40	0.35	2.77	8.47	15.05	1.18	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	26.93	37.18	5.26	11.16	0.35	2.77	5.72	15.05	1.18	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.100	0.022	0.026	0.015	0.012	0.022	0.035	0.027	0.027	N/A	N/A	N/A	N/A
CSE Including Heating Benefit (/kWh)	0.035	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	18.97	114.66	15.41	35.94	1.73	9.72	25.34	68.80	9.61	N/A	N/A	N/A	N/A
CSP ($/KW)	97.93	164.97	65.75	104.97	78.68	163.80	198.22	169.54	144.74	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	19.44	15.60	5.98	5.05	0.27	1.28	4.53	11.03	1.80	N/A	N/A	N/A	N/A

SCG	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,496.28	216.74	0.51	6.37
Total Utility Incentives & Admin. (MM$)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,442.85	165.21	0.00	6.36
CSE ($/therm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.704	0.215	2.962	0.276
CSE Including Cooling Benefit ($/therm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.422	N/A	N/A	N/A
Energy Savings in 2011 (MMtherm/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	111.09	95.06	0.02	3.09

Table VI-17, Continued

TECHNOLOGY FORCING SCENARIO

SCE	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	1,367.87	1,213.68	151.13	313.74	9.39	71.53	204.68	483.43	49.59	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	1,354.20	1,213.68	151.13	311.63	9.39	71.53	157.43	483.43	49.59	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.182	0.035	0.037	0.028	0.021	0.034	0.048	0.038	0.030	N/A	N/A	N/A	N/A
CSE Including Heating Benefit (/kWh)	0.060	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	643.81	3,398.72	454.96	974.30	48.91	265.34	655.18	2,274.98	403.91	N/A	N/A	N/A	N/A
CSP ($/KW)	166.47	259.64	96.26	195.70	136.14	259.96	267.58	235.40	161.44	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	702.50	462.81	176.63	136.92	7.50	34.85	117.02	364.61	75.79	N/A	N/A	N/A	N/A

LADWP	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	376.85	302.25	42.14	101.52	2.95	23.25	69.42	116.56	7.68	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	373.87	302.25	42.14	100.21	2.95	23.25	46.46	116.56	7.68	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.112	0.018	0.020	0.014	0.008	0.016	0.028	0.021	0.025	N/A	N/A	N/A	N/A
CSE Including Heating Benefit (/kWh)	0.030	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	165.10	903.23	121.60	302.34	14.46	79.75	206.74	531.87	62.59	N/A	N/A	N/A	N/A
CSP ($/KW)	107.09	133.83	50.68	96.48	55.01	121.33	156.14	130.91	131.78	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	172.15	123.00	47.21	42.49	2.22	10.47	36.93	85.24	11.74	N/A	N/A	N/A	N/A

BGP	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	49.26	38.99	5.26	12.11	0.35	2.77	8.47	15.05	1.18	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	48.86	38.99	5.26	11.96	0.35	2.77	5.72	15.05	1.18	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.137	0.023	0.026	0.018	0.012	0.022	0.035	0.027	0.027	N/A	N/A	N/A	N/A
CSE Including Heating Benefit (/kWh)	0.037	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	21.62	116.11	15.41	36.60	1.73	9.72	25.34	68.80	9.61	N/A	N/A	N/A	N/A
CSP ($/KW)	131.05	172.25	65.75	128.66	78.68	163.80	198.22	169.54	144.74	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	22.57	15.81	5.98	5.14	0.27	1.28	4.53	11.03	1.80	N/A	N/A	N/A	N/A

SCG	COOLING	REF	COOKING	EDHW	DISH	CLOTHES	EDRY	LIGHT	PPUMP	HEAT	GDHW	GDRY	GPOOL
Total 1992-2011 Investment (MM$)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2,947.23	410.61	0.51	6.37
Total Utility Incentives & Admin. (MM$)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2,928.38	380.79	0.00	6.36
CSE ($/therm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.756	0.306	2.962	0.276
CSE Including Cooling Benefit ($/therm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.526	N/A	N/A	N/A
Energy Savings in 2011 (MMtherm/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	188.62	125.66	0.02	3.09

NOTES: For the Utility Incentives and Technology Forcing scenarios, the Total 1992-2011 Investment and Total Utility Incentives & Administration values are slightly different due to the fact that, in the model, technologies passing TRC are still allowed to compete in the market.

