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Final Appendices

2013 Custom Impact Evaluation Industrial, Agricultural, and Large Commercial

Submitted to:

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Appendix A

Detailed Program Administrator Results and Site Specific GRR and NTGR Results

A.1 Detailed Program Administrator Results

The following sections provide program administrator-specific results as a compliment to the statewide exhibits presented in Chapter 3.

A.1.1 Ex-Ante vs. Ex-Post Savings Estimates by Fuel Type and PA

Figure A-1 through Figure A-6 graphically display MMBtu-based ex-post versus ex-ante *lifecycle* savings estimates for each PAs' M&V sample points. The figures compare the ex-ante (tracking system) MMBtu savings[1] with the ex-post evaluated MMBtu savings for M&V sample points. Each point represents an individual project and the fuel type of each project is specified (electric, gas, or mixed fuel – electric and gas). The chart also includes a unity line, which divides the results into those in which the project-specific realization rates are above 1.0 (sites above the line) and below one (sites below the line). All 189 projects are included in the figures (PG&E = 55, SCE = 53, SDGE = 43, and SCG = 38). Some of the plots isolate points with ex-ante savings estimates below 500,000 in order to ensure better readability, given the clustering of points in this size range.

[1] This figure compares "engineering estimates" for both ex-ante MMBtu and ex-post MMBtu. That is, if the PA-claimed ex-ante savings for a record include the PA RR=0.9 adjustment, that adjustment was removed for the purpose of this comparison.

Figure A-1: PG&E Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates by Fuel Type

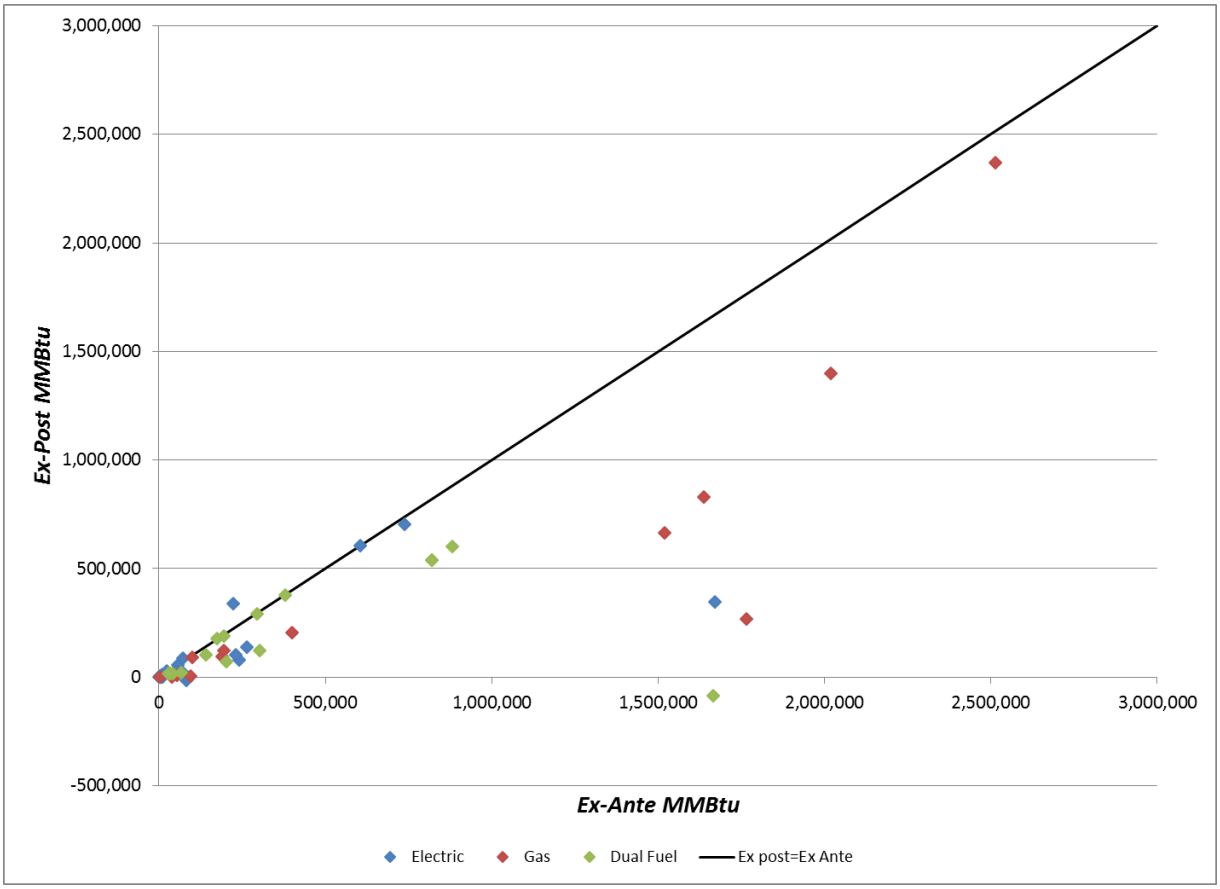


Figure A-2: PG&E Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates by Fuel Type (<500,000 MMBtu Detail)

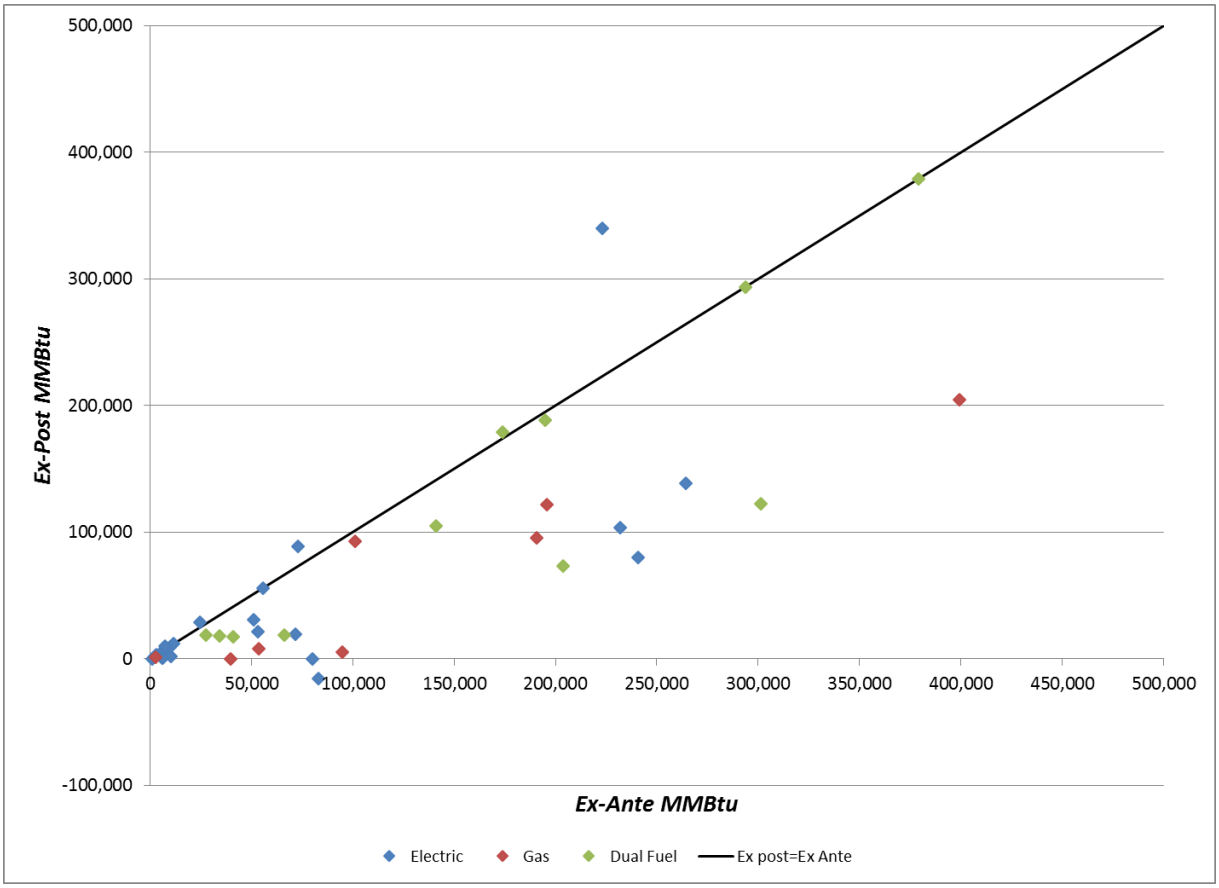


Figure A-3: SCE: Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates

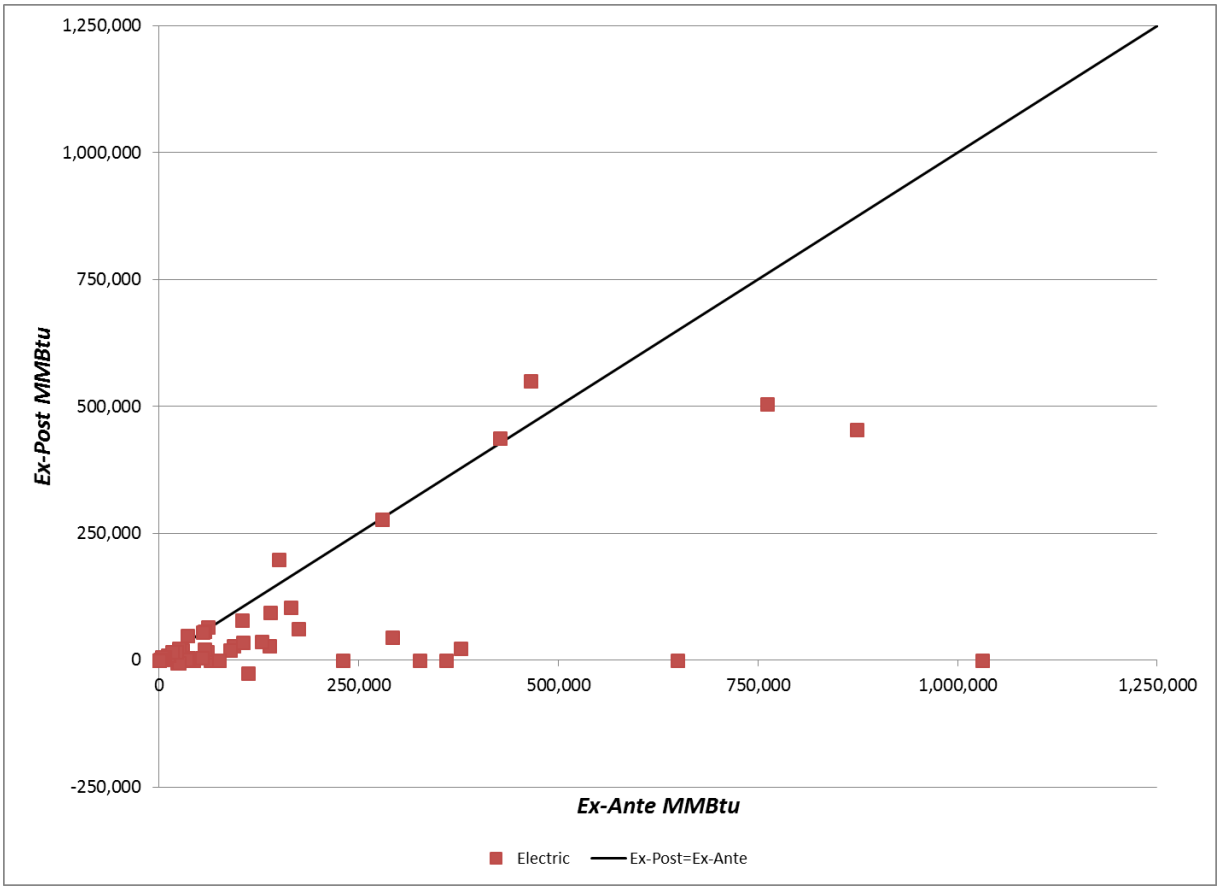


Figure A-4: SDG&E Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates by Fuel Type

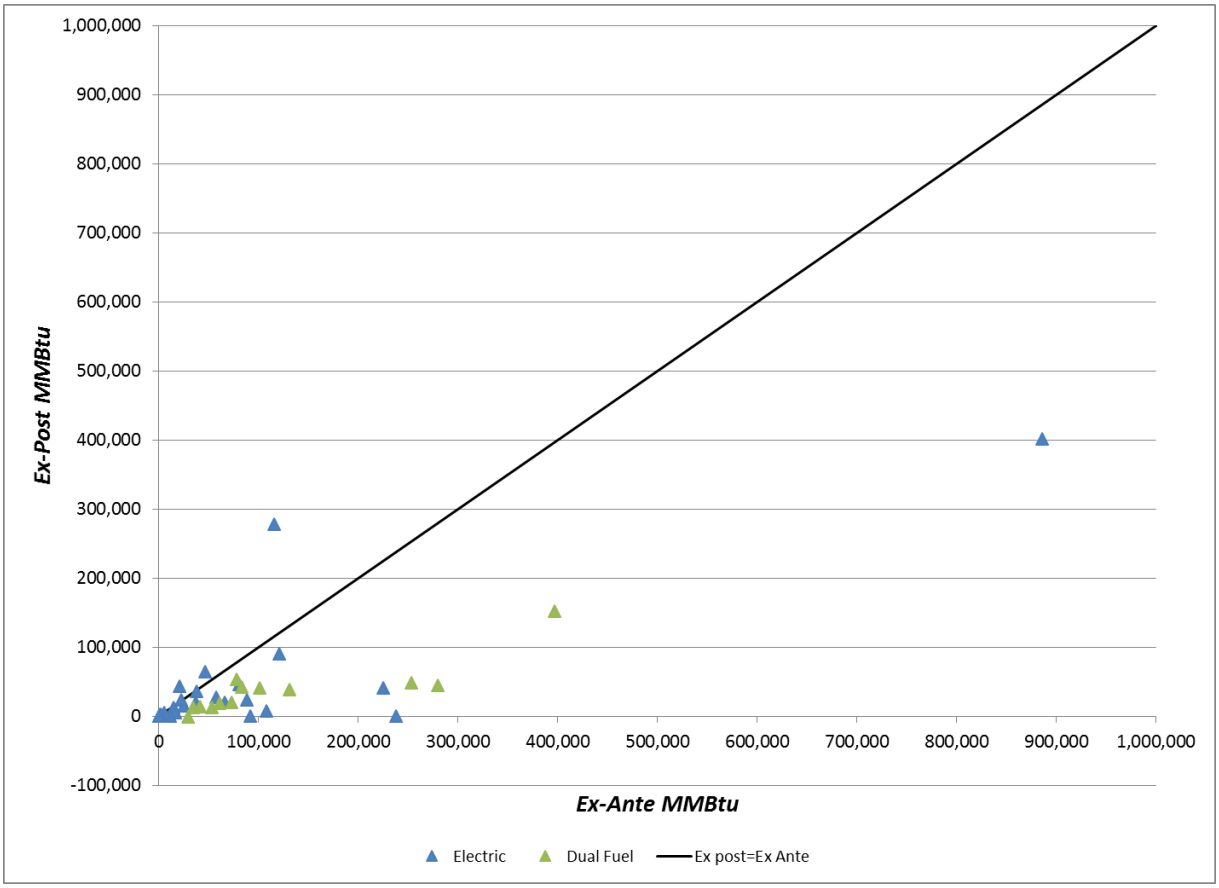


Figure A-5: SDG&E Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates by Fuel Type (<500,000 MMBtu Detail)

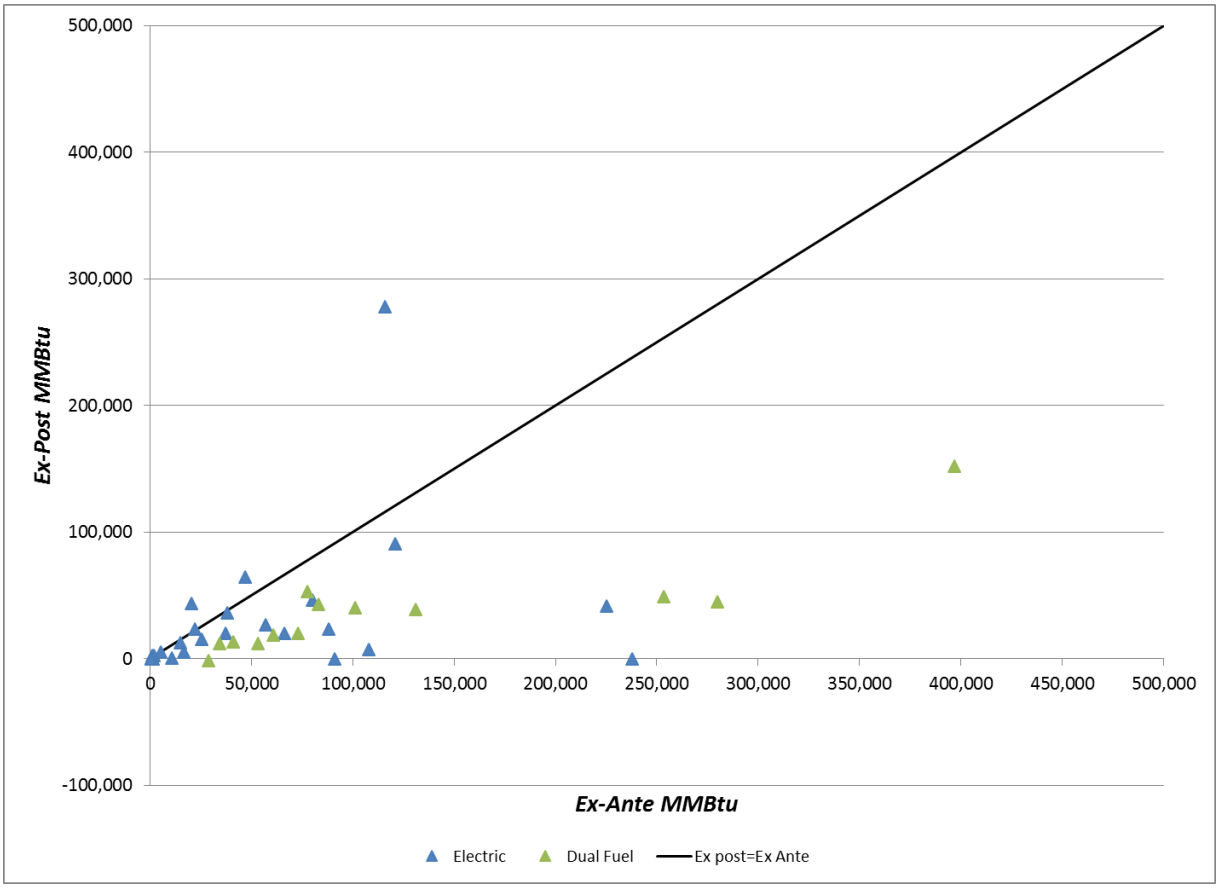
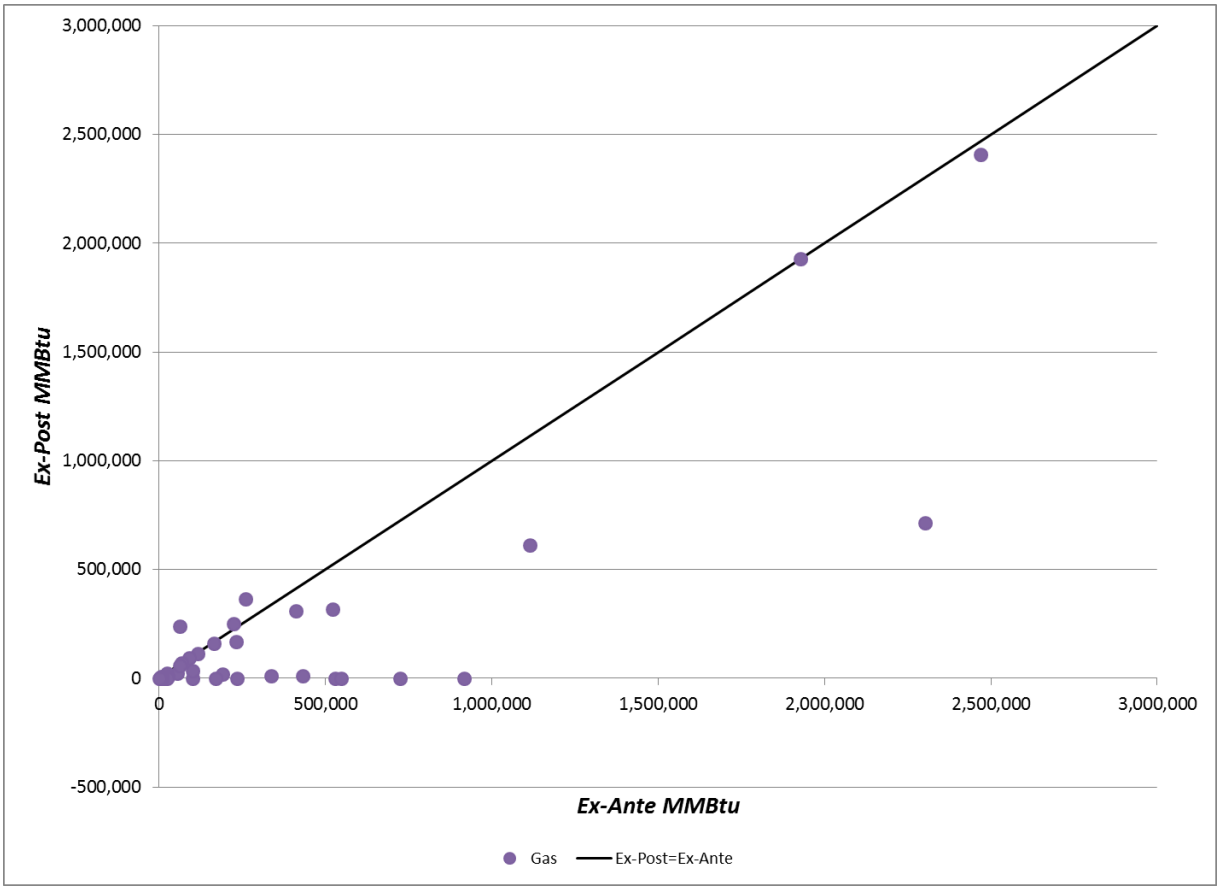


Figure A-6: SCG: Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates



A.2 Discrepancy Analysis

As described in Chapter 3, when ex-post gross impacts for a sampled project were found to be different than the PA ex-ante impacts, the evaluation documented the associated discrepancy factors. For some projects there was only one factor (e.g. the PA calculation method was not appropriate, and another, more appropriate method was used for evaluation) while for others there were multiple factors (e.g. ex-post operating hours observed in the field were different than the number of hours documented in project paperwork *and* the number of measures installed was also different than that reported). Ultimately, individual discrepancy factors were classified into seven categories: operating conditions, calculation method, inappropriate baseline, ineligible measure, inoperable measure, measure count, and tracking database discrepancy.

