APPENDICES A-J

A. Results from the ERT: Evaluated Energy Savings at the Program-Level

The summary results provided in this appendix are the result of updating specific savings parameters for each of the records in the program tracking data based on evaluated results where available, other evaluation and DEER where applicable or the original IOU reported values where no update was available. The ERT process, and the guidance provided to contractors to apply the updates are described in the report. The detailed justification for every parameter update is in Appendix C.

In these tables:

- Both reported and evaluated savings are net, reflecting the incremental impact of these programs.
- The cost effectiveness ratios are provided on the reported net basis as well as the evaluated net basis.
- The final column identifies the evaluation group that was responsible for the updates to that program, and in most cases the direct evaluation of that program.

Pacific Gas and Electric Program Level Results

	Net Reported					Net Evaluated					Net Reported		Net Evaluated		
	Annual			Lifecycle		Annual			Lifecycle						
Program ID	MWh	MW	Therms	MWh	Therms	MWh	MW	Therms	MWh	Therms	TRC	PAC	TRC	PAC	Evaluation Group
PGE2000	536,518	74	-3,608	3,675,550	-5,989	415,309	51	-7,847	2,985,793	-45,502	1.36	1.85	1.68	2.30	Res
PGE2001	45,045	7	1,085	682,392	19,221	30,180	4	1,315	459,373	23,757	2.29	3.02	1.79	2.39	PGE_Ag
PGE2002	3,841	2	144	58,403	2,549	3,841	2	144	58,403	2,549	1.09	1.08	1.09	1.08	ComFac
PGE2003	16,833	3	15	250,833	251	14,935	2	22	224,346	350	2.56	2.92	2.31	2.67	SmallCom
PGE2004	75,568	10	15,466	1,059,835	237,999	32,485	4	4,362	457,765	69,666	3.79	6.78	1.27	2.31	PGE_Ind
PGE2005	44,087	5	320	503,032	4,717	44,087	5	320	503,032	4,717	2.01	2.82	2.01	2.82	ComFac
PGE2006	3,560	0	128	46,607	1,623	2,702	0	143	38,713	2,076	1.12	1.32	1.03	1.23	ComFac
PGE2007	18,229	4	290	272,170	4,022	18,229	4	290	272,170	4,022	1.24	1.33	1.24	1.33	ComFac
PGE2008	889	0	57	13,666	1,025	889	0	57	13,666	1,025	0.67	0.71	0.67	0.71	ComFac
PGE2009	744	1	117	13,464	2,222	744	1	117	13,464	2,222	0.46	0.57	0.46	0.57	NCCS
PGE2015	5,385	1	55	74,825	663	5,208	1	50	73,593	625	1.67	2.29	1.60	2.20	LGP
PGE2016	3,714	1	-8	34,360	-66	3,701	1	-4	41,116	-40	0.87	0.87	0.97	0.98	SmallCom
PGE2017	3,858	1	-45	36,869	-397	3,092	1	-18	29,524	-73	0.72	0.83	0.58	0.68	LGP
PGE2018	1,136	0	75	16,253	1,199	1,093	0	70	14,772	1,158	0.63	0.65	0.57	0.59	LGP
PGE2019	4,248	1	63	53,955	961	4,248	1	63	53,955	961	2.11	2.23	2.11	2.23	LGP
PGE2020	22,586	4	-133	249,761	-1,885	22,586	4	-133	249,761	-1,885	1.71	2.06	1.71	2.06	ComFac
PGE2021	8,179	2	-117	92,309	-1,321	4,284	1	-24	52,858	-258	2.20	2.30	1.27	1.35	LGP
PGE2024	495	0	-6	5,866	-77	495	0	-6	5,866	-77	1.72	1.75	1.72	1.75	LGP
PGE2025	3,461	0	-9	21,050	-83	3,461	0	-9	21,049	-83	1.34	1.38	1.30	1.34	LGP
PGE2026	579	0	-6	6,830	-71	579	0	-6	6,830	-71	1.37	1.37	1.37	1.37	ComFac
PGE2027	4,093	1	-50	40,623	-483	4,093	1	-50	40,623	-483	1.10	1.22	1.10	1.22	LGP
PGE2028	2,672	0	-23	22,902	-170	2,672	0	-23	22,902	-170	1.21	1.29	1.21	1.29	LGP
PGE2029	16,140	3	58	158,949	693	16,140	3	58	158,949	693	1.61	1.94	1.61	1.94	ComFac
PGE2030	3,157	1	-24	40,311	-306	3,157	1	-24	40,311	-306	1.43	1.43	1.43	1.43	LGP
PGE2031	1,193	0	-12	10,852	-109	1,193	0	-12	10,852	-109	1.23	1.23	1.23	1.23	LGP
PGE2036	6,944	1	247	108,315	3,810	8,598	1	159	127,393	2,585	2.02	2.25	2.13	2.40	LGP
PGE2042	24,053	3	2,410	364,046	48,201	7,874	1	976	120,251	19,521	2.37	2.91	0.86	1.06	PGE_Ind
PGE2045	1,342	0	0	14,451	0	1,342	0	0	14,451	0	1.33	1.71	1.30	1.68	PGE_Ag
PGE2046	1,482	0	0	22,229	0	674	0	0	10,117	0	0.88	0.90	0.39	0.40	PGE_Ind
PGE2049	2,490	1	49	35,258	851	2,490	1	49	35,258	851	1.01	1.29	1.00	1.28	PGE_Ag
PGE2050	295	0	22	1,857	452	295	0	22	1,857	452	0.78	0.81	0.78	0.81	ComFac

	Net Reported					Net Evaluated					Net Reported		Net Evaluated		
	Annual			Lifecycle		Annual			Lifecycle						
Program ID	MWh	MW	Therms	MWh	Therms	MWh	MW	Therms	MWh	Therms	TRC	PAC	TRC	PAC	Evaluation Group
PGE2051	12,986	2	0	119,149	0	12,986	2	0	119,149	0	1.64	1.84	1.64	1.84	SmallCom
PGE2052	6,450	1	48	57,132	478	5,468	1	34	47,296	342	1.16	1.50	0.94	1.23	ComFac
PGE2054	10,652	3	-81	130,166	-873	7,142	2	-25	106,288	-354	2.80	3.33	2.05	2.46	SmallCom
PGE2058	43,647	4	0	654,700	0	15,597	1	0	233,948	0	3.53	4.65	1.24	1.66	PGE_Ind
PGE2059	729	0	136	12,863	2,372	729	0	136	12,863	2,372	0.93	0.91	0.93	0.91	NCCS
PGE2060	5,305	2	0	74,303	0	5,305	2	0	74,303	0	1.50	1.50	1.50	1.50	SmallCom
PGE2061	256	0	335	4,093	5,352	256	0	335	4,093	5,352	5.53	6.76	5.53	6.76	SpecCom
PGE2063	4,204	0	0	44,848	0	4,204	0	0	44,848	0	1.32	1.39	1.32	1.39	ComFac
PGE2064	1,499	0	218	23,547	3,268	761	0	78	11,908	1,166	1.04	3.07	0.43	1.28	PGE_Ind
PGE2066	23,056	2	-4	325,183	-127	23,056	2	-4	325,183	-127	3.15	3.87	3.15	3.87	ComFac
PGE2068	10,840	0	37	83,639	246	7,362	1	37	57,055	246	1.68	1.76	1.20	1.27	SpecCom
PGE2070	1,572	0	0	21,471	0	715	0	0	9,762	0	1.28	1.63	0.57	0.73	RCx
PGE2072	199	0	0	2,389	0	91	0	0	1,086	0	0.21	0.21	0.09	0.09	RCx
PGE2074	9,275	1	-18	136,483	-197	9,275	1	-18	136,483	-197	1.97	2.51	1.97	2.51	SmallCom
PGE2077	2,865	0	159	25,635	2,522	2,865	0	159	25,635	2,522	1.60	2.00	1.60	2.00	ComFac
PGE2079	5,028	0	0	80,443	0	5,028	0	0	80,443	0	1.84	3.47	1.81	3.46	PGE_Ag
PGE2080	257,021	52	-40	1,637,319	9,791	129,959	29	1,755	944,163	13,930	1.85	2.86	1.24	1.99	SmallCom
PGE2081	5,223	1	0	78,349	0	2,399	0	0	35,978	0	2.66	3.69	1.19	1.67	PGE_Ind
PGE2084	5,342	1	0	80,130	0	2,486	0	0	37,289	0	1.47	1.77	0.67	0.81	PGE_Ind
PGE2087	174	0	691	2,603	12,097	82	0	249	1,223	4,366	1.84	2.52	0.66	0.91	PGE_Ind
PGE2089	1,450	0	-23	15,390	-268	1,450	0	-23	15,390	-268	1.95	1.32	1.95	1.32	SmallCom
PGE2090	201	0	23	603	70	91	0	13	274	40	0.42	0.47	0.21	0.24	RCx
PGE2091	3,782	0	149	17,385	447	1,719	0	85	7,905	255	1.36	2.28	0.64	1.08	RCx
PGE2092	1,416	2	0	14,159	0	1,416	2	0	14,159	0	2.64	2.55	2.64	2.55	Res
PGE2093	1,023	0	0	16,366	0	1,023	0	0	16,366	0	1.20	1.02	1.20	1.02	Res
PGE2094	2,332	0	0	33,041	0	1,139	0	0	15,219	0	1.88	2.48	0.84	1.12	RCx
PGE2095	1,123	0	-10	12,078	-114	1,123	0	-10	12,078	-114	1.17	1.17	1.17	1.17	LGP
PGE2023	4,765	1	44	58,432	692	4,765	1	44	58,432	692	1.21	1.63	1.21	1.63	PassThru
PGE2034	1,037	0	0	9,398	0	1,037	0	0	9,398	0	0.67	0.71	0.67	0.71	PassThru