End-use Key:

COOLING	Space cooling	LIGHT	Lighting
REF	Refrigeration	PPUMP	Pool pumping
COOKING	Cooking	HEAT	Space heating
EDHW	Electric direct hot water	GDHW	Gas direct hot water
DISH	Dishwashing	GDRY	Gas clothes drying
CLOTHES	Clothes washing	GPOOL	Gas pool heating
EDRY	Electric clothes drying		

Table VI-18 Commercial Financial Impacts by Utility and Energy Service Class

Commercial efficiency investment 1992-2011
Energy savings and cost of saved energy in 2011.
Differences from Frozen Efficiency baseline
Constant 1990 dollars

MARKET POTENTIAL SCENARIO

SCE	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	101.08	23.28	23.60	356.68	41.85	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.049	0.017	0.026	0.024	0.022	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	321.38	186.08	234.43	3090.36	406.74	N/A	N/A	N/A	N/A
CSP ($/KW)	122.13	66.48	165.78	121.41	192.05	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	126.89	47.74	36.21	593.59	45.57	N/A	N/A	N/A	N/A

LADWP	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	44.09	8.33	10.31	139.62	11.64	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.046	0.015	0.028	0.024	0.022	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	147.19	75.09	94.12	1259.55	112.05	N/A	N/A	N/A	N/A
CSP ($/KW)	113.68	57.81	186.09	121.90	193.99	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	58.21	19.52	14.16	239.50	12.61	N/A	N/A	N/A	N/A

BGP	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	5.40	1.03	1.07	16.63	1.27	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.044	0.015	0.026	0.024	0.023	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	18.96	9.25	10.63	150.53	11.63	N/A	N/A	N/A	N/A
CSP ($/KW)	110.08	59.24	168.34	122.84	204.86	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	7.41	2.34	1.62	28.34	1.30	N/A	N/A	N/A	N/A

SCG	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	N/A	N/A	N/A	N/A	N/A	12.89	22.53	0.85	1.70
Total Utility Incentives & Admin. (MM$)	N/A	N/A	N/A	N/A	N/A	0.00	0.00	0.00	0.00
CSE ($/therm)	N/A	N/A	N/A	N/A	N/A	0.22	0.07	0.03	0.09
Energy Savings in 2011 (MMtherm/yr)	N/A	N/A	N/A	N/A	N/A	6.24	41.75	5.23	2.48

Table VI-18 Continued

UTILTY INCENTIVES SCENARIO

SCE	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	529.37	46.59	23.62	995.64	69.07	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	493.10	42.23	19.61	990.52	60.10	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.044	0.018	0.025	0.025	0.024	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	947.33	261.34	236.54	4986.47	538.33	N/A	N/A	N/A	N/A
CSP ($/KW)	107.38	69.46	159.56	129.41	207.51	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	382.52	68.76	36.81	969.14	60.76	N/A	N/A	N/A	N/A

LADWP	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	236.58	14.82	10.32	340.84	19.23	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	224.25	13.38	8.57	338.46	16.67	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.042	0.015	0.027	0.025	0.024	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	430.97	98.60	94.65	1921.70	148.08	N/A	N/A	N/A	N/A
CSP ($/KW)	102.44	57.50	179.09	126.58	209.12	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	173.29	26.01	14.28	367.72	16.70	N/A	N/A	N/A	N/A

BGP	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	28.82	1.98	1.07	41.35	2.12	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	27.29	1.80	0.89	41.08	1.80	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.041	0.016	0.025	0.025	0.025	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	54.19	12.40	10.70	231.13	15.57	N/A	N/A	N/A	N/A
CSP ($/KW)	101.41	62.01	162.03	128.18	218.19	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	21.81	3.23	1.66	44.53	1.77	N/A	N/A	N/A	N/A