Given multiple tracking records associated with some projects, 240 records associated with the impact sample of 189 projects were examined (3.5 Million MMBtu ex-ante impacts). For 42 records, the evaluation found no discrepancies (0.5 MMBtu ex-ante impacts were not adjusted.) For the balance of 198 records, ex-post impacts were different from ex-ante MMBtu impacts; 157 records, affecting 2.5 MMBtu ex-ante impacts, were adjusted downward, and 41 records, affecting

0.5 MMBtu ex-ante impacts, were adjusted upward. A summary of these adjustments is presented for each PA in Figure A-7 through Figure A-10.

Figure A-7: Ex-post Upward and Downward Adjustments to Ex-ante MMBtu for Sampled Projects - PG&E

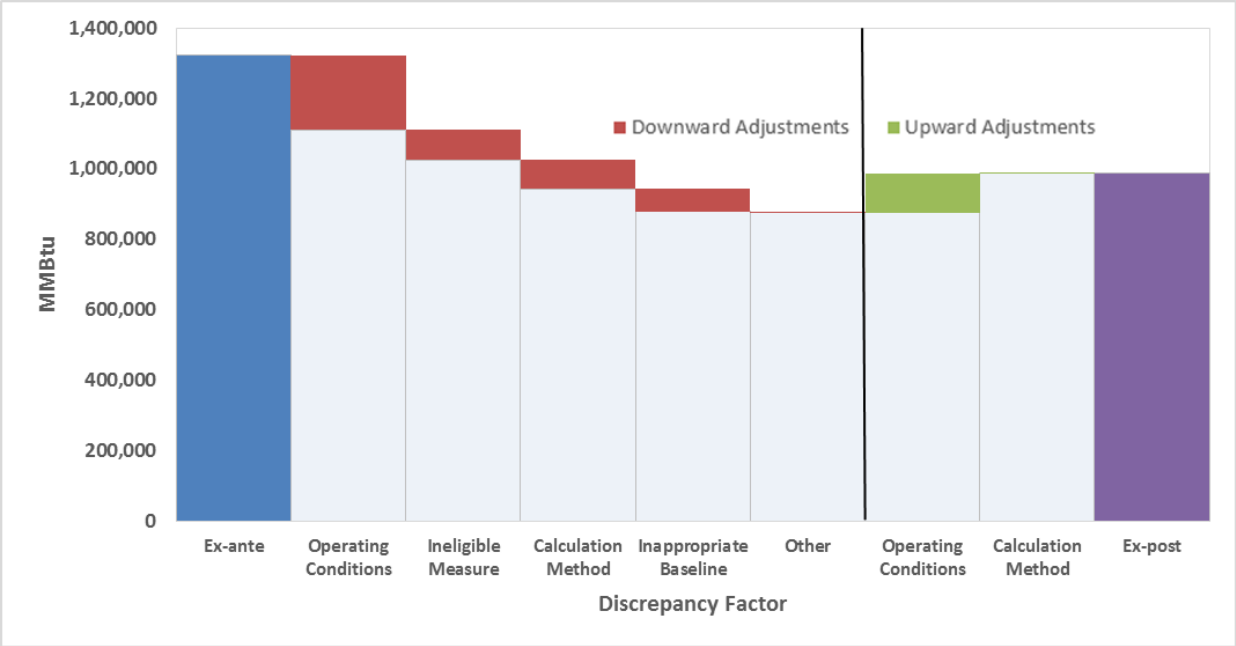


Figure A-8: Ex-post Upward and Downward Adjustments to Ex-ante MMBtu for Sampled Projects - SCE

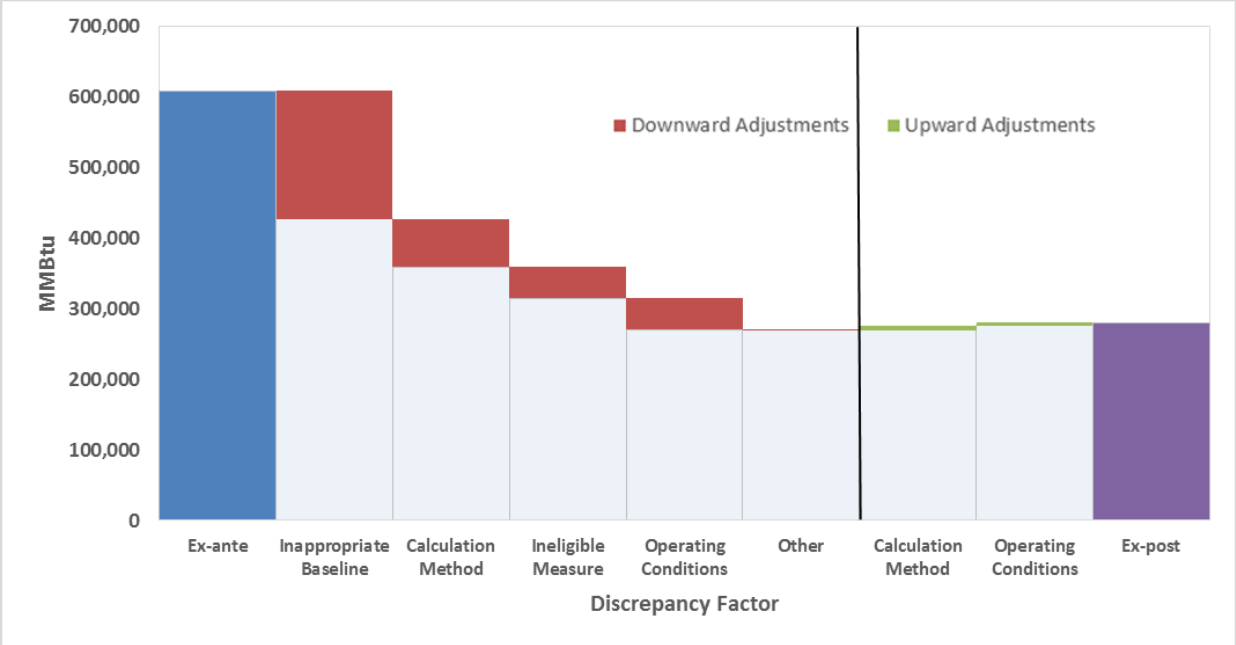


Figure A-9: Ex-post Upward and Downward Adjustments to Ex-ante MMBtu for Sampled Projects - SDG&E

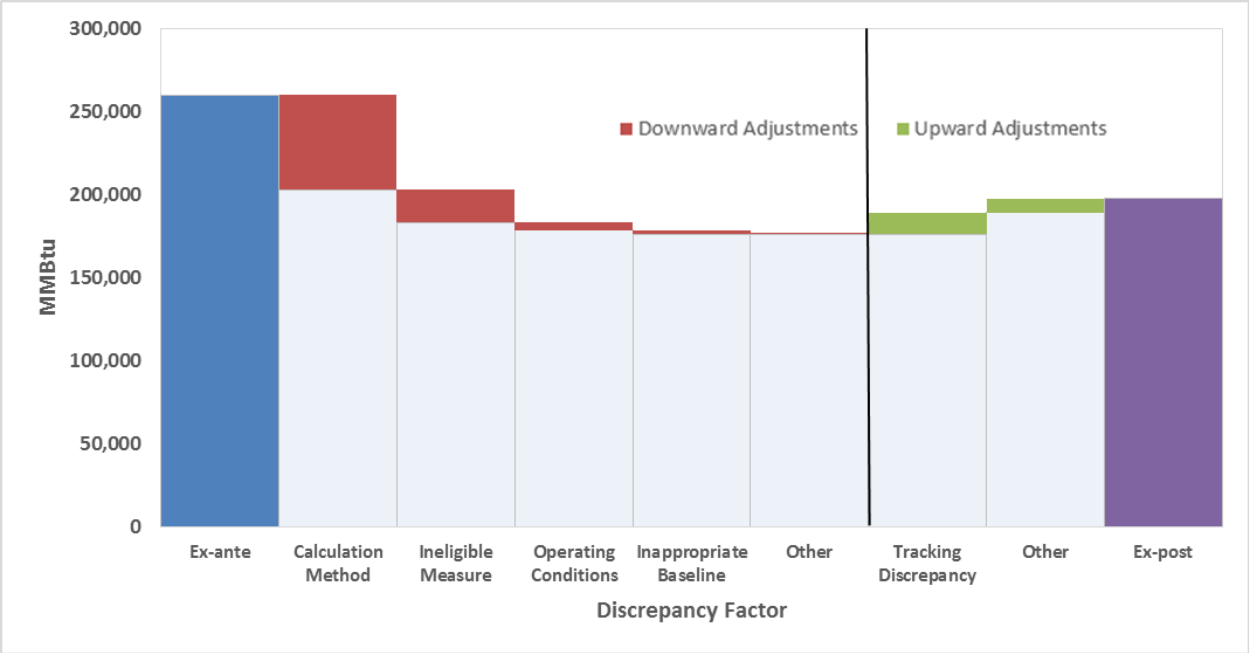
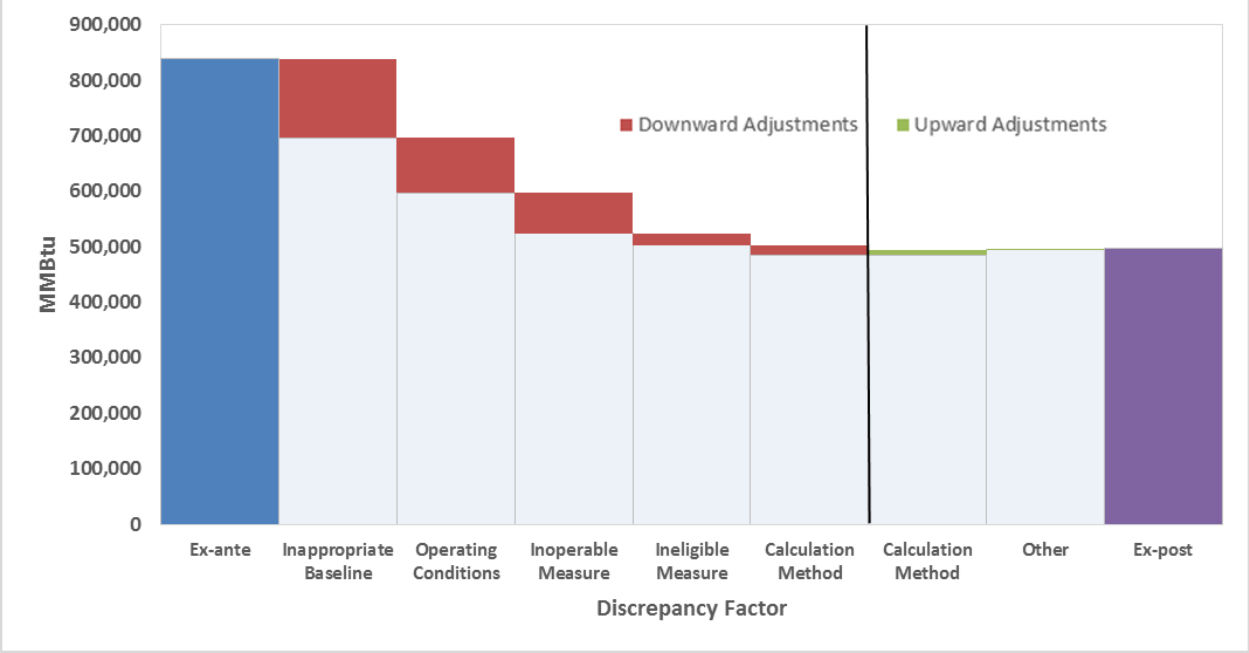


Figure A-10: Ex-post Upward and Downward Adjustments to Ex-ante MMBtu for Sampled Projects - SCG



A.3 Site Specific GRR and NTGR Results

The site specific results in the tables below display the ex-ante claimed and the ex-post evaluated savings values, both first year (FY) and lifecycle (LC) GRRs, and the project-level NTGRs for each of the 189 IALC M&V points evaluated in the 2013 Custom sample. Additionally, the table lists the IOU and the associated project and claim ID numbers along with the sample stratum each M&V point was assigned (1 thru 5), where 1 or 2 represents a larger site receiving greater evaluation rigor, compared to the smaller strata sites (3-5).

First year (FY) savings are broken out by positive kW, kWh and therms, and also include the combined MBtu values (for kWh and therm combined), which was decided as part of the 2013-'14 evaluation research plan. Although every site has an assigned FY and LC GRR (MBtu) value, not every site has a GRR value for (kW), because some projects included only natural gas measures. Also, not every site received a NTG survey interview. Generally the reason an interview is not conducted is because the project champion or decision maker was unavailable or could not be reached over the course of the five-month evaluation period or refused the interview.

The tables also include an "effective EUL." This metric is equal to project level lifecycle savings divided by project level first year savings (i.e. for multi-measure projects, measure level lifecycle and first year savings are aggregated to the project level). The effective EUL calculation has the following effects:

- If you have multiple measures in a project, and they have different EUL, this calculation results in a weighted average EUL at the project level.
- If you have an early retirement case, then the lifecycle savings incorporate the first and second baseline calculations. Then we can use the "effective EUL" for reporting instead of an EUL plus an RUL (which may not apply the same to all the measures in the project).
- If you have the first year savings, then to get lifecycle savings you just multiply that times the "effective EUL."