Southern California Edison Program Level Results

	Net Reported					Net Evaluated					Net Reported		Net Evaluated		
	Annual			Lifecycle		Annual			Lifecycle						
Program ID	MWh	MW	Therms	MWh	Therms	MWh	MW	Therms	MWh	Therms	TRC	PAC	TRC	PAC	Evaluation Group
SCE2500	80,783	12	0	807,831	0	39,478	7	-692	191,856	-3,367	4.25	4.25	0.98	0.98	Res
SCE2501	654,058	105	0	3,839,056	0	439,398	57	-6,249	2,894,257	-40,853	4.26	5.39	3.88	4.91	Res
SCE2504	714	0	0	4,689	0	336	0	0	2,239	0	0.16	0.16	0.07	0.07	SpecCom
SCE2505	335	0	0	5,472	0	2,814	5	116	50,092	2,087	0.24	0.23	2.63	2.90	NCCS
SCE2507	25,015	17	0	199,263	0	19,790	14	0	147,331	0	0.74	1.58	0.53	1.12	Res
SCE2508	13,145	1	0	131,451	0	11,743	2	0	117,429	0	3.04	6.31	2.81	5.83	RCx
SCE2509	63,457	7	0	947,700	0	46,770	5	0	698,937	0	1.51	3.69	1.11	2.72	SCE_Ag_Ind
SCE2510	18,243	4	0	162,977	0	19,405	4	0	172,836	0	0.81	2.33	0.86	2.48	SCE_Ag_Ind
SCE2511	30,516	6	0	336,861	0	18,946	5	-55	255,190	-730	1.63	1.66	1.19	1.21	SmallCom
SCE2512	50,363	10	0	816,085	0	45,128	10	336	726,469	5,598	10.72	5.44	10.41	10.17	NCCS
SCE2517	176,666	30	0	2,036,186	0	129,665	24	-339	1,687,174	-5,146	1.37	3.64	1.11	2.94	MajCom
SCE2519	1,209	0	0	17,784	0	1,209	0	0	17,784	0	0.66	1.35	0.66	1.35	LGP
SCE2520	57	0	0	373	0	57	0	0	373	0	0.08	0.08	0.08	0.08	LGP
SCE2521	623	0	0	5,611	0	623	0	0	5,611	0	1.10	1.15	1.10	1.15	LGP
SCE2522	238	0	0	3,560	0	238	0	0	3,560	0	0.42	0.73	0.42	0.73	LGP
SCE2524	1,572	0	0	13,676	0	1,572	0	0	13,676	0	1.62	1.70	1.62	1.70	LGP
SCE2525	605	0	0	7,987	0	605	0	0	7,987	0	0.71	0.92	0.71	0.92	LGP
SCE2526	3,440	0	0	43,359	0	2,406	0	0	31,102	0	0.12	1.58	0.09	1.12	LGP
SCE2527	1,365	0	0	11,590	0	1,365	0	0	11,590	0	0.74	1.48	0.74	1.48	LGP
SCE2528	1,672	0	0	16,023	0	1,672	0	0	16,023	0	2.64	2.77	2.53	2.65	LGP
SCE2529	2	0	0	33	0	2	0	0	33	0	0.01	0.01	0.01	0.01	LGP
SCE2530	6,832	1	0	81,511	0	5,150	1	-12	61,354	-127	0.60	1.42	0.45	1.08	LGP
SCE2537	2,503	0	0	37,799	0	2,503	0	0	37,799	0	1.27	2.62	1.27	2.62	SpecCom
SCE2544	888	0	0	11,447	0	888	0	0	11,447	0	1.03	1.00	1.03	1.00	SmallCom
SCE2557	14	0	0	273	0	14	0	0	273	0	2.02	8.18	2.02	8.18	NCCS
SCE2560	313	0	0	3,363	0	313	0	0	3,363	0	0.33	0.64	0.34	0.66	MajCom
SCE2561	1,120	1	0	7,690	0	1,205	1	0	8,543	0	1.59	1.59	1.82	1.82	SpecCom
SCE2566	10,565	4	0	79,362	0	6,580	1	-1	57,005	-7	1.07	1.26	0.65	0.77	LGP
SCE2568	70	0	0	458	0	70	0	0	458	0	0.30	0.30	0.30	0.30	LGP
SCE2569	651	0	0	8,426	0	651	0	0	8,426	0	1.25	1.61	1.25	1.61	LGP
SCE2570	141	0	0	330	0	141	0	0	330	0	1.28	1.28	1.28	1.28	LGP

	Net Reported					Net Evaluated					Net Reported		Net Evaluated		
	Annual			Lifecycle		Annual			Lifecycle						
Program ID	MWh	MW	Therms	MWh	Therms	MWh	MW	Therms	MWh	Therms	TRC	PAC	TRC	PAC	Evaluation Group
SCE2571	11	0	0	170	0	11	0	0	170	0	0.06	0.06	0.06	0.06	LGP
SCE2573	1,463	0	0	21,401	0	1,463	0	0	21,401	0	0.55	2.91	0.55	2.91	LGP
SCE2558	74	0	0	1,094	0	74	0	0	1,094	0	0.25	0.26	0.25	0.26	NCCS
SCE2572	404	0	0	1,616	0	404	0	0	1,616	0	0.22	0.64	0.22	0.64	PassThru
SCE2575	343	0	0	6,113	0	343	0	0	6,113	0	0.83	2.55	0.83	2.55	PassThru
SCE2576	10	0	0	154	0	10	0	0	154	0	0.01	0.27	0.01	0.27	PassThru
SCE2577	1,072	0	0	13,247	0	1,072	0	0	13,247	0	3.32	4.93	3.32	4.93	PassThru
SCE2578	507	0	0	4,798	0	507	0	0	4,798	0	1.00	1.36	1.00	1.36	PassThru
SCE2579	213	0	0	2,180	0	213	0	0	2,180	0	0.92	1.94	0.92	1.94	PassThru