SCG	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	N/A	N/A	N/A	N/A	N/A	193.61	68.51	0.85	17.73
Total Utility Incentives & Admin. (MM$)	N/A	N/A	N/A	N/A	N/A	170.86	56.64	0.24	14.76
CSE ($/therm)	N/A	N/A	N/A	N/A	N/A	0.51	0.11	0.02	0.26
Energy Savings in 2011 (MMtherm/yr)	N/A	N/A	N/A	N/A	N/A	16.46	57.35	5.34	6.05

Table VI-18 Continued

TECHNOLOGY FORCING SCENARIO

SCE	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	888.56	198.71	23.62	1047.71	69.07	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	860.54	198.14	21.73	1043.93	60.10	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.059	0.046	0.025	0.026	0.024	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	1278.77	410.70	238.51	5076.23	542.79	N/A	N/A	N/A	N/A
CSP ($/KW)	146.22	176.33	159.56	132.42	207.51	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	511.25	106.12	36.93	981.73	60.97	N/A	N/A	N/A	N/A

LADWP	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	339.49	63.00	10.32	355.57	19.23	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	329.67	62.76	9.50	353.60	16.67	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.053	0.041	0.027	0.025	0.024	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	535.49	147.20	96.41	1972.05	150.84	N/A	N/A	N/A	N/A
CSP ($/KW)	129.72	155.40	179.09	128.95	209.12	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	214.69	38.50	14.54	377.26	17.01	N/A	N/A	N/A	N/A

BGP	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	41.51	7.54	1.07	43.08	2.12	N/A	N/A	N/A	N/A
Total Utility Incentives & Admin. (MM$)	40.28	7.51	0.99	42.85	1.80	N/A	N/A	N/A	N/A
CSE ($/kWh)	0.052	0.040	0.025	0.025	0.025	N/A	N/A	N/A	N/A
Energy Savings in 2011 (gWh/yr)	66.78	18.05	10.87	236.49	15.82	N/A	N/A	N/A	N/A
CSP ($/KW)	129.18	155.13	162.03	130.55	218.19	N/A	N/A	N/A	N/A
Load Savings in 2011 (MW)	26.65	4.63	1.67	45.27	1.79	N/A	N/A	N/A	N/A

SCG	COOLING	VENT	MISC	LIGHT	REF	HEATING	DHW	POOL	COOKING
Total 1992-2011 Investment (MM$)	N/A	N/A	N/A	N/A	N/A	197.11	74.04	0.85	18.75
Total Utility Incentives & Admin. (MM$)	N/A	N/A	N/A	N/A	N/A	175.18	61.39	0.24	16.22
CSE ($/therm)	N/A	N/A	N/A	N/A	N/A	0.523	0.116	0.021	0.272
Energy Savings in 2011 (MMtherm/yr)	N/A	N/A	N/A	N/A	N/A	16.64	59.71	5.48	6.37

Enduse Key:

COOLING	Space cooling	HEATING	Space heating
VENT	Space ventilation	DHW	Direct hot water heating
MISC	Miscellaneous	POOL	Gas pool heat
LIGHT	Lighting	COOKING	Commercial cooking
REF	Refrigeration,freezers,chillers		

The information in the tables may be used to give rough estimates of the relative value of DSM. For example, in Table VI-18 under the Utility Incentives scenario, it is shown that SCE would spend $990.52 million over the 20-year forecast period on commercial lighting efficiency incentives and administrative costs, out of a total cost of $995.64 million to all parties (including some non-incentive purchases, at a much lower market share). Energy and load savings for year 2011 are 4,987 GWh and 969 MW, respectively. Using an estimate of 6.5 cents per kWh and $55.65 per kW-yr as avoided costs to SCE in constant 1990 dollars results in total annual savings for 2011 of about $378 million. This amount would recover the total (undiscounted) cash outlay of $991 million for utility incentives during the 20 year period in 2.6 years, beginning in 2011. This example is meant to show broad relative economics among end-uses and utility service areas in the District. A utility would extend such analysis to include net present value estimates of total proposed DSM plans, discounting the cash flows as well as energy savings over time.