IOU Site Specific GRR and NTG Results

					First Year Project-Level Positive Ex-Ante				FY GRR Project Level		Effective EUL		Lifecycle GRR Project Level		NTGR
IOU	ItronID	Application or ProjectID	Associated ClaimIDs	Sample Stratum	GrosskWPositive	GrosskWhPositive	GrossThermsPositive	GrossMBtuPositive	FY GRR MBtu	FY GRR kW	Ex Ante	Ex Post	LC GRR MMBtu	LC GRR kW	
PGE	E30001	2K09016087	PGE-8337807	1	0.00	0.00	1,795,755.00	179,575.50	0.94		14	14	0.94		0.73
PGE	E30002	TAA0012211	PGE-21802779	1	0.00	0.00	1,346,249.00	134,624.90	1.73		15	6	0.69		0.95
PGE	E30003	TAA0012187	PGE-21796906	1	0.00	0.00	1,177,484.00	117,748.40	0.38		15	6	0.15		0.57
PGE	E30004	NC0123726	PGE-21351547	1	0.00	0.00	1,170,000.00	117,000.00	0.51		14	14	0.51		-
PGE	E30005	TAA0012157	PGE-21770225	1	1,232.36	10,871,695.00	0.00	111,315.29	0.78	0.78	15	4	0.21	0.21	0.70
PGE	E30006	2K11052794	PGE-21706326; PGE-8155056	1	885.80	7,547,052.40	337,714.30	111,045.70	-0.08	0.00	15	10	-0.05	0.00	0.50
PGE	E30007	NC0121846	PGE-8621204	1	0.00	0.00	1,085,405.00	108,540.50	1.02		14	6	0.44		0.83
PGE	E30012	NC0116026	PGE-6657213	2	23.60	206,628.00	566,173.00	58,732.96	0.68	0.82	15	15	0.68	0.82	0.62
PGE	E30013	NC0119926	PGE-8197571	2	57.60	504,709.00	494,701.00	54,637.82	0.66	0.93	15	15	0.66	0.93	0.03
PGE	E30014	NC0119927	PGE-8197586	2	57.60	504,709.00	494,701.00	54,637.82	0.66	0.94	15	15	0.66	0.94	0.03
PGE	E30015	TAA0011897	PGE-21554760	2	497.89	4,802,110.00	0.00	49,168.80	0.95	1.00	15	15	0.95	1.00	0.70
PGE	E30019	NC0122166	PGE-21431729	2	0.00	3,944,823.00	0.00	40,391.04	1.00		15	15	1.00		0.38
PGE	E30021	2K11053633	PGE-6598515; PGE-6598516; PGE-6598518	2	62.00	1,426,503.00	140,666.00	28,672.56	0.97	0.95	6	6	1.03	1.02	0.47
PGE	E30025	TAA0012370	PGE-23242816	2	0.00	0.00	307,283.00	30,728.30	1.00		13	7	0.51		0.50
PGE	E30032	2K09016858	PGE-6673083; PGE-6673084	3	62.20	890,244.00	168,233.00	25,938.51	0.95	0.87	12	5	0.41	0.39	0.63
PGE	E30039	TAA0012507	PGE-23308884	3	69.03	1,088,647.00	109,735.80	22,120.24	0.29	1.00	3	3	0.29	1.00	0.75
PGE	E30041	NC0112990	PGE-23306721; PGE-23306722	3	54.70	1,118,310.00	61,325.00	17,582.88	1.00	1.00	17	17	1.00	1.00	-
PGE	E30045	2K13148180	PGE-9061733	3	0.00	0.00	190,497.00	19,049.70	1.00		10	5	0.50		0.52
PGE	E30046	NC0121328	PGE-8410757; PGE-8410758	3	0.00	34,078.00	186,026.00	18,951.52	1.00		20	20	1.00		-
PGE	E30048	2K10043587	PGE-6339878; PGE-6339882	3	98.00	1,390,910.00	34,211.00	17,662.63	0.83	0.80	12	5	0.36	0.37	0.47
PGE	E30055	2K12111525	PGE-8424635	3	179.00	1,568,100.00	0.00	16,055.78	0.62	0.62	15	8	0.33	0.33	-
PGE	E30059	2K13163610	PGE-9214971; PGE-9214972	3	107.00	1,510,000.00	0.00	15,460.89	0.45	0.00	15	15	0.45	0.00	0.41
PGE	E30060	TAA0012371	PGE-23242818	3	0.00	0.00	150,740.00	15,074.00	1.21		13	7	0.62		0.50
PGE	E30066	NC0125247	PGE-16712650; PGE-16712651	3	305.50	1,353,124.00	0.00	13,854.64	0.50	0.45	19	20	0.52	0.48	-
PGE	E30068	TAA0012462	PGE-23291166	3	20.00	20,000.00	135,000.00	13,704.78	0.43	1.00	3	3	0.43	1.00	0.65
PGE	E30069	NC0124586	PGE-18746398; PGE-18746400	3	23.60	1,135,469.00	0.00	11,626.07	1.50	4.22	19	19	1.52	4.74	-
PGE	E30072	2K11068525	PGE-8542372; PGE-8542373	3	17.60	115,800.00	118,200.00	13,005.68	0.73	0.93	15	20	0.97	1.24	-
PGE	E30088	TAA0011938	PGE-21633562; PGE-21633564	4	0.00	350,907.00	66,917.00	10,284.64	0.48		3	4	0.53		0.55
PGE	E30095	2K1042746C	PGE-8555342	4	167.60	809,078.00	11,328.00	9,416.95	0.74	0.95	15	15	0.74	0.95	0.70
PGE	E30136	2K13194185	PGE-18672550	4	0.00	0.00	67,302.90	6,730.29	0.69		15	20	0.92		0.60
PGE	E30140	2K1355801C	PGE-9267749	4	0.00	0.00	65,860.00	6,586.00	0.00		6	6	0.00		-
PGE	E30161	2K1284094C	PGE-8105661; PGE-8105662	4	0.00	0.00	58,357.00	5,835.70	0.07		9	20	0.15		-
PGE	E30168	2K13198405	PGE-18745285	4	62.16	544,521.50	0.00	5,575.36	1.00	1.00	10	10	1.00	1.00	0.18
PGE	E30170	TAA0012414	PGE-23273865	4	164.39	541,026.00	0.00	5,539.57	-0.19	-0.18	15	15	-0.19	-0.18	0.32
PGE	E30176	2K12114180	PGE-9153527	4	64.77	522,457.50	0.00	5,349.44	0.00	0.00	15	15	0.00	0.00	-
PGE	E30177	2K13206930	PGE-21516455	4	59.09	517,651.60	0.00	5,300.23	0.51	0.51	10	8	0.40	0.40	0.23
PGE	E30179	2K13204214	PGE-21408210	4	56.85	497,959.20	0.00	5,098.60	0.75	0.74	10	8	0.60	0.59	-
PGE	E30188	TAA0012324	PGE-23096749	4	55.47	476,169.70	0.00	4,875.50	1.22	1.14	15	15	1.22	1.14	0.57
PGE	E30190	2K12109526	PGE-9246991	4	39.00	467,645.00	0.00	4,788.22	0.51	0.72	15	8	0.27	0.38	-
PGE	E30194	2K12113827	PGE-8364792	4	0.00	0.00	47,417.00	4,741.70	0.06		20	20	0.06		0.35
PGE	E30326	2K12082182	PGE-7397756; PGE-8226278	5	67.86	166,450.00	5,629.00	2,267.18	0.67	0.08	12	12	0.68	0.10	-
PGE	E30361	2K13145620	PGE-9042043	5	0.00	183,339.20	0.00	1,877.21	1.03		13	15	1.19		0.58
PGE	E30591	UAA0013171	PGE-18740658	5	10.13	68,956.63	0.00	706.05	1.28	1.08	11	5	0.58	0.49	0.19
PGE	E30600	2K13151310	PGE-9045117	5	10.40	67,241.00	0.00	688.48	0.19	0.15	15	15	0.19	0.15	-
PGE	E30617	2K13192708	PGE-16798706	5	7.25	63,466.20	0.00	649.83	0.95	0.95	15	15	0.95	0.95	0.27
PGE	E30639	2K13172487	PGE-9358365	5	0.00	57,079.00	0.00	584.43	1.02		20	20	1.02		-
PGE	E30655	UAA0014080	PGE-21431443	5	9.18	54,325.44	0.00	556.24	0.89	1.00	11	1	0.10	0.11	-
PGE	E30686	NC0123868	PGE-9044879	5	26.20	48,306.00	0.00	494.61	1.33	1.31	15	15	1.33	1.31	0.38
PGE	E30725	UAA0015572	PGE-21740468	5	8.86	41,827.91	0.00	428.28	0.83	-0.34	11	10	0.76	-0.31	-
PGE	E30741	NC0123287	PGE-8963880	5	26.40	39,552.00	0.00	404.97	0.18	0.42	15	10	0.12	0.28	0.45
PGE	E30891	UAA0011995	PGE-10181014	5	4.23	20,320.19	0.00	208.06	1.00	0.05	11	10	0.91	0.04	0.67
PGE	E30895	NC0126686	PGE-21351538	5	13.20	19,751.00	0.00	202.23	1.09	0.62	15	15	1.09	0.62	0.58
PGE	E30925	2K13204213	PGE-18746406	5	3.00	16,646.00	0.00	170.44	0.94	0.71	15	15	0.94	0.71	-
PGE	E30966	2K1173219C	PGE-9241029	5	0.00	0.00	1,251.90	125.19	0.54		20	20	0.54		0.74
PGE	E31035	NC0121746	PGE-8462455	5	3.10	6,694.00	0.00	68.54	0.00	-0.37	15	10	0.00	-0.25	0.50

IOU Site Specific GRR and NTG Results

					First Year Project-Level Positive Ex-Ante				FY GRR Project Level		Effective EUL		Lifecycle GRR Project Level		NTGR
IOU	ItronID	Application or ProjectID	Associated ClaimIDs	Sample Stratum	GrosskWPositive	GrosskWhPositive	GrossThermsPositive	GrossMBtuPositive	FY GRR MBtu	FY GRR kW	Ex Ante	Ex Post	LC GRR MMBtu	LC GRR kW	
NTGR-Only Completes															
PGE	E30011	2K12097090		2	0.00	0.00	663,801.00	66,380.10							0.81
PGE	E30016	STPB014479		2	0.00	0.00	474,393.00	47,439.30							0.60
PGE	E30018	2K08006493		2	0.00	0.00	433,408.00	43,340.80							0.81
PGE	E30026	NC0118806		3	242.00	1,222,861.00	180,018.00	30,522.67							0.60
PGE	E30031	2K12119215		3	0.00	0.00	262,229.00	26,222.90							0.81
PGE	E30050	2K11053635		3	212.00	1,094,351.00	61,698.00	17,374.86							0.47
PGE	E30053	2K10042022		3	352.00	1,550,647.00	2,519.00	16,128.97							0.62
PGE	E30054	STPB016080		3	0.00	0.00	160,822.00	16,082.20							0.56
PGE	E30103	TAA0012333		4	99.23	851,921.90	0.00	8,722.83							0.57
PGE	E30107	TAA0011957		4	96.48	828,220.70	0.00	8,480.15							0.57
PGE	E30162	2K10035115		4	0.00	345,467.00	22,548.00	5,792.04							0.47
PGE	E30167	2K12109887		4	71.50	547,375.00	0.00	5,604.57							0.36
PGE	E30195	TAA0012366		4	52.80	461,934.00	0.00	4,729.74							0.40
PGE	E30926	2K12136330		5	7.00	16,600.00	0.00	169.97							0.49

IOU Site Specific GRR and NTG Results

					First Year Project-Level Positive Ex-Ante				FY GRR Project Level		Effective EUL		Lifecycle GRR Project Level		NTGR
IOU	ItronID	Application or ProjectID	Associated ClaimIDs	Sample Stratum	GrosskWPositive	GrosskWhPositive	GrossThermsPositive	GrossMBtuPositive	FY GRR MBtu	FY GRR kW	Ex Ante	Ex Post	LC GRR MMBtu	LC GRR kW	
SCE	F30001	500189102	SCE2013_Q2_0029109	1	1,061.12	8,531,479.60	0.00	87,353.82	0.78	0.77	10	7	0.52	0.51	0.59
SCE	F30003	500209112	SCE2013_Q4_0308939	1	510.07	6,714,198.40	0.00	68,746.68	0.00	0.00	15	15	0.00	0.00	0.47
SCE	F30004	500190073	SCE2013_Q4_0308732	1	1,047.10	5,208,485.40	0.00	53,329.68	1.02	1.08	8	8	1.02	1.08	0.71
SCE	F30005	500179685	SCE2013_Q4_0308878	1	659.72	4,956,630.80	0.00	50,750.94	0.66	0.57	15	15	0.66	0.57	0.95
SCE	F30006	500364533	SCE2013_Q4_0308887	1	488.89	4,223,985.40	0.00	43,249.39	0.00	0.00	15	15	0.00	0.00	-
SCE	F30007	500172073	SCE2013_Q4_0308934	1	220.11	3,493,612.00	0.00	35,771.09	0.77	0.77	13	20	1.18	1.18	-
SCE	F30012	MBCX-12-000002	SCE2013_Q2_0151075; SCE2013_Q4_0308717	2	1.86	492,580.00	156,149.00	20,658.43	1.00	1.00	8	5	0.62	0.63	0.34
SCE	F30013	500300956	SCE2013_Q2_0176255	2	278.51	2,458,708.00	0.00	25,174.71	0.06	-0.12	15	15	0.06	-0.12	1.00
SCE	F30014	500177332	SCE2013_Q2_0040551	2	270.84	2,340,089.40	0.00	23,960.18	0.00	0.00	15	3	0.00	0.00	-
SCE	F30015	500000545	SCE2013_Q4_0310182	2	228.30	2,125,508.10	0.00	21,763.08	0.00	0.00	15	15	0.00	0.00	-
SCE	F30017	SPCX-08-000037	SCE2013_Q4_0310414	2	181.00	1,904,249.00	0.00	19,497.61	0.16	0.32	15	15	0.16	0.32	-
SCE	F30018	500140136	SCE2013_Q2_0001445	2	28.23	1,818,060.30	0.00	18,615.12	0.99	3.57	15	15	0.99	3.57	0.73
SCE	F30019	ICXO-11-000017	SCE2013_Q4_0308954	2	283.00	1,704,167.00	0.00	17,448.97	1.07	1.18	8	5	0.67	0.74	-
SCE	F30024	500197488	SCE2013_Q2_0151103	2	173.61	1,500,080.40	0.00	15,359.32	0.00	0.00	15	3	0.00	0.00	-
SCE	F30026	500254163	SCE2013_Q2_0151107	2	144.65	1,249,801.30	0.00	12,796.72	0.00	0.00	5	3	0.00	0.00	-
SCE	F30028	500350234	SCE2013_Q4_0308886	3	132.34	1,136,053.60	0.00	11,632.05	0.53	0.53	15	10	0.36	0.35	0.37
SCE	F30032	IEEP-09-100732	SCE2013_Q2_0028920	3	0.00	976,358.40	0.00	9,996.93	1.32		15	15	1.32		0.60
SCE	F30037	500366424	SCE2013_Q4_0310390	3	125.16	901,190.70	0.00	9,227.29	1.00	1.00	15	3	0.20	0.20	0.54
SCE	F30042	500254099	SCE2013_Q2_0151106	3	97.06	838,640.10	0.00	8,586.84	0.00	0.00	5	3	0.00	0.00	-
SCE	F30043	500002026	SCE2013_Q2_0047504; SCE2013_Q2_0047505	3	0.00	835,638.00	0.00	8,556.10	0.61		15	7	0.28		0.95
SCE	F30047	500344977	SCE2013_Q2_0150974	3	102.20	783,036.20	0.00	8,017.51	0.76	1.00	13	13	0.76	1.00	0.80
SCE	F30049	500290038	SCE2013_Q4_0308884	3	84.50	725,432.10	0.00	7,427.70	-0.34	-0.33	15	10	-0.22	-0.22	0.37
SCE	F30054	500245523	SCE2013_Q2_0152920; SCE2013_Q2_0152921	3	18.62	609,089.40	0.00	6,236.47	0.45	2.30	15	10	0.30	1.53	0.43
SCE	F30055	500372601	SCE2013_Q4_0311262	3	158.53	688,044.00	0.00	7,044.88	1.38	1.54	5	5	1.38	1.54	0.50
SCE	F30058	500001687	SCE2013_Q2_0147886	3	37.78	680,811.70	0.00	6,970.83	1.00	1.00	15	5	0.33	0.33	-
SCE	F30075	500321666	SCE2013_Q4_0311150; SCE2013_Q4_0311151	3	37.60	580,780.00	0.00	5,946.61	0.27	0.04	10	10	0.27	0.04	0.80
SCE	F30076	500145146	SCE2013_Q4_0310204; SCE2013_Q4_0310205	3	66.00	577,868.00	0.00	5,916.79	0.25	1.00	15	14	0.23	0.92	0.22
SCE	F30089	PCCC-12-900001	SCE2013_Q4_0311128; SCE2013_Q4_0311219	4	18.60	352,264.00	0.00	3,606.83	1.14	1.31	8	5	0.71	0.82	0.57
SCE	F30091	CRCX-10-000016	SCE2013_Q4_0258489; SCE2013_Q4_0281335	4	5.03	445,597.70	0.00	4,562.47	0.00	0.00	8	11	0.00	0.00	0.44
SCE	F30093	500237707	SCE2013_Q2_0147893	4	56.90	490,135.90	0.00	5,018.50	0.00	0.00	15	15	0.00	0.00	-
SCE	F30102	500174605	SCE2013_Q2_0151116	4	54.91	461,731.60	0.00	4,727.67	0.93	1.03	13	15	1.07	1.19	-
SCE	F30106	500360663	SCE2013_Q4_0308940; SCE2013_Q4_0308941	4	42.36	430,214.10	0.00	4,404.96	1.00	1.00	13	5	0.39	0.38	0.41
SCE	F30125	500248977	SCE2013_Q2_0150971	4	67.31	369,350.60	0.00	3,781.78	1.00	0.89	15	15	1.00	0.89	0.65
SCE	F30132	PLBC-10-007396	SCE2013_Q2_0047541	4	12.11	360,054.20	0.00	3,686.59	0.24	0.00	10	5	0.12	0.00	-
SCE	F30134	500198071	SCE2013_Q4_0308945; SCE2013_Q4_0308947	4	41.83	288,210.00	0.00	2,950.98	1.00	1.00	18	18	1.00	1.00	0.69
SCE	F30170	500252143	SCE2013_Q4_0267793	4	53.32	261,197.20	0.00	2,674.40	0.08	0.12	20	20	0.08	0.12	0.29
SCE	F30180	500322194	SCE2013_Q4_0246970	4	48.36	241,368.00	0.00	2,471.37	0.91	0.00	10	10	0.91	0.00	0.85
SCE	F30190	500294110	SCE2013_Q2_0151112	4	26.30	225,867.00	0.00	2,312.65	0.07	0.07	15	10	0.05	0.05	0.50
SCE	F30193	500417766	SCE2013_Q4_0310408	4	85.46	222,014.10	0.00	2,273.20	-0.28	0.66	10	10	-0.28	0.66	0.61
SCE	F30249	500293940	SCE2013_Q4_0308879	5	18.70	160,603.70	0.00	1,644.42	-0.36	-0.36	15	10	-0.24	-0.24	0.50
SCE	F30319	500221037	SCE2013_Q2_0147916; SCE2013_Q2_0147917	5	68.18	109,586.30	0.00	1,122.05	1.07	1.07	20	14	0.77	0.80	0.13
SCE	F30321	500292492	SCE2013_Q2_0000079	5	3.70	116,095.00	0.00	1,188.70	0.84	0.00	10	10	0.84	0.00	-
SCE	F30365	500221226	SCE2013_Q2_0176220	5	12.68	100,441.00	0.00	1,028.42	0.95	1.66	10	10	0.95	1.66	0.63
SCE	F30439	500255076	SCE2013_Q4_0247034	5	20.59	78,338.90	0.00	802.11	1.00	1.08	20	20	1.00	1.08	-
SCE	F30575	500000079	SCE2013_Q2_0047452; SCE2013_Q2_0047453	5	24.80	39,752.00	0.00	407.02	1.00	1.00	16	16	1.00	1.00	0.68
SCE	F30578	500327902	SCE2013_Q2_0147862	5	11.96	39,411.00	0.00	403.53	0.44	0.00	10	10	0.44	0.00	0.38
SCE	F30580	500354028	SCE2013_Q4_0246986	5	3.51	39,238.00	0.00	401.76	0.88	0.30	10	10	0.88	0.30	0.34
SCE	F30601	500228571	SCE2013_Q2_0047619	5	4.81	34,293.00	0.00	351.13	1.57	1.45	10	10	1.57	1.45	-
SCE	F30767	500211864	SCE2013_Q4_0246940	5	12.42	10,942.00	0.00	112.04	0.66	0.84	10	10	0.66	0.84	-
SCE	F30876	500242300	SCE2013_Q4_0247327	5	0.38	3,326.70	0.00	34.06	0.69	1.16	12	12	0.69	1.16	0.28

IOU Site Specific GRR and NTG Results

					First Year Project-Level Positive Ex-Ante				FY GRR Project Level		Effective EUL		Lifecycle GRR Project Level		NTGR
IOU	ItronID	Application or ProjectID	Associated ClaimIDs	Sample Stratum	GrosskWPositive	GrosskWhPositive	GrossThermsPositive	GrossMBtuPositive	FY GRR MBtu	FY GRR kW	Ex Ante	Ex Post	LC GRR MMBtu	LC GRR kW	
SCE	F30890	500239437	SCE2013_Q4_0246998	5	0.38	2,941.00	0.00	30.11	0.96	1.00	12	12	0.96	1.00	-
SCE	F30909	500259470	SCE2013_Q4_0247075	5	0.22	1,930.00	0.00	19.76	0.93	1.07	15	8	0.50	0.57	-
SCE	F30922	500239437	SCE2013_Q4_0246993	5	0.19	1,470.50	0.00	15.06	0.00	0.00	12	12	0.00	0.00	-
NTGR-Only Completes															
SCE	F30002	500184353		1	1,166.28	7,896,045.40	0.00	80,847.61							0.57
SCE	F30010	500148313		2	358.09	3,136,857.00	0.00	32,118.28							0.62
SCE	F30040	ICXO-11-000025		3	87.00	869,363.00	0.00	8,901.41							0.54
SCE	F30044	500293791		3	94.82	814,049.50	0.00	8,335.05							0.50
SCE	F30045	500212333		3	94.46	810,951.30	0.00	8,303.33							0.50
SCE	F30050	500254201		3	100.08	724,833.50	0.00	7,421.57							0.50
SCE	F30059	500451848		3	84.50	678,288.00	0.00	6,944.99							0.43
SCE	F30084	500293856		3	63.09	541,582.00	0.00	5,545.26							0.50
SCE	F30122	500177279		4	22.25	380,403.90	0.00	3,894.96							0.52
SCE	F30182	500212338		4	27.19	233,429.00	0.00	2,390.08							0.50
SCE	F30216	500330373		5	37.18	196,870.00	0.00	2,015.75							0.45
SCE	F30244	500409403		5	19.25	165,271.50	0.00	1,692.21							0.50
SCE	F30363	500306766		5	37.20	101,197.00	0.00	1,036.16							0.51