San Diego Gas and Electric Program Level Results

	Net Reported					Net Evaluated					Net Reported		Net Evaluated		
	Annual			Lifecycle		Annual			Lifecycle						
Program ID	MWh	MW	Therms	MWh	Therms	MWh	MW	Therms	MWh	Therms	TRC	PAC	TRC	PAC	Evaluation Group
SDGE3001	708	0	4	10,212	78	304	0	3	4,383	68	0.57	1.92	0.27	0.90	LGP
SDGE3006	1,361	0	-18	13,816	-141	1,182	0	-14	12,624	-116	1.02	1.23	0.88	1.06	Res
SDGE3007	270	0	21	4,423	403	449	0	36	7,248	590	0.44	0.45	0.66	0.67	NCCS
SDGE3010	38,657	5	189	579,850	2,840	28,650	4	248	359,079	3,714	2.40	2.83	1.64	1.94	MajCom
SDGE3012	54,875	10	15	449,020	316	27,170	5	90	242,045	474	4.01	5.79	2.60	3.78	SmallCom
SDGE3016	60,477	8	-395	412,616	-2,610	51,547	7	-592	396,281	-3,832	5.77	8.89	9.94	16.00	Res
SDGE3017	2,377	1	513	32,659	5,128	2,400	0	478	31,828	4,794	2.11	2.76	2.02	2.65	Res
SDGE3020	106,444	22	117	947,529	3,980	80,784	16	-43	832,419	-652	3.74	6.02	3.65	5.90	SmallCom
SDGE3023	0	0	137	0	1,512	248	0	31	2,731	342	1.24	1.44	0.67	0.78	LGP
SDGE3024	5,583	2	637	59,351	7,029	4,040	1	497	43,055	5,346	0.88	1.61	0.95	1.75	Res
SDGE3025	5,766	1	136	80,951	2,034	7,517	1	28	99,966	428	1.30	3.09	1.47	3.52	MajCom
SDGE3026	13,556	2	306	145,864	3,090	5,862	0	195	63,396	1,967	2.45	6.31	1.15	2.98	LGP
SDGE3028	17,025	2	0	83,637	0	8,641	2	-144	41,708	-699	2.31	2.57	0.98	1.11	Res
SDGE3029	8,084	6	0	86,852	0	6,852	4	0	68,366	0	1.47	4.65	0.99	3.19	SpecCom
SDGE3030	156	0	0	2,306	0	156	0	0	2,306	0	11.57	-74.45	11.57	-74.45	SmallCom
SDGE3034	0	0	51	0	761	0	0	51	0	761	2.84	2.07	2.84	2.07	SpecCom
SDGE3035	581	0	19	6,718	264	475	0	11	5,109	138	0.53	0.54	0.37	0.37	Res
SDGE3039	2,388	0	110	7,681	355	2,388	0	110	7,681	355	0.95	0.94	0.95	0.94	SmallCom
SDGE3042	0	0	1	0	11	0	0	1	0	11	1.12	3.85	1.12	3.85	SmallCom
SDGE3043	24,038	15	60	161,253	1,091	18,419	11	55	110,631	553	18.67	10.03	13.42	8.72	SpecCom
SDGE3049	308	0	152	3,080	1,517	308	0	152	3,080	1,517	3.84	5.43	3.84	5.43	Res
SDGE3050	3,861	4	1,427	41,645	15,297	3,861	4	1,427	41,645	15,297	3.70	14.19	3.70	14.19	SmallCom
SDGE3053	1,847	0	32	21,501	631	1,847	0	32	21,501	631	1.76	2.36	1.76	2.36	SmallCom
SDGE3054	1,827	1	21	23,058	209	1,854	1	26	23,559	261	1.90	2.01	1.97	2.08	MajCom
SDGE3002	130	0	0	256	0	130	0	0	256	0	0.02	0.02	0.02	0.02	PassThru
SDGE3003	989	0	0	14,841	0	989	0	0	14,841	0	2.84	2.16	2.84	2.16	PassThru
SDGE3005	387	0	0	2,916	0	387	0	0	2,916	0	0.15	0.16	0.15	0.16	PassThru
SDGE3027	4,658	1	70	46,581	700	4,658	1	70	46,581	700	3.13	4.32	3.13	4.32	PassThru
SDGE3044	274	0	34	5,475	684	274	0	34	5,475	684	53.15	79.69	53.15	79.69	PassThru
SDGE3045	15,115	3	39	279,891	822	10,516	1	30	157,738	444	26.80	7.40	13.14	13.14	NCCS
SDGE3047	1,799	0	0	15,699	0	1,799	0	0	15,699	0	0.90	0.90	0.90	0.90	PassThru

	Net Reported					Net Evaluated					Net Reported		Net Evaluated		
	Annual			Lifecycle		Annual			Lifecycle						
Program ID	MWh	MW	Therms	MWh	Therms	MWh	MW	Therms	MWh	Therms	TRC	PAC	TRC	PAC	Evaluation Group
SDGE3055	1,136	0	88	11,835	879	1,136	0	88	11,835	879	0.57	0.57	0.57	0.57	PassThru

SoCal Gas Program Level Results

	Net Reported					Net Evaluated					Net Reported		Net Evaluated		
	Annual			Lifecycle		Annual			Lifecycle						
Program ID	MWh	MW	Therms	MWh	Therms	MWh	MW	Therms	MWh	Therms	TRC	PAC	TRC	PAC	Evaluation Group
SCG3502	650	1	79	12,554	1,519	1,096	1	85	19,310	1,500	0.45	0.64	0.53	0.77	NCCS
SCG3507	0	0	7,097	0	69,600	13	0	8,072	66	51,376	8.32	9.95	7.01	8.40	SmallCom
SCG3510	3	0	180	69	2,068	3	0	180	69	2,076	1.06	1.37	1.07	1.39	Res
SCG3513	0	0	1,367	0	24,262	0	0	969	0	16,238	0.93	1.63	0.63	1.11	MajCom
SCG3517	830	0	1,231	16,601	17,578	351	0	828	7,020	11,860	0.92	1.39	0.60	0.91	Res
SCG3518	0	0	87	0	1,735	186	0	116	3,711	2,327	0.80	1.63	1.34	2.72	LGP
SCG3519	0	0	38	0	380	0	0	38	0	380	1.46	1.82	1.46	1.82	LGP
SCG3520	0	0	80	0	801	424	0	107	4,241	1,075	0.06	1.21	0.13	2.64	LGP
SCG3539	0	0	83	0	1,115	0	0	63	0	757	0.23	0.24	0.16	0.17	Res
SCG3542	0	0	2,385	0	35,800	0	0	1,245	0	18,675	20.31	8.91	10.49	10.49	NCCS
SCG3543	83	0	47	833	482	95	0	54	952	547	0.34	0.35	0.50	0.52	LGP
SCG3544	0	0	65	0	979	0	0	65	0	979	1.62	1.32	1.62	1.32	SpecCom
SCG3546	33	0	250	501	3,756	33	0	250	334	2,504	2.94	2.91	2.21	2.21	PassThru
SCG3547	0	0	486	0	4,856	0	0	486	0	4,856	6.69	-57.88	6.69	-57.88	Res
SCG3550	0	0	647	0	6,476	0	0	647	0	6,476	1.17	1.86	1.17	1.86	Res
SCG3525	1	0	4	6	37	1	0	4	6	37	0.37	0.37	0.37	0.37	PassThru
SCG3528	0	0	144	0	2,166	0	0	144	0	2,166	2.58	5.14	2.58	5.14	PassThru
SCG3534	0	0	81	0	811	0	0	81	0	811	0.81	0.81	0.81	0.81	PassThru
SCG3548	0	0	293	0	3,224	0	0	293	0	3,224	2.74	3.87	2.74	3.87	PassThru

B. Description of HVAC Interactive Effects Factors

The approach that was applied in the 2009 updates was the same as that used in 2006-2008, and is described in this appendix.

The interior building load reduction/increase due to a measure installation in a facility can interact with the heating, ventilating and air-conditioning (HVAC) system, resulting in changes in the consumption of electricity or gas. These HVAC interactive effects can result in positive or negative changes in consumption, and can cross fuel types and energy/demand categories.

Measures causing HVAC interactions primarily include lighting and appliances located within a conditioned space. The impact of HVAC interactions on measure savings were presented in the first two verification reports. Through a series of parametric runs of the VRT software, savings estimates with and without HVAC interactive effects were prepared. This same set of parametrics was applied to the final energy savings calculations within the ERT, but was limited to applications for prescriptive measures. Interactive effects for whole building, custom or process measures were captured in the evaluation measurement and verification work. Only two scenarios of interactive effects are presented: with interactive effects includes both positive and negative effects and without interactive effects removes the interactive effects for prescriptive measure savings.

A series of annual interactive effects multipliers were prepared for a variety of measure types, building types, climate zones and HVAC system types. The annual interactive effects multipliers were derived from the DOE-2.2 simulations used to construct the 2008 DEER[1]. The interactive effect multipliers for the selected combination of parameters were calculated by climate zone and system type. Multipliers were developed for electricity (kWh/kWh), demand (kW/kW) and gas (therm/kWh).

The process for obtaining the multipliers was as follows:

1. A representative measure from DEER for each of the interactive effects categories (lighting, appliances and so on) was selected.

Measure category	DEER Measure ID	Description
Residential CFL	CFL-Int-7W-Rpl-Prim	7 watt screw in CFL replacing a xx watt incandescent
Residential Appliance	RefgFrzrRefRefg-900kWh-500kWh	Refrigerator or freezer replacement; 900 kWh/yr baseline, 500 kWh/yr measure
Commercial CFL	ILtg-FixtPwr-Sec-100wIncRef100w-25wCFLRefSMg25w	25 W CFL reflector replacing a 100 W incandescent reflector
Commercial Linear	ILtg-LFluor-Prim-RplLPD-	4 ft T-8 30 W energy saving lamp

[1] To better estimate interactive-effects, the ED DMQC Team, with assistance from the ED DEER Team, provided an interactive-effects spreadsheet for the ERT Team. Several heating and cooling system types were added to the DEER dataset, and air-conditioning and heating saturations were applied which mitigate the negative therms impact. Additionally, a couple of errors identified in the DEER 2008 analysis software tool were corrected.