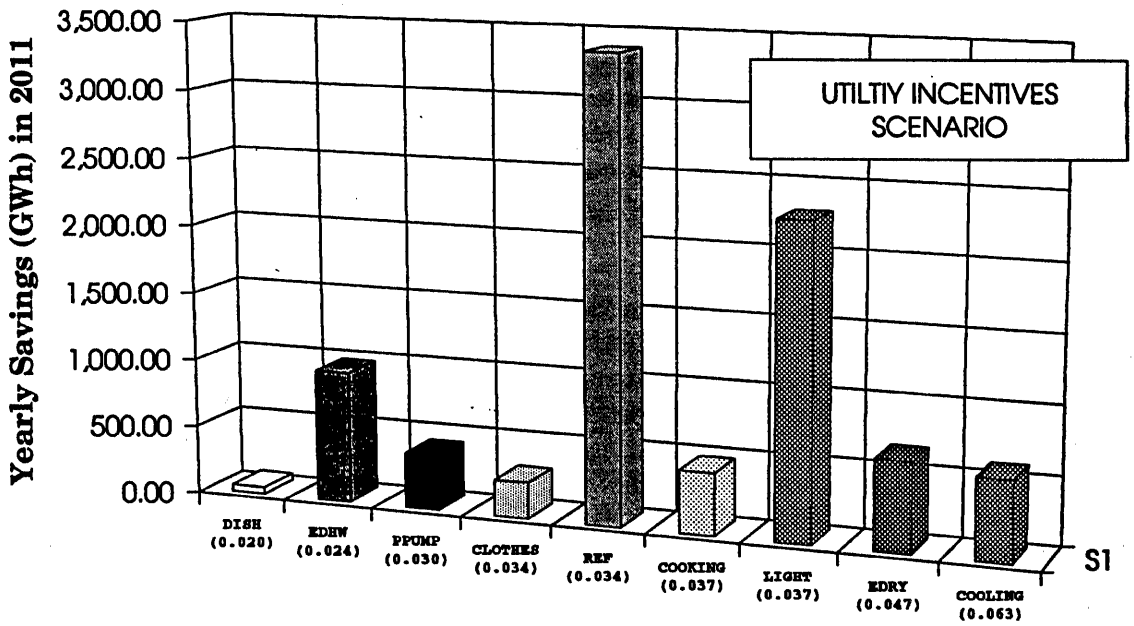
The cost of saved energy (CSE) and cost of saved power (CSP) rows of the tables show the output of the model's calculation of the relative economics of energy efficiency investments within the end-use categories shown in the tables. For the SCE commercial lighting Utility Incentives example, the CSE was $0.025/kWh and $129 per kW. These would be compared to the utility's avoided cost, considered to be $$0.065/kWh and $55.65 per kW-yr, or a total avoided cost of $506, using a (real) capital recovery factor of 0.11. Thus, the commercial lighting measures appear to be extremely cost-effective as an alternative to supply-side measures. In contrast, commercial cooling measures, while still economical, offer less return than lighting, with a simple payback of about 6 years starting in 2011 using the same assumptions as for lighting.

2. Residential Sector Financial Impacts

As shown in Table VI-17, electric utility results for the Utility Incentives and Technology Forcing scenarios are almost identical except for space cooling, indicating that there is not much advantage to lowering the TRC threshold. The gas utility (SCG) results, however, show about 50 percent greater savings by going down to a 0.7 value of TRC as a buy-down threshold. This indicates that while most of the electric DSM measures which are known (and exist in the model) are cost-effective at or above a TRC of 1.0, and thus would not be affected by a policy of lowering of the TRC, there are more marginal natural gas DSM measures that would benefit from any policy which effectively lowers the TRC.