IOU Site Specific GRR and NTG Results

					First Year Project-Level Positive Ex-Ante				FY GRR Project Level		Effective EUL		Lifecycle GRR Project Level		NTGR
IOU	ItronID	Application or ProjectID	Associated ClaimIDs	Sample Stratum	GrosskWPositive	GrosskWhPositive	GrossThermsPositive	GrossMBtuPositive	FY GRR MBtu	FY GRR kW	Ex Ante	Ex Post	LC GRR MMBtu	LC GRR kW	
SCG	G30001	5001171802	2013*SCG3715*5001171802*10	1	0.00	0.00	1,926,967.00	192,696.70	1.00		10	10	1.00		0.83
SCG	G30002	5001172908	2013*SCG3715*5001172908*10	1	0.00	0.00	1,764,349.00	176,434.90	0.98		14	14	0.98		0.90
SCG	G30003	5001171801	2013*SCG3715*5001171801*10	2	0.00	0.00	1,534,710.00	153,471.00	0.70		15	7	0.31		0.67
SCG	G30004	5001171800	2013*SCG3715*5001171800*10	2	0.00	0.00	1,112,789.00	111,278.90	0.82		10	7	0.55		0.67
SCG	G30005	5001164408	2013*SCG3715*5001164408*10; 2013*SCG3715*5001164408*20	3	0.00	0.00	482,230.00	48,223.00	0.00		19	19	0.00		-
SCG	G30006	5001173296	2013*SCG3715*5001173296*10	3	0.00	0.00	440,974.00	44,097.40	0.00		12	12	0.00		-
SCG	G30007	5001173502	2013*SCG3715*5001173502*10	3	0.00	0.00	361,694.00	36,169.40	0.00		20	0	0.00		0.90
SCG	G30009	5001170969	2013*SCG3715*5001170969*10	3	0.00	0.00	275,183.00	27,518.30	0.98		6	6	0.98		0.07
SCG	G30010	5001171609	2013*SCG3715*5001171609*10	3	0.00	0.00	273,824.00	27,382.40	0.00		20	20	0.00		-
SCG	G30011	5001168859	2013*SCG3715*5001168859*10	3	0.00	0.00	260,100.00	26,010.00	1.00		10	14	1.40		-
SCG	G30012	5001171056	2013*SCG3715*5001171056*10	3	0.00	0.00	260,000.00	26,000.00	0.87		20	14	0.61		0.60
SCG	G30014	5001171464	2013*SCG3715*5001171464*20; 2013*SCG3715*5001171464*30	4	0.00	0.00	226,943.00	22,694.30	0.07		19	7	0.02		0.27
SCG	G30015	5001175198	2013*SCG3715*5001175198*10	4	0.00	0.00	205,575.00	20,557.50	0.76		20	20	0.76		0.72
SCG	G30016	5001186682	2013*SCG3719*5001186682*10	4	0.00	0.00	198,771.00	19,877.10	0.00		5	5	0.00		-
SCG	G30017	5001171786	2013*SCG3715*5001171786*10	4	0.00	0.00	190,899.00	19,089.90	1.00		6	6	1.00		0.80
SCG	G30019	5001171354	2013*SCG3715*5001171354*10	4	0.00	0.00	168,656.00	16,865.60	0.03		20	20	0.03		0.18
SCG	G30021	5001171131	2013*SCG3715*5001171131*10	4	0.00	0.00	155,677.00	15,567.70	0.00		15	20	0.00		-
SCG	G30022	5001185581	2013*SCG3715*5001185581*10	4	0.00	0.00	154,513.00	15,451.30	1.00		15	11	0.73		0.05
SCG	G30023	5001189860	2013*SCG3715*5001189860*10	4	0.00	0.00	149,923.00	14,992.30	1.04		6	6	1.04		-
SCG	G30024	10047900	2013*SCG3757*10047900*217599	4	0.00	0.00	148,393.00	14,839.30	1.14		15	15	1.14		-
SCG	G30025	5001170517	2013*SCG3715*5001170517*10	4	0.00	0.00	135,027.00	13,502.70	0.20		14	7	0.09		0.43
SCG	G30028	5001180006	2013*SCG3715*5001180006*10	4	0.00	0.00	112,348.00	11,234.80	0.00		15	15	0.00		-
SCG	G30032	5001167623	2013*SCG3715*5001167623*10; 2013*SCG3715*5001167623*20	5	0.00	0.00	92,318.00	9,231.80	0.33		11	11	0.33		0.75
SCG	G30039	5001169787	2013*SCG3715*5001169787*10	5	0.00	0.00	61,791.00	6,179.10	1.01		11	11	1.01		0.57
SCG	G30046	5001181138	2013*SCG3710*5001181138*10	5	0.00	0.00	53,912.00	5,391.20	0.66		10	6	0.40		0.64
SCG	G30048	5001171152	2013*SCG3715*5001171152*10	5	0.00	0.00	51,091.00	5,109.10	0.97		12	12	0.97		-
SCG	G30055	5001189811	2013*SCG3715*5001189811*10	5	0.00	0.00	40,015.00	4,001.50	1.00		6	6	1.00		-
SCG	G30060	5001173075	2013*SCG3715*5001173075*10	5	0.00	0.00	31,359.00	3,135.90	3.84		20	20	3.84		-
SCG	G30066	5001165565	2013*SCG3710*5001165565*10	5	0.00	0.00	24,400.00	2,440.00	0.00		6	6	0.00		0.57
SCG	G30069	5001186073	2013*SCG3715*5001186073*10	5	0.00	0.00	23,580.00	2,358.00	0.34		11	11	0.34		-
SCG	G30072	5001170939	2013*SCG3710*5001170939*10; 2013*SCG3710*5001170939*20	5	0.00	0.00	22,786.00	2,278.60	0.00		10	5	0.00		-
SCG	G30088	5001169316	2013*SCG3710*5001169316*10	5	0.00	0.00	14,069.00	1,406.90	0.00		6	6	0.00		-
SCG	G30095	5001169317	2013*SCG3710*5001169317*10	5	0.00	0.00	11,214.00	1,121.40	0.00		6	6	0.00		-
SCG	G30097	5001170773	2013*SCG3715*5001170773*10	5	0.00	0.00	11,018.00	1,101.80	0.96		6	6	0.96		-
SCG	G30106	5001185524	2013*SCG3715*5001185524*10	5	0.00	0.00	8,302.00	830.20	0.86		11	11	0.86		-
SCG	G30131	5001184740	2013*SCG3710*5001184740*10	5	0.00	0.00	3,015.00	301.50	0.83		11	11	0.83		0.40
SCG	G30147	5001165736	2013*SCG3710*5001165736*10	5	0.00	0.00	1,110.00	111.00	1.00		15	15	1.00		-
SCG	G30154	5001173437	2013*SCG3710*5001173437*10	5	0.00	0.00	560.00	56.00	1.11		6	6	1.11		-
NTGR-Only Completes															
SCG	G30013	5001182126		4	0.00	0.00	244,483.00	24,448.30							0.57
SCG	G30111	5001168616		5	0.00	0.00	6,815.00	681.50							0.26
SCG	G30143	5001178106		5	0.00	0.00	1,718.00	171.80							0.48

IOU Site Specific GRR and NTG Results

					First Year Project-Level Positive Ex-Ante				FY GRR Project Level		Effective EUL		Lifecycle GRR Project Level		NTGR
IOU	ItronID	Application or ProjectID	Associated ClaimIDs	Sample Stratum	GrosskWPositive	GrosskWhPositive	GrossThermsPositive	GrossMBtuPositive	FY GRR MBtu	FY GRR kW	Ex Ante	Ex Post	LC GRR MMBtu	LC GRR kW	
SDGE	H30001	11-01-005	2013*SDGE3117E*5001201415*10; 2013*SDGE3117E*5001201415*20	1	415.00	5,766,588.00	0.00	59,044.09	1.02	1.18	15	7	0.45	0.53	0.70
SDGE	H30002	3125_46	2013*SDGE3220*5001184791*10; 2013*SDGE3220*5001184791*20	1	47.00	834,647.00	179,116.00	26,457.55	1.15	0.74	15	5	0.38	0.25	1.00
SDGE	H30003	4978	2013*SDGE3220*5001109294*10; 2013*SDGE3220*5001109294*20	2	0.00	2,432,481.00	5,250.00	25,431.17	0.22		11	8	0.16		0.52
SDGE	H30004	5182	2013*SDGE3220*5001135649*10; 2013*SDGE3220*5001135649*40; 2013*SDGE3220*5001135649*60; 2013*SDGE3220*5001135649*70; 2013*SDGE3220*5001135649*90	2	138.00	595,220.00	107,842.00	16,878.66	0.58	0.53	15	5	0.19	0.18	-
SDGE	H30006	12-01-003	2013*SDGE3117E*5001115640*10; 2013*SDGE3117E*5001115641*10	2	26.00	1,465,668.00	0.00	15,006.97	0.55	1.53	15	5	0.18	0.51	0.65
SDGE	H30009	5291	2013*SDGE3220*5001152813*10	3	121.60	1,160,389.60	0.00	11,881.23	0.00	0.00	20	15	0.00	0.00	-
SDGE	H30012	5279	2013*SDGE3220*5001149138*10; 2013*SDGE3220*5001149138*20	3	0.00	856,452.00	4,172.00	9,186.41	0.55		11	8	0.40		0.75
SDGE	H30013	12-01-001	2013*SDGE3117E*5001172239*10; 2013*SDGE3117E*5001172239*30	3	91.70	753,882.14	0.00	7,719.00	2.40	1.32	15	15	2.40	1.32	0.35
SDGE	H30014	3125_63	2013*SDGE3220*5001219317*10; 2013*SDGE3220*5001219317*20	3	0.00	638,592.00	22,073.00	8,745.84	0.89		15	5	0.30		1.00
SDGE	H30015	11-02-004	2013*SDGE3117E*5001188504*10; 2013*SDGE3117E*5001188592*10	3	85.50	702,043.60	0.00	7,188.22	1.01	1.28	15	1	0.07	0.09	0.60
SDGE	H30016	5015	2013*SDGE3220*5001115290*10; 2013*SDGE3220*5001115290*20	3	0.00	670,000.00	2,000.00	7,060.13	0.94		11	8	0.69		-
SDGE	H30018	5325	2013*SDGE3220*5001159212*10; 2013*SDGE3220*5001159212*20	3	0.00	616,473.00	3,003.00	6,612.37	0.38		11	8	0.27		0.59
SDGE	H30019	3125_77	2013*SDGE3117E*5001220003*10	3	65.00	590,887.00	0.00	6,050.09	1.00	1.00	20	15	0.75	0.75	1.00
SDGE	H30021	5274	2013*SDGE3231*5001147745*10	3	65.32	572,207.42	0.00	5,858.83	0.80	0.80	15	5	0.27	0.27	0.47
SDGE	H30024	2038-12	2013*SDGE3221*2038-12*1	4	77.00	456,286.00	8,624.00	5,534.31	0.97	0.90	15	8	0.52	0.48	-
SDGE	H30025	5304-1	2013*SDGE3220*5001147938*10; 2013*SDGE3220*5001147938*20	4	0.00	515,883.00	2,513.00	5,533.43	0.42		11	8	0.31		-
SDGE	H30027	12-03-001	2013*SDGE3117E*5001137022*10; 2013*SDGE3117E*5001179157*10	4	23.80	271,604.40	0.00	2,780.96	1.30	1.94	17	18	1.38	2.06	-
SDGE	H30029	5313	2013*SDGE3231*5001157145*10	4	57.07	445,378.20	0.00	4,560.23	0.00	0.00	20	20	0.00	0.00	-
SDGE	H30030	5432	2013*SDGE3220*5001193516*10	4	0.00	430,135.00	0.00	4,404.15	0.30		15	15	0.30		-
SDGE	H30034	3126_09	2013*SDGE3117E*5001192448*10	4	0.00	392,089.00	0.00	4,014.60	0.58		20	20	0.58		0.21
SDGE	H30036	4563	2013*SDGE3220*5001010589*10	4	0.00	370,820.00	0.00	3,796.83	0.47		15	15	0.47		0.19
SDGE	H30038	61364	2013*SDGE3221*2068-01-02*1	4	0.00	27,892.00	32,485.00	3,534.09	0.43		15	8	0.23		0.34
SDGE	H30043	3125_59	2013*SDGE3220*5001219724*10; 2013*SDGE3220*5001219724*20	4	0.00	146,435.00	12,219.00	2,721.25	1.00		15	5	0.33		1.00
SDGE	H30045	4677	2013*SDGE3220*5001207924*10; 2013*SDGE3220*5001207924*40	4	0.00	247,573.00	0.00	2,534.90	0.96		15	15	0.96		-
SDGE	H30046	5324	2013*SDGE3220*5001159188*10; 2013*SDGE3220*5001159188*20	4	0.00	244,290.00	1,190.00	2,620.29	-0.06		11	8	-0.05		0.77
SDGE	H30050	5259	2013*SDGE3231*5001142226*10	4	32.68	246,862.00	0.00	2,527.62	0.61	0.64	10	10	0.61	0.64	0.85
SDGE	H30054	50438	2013*SDGE3221*2038-02-02*1	4	9.00	124,345.00	10,060.00	2,279.17	0.53	0.71	15	10	0.36	0.47	-
SDGE	H30059	5001175973	2013*SDGE3222*5001175973*10; 2013*SDGE3222*5001175973*20	5	42.30	198,361.00	0.00	2,031.02	1.43	1.40	10	15	2.14	2.10	-
SDGE	H30060	11-02-004	2013*SDGE3117E*5001112227*10; 2013*SDGE3117E*5001112243*10	5	38.80	197,496.20	0.00	2,022.16	0.50	2.12	18	20	0.55	2.51	0.45
SDGE	H30082	4944	2013*SDGE3220*5001169487*10	5	16.44	144,899.10	0.00	1,483.62	1.21	1.12	15	13	1.04	0.96	-
SDGE	H30095	5285	2013*SDGE3231*5001150475*10; 2013*SDGE3231*5001150475*30	5	26.77	107,255.00	0.00	1,098.18	1.00	1.00	14	12	0.84	0.98	0.30
SDGE	H30097	4887	2013*SDGE3220*5001094095*10	5	42.00	107,040.00	0.00	1,095.98	0.69	0.42	15	7	0.31	0.19	0.48
SDGE	H30102	4330	2013*SDGE3220*5000887139*10	5	0.00	95,842.00	0.00	981.33	0.10		11	8	0.07		-
SDGE	H30131	5298	2013*SDGE3220*5001154663*10	5	5.60	49,014.00	0.00	501.85	1.05	1.18	10	10	1.05	1.18	0.76
SDGE	H30188	5101	2013*SDGE3220*5001198266*20	5	1.88	16,483.80	0.00	168.78	1.66	0.96	10	10	1.66	0.96	-
SDGE	H30208	4331	2013*SDGE3220*5000887142*10	5	0.00	11,418.00	0.00	116.91	0.10		11	8	0.07		-
SDGE	H30218	5094	2013*SDGE3220*5001136567*10	5	1.03	9,050.80	0.00	92.67	2.80	1.43	10	10	2.80	1.43	-
SDGE	H30233	5240	2013*SDGE3220*5001223741*10	5	0.57	4,982.69	0.00	51.02	0.95	0.95	12	4	0.32	0.32	0.28
SDGE	H30235	5240	2013*SDGE3220*5001223753*10	5	0.57	4,982.69	0.00	51.02	0.32	0.32	12	4	0.11	0.11	0.28
SDGE	H30243	5240	2013*SDGE3220*5001223668*10	5	0.38	3,321.79	0.00	34.01	0.95	0.95	12	4	0.32	0.32	-

IOU Site Specific GRR and NTG Results

					First Year Project-Level Positive Ex-Ante				FY GRR Project Level		Effective EUL		Lifecycle GRR Project Level		NTGR
IOU	ItronID	Application or ProjectID	Associated ClaimIDs	Sample Stratum	GrosskWPositive	GrosskWhPositive	GrossThermsPositive	GrossMBtuPositive	FY GRR MBtu	FY GRR kW	Ex Ante	Ex Post	LC GRR MMBtu	LC GRR kW	
SDGE	H30247	5240	2013*SDGE3220*5001223736*10	5	0.38	3,321.79	0.00	34.01	0.95	0.95	12	4	0.32	0.32	-
SDGE	H30259	5240	2013*SDGE3220*5001223637*10	5	0.19	1,660.90	0.00	17.01	0.95	0.95	12	4	0.32	0.32	-
SDGE	H30260	5240	2013*SDGE3220*5001223684*10	5	0.19	1,660.90	0.00	17.01	0.95	0.95	12	4	0.32	0.32	-
NTGR-Only Completes															
SDGE	H30042	4902		4	0.00	144,770.00	13,752.00	2,857.50							0.50
SDGE	H30107	4800		5	13.00	90,780.60	0.00	929.50							0.57
SDGE	H30125	5385-1		5	14.00	54,339.00	0.00	556.38							0.46
SDGE	H30155	5528		5	0.00	32,062.00	0.00	328.28							0.18
SDGE	H30227	5050-1		5	1.56	6,794.60	0.00	69.57							0.57

Appendix B

PPA Scoring Guidelines for Site Reporting Forms

Each of the 189 EM&V sample points has a Site Reporting Form that contains project information, a site specific measurement and verification plan (SSMVP), a project practices assessment (PPA), and a final site report (FSR). The SSMVP provides the evaluator's plan for conducting the onsite field work. The FSR component is comprised of as-found conditions, analysis methods, impact results, discrepancies with ex ante claims, GRRs, NTG information, and suggestions to improve ex ante savings claim estimates.

The PPA section of the Site Reporting Form contains 21 individual ratings provided by the evaluation team addressing the IOU's *project documentation, descriptions, quality, and appropriateness* of measure eligibility, baseline claim, EUL, project cost basis, incentive, and calculation methodology, modeling, assumptions and inputs. This appendix highlights the instructions for scoring the project eligibility, baseline/costs, and calculation methods sections of the PPA.

B.1 Project Eligibility Rating

Routine projects, for example, to add a VFD or replace boiler may not have any IOU documentation on eligibility and that should not affect the eligibility ratings. For example, *SCE has an eligibility check built into its IT system to reject ineligible applications, which are then manually reviewed to make a decision to override. An assumption then is that all SCE applications have been reviewed for eligibility whether documented or not.*

The IOU should provide supporting documentation (or an explanation) where key, applicable show-stoppers were identified in the past. These may include: fuel switching, cogeneration at site, code/ISP, AQMD/industry regulations, project payback threshold in RCx, O&M, non-operational existing equipment, like-for-like equipment replacement, regressive baseline, comprehensive measure packages eligible for higher incentives.

B.1.1 Rate appropriateness of eligibility treatment

For routine projects[1]

- Provide a rating of 3 – i.e., effort meets expectations

For non-routine projects

1. No evidence of any investigation conducted by the IOU
2. Minimal investigation conducted by the IOU to check the eligibility requirements, lacks detailed narrative and documentation
3. IOU verified all requirements with a narrative
4. IOU verified all requirements and documented the rationale with citations
5. IOU verified all requirements, documented the rationale with citations, and provided additional documentation with analysis/research when applicable

B.1.2 Rate quality of eligibility documentation

For routine projects

- Provide a rating of 3 – i.e., effort meets expectations

For non-routine projects

1. No explanation or documentation by the IOU
2. Minimal explanation by the IOU about the eligibility of the project without any supporting documentation
3. Good explanation by the IOU about the eligibility of the project including supporting documentation detailing the investigation conducted
4. Good explanation by the IOU about the eligibility of the project including extensive supporting documentation with details of the investigation conducted
5. Good explanation by the IOU about the eligibility of the project including extensive supporting documentation details of the investigation conducted, and calculations/research performed

B.2 Quality of Baseline Documentation Rating:

For early replacement, add-on measure (REA), or system optimization projects:

1. No documentation or discussion included to support the baseline. For example, no information about age, condition and RUL assessment of the existing equipment provided for ER, IOU influence not documented

[1] A routine measure includes all standard add-on measures (such as VFDs, controls, insulation, and heat recovery measures), building envelope measures, RCx measures, and standard high efficiency retrofit measures (boilers, chillers, pumps, fans, motors, etc.). Non-routine measures include specialty refrigeration, oil refinery, RTOs, some non-maintenance IRCx measures, DCV, split pass flow design, natural gas-fired cooking equipment, complex system modifications, or uncommon measures.