Fluorescent	48in39wT12SMg60w-48in3g30wT8ESPISNEl27w	replacing a 4 ft T-12 standard lamp with standard magnetic ballast
Commercial Exit Signs	ILtg-Power-Exit-60pct	Exit sign with 60% power reduction

2. Data were extracted from MISer for each measure, building type, HVAC type and climate zone combination.

3. The end-use and whole building savings from the MISer database extract were compiled. The relevant fields in the MISer database are shown below:

Name	Description
ElecDem_D08	Demand : Whole Bldg Demand 2008 peak period (kW)
ElecDemD08_EU	Demand : Direct End Use Demand 2008 peak period (kW)
Imp_AnnualkWh	Impact : Annual electricity use (kWh)
Imp_AnnualkWh_EU	Impact : Annual electricity use - direct end use (kWh)
Imp_Annualtherm	Impact : Annual gas use (therm)

The HVAC interactive effects multipliers for kWh were calculated as follows:

$$HVAC_{kWh} = (Imp\_AnnualkWh - Imp\_AnnualkWh\_EU) / Imp\_AnnualkWh\_EU$$

The HVAC interactive effects multipliers for kW were calculated as follows:

$$HVAC_{kW} = (ElecDem\_D08 - ElecDem\_D08\_EU) / ElecDem\_D08\_EU$$

The HVAC interactive effects multipliers for therms were calculated as follows:

$$HVAC_{therm} = Imp\_Annualtherm / Imp\_AnnualkWh\_EU$$

The process for incorporating the multipliers was as follows:

1. Measures were mapped to appropriate measure type in the HVAC interactive effects tables. For residential buildings, HVAC interactive effects multipliers were developed for interior lighting and appliances, using simulations for CFLs and refrigerators/freezers. For commercial buildings, HVAC interactive effects multipliers were developed for CFLs, linear fluorescent lighting and exit signs. CFL measures used the CFL HVAC interactive effects multipliers, exit sign measures used the exit sign HVAC interactive effects multipliers, and all remaining interior lighting measures used the linear fluorescent interactive effects multipliers.

2. The climate zone where the building is located was identified in the standard program tracking database (SPTdb). This information, along with the IOU service territory was used to select the correct climate zone. If the climate zone was not known (as is the case with upstream lighting measures), the IOU average value was used. More detail about assigning climate zones for unknown cases is presented in the documentation of the SPTdb.

3. The appropriate DEER building type was identified from the DEER building type field in the SPTdb. More detail about assigning building type for unknown cases is presented in the documentation of the SPTdb. HVAC interactive effects multipliers were developed for each of the DEER building types shown below:

Residential Building Types with HVAC Interactive Effects Multipliers

Single Family Residential
Multi-Family Residential
Double Wide Mobile Home

Commercial Building Types with HVAC Interactive Effects Multipliers

Assembly	Manufacturing - Bio/Tech
Education - Primary School	Manufacturing - Light Industrial
Education - Secondary School	Office - Large
Education - Community College	Office - Small
Education - University	Restaurant - Sit Down
Education - Relocatable Classroom	Restaurant - Fast Food
Grocery	Retail - Multistory Large
Health/Medical - Hospital	Retail - Single-Story Large
Health/Medical - Nursing Home	Retail - Small
Lodging - Hotel	Storage - Conditioned
Lodging - Motel	

The SPTdb DEER building type is not populated for all records. In situations where the building type is unknown or set to "Average" or "Miscellaneous," a weighted average across the building types by program was used. See the individual measure sections for specific details on how the weighting factors were developed.

4. The HVAC system type from building characteristics data collected during the site M&V activities were used to select the correct HVAC interactive effects multipliers. HVAC interactive effects multipliers were developed for the following residential HVAC system types:

System Name	Description
GasPac	Central air conditioning system with gas furnace
HP	Central air source heat pump
ElecHeat	Electric resistance space heating only (no AC)
GasFurn	Gas furnace only (no AC)

HVAC interactive effects multipliers were developed for the following commercial HVAC system types:

System Name	Description
GasPac	Packaged rooftop AC unit with gas heat

HP	Packaged rooftop air source heat pump
PVAV	Packaged rooftop VAV system with zone level gas reheat
SVAV	Built-up VAV system with zone level gas reheat
WLHP	Water loop heat pump
PSZElec	Packaged rooftop AC unit with electric heat
PVAVElec	Packaged rooftop VAV system with zone level electric reheat
SVAVElec	Built-up VAV system with zone level electric reheat
ElecHeat	Electric resistance space heating only (no AC)
GasFurn	Gas furnace only (no AC)

If the HVAC system type was not known, a weighted average based on the saturation of HVAC system types in the participant population was used. The weights were derived from several sources: the Residential Appliance Saturation Study (RASS), the Commercial End-Use Survey (CEUS) and primary data collected during the course of the evaluation studies.

PG&E HVAC System Weights

Building Type	GasPac	HP	WLHP	PSZElec	ElecHeat	GasFurn	PVAV	SVAV	PVAVElec	SVAVElec	DX/Other	Unconditioned
Assembly	0.443	0.127	-	0.036	0.045	0.246	-	-	-	-	-	0.102
Education - Primary School	0.470	0.192	-	0.014	0.008	0.316	-	-	-	-	-	-
Education - Secondary School	0.435	0.177	-	0.013	0.007	0.293	0.066	0.008	0.001	0.000	-	-
Education - Community College	0.322	0.052	0.009	0.012	-	0.190	0.360	0.042	0.011	0.001	-	-
Education - University	0.330	0.053	-	0.012	-	0.190	0.360	0.042	0.011	0.001	-	-
Education - Relocatable Classroom	0.470	0.192	-	0.014	0.008	0.316	-	-	-	-	-	-
Grocery	0.498	0.137	-	0.027	0.271	0.047	-	-	-	-	-	0.021
Health/Medical - Hospital	0.351	0.117	-	0.046	0.000	0.246	0.197	0.023	0.018	0.002	-	0.001
Health/Medical - Nursing Home	0.351	0.117	-	0.046	0.000	0.246	0.197	0.023	0.018	0.002	-	0.001
Lodging - Hotel	0.213	0.194	0.038	0.115	0.082	0.187	0.121	0.014	0.031	0.004	-	-
Lodging - Motel	0.275	0.251	-	0.149	0.098	0.226	-	-	-	-	-	-
Manufacturing - Bio/Tech	0.441	0.127	0.004	0.036	0.045	0.246	-	-	-	-	-	0.102
Manufacturing - Light Industrial	0.443	0.127	-	0.036	0.045	0.246	-	-	-	-	-	0.102
Office - Large	0.201	0.091	0.059	0.004	0.019	0.152	0.420	0.049	0.004	0.001	-	-
Office - Small	0.312	0.273	0.017	0.038	0.077	0.230	0.045	0.005	0.003	0.000	-	-
Restaurant - Sit Down	0.514	0.083	-	0.013	0.142	0.151	-	-	-	-	-	0.097
Restaurant - Fast Food	0.514	0.083	-	0.013	0.142	0.151	-	-	-	-	-	0.097
Retail - Multistory Large	0.396	0.173	0.000	0.050	0.057	0.240	0.023	0.003	0.002	0.000	-	0.056
Retail - Single-Story Large	0.408	0.178	-	0.052	0.058	0.248	-	-	-	-	-	0.056
Retail - Small	0.408	0.178	-	0.052	0.058	0.248	-	-	-	-	-	0.056
Storage - Conditioned	0.365	0.280	-	0.003	0.136	0.174	-	-	-	-	-	0.043
Single Family Residential	0.4971	0.0286			0.0214	0.3729					0.046	0.034
Multi-Family Residential	0.3032	0.0436			0.0628	0.4365					0.063	0.091
Double Wide Mobile Home	0.5702	0.0815			0.0185	0.1298					0.163	0.037