Figure VI-26 shows the cost-effectiveness of the residential measures for the SCE results, which were about the same across all of the electric utilities. This chart is arranged from left to right in order of increasing CSE (decreasing profitability of DSM packages applied to the end use categories), while the vertical axis shows the total energy savings from the Frozen Efficiency baseline. As is clear form this chart, residential lighting and refrigeration DSM measures provide the greatest opportunity for savings for the District region. Potential savings from refrigeration are about 35 percent of total energy use and potential savings from lighting are about 30 percent of the total. In terms of cost-effectiveness, dishwashing has the lowest CSE ($0.02/kWh) but offers relatively little savings, followed by pool pumps, clothes washing, refrigeration, cooking, lighting, clothes drying, and space cooling. All of these show an average CSE of less than

Figure VI-26 Economics of Residential DSM Technologies for the Southern California Edison Service Area



Energy Service Class
(CSE $/kWh)

$0.04/kWh. Some of these measures show an even lower CSE in the utility incentives scenario. Note that with space cooling (COOLING) and space heating (HEAT) the CSE with and without the combined effect of each is provided in Table VI-17, but that only the cooling-only figure ($0.14) is shown on the figure. The sizeable difference shows the importance of not treating cooling or heating end uses in isolation. Separately, neither shows much promise in terms of being cost-effective, whereas together the combined effects are adequate to make such measures moderately cost-effective.

Only space cooling (COOLING), gas heating (HEAT), and gas hot water heating (GDHW) show much increase in savings and cost for the Technology Forcing scenario. For the most part, all other end uses approach their maximum return under the Utility Incentives scenario. This shows that the policies implied in the Technology Forcing scenario --- reducing the TRC test threshold below a value of 1.0 --- will not achieve much for the residential sector.

3. Commercial Sector Financial Impacts

Table VI-18 and Figure VI-27 show the commercial sector financial results. As is clear from Figure VI-27, commercial lighting measures dominate all other end uses. They produce a very high fraction of overall commercial sector savings (about 73 percent), which occur at a relatively low CSE ($0.025/kWh). For natural gas, DHW measures dominate (75 percent of total savings). Commercial refrigeration is the next most robust end use in terms of low cost and potential savings, followed by space cooling (COOLING), miscellaneous (MISC, which includes electronic office equipment), and commercial ventilation (VENT).

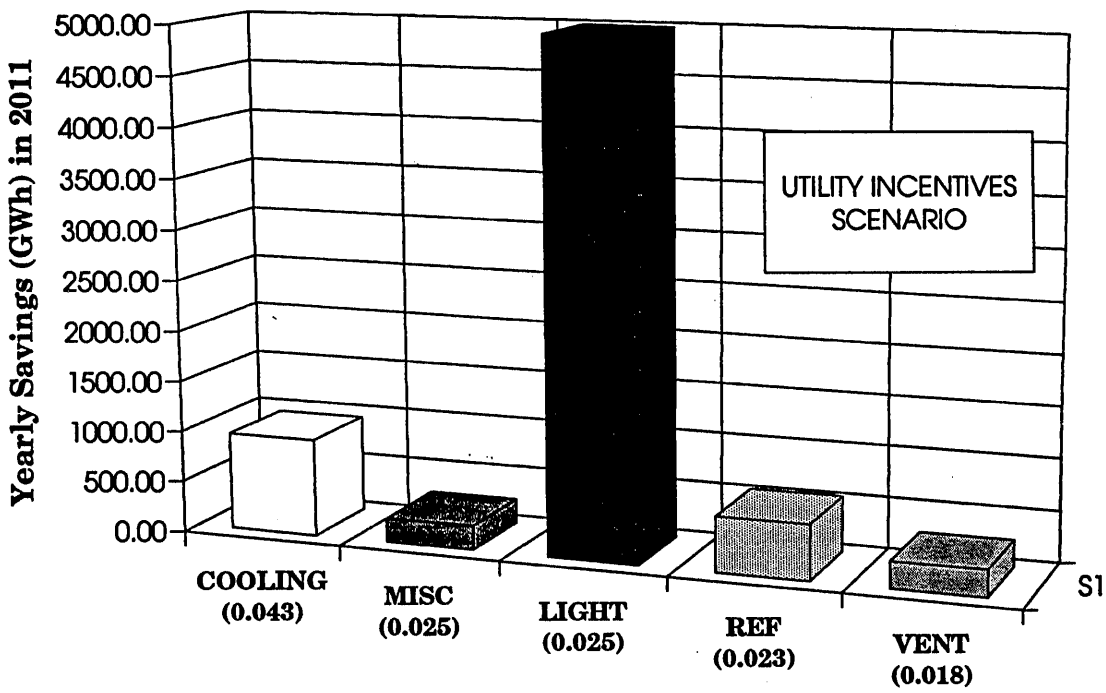
As with the residential sector, commercial sector results show that the extra incentives offered under the Technology Forcing scenario only impact the space cooling ESC. All other end uses are close to full potential under the Utility Incentives scenario. Due to the complexity of the commercial model, CSEs for COOLING and HEATING are calculated separately (i.e., only including individual costs and benefits), and therefore show DSM measures for COOLING and HEATING as being less cost-effective than they would have been had crossover effects been included as in the residential analysis. We estimate that the cooling CSEs would be lower by about 40 percent to 50 percent had both effects been included.