2. Age, condition and RUL assessment of the existing equipment provided, IOU influence not documented
3. Age, condition, RUL assessment, capability of performance through RUL of the existing equipment provided, IOU influence not documented
4. Age, condition, RUL assessment, capability of performance through RUL, maintenance records, normal facility practices and standard industry practices information provided; minimal IOU influence documentation
5. Age, condition, RUL assessment, capability of performance through RUL, maintenance records, normal facility practices, standard industry practices information, provided; IOU influence fully documented

For new construction, capacity expansion and major renovation projects:

1. No documentation or discussion included to support the baseline.
2. Code/ISP mentioned, but the documentation/explanation about baseline selection is not included
3. Code/ISP review conducted, capability of baseline equipment meeting facility requirements has been assessed, efficiency levels of the baseline equipment provided; the baseline rationale is briefly documented
4. Code/ISP review conducted, capability of baseline equipment meeting facility requirements has been assessed, and efficiency levels of the baseline equipment provided, baseline rationale is narrated with partial supporting documents
5. Code/ISP review conducted, capability of baseline equipment meeting facility requirements assessment, efficiency levels of the baseline equipment, baseline rationale is narrated with full supporting documentation

For natural replacement and ROB projects:

1. No documentation or discussion included provided to support the baseline.
2. Age, condition and RUL assessment of the existing equipment and evidence of functionality of the existing system provided; code/ISP review cited briefly. Normal replacement and upgrade practices quoted. Capability of baseline equipment to meet functional requirement not provided. Non-regressive baseline not demonstrated.
3. Age, condition and RUL assessment of the existing equipment and evidence of functionality of the existing system provided; code/ISP review provided as a narrative. Normal replacement and upgrade practices described in detail but evidence not included. Capability of baseline equipment to meet functional requirement provided. Non-regressive baseline explained.
4. Age, condition and RUL assessment of the existing equipment and evidence of functionality of the existing system provided; code/ISP review provided referencing documentation. Normal replacement and upgrade practices described in detail with evidence included. Capability of baseline equipment to meet functional requirement provided. Non-regressive baseline explained with analysis.
5. Age, condition and RUL assessment of the existing equipment and evidence of functionality of the existing system provided; code/ISP review provided referencing documentation. Normal replacement and upgrade practices described in detail with

evidence included. Capability of baseline equipment to meet functional requirement provided. Non-regressive baseline explained with analysis. Additional research conducted to support baseline determination for the majority of the previously mentioned factors.

B.3 Rate EUL Documentation

Projects that use DEER EULs do not need special documentation; only a properly assigned EUL is necessary.

1. EUL has not been assigned in project documentation.
2. EUL assigned in the project documentation does not match with the EUL (DEER or otherwise) or EUL is found to be incorrectly claimed.
3. EUL from project documentation matches the DEER EUL.
4. EUL for measures for which DEER EUL is not available. One or more reliable source of EUL is used.
5. EUL for measures for which DEER EUL is not available. The EUL claim is supported by additional research when secondary sources were not reliable.

Rate RUL Documentation:

1. RUL estimate has not been provided in the project documentation.
2. RUL estimate provided in project documentation is inaccurate.
3. RUL in the project documentation is accurately assigned as the default RUL i.e., one-third of EUL
4. RUL is not the default values, and plausible arguments have been presented to support the RUL assignment
5. RUL is not the default value, and plausible arguments have been presented to support the RUL assignment. RUL estimate is supported with additional sources such as customer interviews, maintenance records, research about facility requirements, and market research for similar equipment type

Project Baseline Appropriateness Rating:

1. ER has been specified as the baseline; second baseline has not been specified in project documentation
2. ER has been specified as the baseline; second baseline has been specified (right or wrong) in project documentation
3. ER has been specified as the baseline; second baseline has been ACCURATELY specified in project documentation. A narrative has been included for the second baseline assignment.
4. ER has been specified as the baseline; second baseline has been ACCURATELY specified in project documentation. A narrative and some level of supporting documentation have been included for the second baseline assignment.

5. ER has been specified as the baseline; second baseline has been ACCURATELY specified in project documentation. A narrative has been included for the second baseline assignment and supporting documentation includes additional research.

Baseline Description (Equipment/Efficiency) Rating:

Complete section for all project types; for ER measures also include ratings of the EUL – RUL period.

1. Neither baseline equipment nor efficiency level were described in project documentation. Wrong baseline equipment selected for non-ER projects; wrong baseline equipment described for both baselines for ER projects.
2. Baseline equipment inferred (in calculations), partially described, or no efficiency levels provided in project documentation. For ER projects, wrong baseline described for one of the two baselines.
3. Baseline equipment fully described and accurately identified in project documentation.
4. Baseline equipment fully described and accurately identified in project documentation AND baseline efficiency levels identified.
5. Baseline equipment fully described and accurately identified AND baseline efficiency levels identified and fully described in project documentation.

Project Cost Data Rating:

Full Project Cost Documentation Rating:

1. Full cost documentation not provided
2. Full cost documentation provided as one invoice for installed cost that does not describe the minimal measure specs and lacks itemized material/labor breakdown
3. Full cost documentation for material and labor is provided separately but lacks itemized breakdown within each category; minimal measure specs are provided
4. Full cost documentation for material and labor is fully itemized; moderate level measure specs are provided
5. Engineering grade itemized documentation for ALL costs (equipment, installation labor, engineering design, disposal, permitting, etc.) incurred is provided with full specifications.

Incremental Project Cost Documentation Rating:

1. Incremental cost documentation not provided
2. Incremental cost documentation provided as one invoice for installed cost that does not describe the minimal measure specs and lacks itemized material/labor breakdown
3. Incremental cost documentation for material and labor is provided separately but lacks itemized breakdown within each category; minimal measure specs are provided
4. Incremental cost documentation for material and labor is fully itemized; moderate level measure specs are provided

5. Engineering grade itemized documentation for all incremental costs (equipment, installation labor, engineering design, disposal, permitting, etc.) incurred is provided with full specifications.

Full Project Cost Quality Rating:

1. Sources for cost estimates not provided
2. Reliable sources (invoices, price quotes from manufacturers, etc.) for cost estimate does not include all items included in the project cost
3. Reliable sources (invoices, price quotes from manufacturers, etc.) for cost estimate includes all items included in the project cost
4. Reliable sources (invoices, price quotes from manufacturers, etc.) for cost estimate includes all items - material and labor is fully itemized in the project cost
5. Reliable sources (invoices, price quotes from manufacturers, etc.) for cost estimate includes all items – material, labor and design is fully itemized in the project cost

Rate appropriateness of full project cost data:

1. First baseline (ER, Add-on, System Opt, NR, ROB, NC, Cap Exp, Major Ren) or second baseline (ER only) costs not provided or are inconsistent with the baseline chosen
2. First baseline or second baseline (ER only) have been provided at an aggregate level, but are consistent with the baseline chosen
3. First baseline or second baseline (ER only) have been provided, broken down by equipment and labor, and are consistent with the baseline chosen
4. First baseline or second baseline (ER only) have been provided, broken down by equipment and labor, and are consistent with the baseline chosen; plus supporting documentation has been included from manufacturers/trade allies/design firms.
5. First baseline or second baseline (ER only) have been provided, broken down by equipment and labor, and are consistent with the baseline chosen; plus supporting documentation has been included from manufacturers/trade allies/design firms with each cost component further broken down into constituent categories

Incremental Measure Cost (IMC) Quality Rating:

1. Sources for IMC estimates not provided
2. Reliable sources (invoices, price quotes from manufacturers, etc.) for cost estimate does not include all items included in the project cost
3. Reliable sources (invoices, price quotes from manufacturers, etc.) for cost estimate includes all items included in the project cost
4. Reliable sources (invoices, price quotes from manufacturers, etc.) for cost estimate includes all items - material and labor is fully itemized in the project cost
5. Reliable sources (invoices, price quotes from manufacturers, etc.) for cost estimate includes all items – material, labor and design is fully itemized in the project cost

Rate appropriateness of IMC data:

1. First baseline (NR, ROB, NC, Cap Exp, Major Ren) or second baseline (ER) costs not provided

2. First baseline (NR, ROB, NC, Cap Exp, Major Ren) or second baseline (ER) costs have been provided at an aggregate level
3. First baseline (NR, ROB, NC, Cap Exp, Major Ren) or second baseline (ER) costs have been provided, broken down by equipment and labor, and are consistent with the baseline chosen
4. First baseline (NR, ROB, NC, Cap Exp, Major Ren) or second baseline (ER) costs have been provided, broken down by equipment and labor, and are consistent with the baseline chosen; plus supporting documentation has been included from manufacturers/trade allies/design firms
5. First baseline (NR, ROB, NC, Cap Exp, Major Ren) or second baseline (ER) costs have been provided, broken down by equipment and labor, and are consistent with the baseline chosen; plus supporting documentation has been included from manufacturers/trade allies/design firms with each cost component further broken down into constituent categories

B.4 Incentive Appropriateness Rating:

1. Incentives incorrectly calculated or incorrect cap applied or tracking data incentives do not match project documentation
2. Incentives correctly calculated but incorrect incentive cap applied or tracking data incentives do not match project documentation
3. Incentive and cap correctly calculated but tracking data incentives do not match project documentation
4. Incentives correctly calculated, appropriate cap used and the tracking data incentives match the project calculations
5. Incentives correctly calculated, appropriate cap used and the tracking data incentives match the project calculations for both full and incremental measure costs for an ER measure.

If the cap is not triggered since the incentives are lower than the eligible cap, then either 1) leave all check boxes blank or select the box marked as “Incentive cap not triggered” box.

B.5 Project Calculation Methods Rating:

Rate appropriateness of the model applied:

1. Calculation model is not suitable for the project
2. Calculation model is appropriate, but does not consider key factors that impact the savings (e.g., weather, production or seasonal adjustments not performed)
3. Calculation model is appropriate and considers key factors that impact the savings (e.g., weather, production or seasonal adjustments performed)

4. Calculation model considers key factors that impact the savings (e.g., weather, production or seasonal adjustments performed) and includes extensive M&V data collection in support of the model
5. Calculation model considers the factors that impact the savings (e.g., weather, production or seasonal adjustments performed) and includes extensive pre- and post-installation M&V data collection in support of the model and alternative methods are used to check reasonableness of savings

Rate quality of the model documentation:

1. Documentation not provided to explain the calculation model or model cannot be used by evaluator because it was locked, protected or provided in PDF format, or the model is missing input or output files.
2. Documentation provided is insufficient (minimal) to explain the calculation model. For example, post installation calculation model is well documented showing parameter relationships, but baseline calculation model lacks clarity.
3. Documentation provided is sufficient to explain calculation model for pre- and post-installation conditions.
4. Documentation provided is sufficient to explain calculation model for pre- and post-installation conditions, M&V data has been integrated when applicable, and special treatment of unusual data has been explained
5. Documentation provided is sufficient to explain calculation model for pre- and post-installation conditions, M&V data has been integrated when applicable, and special treatment of unusual data has been explained and the model has been validated or calibrated.

Rate accuracy of the model:

1. Calculation model is not verifiable, is invalid or is unacceptable.
2. Calculation model does not use site-specific values for key parameters/variables or reliable typical input values (such as, flow rates, pressures, temperatures, weather data or production data)
3. Calculation model uses site-specific values and reliable typical input values (such as, flow rates, pressures, temperatures, weather data or production data)
4. Calculation model uses site-specific values supported by M&V, trend logs, SCADA, production data as applicable, and uses reliable typical input values (such as, flow rates, pressures, temperatures, weather or production data)
5. Calculation model uses ALL site-specific values supported by M&V, trend logs, SCADA, production data as applicable

B.6 Inputs and Assumptions Rating:

Rate Comprehensiveness of the Inputs:

1. Inputs and assumptions used in the calculations are not verifiable or missing.

2. Calculation model does not include all relevant inputs (e.g., load factor, efficiency, flow, power factor) and assumptions (e.g., weather, production or seasonal adjustments performed).
3. Calculation model includes most relevant inputs (e.g., load factor, efficiency, flow, power factor) and assumptions (e.g., weather, production or seasonal adjustments performed).
4. Calculation model includes ALL relevant inputs (e.g., load factor, efficiency, flow, power factor) and assumptions (e.g., weather, production or seasonal adjustments performed).
5. Calculation model includes ALL relevant inputs (e.g., load factor, efficiency, flow, power factor) and assumptions (e.g., weather, production or seasonal adjustments performed), AND are clearly described within the documents or models.

Rate Documentation Quality for inputs and assumptions:

1. No supporting sources provided for inputs and assumptions used in the calculations
2. Supporting sources provided for some inputs and assumptions used in the calculations
3. Supporting sources provided for all critical inputs and assumptions (parameters that have high impact on savings) used in the calculations
4. Supporting sources provided for ALL inputs and used conservative assumptions used in the calculations
5. Supporting sources provided for ALL inputs and including research for conservative assumptions used in the calculations.

Rate Accuracy of the Inputs and assumptions:

1. Inputs and assumptions used in the calculations are not verifiable or inaccurate for some of the parameters
2. Inputs and assumptions are inaccurate for all the parameters used in the calculations
3. Inputs and assumptions are accurate for all the parameters used in the calculations
4. Inputs and assumptions are accurate and conservative for all the parameters used in the calculations
5. Inputs developed are accurate and research was conducted to develop conservative assumptions used in the calculations

Appendix C

Custom Impact EM&V Procedures & Protocols

The Custom Impact Evaluation Procedures and Protocols document that comprises Appendix C was developed as a stand-alone reference document for all evaluation staff working on the project and conducting EM&V activities (whether Itron employees or our engineering subcontractors). The document provides key information about all aspects of the project, such as schedule, M&V rigor levels, application review procedures, data collection protocols, M&V plan development, QA-QC processes, and guidelines for completing the PPA section of the FSR, among other information. The Procedures and Protocols document is included in this Appendix in its original form, including the cover page and table of contents, for the reader's convenient reference.

Itron
Knowledge to Shape Your Future

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information collection, analysis and application

2013-2014 IALC Custom Impact Evaluation

Procedures for Site-Specific Impact Analysis

Submitted to:

Energy Division
California Public Utilities Commission
505 Van Ness Ave.
San Francisco, CA 94102

Submitted by:

Itron, Inc.
1111 Broadway, Suite 1800
Oakland, CA 94607
(510) 844-2800

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Custom Impact Evaluation Procedures and Protocols

This impact evaluation for the 2013-2014 program years focuses on custom non-deemed energy efficiency projects in the industrial, agricultural and large commercial sectors. The evaluation effort includes an ex post (i.e., post-installation) assessment of energy savings for a planned sample of 315 projects (190 for 2013 evaluation effort plus 125 for the 2014 effort). The objective of this evaluation is to compare and contrast the ex ante (reported and claimed) energy impact estimates found in the IOU-supplied project tracking systems and financial incentive applications to the independent evaluation findings (i.e., the ex post energy impact findings). In this process, we will employ detailed application review; on-site measurement and verification; data collection from multiple sources; and revisions to ex ante (or completely independent) calculations. Additionally, we will collect other project specific information deemed relevant to the research plan.

The overall goal of the evaluation is to obtain unbiased, reliable estimates of program/sector level energy savings and kW demand reduction over the life of the measure and the expected net impacts. In addition to the energy impact analysis task that is the focus of this document, Itron will be conducting several other tasks as part of the overall evaluation. These tasks include interviews with utility program managers, energy efficiency service providers (EESPs), and program participants; a small number of program non-participants may also be interviewed. These interviews will allow estimation of the program net-to-gross ratio (NTGR) and inform net–to-gross (NTG) findings. It is particularly important to note that a separate team will conduct NTG-related in depth interviews (or CATI surveys) with each of the end users included in the impact evaluation sample. **These interviews will be conducted by telephone and will be coordinated with the on-site work conducted by the engineering team. The engineering gross impact team is responsible for knowing the current status of the NTG efforts and must also inform the project contacts of the timing of these efforts, if not already conducted.**

Engineering team members should refer to the *Research Plan*[1] submitted to the CPUC for more information on specific tasks and overall project objectives. Contact information for lead project staff will be provided and updated as necessary. However**, subcontractors should contact Itron staff on project-related issues, and SHOULD NOT contact CPUC staff or IOU staff directly, unless specifically instructed to do so.**

[1] Expected to be available on www.energydataweb.com

Note that Itron may request changes to this procedures manual at the CPUC's directions at any time.

1.1 Project Schedule

Measurement and verification (M&V) planning, data collection and analysis for the site-specific impact evaluations are expected to begin in 2014 and are scheduled to be completed in 2015. The overall evaluation effort will be split between 2013 and 2014 claim years. The 2013 claim year schedule requires 40 to 45 project evaluations to be completed per month. Exact timing will be dependent on the provision of complete application data from the IOUs. Work on the projects in the 2013 claim year began in September 2014 and completed in early January 2015 with analysis and report writing planned for completion in mid-March. Work on the Q1-Q2 2014 projects is expected to begin in March 2015. More detailed schedule information, particularly for the projects in the 2014 claim year, will be provided in the work authorizations for each subcontractor.

1.2 Useful Definitions

California Public Utilities Commission's Energy Division (*CPUC-ED*). The CPUC is the end client for this evaluation study. CPUC ED staff is responsible for overseeing the delivery of the evaluations.

Investor Owned Utilities (**IOUs**). The impact evaluation will be focused on energy efficiency programs administered by the four California Investor Owned Utilities (**IOUs**): Pacific Gas and Electric (PG&E), Southern California Edison (SCE), Southern California Gas Co., and San Diego Gas and Electric (SDG&E).

Customer. A customer is a unique company or corporation which purchases energy from one of the California IOUs.

Application. An application for financial incentives is received from (or on behalf of) a customer entity which participates in an energy efficiency program (by way of the installation of program qualifying energy efficiency measures) at one or more sites. A customer may have prepared a single incentive application to cover either multiple measures or multiple sites or both; an application may also involve a single measure at a single site.

Project Sponsor. A project sponsor is the entity that executes and submits the application to the IOU. Customers can serve as their own sponsor or may elect to have a third party (such as an ESCO, a lighting contractor, or an HVAC contractor, collectively referred to as ***energy efficiency service providers*** or ***EESPs***) execute the agreement on their behalf. The project

sponsor may receive the incentive payment if the customer directs the IOU to pass it onto the sponsor.

Tracking System. Each IOU has its own ***tracking system***, a database configured to track various pertinent parameters of the application process. The tracking system is periodically updated. Itron will receive this data periodically from the IOUs and maintain its own statewide tracking system to support this evaluation. The relevant project data will be passed on to the assigned evaluation team member or subcontractor.

For a given application, there can be multiple measures (such as high efficiency AC packaged units and the installation of a VFD on a chiller) in one end use. Note that multiple tracking system records may be created when a given IOU tracks either multiple measures or multiple applications for a given customer. Each project evaluation covers only one tracking system project; these may however, include multiple records or tracking system 'line items' (entries).

Reviewer. The IOU incentive program includes a review process. The "**reviewer**" may be IOU staff or may be an outside contractor hired by the IOU to review and approve the projects, calculations, and accompanying incentive applications.

Impact Evaluation. Itron and its subcontractors are performing a ***"gross impact evaluation"*** for the 2013- 2014 Industrial, Agricultural and Large Commercial Custom Energy Efficiency programs. This evaluation is designed to yield accurate estimates of energy savings that actually result from these programs.

Ex ante savings / ex ante calculations. The "***ex ante***" (i.e., forward-looking) savings estimates and calculations are included in the application documents. The ex ante savings are reported by the IOUs as the estimated savings in the IOU tracking systems and form the savings basis for the projects in this evaluation effort.

Ex post savings / ex post calculations. The "***ex post***" (after the fact) savings estimates are the evaluation results after revised figures or calculation methodologies are applied by the evaluation team to adjust the energy savings or demand reduction estimates. In a few cases, where operating reports supplement installation reports, the IOUs may have also conducted some post installation measurements and recalculations (which typically results in an adjustment to the tracking system and revised ex post figures).

Evaluator. The "***evaluator***" is the individual responsible for the project-specific impact investigation.

Evaluation Team. The ***"evaluation team"*** is composed of all individuals and firms involved in a specific project review. The evaluation team will review the ex ante calculations and other

information included in the application documents; prepare M&V plans; perform site specific M&V and data collection; calculate ex post energy savings and/or demand reduction estimates; prepare final site reports to submit project results; and conduct program practices assessments (PPAs) after the final site reports for program comparison efforts. The PPA is described later in this document and is similar to the lower rigor assessment (LRA) performed for the PY2010-12 custom impact WO033 effort. Both subcontractors and Itron will maintain and employ, as part of the evaluation team, assigned quality control staff to review each project.

Gross Realization Rate (GRR). The ratio of the ex post savings to the ex ante savings is the ***"gross realization rate***". If the ex post evaluation effort confirms that energy savings are realized from the measure under investigation, the GRR is positive and greater than, equal to, or less than 1.00 (100%). If the measure increases energy use, the GRR is negative. If zero energy savings are attributed to the measure, the GRR is zero.