SCE HVAC System Weights

Building Type	GasPac	HP	WLHP	PSZElec	ElecHeat	GasFurn	PVAV	SVAV	PVAVElec	SVAVElec	DX/Other	Unconditioned
Assembly	0.591	0.170	-	0.048	0.017	0.091	-	-	-	-	-	0.084
Education - Primary School	0.614	0.250	-	0.018	0.003	0.115	-	-	-	-	-	-
Education - Secondary School	0.548	0.223	-	0.016	0.003	0.102	0.031	0.075	0.001	0.002	-	-
Education - Community College	0.475	0.077	0.014	0.018	-	0.078	0.096	0.233	0.003	0.007	-	-
Education - University	0.487	0.079	-	0.018	-	0.078	0.096	0.233	0.003	0.007	-	-
Education - Relocatable Classroom	0.614	0.250	-	0.018	0.003	0.115	-	-	-	-	-	-
Grocery	0.593	0.163	-	0.032	0.090	0.016	-	-	-	-	-	0.106
Health/Medical - Hospital	0.439	0.146	-	0.057	0.000	0.086	0.072	0.176	0.007	0.016	-	-
Health/Medical - Nursing Home	0.439	0.146	-	0.057	0.000	0.086	0.072	0.176	0.007	0.016	-	-
Lodging - Hotel	0.285	0.260	0.051	0.154	0.030	0.070	0.035	0.085	0.009	0.022	-	-
Lodging - Motel	0.360	0.328	-	0.195	0.036	0.082	-	-	-	-	-	-
Manufacturing - Bio/Tech	0.588	0.169	0.005	0.047	0.017	0.091	-	-	-	-	-	0.084
Manufacturing - Light Industrial	0.591	0.170	-	0.048	0.017	0.091	-	-	-	-	-	0.084
Office - Large	0.265	0.120	0.078	0.005	0.007	0.056	0.135	0.329	0.001	0.003	-	-
Office - Small	0.407	0.355	0.022	0.050	0.028	0.083	0.015	0.036	0.001	0.002	-	0.001
Restaurant - Sit Down	0.711	0.114	-	0.018	0.054	0.058	-	-	-	-	-	0.045
Restaurant - Fast Food	0.711	0.114	-	0.018	0.054	0.058	-	-	-	-	-	0.045
Retail - Multistory Large	0.511	0.223	0.000	0.064	0.020	0.086	0.007	0.018	0.001	0.002	-	0.068
Retail - Single-Story Large	0.526	0.230	-	0.066	0.021	0.089	-	-	-	-	-	0.068
Retail - Small	0.526	0.230	-	0.066	0.021	0.089	-	-	-	-	-	0.068
Storage - Conditioned	0.491	0.376	-	0.003	0.051	0.065	-	-	-	-	-	0.013
Storage - Unconditioned	0.987	-	-	-	-	-	-	-	-	-	-	0.013
Warehouse - Refrigerated	0.888	-	-	-	-	-	-	-	-	-	-	0.112
Single Family Residential	0.6335	0.0364			0.0136	0.2365					0.058	0.022
Multi-Family Residential	0.4305	0.0619			0.0445	0.3092					0.090	0.064
Double Wide Mobile Home	0.5657	0.0808			0.0192	0.1343					0.162	0.038

SDG&E HVAC System Weights

Building Type	GasPac	HP	WLHP	PSZElec	ElecHeat	GasFurn	PVAV	SVAV	PVAVElec	SVAVElec	DX/Other	Unconditioned
Assembly	0.616	0.177	-	0.050	0.021	0.114	-	-	-	-	-	0.023
Education - Primary School	0.600	0.245	-	0.017	0.003	0.134	-	-	-	-	-	-
Education - Secondary School	0.561	0.229	-	0.016	0.003	0.126	0.009	0.055	0.000	0.001	-	-
Education - Community College	0.371	0.060	0.011	0.014	-	0.073	0.063	0.394	0.002	0.012	-	-
Education - University	0.380	0.062	-	0.014	-	0.073	0.063	0.394	0.002	0.012	-	-
Education - Relocatable Classroom	0.600	0.245	-	0.017	0.003	0.134	-	-	-	-	-	-
Grocery	0.571	0.157	-	0.031	0.103	0.018	-	-	-	-	-	0.121
Health/Medical - Hospital	0.427	0.142	-	0.056	0.000	0.099	0.035	0.218	0.003	0.020	-	-
Health/Medical - Nursing Home	0.427	0.142	-	0.056	0.000	0.099	0.035	0.218	0.003	0.020	-	-
Lodging - Hotel	0.276	0.251	0.049	0.149	0.035	0.081	0.018	0.109	0.005	0.028	-	-
Lodging - Motel	0.352	0.320	-	0.190	0.042	0.096	-	-	-	-	-	-
Manufacturing - Bio/Tech	0.612	0.176	0.005	0.049	0.021	0.114	-	-	-	-	-	0.023
Manufacturing - Light Industrial	0.616	0.177	-	0.050	0.021	0.114	-	-	-	-	-	0.023
Office - Large	0.340	0.154	0.100	0.006	0.011	0.085	0.042	0.259	0.000	0.003	-	-
Office - Small	0.421	0.367	0.023	0.051	0.035	0.103	-	-	-	-	-	-
Restaurant - Sit Down	0.727	0.117	-	0.018	0.067	0.071	-	-	-	-	-	-
Restaurant - Fast Food	0.727	0.117	-	0.018	0.067	0.071	-	-	-	-	-	-
Retail - Multistory Large	0.513	0.224	0.000	0.065	0.024	0.103	0.003	0.018	0.000	0.002	-	0.048
Retail - Single-Story Large	0.525	0.229	-	0.066	0.025	0.106	-	-	-	-	-	0.048
Retail - Small	0.525	0.229	-	0.066	0.025	0.106	-	-	-	-	-	0.048
Storage - Conditioned	0.483	0.370	-	0.003	0.060	0.077	-	-	-	-	-	0.007
Storage - Unconditioned	0.993	-	-	-	-	-	-	-	-	-	-	0.007
Warehouse - Refrigerated	1.000	-	-	-	-	-	-	-	-	-	-	-
Single Family Residential	0.4031	0.0232			0.0268	0.4669					0.037	0.043
Multi-Family Residential	0.3117	0.0448			0.0615	0.4280					0.065	0.089
Double Wide Mobile Home	0.3664	0.0523			0.0477	0.3336					0.105	0.095

Application to ERT

Measure savings are uploaded to the ERT parameter update tables as revised unit energy savings (UES) values. The ERT accepts updated UES values with and without interactive effects in the fields EDUESi, and EDUES respectively from the input files. Input file documentation also calls out the use of these interactive effects factors for any given program. Some of the custom lighting measure savings analyses have been conducted using a building energy simulation program, where the HVAC interactive effects are automatically included in the results. In these instances, the UES values are held constant for the interactive and non-interactive UES updates.

C. ERT Input Summary tables by Contract Group and documentation files

Appendix C is provided as a separate document due to size constraints.

D. Policy Direction on ED options for Extrapolating Results

Appendix A. Policy Direction on ED options for Extrapolating Results

D-07-09-043 , Section 8.4.2, p137

Finally, establishing where performance falls along the adopted penalty/earnings curve involves estimating load impacts, load shapes and (for calculating PEB) measure and program costs for an extensive number of programs and measures. In recognition that we may not have the resources to verify each parameter on an *ex post* basis for every program, our adopted EM&V protocols provide staff the flexibility to establish priorities for the EM&V efforts throughout the program cycle. In performing its EM&V duties, we clarify that staff or its evaluation contractors may utilize any or all of the following approaches in order to report an estimated PEB for those programs that do not receive an impact evaluation, as staff deems appropriate:

- Extrapolate findings from comparable programs to determine net resource benefits for programs that do not receive full impact evaluation; or
- Accept reported savings values for programs that do not receive impact evaluation; or
- Extrapolate savings findings from impact evaluations for comparable programs for some net resource benefit parameters and accept reported values for others; or
- Apply a discount factor to savings or costs from programs that do not receive impact evaluation based upon historic impact evaluation results for comparable programs.

Staff should describe the method(s) it uses to estimate PEB for those programs that do not receive an impact evaluation in the Final Performance Basis Report, which will be issued to obtain stakeholder input pursuant to the Attachment 7 procedures. In addition, Energy Division may need to prioritize resources for verifying measure installations and program costs over the program cycle, and may, as circumstances warrant, report the results of completed verification tasks in the Final Verification and Performance Basis Report. If such circumstances arise, Energy Division should describe in each Verification Report the additional verification activities that will be performed and reported later in the program cycle.

E. Requirement for the application of the DEER 2008 updates

D. 08-01-042 (Ordering Paragraph 3)

3. For the 2006-2008 program cycle, the following ex ante assumptions of energy savings and demand reductions ~~shall be used~~ in conjunction with verified installations and verified costs, shall be used as the basis for ~~to calculate~~ the 1st and 2nd Claims: [line out strike out per D.08-12-059; OP 11.]

(a) Except as otherwise provided for below, the ex ante measure savings parameters that are contained in the utilities' E3 calculators, as of the 4th quarter 2007 report for the 1st Claim and as of the 4th quarter 2008 report for the 2nd Claim.

(b) For measures contained in the Database for Energy Efficient Resources (DEER), the 2008 and 2009 DEER updates of ex ante measure savings parameters, including net-to-gross ratios and expected useful lives. The 2008 DEER update shall apply to the 1st Claim and the 2009 DEER update shall apply to the 2nd Claim.

(c) For customized measures or customized projects that represent aggregated measures in the E3 calculator, Energy Division shall identify the appropriate installed measure(s) based on its measure verification results and develop the associated ex ante load impact values. For this purpose, Energy Division may use the utilities' tracking system information, engineering work papers, DEER values and methods, or other current measurement and verification results that are available.

G. ERT Quality Control Activities

Several quality control (QC) checks were run and are documented as part of that effort. The QC team, consisting of Energy Division and a sub-group of its consultants, used the full table of ERT Input sheets to perform additional QC checks at multiple levels. The QC team's goal was a 100% match between the final evaluation reports and the numbers used in the ERT, the correct application of DEER EUL values, and the proper application of evaluation results to the UES and net to gross ratios used in the ERT. A description of the specific QC activities undertaken are discussed in this Appendix.