4. Industrial Sector Financial Impacts

As mentioned in the model description section of the report, the lack of good data on industrial individual end uses by SIC code makes the sector more difficult to evaluate in terms of specific DSM measures than either the residential or commercial sectors. The LIEF model uses a "top-down" approach with some "bottom-up" features such as the conservation supply curve (CSC).

Table VI-19 shows the industrial sector financial results. As the table shows, industrial sector energy savings results across the three scenarios show steady incremental savings (a not-so-obvious rate of diminishing returns) per dollar of investment than for the other sectors. In particular, the Technology Forcing scenario, defined in the LIEF model as a greater penetration for DSM, shows greater savings than in the commercial and residential sectors. Dr. Marc Ross, principal author of LIEF, when

Figure VI-27 Economics of Commercial DSM Technologies for the Southern California Edison Service Area



Energy Service Class
(CSE $/kWh)

Table VI-19 Industrial Financial Impacts by Utility and Energy Service Class

Industrial efficiency investment 1992-2011
Energy savings and cost of saved energy in 2011.
Differences from Frozen Efficiency baseline
Constant 1990 dollars

SCE	MARKET POTENTIAL	UTILITY INCENTIVES	TECHNOLOGY FORCING
Total 1992-2011 Investment (MM$)	400.95	984.41	1,133.76
Total Utility Incentives & Admin. (MM$)	-	-	-
CSE ($/kWh)	-	-	-
Energy Savings in 2011 (gWh/yr)	2,741	5,711	6,549
CSP ($/KW)	-	-	-
Load Savings in 2011 (MW)	437	910	1043

LADWP	MARKET POTENTIAL	UTILITY INCENTIVES	TECHNOLOGY FORCING
Total 1992-2011 Investment (MM$)	57.60	141.42	162.87
Total Utility Incentives & Admin. (MM$)	-	-	-
CSE ($/kWh)	-	-	-
Energy Savings in 2011 (gWh/yr)	394	820	941
CSP ($/KW)	-	-	-
Load Savings in 2011 (MW)	70	146	168

BGP	MARKET POTENTIAL	UTILITY INCENTIVES	TECHNOLOGY FORCING
Total 1992-2011 Investment (MM$)	6.50	15.96	18.39
Total Utility Incentives & Admin. (MM$)	-	-	-
CSE ($/kWh)	-	-	-
Energy Savings in 2011 (gWh/yr)	45	93	106
CSP ($/KW)	-	-	-
Load Savings in 2011 (MW)	9	18	21

SCG	MARKET POTENTIAL	UTILITY INCENTIVES	TECHNOLOGY FORCING
Total 1992-2011 Investment (MM$)	329.07	730.80	864.03
Total Utility Incentives & Admin. (MM$)	-	-	-
CSE ($/therm)	-	-	-
Energy Savings in 2011 (MMtherm/yr)	397	787	902

told of these preliminary results, indicated that this result is commonly found in running the model in other areas of the country and that it appears to show that there is more room for savings in the industrial sector dollar of investment, especially in the area of new technology for manufacturing.

No CSE values were calculated and no disaggregation by end-use is provided due to the present limitations of the LIEF model. (DOE, which has funded the development of LIEF, is reported to be adding new features to the model as funding becomes available.)