Strata/ Stratum. Itron identified a statistically valid sample of projects within five individual ***"stratum"*** for this evaluation; these ***strata*** refer to the quantity of claimed energy savings. There are five strata for each IOU, with electric and gas savings combined on an MMBtu basis for utilities with both electric and gas savings. This stratification is required to capture the influence of the few projects which represent the majority of savings for the programs. Each stratum is assigned a weight to scale the savings from the sample results to the entire population in order to obtain program/sector/population results. Sample points in the large-project strata have a small sample weight and sample points in the small-project strata have a larger sample weight, thus; the sample points in the large-project strata may represent only the sampled project for a few larger projects whereas the sample points in the small-project strata represent the savings from a large number of other projects.

Rigor Levels. Sites are classified in this evaluation according to two **"rigor levels"** depending on the level of complexity of the measures and the likely degree of analysis and on-site work required. The stratum assigned to the project is a factor in determining the rigor level for particular sampled projects. Table 1.1 below provides an overview of the expected project M&V tasks for each rigor level. All activities during this evaluation are expected to fall into either Level 1 (called larger strata 1or 2 projects) or Level 2 (smaller strata 3, 4, or 5 projects). Projects will be assigned to evaluation teams in groups with a maximum allowable evaluation budget that allows costs not spent on less complex projects to be applied to larger, more complex projects. In order to allow this reallocation, each team should work as efficiently as possible to provide the maximum value to the entire evaluation effort. Note that project costs are a "not to exceed" cost and include M&V expenses, travel expenses, and travel time. Evaluation teams are urged to consolidate site visits and minimize costs to maximize product quality. Each project evaluation may include multiple reviews and evaluation teams need to budget for that eventuality.

CMPA DEERESOURCES.INFO EM&V Portal. All project documentation including IOU data and responses to data requests, Itron and its subcontractors' project evaluation files, etc. will be stored on a secure web platform administered by the CPUC. Each point of contact from the evaluation team will receive access to this web portal. The CMPA EM&V portal facilitates review back-and-forth efforts to be carried out using the respective project location.

M&V Description for Proposed Engineering Rigor Levels

Level 1
Large or relatively complex projects (strata 1 & 2). Detailed application review, PPA, on-site verification, collection of data on key parameters, billing/interval data analysis, engineering models, spot measurements, short-term post monitoring, and baseline verification. Expected maximum effort: 40 hrs/project; Maximum allowable cost: $7,000 per project.
Level 2
Smaller, simpler projects (strata 3, 4 &5). Desk review, PPA, baseline verification, on-site verification, collection of data on key parameters, revised engineering calculations, billing data analysis, and possible spot measurements. Expected maximum effort: 20 to 25 hours per project; Maximum allowable cost: $4,000 per project.

1.3 Procedures and Protocols

1.3.1 Application Review

Each site specific evaluation will begin with the evaluator commencing review of the ex ante documentation and tracking details for each project provided by Itron. The materials to be reviewed are obtained from the IOUs and may include electronic application records, utility bills, tracking system data, customer contact information, etc.

An Itron-generated and pre-populated MS Excel form will be used to create the three primary components of the site evaluation including the Program Practices Assessment (PPA), Site-Specific Measurement and Evaluation Plan (SSMVP), and Final Site Report (FSR) for each site in the assigned M&V sample. Note: This differs from previous years when MS Word documents were used. This will make completing forms more straightforward than the multiple documents used during the previous evaluations. This single Excel form is called the Site Reporting Form.

1.3.2 Co-ordination with Ex Ante Review (EAR) Team

For each assigned project, the evaluation team will coordinate with their assigned Itron QC reviewer and with the EAR team in guiding baseline selection and savings calculations for similar projects or measures where there is precedence set as part of the EAR process. For the

sample points which overlap with the EAR points, the evaluation team (including the Itron QC reviewer) will plan for appropriate level of ex post analysis based on the EAR findings.

Tracking data extracts will be posted to CMPA for each of the M&V sample points that include information on any ISP guidance or related EAR projects that may provide guidance, list issues, or describe evaluation methodologies. The Itron QC reviewers will assist thee evaluation team in obtaining or locating these documents on the CMPA EM&V portal.

1.4 Site Visit Setup

This section provides guidance for establishing initial customer contact and securing consent to visit the site for conducting measurement and verification (M&V). Customer approval to visit the site is a pre-requisite for developing the site-specific measurement and verification plan (SSMVP). The SSMVP should not be prepared until the participant has agreed to allow access to perform on-site M&V activities. Contact Itron's project manager or your Itron QC reviewer if the facility fails to return calls or refuses to allow site access so that additional resources can be called upon to facilitate customer cooperation or so that a backup site can be assigned. For difficult-to-recruit large strata sites, or where a back-up may not be available, Itron staff will work with IOU and CPUC staff to assist the evaluation team in the customer recruitment process.

1.4.1 Utility Representative Contact

Itron will provide the contact information for each customer's utility account executive/ representative or the local program coordinator. **Before contacting the customer** the evaluator should contact the customer's utility account executive/representative or the local program coordinator to inform them of the intent to contact the customer in two business days regarding the evaluation. If possible, the utility account representative should be asked to confirm the site contact information, telephone number, email addresses, cellular numbers, and alternate contact information. The utility account representative should also be asked to alert the customer of the names of the individuals and firms conducting the evaluation for Itron. The most efficient approach is generally by email with the evaluation authorization letter from the CPUC attached, and followed immediately by a telephone call to both office and cellular lines that day and the following business day. Itron will assist, if needed, with templates of account executive and customer notification emails (these notifications follow those used in the preceding 2010 -2012 evaluation).

If any difficulties are encountered contacting the utility account representative within one to two calendar days, the evaluation team will notify their Itron QA reviewer immediately to provide assistance. Tracking data may contain outdated or inaccurate contact information; the IOU evaluation leads can provide updates through Itron.

1.4.2 Initial Customer Contact

The evaluation team may contact the customer on the second business day after alerting the IOU representative. The team should briefly review the application documents provided by Itron to assist in an understanding of the project scope, the formulation of the M&V plan, and site visit activities. The evaluator may wish to contact (via Itron) the utility reviewer or reviewing firm at this stage for clarifications on the application paperwork and request any follow-up site data if needed.

Prompt customer contact to allow for maximum scheduling flexibility and is key to ensure timely project completion.

Itron will provide each evaluation team with site contact information based on program tracking system records and contact information provided by the IOU. **If any difficulties are encountered contacting the customer, inform Itron immediately for assistance.** Tracking data will, in some instances, contain outdated or inaccurate contact information. Itron will contact the IOU to obtain updates, as needed.

Site recruiting and scheduling appointments are the responsibility of the evaluator assigned to a given project.

The evaluation includes a phone interview of the program participants as part of NTG assessment efforts. The survey targets the project decision-maker who may be the same person involved with facilitating the on-site evaluation work. If the NTG interview occurs first, Itron's phone interviewer will inform the customer that they will be contacted by evaluators for a separate on-site evaluation visit. Interviewers on the NTG team will attempt to verify the site contact information before conducting the telephone survey. If customer contact is first made by the gross impact evaluation team, that team member will inform the customer of the pending net-to-gross phone interview and should attempt to identify the most appropriate individual for this interview and to obtain their contact information. Your Itron QA reviewer should be informed when each customer has been alerted and when a site visit has been approved, including the date.

Again, efficient contact is usually performed through a combination of alerting emails and phone contact (via voice and cellular lines) to schedule visits.

When contacting the customer, it is important to identify yourself as a consultant acting on behalf of the CPUC (regardless of your employer affiliation), explain the purpose of the project to the customer, offer to connect them with our CPUC project manager to answer any questions, and inform them that you would like to schedule a site visit. The customer should be informed that the evaluation report will not reference their company name or the name of any site representative contacted and that they are participating anonymously. It is useful to stress that

there are no changes in the incentive monies and no penalties associated with this review. If the customer contact person expresses reservation or refuses to allow the on-site visit, to the reviewer should press for cooperation with the terms of the project application which stipulates as a condition of receiving the incentive to facilitate post-installation site visits. Permission to visit the site for post-implementation review is a requirement under CPUC guidelines included on the program application agreement that the customer executed to participate in the incentive program.

It is often helpful to offer some specific details about the project you are evaluating to increase your credibility. An example would be a statement such as "your company participated in the 2013 PG&E Heavy Industrial Energy Efficiency Program and received a $50,300 incentive for the replacement of five plastic injection molding machines with higher efficiency machines."

Success in this project depends upon establishing credibility with the customer from the first telephone contact. The evaluation team should work to maintain credibility during the first on-site meeting and any subsequent site visits, phone calls, data requests, and other correspondence with the customer. During recruitment, in addition to discussing the scope of the evaluation, the evaluator must also discuss the availability of pertinent data from the customer's energy management system (EMS) or supervisory control and data acquisition (SCADA) machines, the potential of installation of metering or monitoring equipment, photographing the measure(s) and site visit needs (personal protective equipment or PPE, clothing requirements, onsite meeting logistics for time and location, etc.).

Itron should be notified immediately following the scheduling of any visit to any customer site. This should be done on both an individual basis and summarized in any project meetings. If time permits the on-site visit should be scheduled 1 to 2 weeks in advance to allow time for the Itron QA reviewer to review the SSMVP, as discussed later.

1.4.3 Letter of Introduction

Letters from Itron (on CPUC letterhead) and picture identification should be carried by evaluation personnel conducting site visits. The on-site evaluator should offer to connect the customer representative with our CPUC contract manager if there are any questions. The site or company contact may call the applicable CPUC representative identified on the letter or Itron to verify the purpose of our study or to address other concerns. If site access is refused after arriving at the site, after carefully probing the customer's reason for refusal and removing yourself to a safe location, contact your Itron QA reviewer for assistance.

1.4.4 Reminder Calls

Always contact the site representative during the week of any scheduled travel and the day before the scheduled site visit to ensure the facility is prepared to accommodate your arrival.

Reminder calls the day prior to a given appointment help ensure that no conflicts have arisen that would impact the site visit or data collection activities.

1.5 Site Report Form

Itron will upload a pre-populated form (an MS Excel workbook) for each assigned M&V point on the CMPA EM&V portal under the proper folder each identified with the Itron ID. The form is called a Site Report Form.

This workbook includes templates for the PPA, SSMVP, and the Final Site Report (FSR) sections. Please use the site-specific PPA electronic form for all reports so that there is consistency in the format of the evaluation. The form is pre-populated with data from the IOU tracking database specific to each sample point.

The site report form is designed for use in conducting initial desk reviews to identify issues with the tracking data, eligibility, baseline, costs, and calculation methods. The site report form includes the M&V plan is a requirement for conducting post-installation M&V as part of the custom project ex post impact evaluation and is filled out only after securing facility consent for a site visit (recruitment). The SSMVP section of the form must **be submitted to Itron one week prior to conducting on-site work**. The FSR sections of the form will be completed upon commencing final ex post savings analysis.

Relevant notes on completing the Site Report Form (including the PPAs, SSMVPs and FSRs) are as follows:

1.5.1 Project and Site Visit Info - Worksheet #1

- Most of the data needed for worksheet #1 (Project & Site Visit Info) is found in the IOU tracking database.
- It is important to note that all customers and IOUs are participating anonymously in the evaluation. The reports should not reference any customer name, account numbers, location or other information that could allow identification of the customer. There should not be any way to identify the customer or location in the report. This requirement applies equally to all tables, figures, and spreadsheets that are provided or are pasted into the document. Itron distributed data handling and confidentiality agreements and requirements to the evaluation teams and these will be updated as revisions become available.
- The Itron Project ID is a six-character string that starts with the letter E, F, G or H, followed by a "3" (for 2013) or a "4" (for 2014), and then four numbers identified over the IOU population of ex post projects (0001 up to 9999, as needed). Please preserve any

leading zeroes in the ItronID and do **not** use any hyphens when the ItronID appears in any emails, site report notes or other correspondence.

1.5.2 Baseline & Costs, Project Eligibility, and Calculation Methods Worksheets 2 through 4

- The three –worksheet tabs labeled "Baseline & Costs," "Project Eligibility," and "Calculation Methods" are the repository of the key data for the PPA and SSMVP. The SSMVP sections of these worksheets need to be completed prior to 1) developing the M&V plan, and 2) conducting the field work. The FSR sections of these three worksheets need to be completed after the site visit and included with delivery of the final FSR product.
- The "Baseline and Costs" worksheet collects and detail information on replaced equipment related to effective useful life (EUL) and remaining useful life (RUL). Record information about periodic equipment maintenance and repairs in the "Additional Comments" tab. Evaluators should review the embedded EUL/RUL Guidance document in the Reference Documents section of this document because CPUC requirements are changing and will affect the approach to calculating initial and lifetime savings.
- The "Baseline & Costs" worksheet provides fields for recording the cost estimate for the selected energy efficiency measure(s). These data should be collected either on-site or from the application documentation for the measure(s)/project(s) reported in the application. Also provide a statement in the "Baseline & Costs" worksheet supporting your assessment of your perceived accuracy of the cost estimate. Special attention should be given as to whether the tracking system costs and the incentive cap calculations show the full cost of the measure or the incremental cost of the measure. The evaluator should assess the appropriateness of this/these cost basis(es) in light of the program and CPUC baseline requirements, definitions, and other evaluation guidance.

1.5.3 Site Specific M&V Analysis – Worksheet #5

- For the first phase of the M&V plan complete the "As Planned" column of the "Site Specific M&V Analysis" worksheet (tab 5).
- The evaluator should use "N/A" only for fields that are not applicable to the evaluated project and measure. All other fields should be filled out with relevant information or the reasons for missing data. In some cases specifying "Unknown" is acceptable such as when data is applicable but was not provided by the IOU or is infeasible to be obtained within the scope and budget of the evaluation effort.
- For the FSR phase of the project, complete the last column in tab 5 labeled "Final Ex Post Analysis (As Implemented or Found)". This column should be filled out with any

updates or corrections. The form updated with ex post evaluation findings shall be submitted as the draft Final Site Report (FSR) **within two weeks after the site visit.** Use "Same" for the "As Implemented or Found" column if the data has not changed.

1.5.4 Savings Calculation Method, Impact Results, and Reasons for Discrepancy – Worksheets #6 through 8

- The Excel worksheet tabs 6 thru 8 labeled " Ex Post Savings Calculation", "Impact Results", and "Reasons for Discrepancy" are to be filled out while completing the ex post analysis. The information includes the summary of the ex post results, installation verification, and scope of the impact assessment.
- These data also identify and provide further details on the key reasons for discrepancy between claimed and evaluated savings. Any change in the measure realization rate is expressed as a percentage of the difference from 100% of ex ante savings estimates and is attributed to the appropriate reason for discrepancy. For example: a project with a gross realization rate of 60% has a total discrepancy of –40% (this is the adjustment in savings as compared to 100% of ex ante savings estimates). For the same example project, the changes in operating conditions may be contributing to a 30% reduction in savings and the remaining 10% could be the resultant of incorrect baseline application. These savings reductions collectively combine to form the 40% reduction (or the –40% discrepancy) for the project. The percentages and reasons for savings discrepancies for multiple measure projects are reported separately for each of the evaluated measure.
- The Site Reporting Form, your analysis (external calculation spreadsheets are acceptable), and all associated data files (logger data, SCADA data, photos, etc.) must be submitted to Itron for review. Note: Eight of the ten tabs (the first eight) should be completed prior to sending for Itron QC review.

1.5.5 Additional Comments – Worksheet #9

- Worksheet tab 9 (Additional Comments), discusses, from the customer's perspective, the non-energy benefits of the measure(s). Possibilities include, but are not limited to: Replaced aging equipment that was maintenance-intensive, reduced need for regular maintenance / repairs, increased capacity or production, increased comfort, higher quality energy service, reduced emissions, water savings, increased security, etc. In some instances, customers will indicate that there are no perceived non-energy benefits; this should also be noted.
- Also part of the Additional Comments worksheet are fields to discuss if the customer has any planned changes in the operation of the primary measure that will impact the energy savings or demand reduction in the future. For instance, a customer may have retrofitted a compressed air system and is aware that one of the devices that consumes compressed

air is going to be permanently removed from service. Since this would change the hours of operation compared to historical patterns, this will change the energy savings. The timing of these changes is important if verifiable, as this information can be used to adjust savings figures in the life-cycle (LC) GRR calculation.

- The Additional Comments worksheet can also be used to describe any spillover measures observed during the course of the evaluation. Although spillover is a measure of energy savings, the California evaluation framework does not recognize spillover as valid energy savings for IOU savings claims.

1.5.6 Net-to-Gross Review – Worksheet #10

- The Net-to-Gross Review worksheet is completed by Itron's Net-to-Gross team after they complete their decision-maker interview. This worksheet also the team to communicate with field engineers regarding the resolution of baseline issues.
- Please enter any other project pertinent details obtained from the site such as customer standard practice, problems with verification or access, equipment maintenance issues, standby operation, problems with the measure, other large changes at the plant affecting equipment operation, etc., into worksheet tab 9 (Additional Comments).

1.6 Itron Review of the SSMVP

Assigned Itron QC reviewers will review the Site-Specific Measurement and Evaluation Plan (SSMVP) upon submittal by each evaluation team. The subcontractor's point of contact (POC) will ensure that each draft report has been peer reviewed for accuracy, clarity and adherence to the reporting requirements outlined in this document before the document is forwarded to Itron for review. Professional level writing that clearly and accurately describes the impacts of the project is required.

The SSMVP should be submitted at least three days before the site visit to maintain the project schedule, to enable timely review, to allow required M&V equipment collection, and for efficient site visit scheduling. Itron's project manager or QC reviewer will provide guidance for specific situations, including technical details, potential scheduling difficulties, conflicts of interest, or ineligibility for various programs. Each subcontractor is encouraged to engage in active discussions with Itron, particularly at the beginning of the project. This will help reduce wasted time and effort and provide for a better work product.

The SSMVP will be submitted to the CPUC for review after Itron has reviewed the document and made needed modifications. Once the SSMVP is provided to the CPUC for further review, each evaluator will proceed with the remainder of the tasks (confirm site visit date, conduct site visit, perform data collection and analysis, draft the FSR, etc.). The Itron reviewer is responsible for relaying any comments on the evaluation plan to the field engineer.

1.7 Use of CMPA/ EM&V Portal to Transfer Files

Itron and all subcontractors will be using the CMPA/ EM&V portal to transfer files between members of the evaluation team for this impact evaluation. Each subcontractor will have access to their assigned gross M&V sample points on this site. Electronic files should be uploaded to CMPA/EM&V portal under the appropriate project directory. All files related to a particular project will be saved in the folder for that project as they are completed. Itron will provide training on the use of the CMPA/ EM&V portal on an as-needed basis.

For all issues related to file transfer and the CMPA. EM&V portal, please notify your Itron QC reviewer.

1.8 On-Site M&V Visits and Sampling within a Site

1.8.1 Measure Installation Verification

The objectives of measure installation verification are to confirm that:

- the measures were actually installed,
- the installation meets reasonable quality standards,
- the measures are operating correctly, and
- the measures have the potential to generate the predicted savings.

Measure, make, model number, and capacity data should be collected and compared to the documentation contained in the application. As-built construction documents may be used to verify measures where access is difficult or impossible.

For multiple measure projects (whether a large or small stratum site) the evaluator will be verifying only the top two measures by ex ante savings claim value. Note that the top two measures may not be the first two numerically listed measures, e.g. Itron ID E30044-001 may have lower savings than E30044-002. The Site Report Form for each of these multiple measure projects will identify and pre-populate information available from the tracking database for the two relevant measures at each site. It must be noted that for a few projects, there may be more than two measures. Itron will provide specific guidance for such projects.

1.8.2 Data Collection, Monitoring, and Sampling

On-site data collection should be completed in a manner consistent with the SSMVP developed for the site, within reason. Opportunities to enhance the original plan should be pursued as appropriate, given the project conditions, schedule and budgeted level of effort. Contact your Itron QC Reviewer if the site refuses access to the facility or any specific measure, if any measure is found to have been removed, or if the approach described in the M&V Plan is not feasible due to access restrictions, safety, time constraints, or unforeseen circumstances.

The engineer may elect to employ a sample of the installed measures within a site for projects involving quantities of widgets too numerous to evaluate with the available resources. Itron will work with each evaluation team to develop a sampling plan as part of the SSMVP prior to the engineer arriving on-site. However, in some situations, sampling decisions will need to be made on site. The assigned engineer should attempt to contact the Itron QC reviewer to discuss on-site sampling strategies prior to implementing the revised plan.