The QC team segregated its tasks into several distinct activities. :

- *Identifying Gross Errors in ERT Input sheets*- Energy Division required contractors to perform three distinct iterations of ERT application runs. In the first iteration, the QC team identified multiple errors that resulted from mistakes in the input files. These gross errors were fixed by iteration 2.

- *Comparing quantities reported in Final Evaluation Reports to ERT data*- A primary goal of the ERT process was to assure that the data in the ERT agreed with the results as documented in the Final Evaluation Reports. The QC team created a table of reported results from the Final Evaluations and then ran queries on the entire portfolio, rolled up by program and measure group. These queries comprise the core set of QC activities. The comparison focused primarily on gross realization rates and net to gross ratios for kW, kWh, and therms. These metrics were extracted from the contractor reports and compiled into a table. The results of the queries were used to compute the apparent gross realization rates and net to gross ratios for all records identified as updated through the evaluation studies. Due to differences in measure naming and target populations, these numbers seldom matched exactly. The magnitude of the discrepancy in the realization rates and net to gross ratios was multiplied by the ex-ante claim amount to estimate the potential swing in the reported savings. The QC team addressed all the deviations that represented a potential swing in any of the energy savings metrics of greater than 1% at the IOU level. As time ran out, the team stopped when the largest variation was ~.5%. A list of known deviations are in a spreadsheet filed with Appendix G.

- *Application of HVAC Interactive Effects*- The query results were used to identify which records had HVAC interactive effects multipliers applied, and the magnitude of the adjustments. Contractors were instructed to apply HVAC interactive effects multipliers to all interior lighting and appliance measures not subject to "whole building" analysis[2]. Although HVAC interactive effects were not applied to all interior lighting and appliance measures, the majority of the applicable measures were addressed. The savings reported with and without interactive effects were compared to estimate the apparent magnitude of the adjustments. The magnitude of the adjustments was compared to the HVAC interactive effects multipliers supplied to the contractors to identify potential misapplication of the HVAC

[2] Some lighting and/or appliance measures were analyzed with building energy simulation models, where the HVAC interactive effects are included in the analysis.

interactive effects multipliers. A list of the HVAC interactive effects adjustments is shown in Appendix B.

- *Comparing Record counts* - ED required evaluation contractors to declare each record on which they performed any evaluation activity. The QC team ran queries on the ERT Input sheets to test the condition where any UES or NTG "TYPE" was marked "EMV", against the table of declared records.

- *Assuring that Update TYPES agreed with parameter data* - The QC team ran queries that tested the case where the parameter was marked "PassThru" by comparing the EDFilled value to the ED"update" value. Any discrepancies were corrected.

- *Comparing ERTInput EUL data to DEER EUL data* - Having completed the primary QC tests to assure adequate quality on parameter data relevant to the MPS parameters the QC team moved on to QC tests on the EUL parameters. The QC team loaded a table of DEER EUL quantities, as mapped to 2006-2008 ED Measure Group categories, onto the ERT database. The team then ran a comparison of all ERT EUL values against the appropriate DEER value for that measure group. The team identified several discrepancies but did not have sufficient time to reconcile them all. A list of know discrepancies is filed with Appendix G.

The QC team's goal was a 100% match between the final evaluation reports and the numbers used in the ERT, the correct application of DEER EUL values, and the proper application of evaluation results to the UES and net to gross ratios used in the ERT. Invariably, some discrepancies were identified were irreparable. In all cases these did not exceed 1% and there was no observed directional bias, i.e., discrepancies were both high and low.

H. Evaluation Reporting Tools (ERT)

Documentation V.03

The ERT stands for "Evaluation Reporting Tools" and generally refers to the suite of tools and processes that work in concert to produce the final evaluated results for the 2006-2008 Energy Efficiency portfolio.

However, within that suite of tools is an MS Access database that is also referred to as the ERT or ERT Application. This document specifically describes the forms, tables, and queries found in ERT application.

I. Forms

There is only one form in the ERT application, but there are 8 tabs within this form.

a. Main

i. Link Data File tab

1. Function – This tab is mainly used by the contract groups who have created 'ERT Input Sheet' .txt files. This tab allows the ERT application to find the appropriate .txt files and also performs an initial quality control check on the data in the .txt files.
2. "Link Data Text File" - This link will open up a window so the user can select a folder that stores all the 'ERT Input Sheet' .txt files. Once the user clicks "OK", all the fields in this tab are automatically populated and the 16 QC tests are automatically run.
3. "QC Data File" - This link will perform a quality control check on the input file.
4. "View Data File" - This will open up the "Evaluation" query

ii. Run E3 Calculator tab

1. Function – This tab is mainly used by the contract groups to process the data in the 'ERT Input Sheet' .txt files through the appropriate E3 engine.
2. Select Option
    a. Option 1: E3 Claim Lines – Selecting this option processes the line items from the utility E3 records through the appropriate E3 engine. This option has no "Select Scenario" options. The input data for Option 1 comes from the IOU_E3_Claim_Q42008 table.
    b. Option 3: Program Tracking Modified Parameters – Selecting this option processes the line items at the tracking database level. This is how a user would process all the updated data from an 'ERT Input Sheet' .txt file through an E3 engine.
3. Select Scenario
    a. User can select scenarios to run for Primary output (savings from the Export tab) and secondary output (Emissions,

Annual Reductions, and Net Impacts by Sector, End Use, and Climate Zone).

b. The scenarios are defined as follows:
    i. All Scenarios – The user typically would select this option so that the E3 data are processed to pick up results for each of the 11 scenarios listed below.
    ii. No Update – None of the evaluated results are processed through the E3 engine. This is basically similar to an Option 1 run.
    iii. EDFilledPaidDate – Only the EDFilledPaidDate is applied to each record. All other parameters are passed through. The EDFilledPaidDate determines which quarter (or year for SCE) the quantity is applied.
    iv. Irate – Only the installation rates are applied to each record and processed through the E3 engine, all other parameters are passed through.
    v. UES – Only the ex-post UES values are applied to each record and then each record is processed through the E3 engine, all other parameters are passed through
    vi. UES_I – Only the ex-post UES values with the Interactive Effect factor applied will be processed through the E3 engine, all other parameters are passed through.
    vii. NTGR – Only the ex-post NTGRs are applied and processed through the E3 engine, all other parameters are passed through.
    viii. EUL - Only the updated EULs are applied and processed through the E3 engine, all other parameters are passed through.
    ix. EDFilled – This scenario uses parameters from the SPT database instead of the EDClaim table.
    x. IRateUESEUL – This scenario produces gross energy savings results by applying the installation rate, ex-post UES, and updated EUL values, and processes the records through the E3 engine. The NTGR is not applied at all in this scenario.
    xi. IRateUESEUL_I -This scenario produces gross energy savings results (with interactive effects) by applying the installation rate, ex-post UES (with interactive effect factors applied), and updated EUL values, and processes the records through the E3 engine. The NTGR is not applied at all in this scenario.
    xii. Gross – This scenario produces gross energy savings results by applying the installation rate, ex-post UES, and updated EUL values, and processes the

records through the E3 engine. It does not apply net-to-gross.

xiii. Gross_I – This scenario produces gross energy savings results (with interactive effects) by applying the installation rate, ex-post UES, and updated EUL values, and processes the records through the E3 engine. It does not apply net-to-gross.

xiv. All – This scenario produces net energy savings results by applying the installation rate, ex-post UES, ex-post NTGR, and updated EUL values, and processes the records through the E3 engine.

xv. All_I - This scenario produces net energy savings results (with interactive effects) by applying the installation rate, ex-post UES, ex-post NTGR, and updated EUL values, and processes the records through the E3 engine.

c. Select Programs – The user can process the records for a select group of programs only, or all programs at once. Selecting "All Program" will only process all programs that have been linked through the 'ERT Input Sheet' .txt file from the Link Data File tab.

iii. Analysis tab

1. Function – This tab allows the user to compare one set of data to another set and see the percentage change and also view run results for savings and secondary output. The "Select Option" and "Select Scenario" are the same as in the Run E3 Calculator tab, except there is one more option
2. Select Option – In addition to Option 1 and Option 3, the user can compare to Option 0. This option does not re-run the E3 line items through the E3 engine. Instead, Option 0 takes the results from the utility run E3 files as was submitted.
3. Run Comparison Query – This button will open the "Compare Results Set" query. It will compare Result Set 1 with Result Set 2.
4. Show All Rolled-up Results by IOU - This link will run the "q_Results_Rollup_IOU_Option" query.
5. Show All Rolled-up by Program – This link will run the "q_Results_Rollup_Program" query.
6. Show All Run Results – This link will run the "q_All_Results" query.
7. Combined Options 1 & 3 checkbox: if this is checked then the results will be the same as for the RRIM Calculations. All Option 3 programs will be displayed and all Option 1 programs if there is no Option 3 runs (passthru).