Monitoring shall be performed in a manner which avoids the potential for bias in the results. For example, it is not acceptable to monitor on equipment that is convenient to monitor while treating differently other equipment that is out-of-reach or somewhat more difficult to monitor. Random sampling and stratified sampling (see Chapter 13 of the California Evaluation Framework Study) shall be employed as appropriate to preserve sampling integrity. Evaluation team members should also review the measure sampling discussion in Chapter 7 – Measurement and Verification, pp. 193 and 194, of the California Evaluation Framework Study.[2]

1.8.3 Photographs

With the customer's consent, photographs should be taken at each site visited. Photographs should focus on items relevant to the evaluation. Take notes to identify the subject of each photograph. Photographs should be taken to document all measurement points showing the instrument used and where the measurement is taken. Photographs should not be included in the final site reports, but should be submitted in a separate electronic zipped file (with separate jpeg files) to Itron. Clear photos that include site identification details (Itron ID number), facility equipment coding (SF-3, IMM-13, etc.), equipment nameplate, and pertinent operator interface control "screen shots", which show a date/time stamp, are preferred. Confirm that each photograph taken is in-focus and legible by viewing the image and "zooming in" to inspect the clarity and readability. Digital photos should be saved in the smallest resolution possible without sacrificing clarity. Only relevant photographs should be provided, and each photograph should be clearly labelled with Itron ID and subject. Photographs that support the evaluation findings should be detailed in the Final Site Reports. If a building simulation is proposed, photographs pertinent to the building model, such as exterior exposures, typical spaces, and mechanical equipment can be included.

1.8.4 Obtain Other Documentation

In many instances, it may prove useful to obtain data from manufacturers' representatives, manufacturer's contact information (telephone number and location), and service provider information. Note that this contact information or serial numbers that may reveal the location of the project should **not** be included in the FSR.

[2] The California Evaluation Framework Study, Tec Market Works.

1.8.5 Considerations for Safety

Evaluators are required to review appropriate OSHA/NFPA guidelines and rulings, and all other applicable codes and standards regarding electrical and workplace safety. Evaluators should ensure that all personnel working on this project have received appropriate training on topics including, but not limited to, the proper use of equipment, safety considerations for all conditions under which work will be performed, and the use of proper safety equipment (electrical safety gloves, protective eyewear, earplugs, appropriate footwear and clothing, etc.).

It is envisioned that the site evaluation effort will involve the placement of data loggers, use of spot measuring equipment such as clamp-on ammeters, placement of vibration sensors on rotating equipment, installation of current transformers (CTs) and potential transformers (PTs), opening electrical panels and other control panels, and the placement and removal of other monitoring and metering equipment.

In general, the monitoring function will be accomplished utilizing the equipment supplied by the evaluation team. In some cases, measurements may be obtained utilizing instrumentation in place at the site. Also, in rare instances, the customer may allow use of their own short or long term monitoring equipment. Hand-held measurement devices meeting sufficient accuracy requirements should be used to verify equipment operating conditions with spot readings of voltage, amperage, power factor, or kW.

When possible, instrument installation, placement, and removal tasks should be performed by personnel employed by the customer at the facility being evaluated. The safest and most secure arrangement for installation should be planned prior to the site visit, documented, and then re-assessed during the field visit. In the planning and evaluation process, the use of site equipment or personnel, and their cooperation/timely response should not be presumed at any point of the evaluation process. Each evaluator is responsible for the labor and costs associated with the safe and proper placement, installation, and safe removal of monitoring and data acquisition equipment as outlined in the SSMVP, both as submitted and as adjusted for field conditions.

In addition to electrical safety gear, any persons planning to visit a site shall be prepared to comply with the customer's safety requirements for visitors and should have their individual personal safety glasses, ear plugs, hard hat, electrically insulated rubber-soled boots (steel or reinforced toe as required by the site) and other required PPE available for use at each site visit where required. Field staff should be informed of and be prepared to provide documentation of all required safety training prior to visiting the site.

1.9 Impact Analysis and Final Site Report

The FSR will be prepared following the completion of site work and data collection, and will entail the following activities.

1.9.1 Ex Post Analysis

The Site Report spreadsheet utilizes protection to ensure the integrity of data entry and to prevent accidental changes. Any external ex post calculation and analysis spreadsheets should never be attached to or embedded in the Site Report Forms. All supporting documents should be uploaded separately but simultaneously alongside the Site Report Form.

The ex post evaluation should segregate the analysis and documentation of the targeted measure(s) in the project or application. For applications with multiple measures or end uses, the evaluator must review the application to determine the site(s), measure(s), cost, energy savings and other parameters associated with the assigned measure, which Itron will help identify.

As described in previous sections, the installation of all evaluated measures in a project should be verified during the site visit and the efforts should be documented within the verification section of the report. The evaluators should contact Itron for clarification if there is any question about the scope of the ex post evaluation.

Describe clearly the calculation parameters and methodologies in worksheet #6, Savings Calculation Method.

Within the Site Report From workbook (the Impact Results and Reasons for Discrepancy worksheet #7 and 8) the evaluation team is expected to provide a clear, concise and well-written summary of the ex post evaluation including the project description, methodology and calculations. Text box cells should contain a brief description, with a reference to additional project details. Discussion of the basis of the calculations (such as measured data, assumptions, extrapolations, estimates, formulae, etc.) must be provided. It is vital to define the baseline type and level of efficiency of the baseline and installed measures and to provide sufficient written explanation to ensure that these have been defined according to the program guidelines and industry standard practice or code. Any modifications and deviations from the SSMVP during the site visit and analysis must be discussed. A brief description of the approach used, pertinent information about the facility and its production process, and relevant information obtained from the site representatives are required. Verification results are summarized in tabular format. The installation verification requires an installation realization rate which is the ratio of the as-found equipment quantities divided by the ex ante claimed quantities.

The effective useful life (EUL) will be supported, as necessary, by the Database for Energy Efficiency Resources (DEER) recommendations.

All inputs and formulae used to calculate the ex post savings will need to be clearly identified in the analysis spreadsheets to facilitate peer review. The Itron QC lead needs site reporting forms and calculations demonstrate a clear understanding of the approach used with sufficient detail to re-create any customized calculations. All inputs to simulation models that are not otherwise documented should be described in tabular form in a separate document.

The factors relating to the differences between the ex ante results and the ex post results, and any comments on shortcomings identified with the ex ante approach, should be identified in the Reasons for Discrepancy worksheet #8. Additionally, the realization rate and the detailed reasons for discrepancy in ex ante vs. ex post savings estimates should also be discussed and the differences summarized.

1.9.2 Building Simulations

Where required, building simulations performed for the evaluation will use DOE 2.2 (latest version) or DOE2-R (refrigeration). The interface provided by eQUEST or EnergyPro may be the most effective method to achieve reliable results. Simulations will be calibrated to utility bills and weather, when applicable, using IPMVP Option D for guidance. Simulations should be calibrated to both actual energy and demand. Utility billing data should be normalized using actual weather obtained from NOAA or other reliable sources for the baseline (pre-retrofit) or as-built (new construction) conditions. Calibration may be based upon on site data collection. Simulations should then be run using NOAA actual weather data for site specific impacts (to determine the model validity) and CEC climate zone weather data for pre and post-installation periods to estimate typical impacts at the climate zone level for the project. Savings and demand reduction impact results will be reported for the weather data applicable to the CEC climate zone and for the appropriate peak demand period.

1.9.3 Compressed Air Simulations

Simulations for compressed air systems will use AIRMaster + (1.2.7, or latest version), which can be downloaded from:

http://www1.eere.energy.gov/manufacturing/tech_assistance/software_airmaster.html

The simulation shall be calibrated to field measured data. Complex flow measurements may be available from site instrumentation or vendor / installer provided instrumentation (such as during a start-up or commissioning exercise). The validity of this information should be confirmed before using this information in savings estimations. In all cases, expected accuracy of the values should be indicated.

1.9.4 Annual Hours of Operation

All calculations should standardize the number of annual hours to be 365 days/year x 24 hours/day (8,760 annual hours). Calculations should accurately account for weekends, holidays and actual hours of operation (determined from the customer representative interview).

1.9.5 Coincident Peak Demand Reduction / Reported Demand Reduction

Coincident peak demand impacts are generally the reduction in demand from the incentivized measures estimated in a manner consistent with the guidance for peak demand as defined in DEER. The coincident peak demand period is defined as;

> ***"The average grid level impact for a measure between 2 pm and 5 pm during the three consecutive weekday periods containing the weekday with the hottest temperature of the year".***

DEER identifies these three contiguous peak kW days, for each of the 16 California climate zones, based on the weather data sets developed for the California Title 24 Building Energy Efficiency Standards.

These may be found in Section 6.2 of the DEER2013 Update[3]. While this definition of kW does not explicitly segregate weather sensitive measures and non-weather sensitive measures, the peak load kW impact for a non-weather sensitive measure would be expected to correspond to the average kW reduction on a typical summer weekday (June through September) between 2 pm and 5 pm. For weather-dependent measures, the peak load kW impact for a non-weather sensitive measure would be expected to correspond to the average kW reduction on the hottest summer weekdays (June through September) between 2 pm and 5 pm (with climatic conditions that are typical of the weather data sets for that climate zone).

When building simulations are performed, the reporting of peak kW can be calculated accurately by using the days DEER defined peak kW days. For other measures, monitoring should be conducted during (or modeling should be performed using) climatic conditions similar to those contained in the weather data sets. If the monitored period contains the DEER identified three day period, peak kW impacts should also be reported at these time periods.

Peak demand impacts are only valid for measures and processes known to be in operation during the peak demand period. When it is not possible to measure the energy consumption of the measure during this peak demand period, a suitable alternative time period will be measured. The validity of the measured demand reduction should be discussed in terms of the relationship

[3] http://www.cpuc.ca.gov/NR/rdonlyres/4F93F9C2-434E-4B06-8D80-B2CB7E0A4198/0/DEER2013UpdateDocumentation_792013.pdf

between the measured time period and the CA peak coincident demand period and any potential bias introduced into the calculation of savings.

1.9.6 Increases in Production

For industrial measures, changes in production between the pre-installation and post-installation periods must be considered in a manner consistent across this evaluation. Changes in production have a direct impact on total energy usage and energy savings. In order to adjust the baseline, an industrial process application must clearly elaborate how an increase in production between the base case and the improved case is traceable to market conditions and not to production improvements due to the implementation of the incentivized measures. If the causes for production increases are not adequately described then load impacts shall be calculated using the production prior to the installation of the measures to prevent subsidization of equipment purchased for enhancing production rates alone rather than energy efficiency.

For example, a baseline condition may have resulted in 4,000 hours per year of equipment use for 100 units of production. Efficiency increases may have reduced the necessary use to 3,000 hours for the same 100 units. Shift schedules, however, resulted in 4,000 hours of use in which 120 units were produced. If the efficiency improvement also increases the rate of production as a side-effect of the measure and induced the customer to increase the production, then the baseline and post retrofit energy use should be calculated on the original 100 units of production. However, if market conditions required 120 units of production, and shift hours would have been increased to produce these 120 units with the original equipment, then the baseline should be adjusted for the 120 units. The determination of whether market conditions caused the actual change should be investigated through interviews with the customer during the site visit or with written documentation from the initial application file.

There are also cases in which the production has decreased and the measure did not cause the change in output. In such cases the post retrofit equipment and pre retrofit equipment should be evaluated using the post retrofit production levels. Thus, if production decreased from 100 to 80 units due to market conditions, the baseline should be adjusted for the 80 units. In the unlikely event that the output of 80 units was due to the change in process or equipment, the post retrofit energy use should be adjusted for the pre retrofit production of 100 units. The intent is to incentivize the increase in production efficiency independent of changes in market and customer demand.

Decisions on whether adjustments are made for changes in productivity must be clearly described in the site report form and reviewed and approved by Itron if there is any uncertainty as to the appropriateness of the adjustment.

1.9.7 HVAC Interactive Effects

The evaluation protocols require that all measure impacts be estimated net of interactive effects due to non-incentivized measures. When the interactive effects are large relative to overall energy or costs savings (10% or greater), evaluators should make an especially clear note of this in the SSMVP and incorporate procedures and measurements to account for the interactive effects.

Note that DEER prescribes cooling and heating load interaction factors for certain building types and climate zones. When building simulations are performed, the load impacts should be included with the end use designated for that application, e.g., VFD energy savings for a chilled water recirculation loop will usually appear in the cooling energy savings end use category.

1.9.8 Non-HVAC Interactive Effects

This would include assessing any "direct" interactive effects that would impact gross savings. This category includes, for example, a process equipment retrofit that reduced space temperatures and, as an interactive result, compressor energy use for space cooling.

1.10 Itron Review of the Final Ex Post Analysis and Site Report Forms

Each evaluation subcontractor team has an assigned Itron QC reviewer who reviews the completed Final Ex Post Analysis, Site Report Form (PPA, SSMVP, and FSR), and all other pertinent site info including logger data files, equipment specification sheets, photos, production record logs, etc. As FSRs are completed, the Site Reporting Form should be labeled as DRAFT versions and the electronic file naming convention for this project (provided by Itron) should be used. The subcontractor is responsible for implementing quality control procedures for each site and application review. At a minimum, each subcontractor's POC will ensure that each draft report has been reviewed internally for accuracy, baseline consistency, clarity, and adherence to the reporting requirements outlined in this document before the document is forwarded to Itron for review. The peer reviewer is usually the point of contact for that evaluation team.

Professional level writing is expected for this project. All tables, exhibits, etc. will be numbered and referenced in the text of the report in the format required. Reports are expected to be concise and written at a level that can be comprehended by an energy efficiency industry professional who may not have an engineering background but who has a conceptual understanding of the technical aspects of the profession. Itron expects to receive documentation that is clear, concise, and error-free.

Each report will be tracked from inception through completion in worksheet #1 of the Site Report Form (Project & Site Visit Info) that identifies the project and the first and last name of the project evaluation engineer. After in-house quality control review, the Site Report Form and

associated supporting calculations, photographs and collected data should be promptly submitted to Itron for review and approval. **The first project FSR submissions should occur within two weeks of the final project on-site visit.** A zip file containing photographs pertinent to the site report should be provided. All spreadsheets used for calculations should be delivered with all cells active and linked to facilitate reviewed. Savings analysis results should be summarized per measure on a single worksheet and table with cells referencing any other analysis contained in other worksheets or workbooks.

Timely review is meant to allow appropriate inputs and speedy resolution of omissions or errors. **Itron reviewers will complete review in three working days of FSR submission. Evaluation teams must provide responses to FSR modification requests within three working days.** This will enable projects to meet high technical standards while remaining on schedule.

1.10.1 Data Products and Project Output

All final data products – collected site data, SCADA/ EMS files, production records, logger files, equipment spec sheets, interview notes, photos, etc. –should be enumerated in the site report form along with the specified in the evaluation methodology and plan and provided in electronic format to Itron via the CMPA/ EM&V portal. These data products should be referenced to the goals and objectives of the project and include a specification of the data formats and engineering units. For example, a suitable description will be that "a DENT ElitePro logger will provide five minute interval data for kW, amps and volts and power factor. The kWh value is computed in the project analysis spreadsheet".

1.10.2 M&V Protocol

The M&V protocol chosen for the project should be described in the Site Report workbook on the Site Specific M&V Analysis worksheet #5. In general, option A, B, or D will be used. Option C, entailing aggregate facility energy usage and billing history, could be used when the energy savings are significant relative to the total metered energy use (typically by more than 10%) and when the underlying drivers affecting energy use remain relatively constant with readily quantifiable changes. Otherwise, whole facility energy usage variations may not be able to capture the true effects of the energy retrofit. Interval data on 15-minute intervals for electric demand may be useful in determining peak demand savings for all evaluations and should be considered. Interval data is available for over 90% of customers larger than 200 kW in California. Many of these interval meters have been installed relatively recently. Itron will attempt to obtain billing information for all customers, and will request pre- and post-installation interval data from the IOUs for selected customers. Unlike monthly billing data, interval data can be extremely valuable for estimation of peak demand savings and for model calibration. To obtain these data the site evaluation team submits a request for utility billing usage data to the Itron QC lead who will coordinate delivery of the data through the CMPA M&V portal website.

Any proposed deviations or modifications from the IPMVP options within the proposed protocol should be noted. The *California Energy Efficiency Evaluation Protocols*[4] and *The California Evaluation Framework* should be used as resources and may be referenced as appropriate.

1.11 Program Practices Assessment (PPA)

The PPA process will provide additional insight into utility practices applied in deriving custom project impact claims. As with the SSMVPs and FSRs, concise responses to the parameters of interest are required. The Site Report Forms will need to be updated for the PPAs and SSMVPs during or immediately after the site analysis and FSR sections are completed.

1.12 Additional Evaluation Findings

The Site Report Form includes a worksheet (#9) for any additional notes regarding the evaluation, which can include additional discussion of the uncertainty associated with the ex post results and how to reduce uncertainty for future similar ex post evaluations are examples of additional useful information. The economic parameters for the project could also be included, limited confined to the primary two measure(s) evaluated / assigned for the project.

See Section 1.4.5 (Additional Comments - Tab) for additional findings or comments that could be included in the FSR.

1.13 Reference Documents

The website hyperlinks for the files below will be made available when they are posted to the CPUC public website.

- Evaluation Guidance for Site Specific Analysis_2014_0918_Update.xlsx[5]
- IALC 2013 - EAR Overlap and ISP Guidance.xlsx[6]
- ProjectBasis_EULRUL_Evidencev1July172014.pdf[7]

[4] The referenced evaluation protocols can be found at:
http://www.calmac.org/events/EvaluatorsProtocols_Final_AdoptedviaRuling_06-19-2006.pdf

[5] Industrial, Ag and Large Commercial Evaluation Guidance available at www.energydataweb.com/cpuc/. Select the search tab, and from the drop down menus, select Portfolio Cycle 2013-2014 and Work Order (ED_I_IAL_2-Itron) 1314 IALC Impact.

[6] Appendix D of this report

[7] http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Ex+Ante+Review+Custom+Process+Guidance+Documents.htm

Appendix D

EAR Overlap and ISP Guidance

The tables below show a list of all 189 EM&V sample points and identifies whether or not the project contains any applicable or recent industry standard practice (ISP) baseline studies or ex-ante review (EAR) guidance that might apply to the measures or project being evaluated. The purpose of this table is to inform the EM&V field engineer about relevant CPUC guidance previously conducted on similar measures or perhaps identifies an exact EAR project, in which CPUC staff has already reviewed and provided a disposition or directives to the Program Administrators (PAs). In this way, CPUC evaluators can utilize consistent interpretation, analysis and guidance throughout all EM&V sample points.

For the identified ISP baseline studies, field staff reference and locate the studies from the CPUC's CMPA online database. The baseline studies have been conducted by the PAs or CPUC staff since the fall of 2011. Most of these ISP baseline studies are considered low-rigor.

When a project is an exact EAR match, then perhaps less time may be required to conduct field M&V than would normally be. CPUC's ex ante review (EAR) process may have directed significant pre- and post-install M&V by the PAs. For similar measures, the CPUC's evaluation contractors can detect and apply policy guidance appropriately and reliably.

Appendix E

Additional Project Practices Assessment Findings

E.1.1 Introduction

As described in Chapter 5, Project Practices Assessments (PPAs) are structured site-specific reviews of Program Administrator (PA)[1] application files and calculations that systematically examine and record the evaluation team's conclusions surrounding PA treatment of energy efficiency measure installations. PPAs were completed for each M&V point/measure in the gross impact sample selected for evaluation. The PPA process provides impact-oriented findings and feedback to the PAs. The PPA process is conducted on all sampled gross impact points, but analyses and feedback are bifurcated based on applications with a customer agreement date falling in 2013 versus all other applications (pre-2013 and 2013+). This segregation is meant to capture any effects of the policy guidance issued from the 2012 EAR process that might need some lead time to get reflected prospectively in custom project applications (assumed to be approximately one year based on the volume and timing of ex ante reviews).[2] Pre-2013 results serve as an initial baseline against which to measure 2013+ improvement.