iv. View Runs tab

1. Function – This tab allows the user to see which Program/Scenario combinations have been run. There is the ability to filter the program runs by IOU or contract group; and view all programs, missing programs (according to the Study Group list), or only

programs with runs. The runs can be viewed for net savings as well as secondary output options.

v. Server QC tab
    1. Note – This tab is viewable by checking the box "View RRIM Calculations" box in the Setting tab
    2. Function – This tab allows the user to perform four additional quality control checks on the input files. It is called Server QC because the QC checks are queries against the SPT table in the SQL Server database which resides on the ED Central Server.
    3. QC all ERTInput Files in Folder – This will run the QC checks on all ERTInput files in a folder.
    4. QC Single ERTInput File – This will run QC checks on a single ERTInput file.
    5. QC Missing Study Group Programs – This runs the QCS_5_1_MissingStudyGroupPrograms query.
    6. Checked = Values must be exact –
    7. QC Tests
        a. Missing Records – program tracking records in the SPT table but missing from the ERTInput file
        b. Extra Records – records in the ERTInput file that do not exist in the SPT table.
        c. Duplicates – checks for duplicate records.
        d. Values Match – this query compares SPT fields that exist in the ERTInput files and compares against the SPT table in the SQL Server.

vi. RRIM Calculations
    1. Function – This tab is primarily used by Energy Division to merge all the submitted ERTs and to populate the RRM spreadsheet.
    2. Merge
        a. Import Results from All ERTs in Folder – This button opens a window that allows the user to select the folder that stores the ERT .mdb applications to merge
        b. Import Results from Individual ERT file - This button opens a window that allows the user to select a single ERT .mdb file to import
        c. Merge programs into existing results set – The existing results are kept and merge with any new results
        d. Clear existing results before importing – All Option 3 results in the result tables are cleared before any new results are merged
        e. Merge Programs into Existing Results set (existing programs will be over-written). This is selected as a default. This will remove all Option 3 data for a program before merging data from ERTs into the results tables.
        f. Merge Scenarios into Existing Results set (existing scenarios will be over-written) - This will remove Option 3 data for a scenario before merging data from ERTs into the results tables if a scenario is present in the source ERT.

g.

3. RRM Calculations
    a. Options and Scenarios are the same as described in the Run E3 Calculator tab in section 1(a)(ii).
    b. Show RRIM Calcs Results by IOU – This button runs the "q_RRIM_Results_Rollup_IOU" query.
    c. Export to RRM Calcs Spreadsheet – This button will populate the latest version of the RRM spreadsheet with the appropriate energy savings and net benefits results from the merged ERT datasets. The RRM spreadsheet has to be in the same folder as the ERT application (.mdb file). The name of the spreadsheet must not be altered: RRMCalculator_Template_v6.xls

vii. Settings tab
1. Function – This tab is mainly for Energy Division use to make functions available to the user
2. Fill E3 with Program Costs from IOU_E3_Cost_Q4208 table
3. Run Excel in visible mode
4. View E3 calculator version
5. View RRIM calculations tab – The default is unchecked. By checking this box, the QC server and RRM Calculations tab are visible to the user
6. Debug features – this will stamp the EDPrgTrkClaimID on each E3 line to make it easier to track the source of individual E3 lies. It will also check input data for hidden characters including line feeds.

viii. Utilities tab
1. Function – This tab includes miscellaneous functions.
2. Import IOU Claim Tables – This will import the IOU_E3_Claim, Cost, and Output tables from another mdb file.
3. Force-close Excel Instances - Occasionally hidden instances of Excel remain in memory after the runs are complete. Press this button and it will force-close all Excel instances, including hidden instances.
4. Remove run labels – This will remove any labeled runs from the results tables.
5. Remove option 3 run results – This is a way to remove results at a program level.
6. Import ERT Input files in folder – This button will import all ERT input text files in the folder and subfolders into the ERTInput table in the ERT SQL Server database which resides on the ED Central Server.

II. Tables
a. CG_Program_Assignments: Lists all the program IDs that contribute savings in 2006-2008, and the corresponding contract group, and CPUC/MECT/Evaluator point person. Used for identifying which programs are "touched" by an evaluation study design
b. ContractGroups: Lists the contract groups and assigns code numbers to each.

c. E3Calculators: List the available E3 version numbers and E3 files names specific to each utility. Also lists the current RRM Spreadsheet name. These names are used by the application to identify the appropriate E3 file and RRM spreadsheet to use.
d. IOU_E3_Claim_Q42008: This table contains the records from the utility Q42008 E3 spreadsheet "Input" tab that report savings.
e. IOU_E3_Cost_Q42008: This table contains the cost data from the utility Q42008 E3 spreadsheet "Input" tab.
f. IOU_E3_Output_Q42008: This table contains the results data from the utility Q42008 E3 spreadsheet "Export" tab.
g. LinkedFileInfo: Saves information of the currently linked file.
h. lkupOptions: List the three different options which the ERT application can produce
i. lkupProgramIDs: List of Program options to run (i.e., All Programs, PGE Programs, SCE Programs, SCG Programs, SDGE Programs).
j. lnkSPT: Table linked to the SQL Server . Used on the ED Central Server to QC the ERTInput files. Mapping_Input_Measures: Provides mapping information for the measure-level input. This and the Mapping_Scenarios_Option3 table are used by the q_Mapping_Scenarios_Option3 query to provide a mapping between the input data (the Evaluation query) and the E3 calculator for all the scenarios and versions of the E3.
k. Mapping_Input_Program: Provides mapping information for the program-level input for the E3 calculator. The program-level input comes from the IOU_E3_Cost_Q42008 table.
l. Mapping_Input_Ranges: The ERT outputs data into the E3 calculator by 'pasting' from memory consequetive blocks, or ranges, of data that has been placed into memory. The Mapping_Input_Ranges table contains the information on the ranges used by the ERT to know where to paste the ranges of data.
m. Mapping_Input_Ranges_SCE. Same as above but for SCE. The difference is that the SCE E3 versions import quantities into the year columns instead of the quarter columns.
n. Mapping_Results: This table maps the fields from the E3 calculator to the result table. It maps at the Excel cell level. The primary mapping is from the 'Export' sheet to the Results_Savings_Claim table.
o. Mapping_Results_Tables. This table maps the fields from the E3 calculator to results tables for row-level data. It is used mainly to map the secondary output data on the 'Output' tab. The output includes Annual and Lifecycle Emission reductions Net and Gross, Annual Net Reductions, Net Impacts by Sector, Net Impacts by End Use, and Net Impacts by Climate Zone. The corresponding results tables are: Results_Emissions, Results_EmissionsLifecycle, Results_AnnualReductions, Results_NetImpactsSector, Results_NetImpactsEndUse, Results_NetImpactsClimateZone.
p. Mapping_RRMCalcs: This table describes which cells in the RRM spreadsheet, "ERT Summary" tab should be populated with which source field.
q. Mapping_Scenarios_Option1: This table defines which fields are used to run Option 1. The only scenario allowed for Option 1 is NoUpdate.
r. Mapping_Scenarios_Option3: This table defines which fields are used for the various scenarios. Depending on scenario, different input fields may be used to populate the E3 calculator. This table and the Mapping_Input_Measures table are used by the q_Mapping_Scenarios_Option3 query to provide a mapping between the input data

(the Evaluation query) and the E3 calculator for all the scenarios and versions of the E3

s. ProgramGroups: Lists the program groupings by contact groups.
t. QC_Queries: List of QC queries that are run when a file is first linked.
u. QCS_Queries - List of Server-side QC queries.
v. Results_Savings_Claim: This is where the savings results are stored in the ERT application.
w. Results_Server_QC: This table shows the program level results of the "Server QC" tests.
x. ResultSet1: Internal table used in the Analysis compare query. Resultset1.
y. ResultSet2: Internal table used in the Analysis compare query. Resultset2.
z. RunStatus: This table contains the program scenarios which have been run. This is the underlying table for the query that populates the "View Runs" tab of the ERT application.
aa. Scenarios: Lists the 14 different scenarios available through the ERT application. This is used to populate the drop down box.
bb. Scenarios_ToRun: This is used to populate the list of scenarios to run on the 'Run E3 Calculator' tab.
cc. SQLServerSettings: This table contains the settings for SQL Server needed to run the server-side QC queries.
dd. tmp_ID: This is a temporary table to store lists of IDs during queries.
ee. tmpValueMatch: This is a temporary table used during the QC queries.
ff. txtERTInput: This is a linked table to the "ERT Input Sheet" .txt file during the server-side QC process of the ERT Input Sheets.
gg. txtEvaluation: This is the linked table to the "ERT Input Sheet" .txt file.
hh. Version: Lists the latest changes to the latest version of the ERT application

III. Queries

a. Compare_Result_Sets: This query is populated based on the options selected for the "Run Comparison Query" in the "Analysis" tab. The query compares the numbers for two sets of results and shows the percent difference, by program, for 17 parameters (for example kW, kWh, therms, TRC cost, PAC cost..)
b. Compare_Result_Sets_All: Same as above but will show all results even if there are no differences.
c. Evaluation: This query an older version of the main query that displays the complete data set on input data. The query joins two tables: 1) the IOU_E3_Claim_Q82008 tables and 2) the txtEvaluation table, which is a linked table to the ERTInput text file. The Evaluation query is in a format that is not compatible with the Upstream revision.
d. EvaluationUp: This query is the main query that displays the complete data set of the input data. The query joins two tables: 1) the IOU_E3_Claim_Q82008 tables and 2) the txtEvaluation table, which is a linked table to the ERTInput text file. The Evaluation query is in a format that is compatible with the Upstream revision, so it is an older version.
e. Find duplicates for Results_Savings_Claim: this is a query that will identify if any duplicate records exist in the Results_Savings_Claim table.

f. Find duplicates for txtERTInput: this is a query that will identify if any duplicate records exist for the txtERTInput table. This is used during the server-side QC.
g. q_All_Results: This query is accessed by clicking the "Show All Run Results" in the Analysis tab. This query shows a subset of the fields stored in the "Results_Savings_Claim" table including the energy savings and net benefits results for each program, for each scenario, and for each run of the E3. So for one program/scenario combination there could be multiple "runs".
h. q_OptionList: This is a query on the lkupOptions table. This is used to populate the drop down box in the Run E3 Calculator tab.
i. q_OptionList0: This is a query on the lkupOptions table. This is used to populate the drop down box in the Analysis tab. It includes Option 0.
j. q_ProgramIDs: This query returns the unique list of ProgramIDs from the E3_Cost_Q42008 table.
k. q_ProgramList: This query is a union of the lkupProgramIDs table and the q_ProgramList query. It is a list of options to run programs, including All Programs, IOU programs, and individual programs. It is used to populate the drop down box on the Run E3 Calculator tab.
l. q_RequiredDataTextFields: This is a query on the Mapping_Scenarios_Option3 table and returns the values where the Source field equals SPT or EDUpdate. It is used to validate the ERTInput text file to make sure that the required fields are present in the file.
m. q_Results_Rollup_IOU: This is a query on the Results_Savings_Claim table that sums the energy and net benefits metrics and groups the results by IOU and Option (either Option 1 or 3).
n. q_Results_Rollup_IOU_Option: This query is used in the Analysis tab to show results by IOU. The query is dynamically generated in-code. Each time the user selects to show results the query will be generated based on the filters that the user selected. The underlying table is the Results_Savings_Claim table.
o. q_Results_Rollup_Program: This query is used in the Analysis tab to show results by program. The query is dynamically generated in-code. Each time the user selects to show results the query will be generated based on the filters that the user selected. The underlying table is the Results_Savings_Claim table.
p. q_RRIM_Results_Rollup_IOU: This query is used on the RRIM Calculations tab to view to RRM calculation parameters. The underlying table is the ResultsSet1 table, which is a temporary table that is populated based on the filter that the user selects
q. QC_1_1_ClimateZone: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Climate Zone.
r. QC_1_2_ClimateZone: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Climate Zone.
s. QC_2_1_EULRange: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid EUL range.
t. QC_2_2_EULRange: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid EUL range.
u. QC_3_1_NTGRRange: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid NTGR range.
v. QC_4_1_kWh_TargetSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Target Sector.

w. QC_4_2_kWh_TargetSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Target Sector.
x. QC_4_3_kWh_TargetSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Target Sector.
y. QC_5_1_Therms_GasSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Gas Sector.
z. QC_5_2_Therms_GasSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Gas Sector.
aa. QC_5_3_Therms_GasSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Gas Sector.
bb. QC_7_1_kWh_Qty: This query is one of the QC queries when an ERTInput text file is first linked. It checks quantity if there is a value for savings.
cc. QC_7_2_kWh_Qty: This query is one of the QC queries when an ERTInput text file is first linked. It checks quantity if there is a value for savings.
dd. QC_7_3_kWh_Qty: This query is one of the QC queries when an ERTInput text file is first linked. It checks quantity if there is a value for savings.
ee. QC_8_1_Mismatched_ProgramIDs: This query is one of the QC queries when an ERTInput text file is first linked. It checks the foreign keys for the EDIOUClaimID between the ERTInput txt file and the IOU_E3_Claim_Q42008 table to make sure the program matches.
ff. QCS queries: These are a series of queries (prefixed with 'QCS') that are used by the server-side QC process. They primarily check the ERTInput text file against the SPT table in the SQL Server database on the ED Central Server.
gg. qEmissions: This query is used to join the Results_Emissions and Results_EmissionsLifecycle tables to create one virtual view of the emissions results.
hh. qMapping_Scenarios_Option1: This query joins the Mapping_Scenarios_Option1 and the Mapping_Input_Measures tables and is used to provide a mapping between the input data (EvaluationUp query) and the E3 calculator for all versions of E3 calculators.
ii. qMapping_Scenariors_Option3: This query joins the Mapping_Scenarios_Option3 and the Mapping_Input_Measures tables and is used to provide a mapping between the input data (EvaluationUp query) and the E3 calculator for all of the scenarios and versions of E3 calculators.
jj. qRunStatus: This query is used by the View Runs tab to view the status of runs.
kk. Results_Savings_Claim_Option0: This query is used to provide input for Option 0. The underlying table is the IOU_E3_Output_Q42008 table.

I. Standard Program Tracking Database March 2010v.8

The documentation for the Standard Program Tracking Database is provided in an external appendix. It includes an executable file with the database: SPTdb2006 2008 17Marc2010v8.exe

J. ERT Input Sheet Documentation

INPUT TEXT FILE

Documentation V.01

This is documentation for the file, "ERTE3Input 20100115.xls," also known as the ERT Input Sheet Design Specification, hereafter referred to as "ERT Specification." The ERT Specification is an Excel spreadsheet which lists all the necessary columns for the ERT application to run properly. It also indicates where the data should come from and which data are needed for the various scenarios the ERT application is able to produce.

Each evaluation team used the ERT specification to create the ERT Input Sheet, which is the main source of data for the ERT application. The ERT specification lists a total of 75 fields in Column A, but not all of them are required to be submitted in the ERT Input Sheet, as described below.

Fields in ERT Specification

Column	Name	Description
A	Field Name	Lists the 75 fields needed to run the ERT
B	E3ColumnName	Maps the corresponding E3 spreadsheet field names
C	InTextFile	This is important because it tells the evaluation contractor which 35 fields need to be populated when they create their ERT Input Sheets.
D	Source	Tells you where the data come from. • SPT means the data come from the Standardized Program Tracking database. All evaluation contractors used the same SPT db. 19 fields come from the SPT. • E3Claim means the data come from the table of Standardized E3 table. There is one table in the ERT application that combines all the E3 spreadsheets into one table. If the source says "E3Claim" then the value comes from this table in the ERT application. 10 fields come from E3Claim. • EDUpdate means the data come from the evaluation contractors. The numbers either come directly from their own study (cell value in ERT Input Sheet = "EMV") or from another evaluation study (cell value in ERT Input Sheet = "OthEMV") or DEER (cell value in ERT Input Sheet = "DEER") or are pass-thru, meaning no update is made (cell value in ERT Input Sheet = "Pass Thru"). 16 fields come from EDUpdate. • Computed means the ERT application is programmed is compute these fields based on

		other submitted data fields. 30 fields are computed.
E	Equation/Derivation/Value List	Includes the formulas used to calculate "Computed" fields. Also lists the restrictions of some of the fields.
F	No Update	Indicates which fields are needed to produce numbers in the ERT application where no utility numbers are updated.
G to L*	[various]	Indicates which fields are needed to produce numbers in the ERT application under one of the individual update scenarios. • Irate = only the installation rate is adjusted • UES = only the unit energy savings values are adjusted • UES_I = only the unit energy savings values with interactive effects factors applied are adjusted • NTGR = only the net-to-gross ratios are adjusted • EUL = only the effective useful life values are adjusted • EDFilled = only the fields beginning with EDFilled_ are adjusted
M to P*	[various]	Indicates which fields are needed to produce numbers in the ERT application under one of the combined update scenarios. • Gross = The installation rates, UES, and EUL values are adjusted. The NTGR is not applied. This produces gross evaluated savings. • All = The installation rates, UES, NTGR and EUL values are adjusted. This produces net evaluated savings. • Gross_I = The installation rates, UES with interactive effects factors applied, and EUL values are adjusted. The NTGR is not applied. This produces gross evaluated savings with interactive effects applied. • All_I = The installation rates, UES with interactive effects factors applied, NTGR and EUL values are adjusted. This produces net evaluated savings with interactive effects applied.

***** If the cell in any of these columns has a value of '99', it means that the field is needed to calculate another field, but it is not a direct input to the E3 calculator. A '4' just means that value has to be entered four times.