This Appendix provides additional results and supporting evidence for the bigger picture results and findings conveyed in Chapter 5. These include Project Eligibility Considerations, RUL Assessment, Full Cost Assessment, Incremental Cost Assessment, and the Incentive Assessment.

E.1.2 Project Eligibility Considerations

The first section of the PPA form concerns relevant project eligibility considerations such as program rules, CPUC decisions/guidance, and EAR guidance. The evaluators reviewed PA project documentation to determine which eligibility considerations were taken into account for a

[1] California energy efficiency program administrators include PG&E, SCE, SCG, SDG&E, Marin Clean Energy, the Bay Area Regional Energy Network (REN), and the Southern California REN. However, this evaluation only addresses programs under the administration of PG&E, SCE, SCG and SDG&E.

[2] http://docs.cpuc.ca.gov/published/FINAL_DECISION/139858.htm. Decision 11-07-030
The EAR process involves an M&V-level of review for PA projects that are under development, prior to claims. CPUC staff and their contractors participate in these reviews and seek to actively influence the outcome of associated ex-ante project savings estimates, as well as PA within-program engineering processes and procedures more generally. Importantly, D. 11-07-030 features detailed baseline requirements that were hypothesized to have significant influence on PA project results, including remaining useful life/effective useful life (RUL/EUL) treatment and the need to demonstrate and document all associated early replacement (ER) claims.

given measure based on written comments in the project files. Then, the evaluator indicated which eligibility requirements were examined under the ex-post evaluation for that same measure. Table E-1 shows the results of the eligibility considerations analysis by PA and application period (pre-2013 and 2013+). Note that for any given measure, multiple eligibility considerations may be relevant (i.e. percentages may sum to greater than 100 percent).

The top rows in each time period provide one key finding: that looking across all PAs the program applications document eligibility considerations for less than 50 percent of all measures, whereas the evaluation saw fit to do so roughly 90 percent of the time. It is notable, however, that PG&E documented eligibility considerations more frequently than did the other PAs.

The analysis found good agreement between the eligibility considerations documented by the PAs and ex-post evaluation assessment with a few exceptions. Three notable exceptions stand out in both the pre-2013 and 2013+ periods: CPUC guidance, requirement that measures exceed code/ISP baseline, and previous EAR guidance. For all three categories the ex-post evaluation consistently found that these considerations were relevant for a higher fraction of projects than was documented by the PAs, which indicates inadequate attention to these eligibility criteria. There was little or no evidence of improvement in the pre-2013 versus 2013+ periods.

Table E-1: Comparison of PA and Ex-Post M&V Eligibility Considerations by Customer Agreement Date

Parameter Examined	PG&E	Ex-Post	SCE	Ex-Post	SCG	Ex-Post	SDG&E	Ex-Post	Overall	Ex-Post
Pre-2013 Customer Agreement Date										
Number of measures evaluated (N)	42		50		22		56		170	
Number of measures with eligibility considerations documented (N)	31	40	19	46	7	16	26	49	83	151
Frequency of eligibility considerations documented (%)										
Program rules	55%	63%	53%	65%	29%	44%	42%	41%	48%	54%
Normal maintenance	10%	18%	5%	9%	14%	19%	0%	4%	6%	11%
Operating practice change	19%	30%	11%	7%	29%	19%	12%	24%	16%	20%
CPUC decisions	0%	3%	0%	2%	0%	6%	4%	2%	1%	3%
CPUC guidance	19%	33%	5%	13%	0%	38%	4%	22%	10%	24%
Requirement that measures exceed code / ISP baseline	45%	65%	16%	48%	43%	69%	31%	59%	34%	58%
Previous EAR guidance	10%	23%	5%	30%	0%	38%	0%	10%	5%	23%
Previous evaluation findings	0%	5%	0%	17%	0%	6%	4%	4%	1%	9%
Project boundary condition	6%	13%	0%	2%	0%	6%	0%	0%	2%	5%
EE Policy Manual	0%	8%	5%	0%	14%	0%	4%	0%	4%	2%
Multiple PA fuels (includes cogeneration and fuel switching)	10%	13%	5%	0%	14%	6%	0%	0%	6%	4%
Three prong test	10%	8%	0%	0%	0%	0%	0%	0%	4%	2%
Non-PA fuels and ancillary impacts (cogen, refinery gas, WHR, etc.)	23%	25%	0%	0%	29%	25%	4%	0%	12%	9%
Other	0%	3%	16%	4%	0%	13%	19%	10%	10%	7%
2013+ Customer Agreement Date										
Number of measures evaluated (N)	27		14		20		9		70	
Number of measures with eligibility considerations documented (N)	20	26	7	10	5	19	1	9	33	64
Frequency of eligibility considerations documented (N)										
Program rules	45%	38%	57%	50%	40%	32%	100%	100%	48%	47%
Normal maintenance	10%	8%	0%	0%	0%	5%	0%	0%	6%	5%
Operating practice change	15%	23%	29%	20%	0%	16%	0%	0%	15%	17%
CPUC decisions	10%	8%	0%	0%	0%	0%	0%	0%	6%	3%
CPUC guidance	10%	12%	0%	10%	0%	16%	0%	0%	6%	11%
Requirement that measures exceed code / ISP baseline	20%	65%	14%	60%	0%	47%	0%	22%	15%	53%
Previous EAR guidance	5%	27%	0%	20%	0%	32%	0%	0%	3%	23%
Previous evaluation findings	0%	4%	0%	10%	0%	0%	0%	11%	0%	5%
Project boundary condition	15%	15%	0%	0%	0%	0%	0%	0%	9%	6%
EE Policy Manual	10%	8%	0%	0%	0%	0%	0%	0%	6%	3%
Multiple PA fuels (includes cogeneration and fuel switching)	0%	4%	0%	0%	0%	5%	0%	0%	0%	3%
Three prong test	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Non-PA fuels and ancillary impacts (cogen, refinery gas, WHR, etc.)	10%	8%	0%	0%	20%	5%	0%	0%	9%	5%
Other	15%	4%	0%	10%	60%	5%	0%	0%	18%	5%

E.1.3 RUL Assessment

Table E-2 summarizes each PA's tracking system-based and application documentation-based RUL findings by customer agreement date, first for the sites with early retirement as the PA project baseline, then for sites with all other project baseline types. The values in the Number of Measures Assessed field represent the number of projects that were specified as early retirement by the PAs (and, therefore, are expected to have an RUL value). As shown in the table, none of the PAs reported RUL values for all of their early replacement sites in either the tracking data or the project documentation, with project application files being especially deficient (only two of 32 applicable measures had RUL documented in the project files). The PA RUL designations are not compared to ex-post RUL estimates in Table E-2 because so few measures were found to have an early replacement baseline by both the PAs and the evaluation team that it was difficult to draw meaningful conclusions.

SDG&E was the only PA that provided RUL values in the tracking data for measures that had a baseline type other than early replacement, which included for 30 measures in the pre-2013 period and 3 measures in the 2013+ period. This practice might be misleading given that RUL is only expected in the tracking system for early replacement projects. Furthermore, the values that are stored in the tracking system are generally a calculation set equal to one-third of the EUL, an RUL default value, but not best practice.

It should be noted that the CPUC encourages the PAs to examine the RUL of the existing equipment for all relevant projects, and this should be recorded in the application documentation. Best practice in baseline selection often relies on an assessment of the condition and remaining useful life of existing equipment along with other evidence for causing program-induced early retirement.[3]

[3] For additional guidance see: http://www.cpuc.ca.gov/NR/rdonlyres/8AB0DEB5-41B0-4881-BC63-F7EBBEC81318/0/ProjectBasis_EULRUL_Evidencev1July172014.pdf

Table E-2: RUL Assessment by PA and Customer Agreement Date

Parameter Examined	Pre-2013 Customer Agreement Date				2013+ Customer Agreement Date			
	PG&E	SCE	SCG	SDG&E	PG&E	SCE	SCG	SDG&E
Number of ER Measures According to PA Documentation	1	6	4	10	2	2	2	5
Summary of PA RUL Treatment for EARLY REPLACEMENT Projects								
Number of Measures with PA Tracking System RUL Greater Than Zero (N)	--	1	--	7	1	1	--	--
Mean PA Tracking System RUL (where greater than zero)	--	10.00	--	6.68	5.00	5.00	--	--
Median PA Tracking System RUL (where greater than zero)	--	10.00	--	6.68	5.00	5.00	--	--
Number of Measures with PA RUL Documented in the Project Application Files	--	1	--	--	--	1	--	--
Mean PA Application File-Based RUL (where greater than zero)	--	8.00	--	--	--	5.00	--	--
Median PA Application File-Based RUL (where greater than zero)	--	8.00	--	--	--	5.00	--	--
Summary of PA RUL Treatment for OTHER Projects								
Number of Measures with PA Tracking System RUL Greater Than Zero (N)	--	--	--	30	--	--	--	3
Mean PA Tracking System RUL (where greater than zero)	--	--	--	6.68	--	--	--	6.68
Median PA Tracking System RUL (where greater than zero)	--	--	--	6.67	--	--	--	6.67
Number of Measures with PA RUL Documented in the Project Application Files	--	--	--	1	--	--	--	--
Mean PA Application File-Based RUL (where greater than zero)	--	--	--	8.00	--	--	--	--
Median PA Application File-Based RUL (where greater than zero)	--	--	--	8.00	--	--	--	--

E.1.4 Full Cost Ratings Assessment

A full cost ratings assessment was performed only for those measures where full cost is applicable (measures defined by the PA as being ER, Add-on, and System Optimization). For each applicable measure, the appropriateness, the quality, and the documentation were rated. In order for a given measure to obtain an appropriateness score of 3 (meets expectations) the full cost must be provided, broken down by equipment and labor, and must be relevant for the chosen baseline (including the second baseline for ER measures). The full cost quality rating is a measurement of the reliability of the cost data sources. Reliable sources would include invoices, price quotes from manufacturers, and etc. Finally, the documentation score reflects the level of detail included in the cost data sources. A documentation quality score of 3 would indicate that material and labor costs were provided separately (itemization within each category not required) and include some level of detail on the measure specifications.

Mean full cost appropriateness ratings did not meet expectations (score of 3) for any PA, with scores ranging from 2.52 to 2.78 in the pre-2013 period and from 2.45 to 2.89 in the 2013+ period. The primary source of full cost data for all of the PAs was actual project invoices, which often contained the appropriate level of detail for materials and labor costs, though measure-specific costs were not always discernable. For SDG&E, 16 of their 45 applicable measures in the pre-2013 period received appropriateness scores of 1 or 2, which contributed to their relatively lower score of 2.52. The majority of the low ratings for these 16 measures were due to customer certified documents that provided a minimal amount of detail. Other reasons for low PA appropriateness scores included wrong or missing invoices or aggregated cost data / invoice summaries.

PA full cost quality ratings and documentation ratings are also somewhat below expectations as a whole, with all scores in both the pre and post-2013 periods ranging from 2.52 to 2.92. Wrong or missing invoices, high-level invoice summaries, and sometimes unclear “other project documentation” (IR form, RCx report, ESB spreadsheet, etc.) all contributed to low quality and documentation scores for some measures.

Table E-3: Full Cost Ratings by PA and Customer Agreement Date

Parameter Examined	PA Full Cost Ratings (1 = Does not meet basic expectations, 5 = Consistently exceeds expectations)							
	Pre-2013 Customer Agreement Date				2013+ Customer Agreement Date			
	PG&E	SCE	SCG	SDG&E	PG&E	SCE	SCG	SDG&E
Number of Measures Assessed* (N)	27	32	15	45	17	11	12	9
Assessment of PA Full Cost Appropriateness Rating								
Number of Measures with Full Cost Populated (N)	27	32	15	45	17	11	12	9
Number of Measures with Full Cost Appropriateness Ratings (N)	27	32	14	44	17	11	12	9
Mean Full Cost Appropriateness Rating	2.78	2.75	2.71	2.52	2.76	2.45	2.83	2.89
Median Full Cost Appropriateness Rating	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0
Number of Measures with Full Cost Appropriateness Ratings of 1 or 2 (N)	6	5	3	16	3	3	1	3
Source of PA Full Cost Data								
Customer-certified documentation	1	-	-	9	1	-	1	-
Invoices	16	28	14	27	15	10	11	6
Price quotes	2	3	-	1	1	-	-	-
OTHER: Invoice summary	2	2	1	1	1	-	-	-
OTHER: Aggregated project cost data (not measure level)	-	-	-	2	1	-	-	-
OTHER: Other project documentation (IR form, RCx report, ESB spreadsheet, etc.)	6	1	-	3	1	1	-	2
OTHER: Wrong or missing invoice	-	-	-	-	-	1	-	1
OTHER: Miscellaneous	-	-	-	2	-	-	-	-
Assessment of PA Full Cost Quality Rating								
Number of Measures with Full Cost Quality Ratings (N)	27	32	15	44	17	11	12	9
Mean Full Cost Quality Rating	2.52	2.88	2.87	2.84	2.76	2.73	2.92	2.89
Median Full Cost Quality Rating	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0
Number of Measures with Full Cost Quality Ratings of 1 or 2 (N)	11	4	2	10	5	2	1	3
Assessment of PA Full Cost Documentation Rating								
Number of Measures with Full Cost Documentation Ratings (N)	27	32	15	45	17	11	12	9
Mean Full Cost Documentation Rating	2.56	2.84	2.86	2.84	2.65	2.64	2.92	2.89
Median Full Cost Documentation Rating	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0
Number of Measures with Full Cost Documentation Ratings of 1 or 2 (N)	10	4	2	10	5	2	1	3

* Measures examined for PA full cost treatment includes only cases where full cost is applicable.

Determination of full cost applicability is based on the PA conclusion of project type being early replacement, add-on or system optimization.

Full project cost is not relevant for other project types, including replace on burnout, natural replacement, new construction and capacity expansion.

E.1.5 Incremental Cost Ratings Assessment

As with the full cost ratings, incremental cost ratings were only assessed where applicable project types were assigned by the PA (ER, ROB, NR, NC, and capacity expansion). The appropriateness, quality, and documentation scores for incremental measure costs (IMCs) were assigned based on the same guidelines described above for full measure costs.

As compared to full cost treatment, PA attention to incremental costs in the project application files was minimal. The most important finding is that a large fraction of measures for which incremental cost figures are applicable *did not have incremental costs documented and retained* in the project application files. The bullets below show the fraction of applicable measures with no incremental costs. PG&E and SCE show moderate improvement in the documentation of IMCs in the 2013+ period while SCG shows the opposite trend. SDG&E showed drastic improvement between the two periods, with the frequency of undocumented IMCs dropping from 81 percent in the pre-2013 period to zero percent in the 2013+ period.

- PGE - pre-2013: 44 percent; 2013+: 33 percent
- SCE - pre-2013: 67 percent; 2013+: 40 percent
- SCG - pre-2013: 55 percent; 2013+: 70 percent
- SDG&E - pre-2013: 81 percent ; 2013+: 0 percent

In the pre-2013 period, every PA had a large fraction of applicable measures with incremental cost appropriateness ratings of 1 or 2 (ranging from 44 percent of measures for PG&E to 95 percent of measures for SDG&E). Similarly, in the 2013+ period 67 percent of PG&E measures, 70 percent of SCG measures and 70 percent of SCE measures received appropriateness scores of 1 or 2. Notably, all five of SDG&E's 2013+ measures received appropriateness scores of 4 based on clear invoice documentation. Incremental cost quality and documentation ratings showed similar figures as the appropriateness ratings.

Aside from the high-level finding that incremental measure costs are not often populated, the evaluation found that even when incremental costs were established by the PA, they were often documented poorly. Comments regarding insufficient documentation included: cost populated but no source specified, other unclear project documentation, and unjustified assumptions that IMC is a specified fraction of full-cost.

Table E-4: Incremental Cost Ratings by PA and Customer Agreement Date

Parameter Examined	PA Incremental Cost Ratings (1 = Does not meet basic expectations, 5 = Consistently exceeds expectations)							
	Pre-2013 Customer Agreement Date				2013+ Customer Agreement Date			
	PG&E	SCE	SCG	SDG&E	PG&E	SCE	SCG	SDG&E
Number of Measures Assessed* (N)	16	24	11	21	12	5	10	5
Assessment of PA Incremental Cost Appropriateness Rating								
Number of Measures with Incremental Cost Populated (N)	9	8	5	4	8	3	3	5
Number of Measures with Incremental Cost Appropriateness Ratings (N)	15	24	11	21	12	5	10	5
Mean Incremental Cost Appropriateness Rating	2.07	1.50	1.73	1.14	1.83	1.20	1.60	4.00
Median Incremental Cost Appropriateness Rating	3.0	1.0	1.0	1.0	1.5	1.0	1.0	4.0
Number of Measures with Incremental Cost Appropriateness Ratings of 1 or 2 (N)	7	20	7	20	8	5	7	-
Source of PA Incremental Cost Data								
Price quotes	3	-	4	-	2	-	-	.
Letter certifying proportion of full cost	2	2	-	-	-	-	-	.
Manufacturer or contractor quotes	-	-	2	-	3	-	1	-
Certified engineering estimates	1	1	-	-	-	-	-	-
Industry cost guide	-	1	-	1	-	-	-	-
OTHER: No source specified	2	1	1	3	1	-	3	-
OTHER: Other project documentation	3	3	-	2	2	1	2	-
OTHER: Assumed percent of full cost	-	3	-	-	-	2	-	-
OTHER: Customer provided	-	1	1	-	-	-	-	-
OTHER: DEER	-	-	-	-	1	-	-	-
OTHER: EAR	1	-	-	-	-	-	-	-
OTHER: Project Invoices	-	-	-	-	-	-	-	5
Assessment of PA Incremental Cost Quality Rating								
Number of Measures with Incremental Cost Quality Ratings (N)	15	24	11	21	12	5	10	5
Mean Incremental Cost Quality Rating	2.07	1.42	1.64	1.14	1.75	1.20	1.60	4
Median Incremental Cost Quality Rating	3.0	1.0	1.0	1.0	1.5	1.0	1.0	4.0
Number of Measures with Incremental Cost Quality Ratings of 1 or 2 (N)	7	21	8	20	9	5	7	-
Assessment of PA Incremental Cost Documentation Rating								
Number of Measures with Incremental Cost Documentation Ratings (N)	15	24	11	21	12	5	10	5
Mean Incremental Cost Documentation Rating	1.80	1.50	1.82	1.14	1.75	1.20	1.60	4
Median Incremental Cost Documentation Rating	1.0	1.0	1.0	1.0	1.0	1.0	1.0	4.0
Number of Measures with Incremental Cost Documentation Ratings of 1 or 2 (N)	9	19	7	20	8	5	7	-

* Measures examined for PA incremental cost treatment includes only cases where incremental cost is applicable.
Determination of incremental cost applicability is based on the PA conclusion of project type being early replacement, replace on burnout, natural replacement, new construction or capacity expansion. Incremental project cost is not relevant for other project types, including add-on and system optimization.

E.1.6 Incentives Assessment

Table E-5 provides several key pieces of information regarding measure-level incentive assessments. First, it provides the percentage of measures for which the PA tracking system and the PA project application files documented measure-level incentive amounts. It also provides the frequency in which the tracking system and application files had the same incentive value populated. Nearly all PAs fully populated incentive amounts in both the tracking system and the project applications. In the pre-2013 period, however, PG&E and SCE had unpopulated incentive values for two to five percent of measures. There was also relatively good agreement observed between the project application files and the tracking data, ranging from 76 percent to 92 percent in the pre-2013 period and from 56 percent to 100 percent in the 2013+ period (note the 56 percent match for SDG&E is only based on 9 sampled points).

Table E-5 also includes an incentive calculation appropriateness rating. A full description of this appropriateness score is included below because, unlike other scores, ratings of 4 or 5 are necessary to ensure that all of the necessary information is captured accurately in the tracking data.

- 1 – Incentives incorrectly calculated or incorrect cap applied or tracking data incentives do not match project documentation
- 2 – Incentives correctly calculated but incorrect incentive cap applied or tracking data incentives do not match project documentation
- 3 – Incentive and cap correctly calculated but tracking data incentives do not match project documentation
- 4 – Incentives correctly calculated, appropriate cap used and the tracking data incentives match the project calculations
- 5 – Incentives correctly calculated, appropriate cap used and the tracking data incentives match the project calculations for both full and incremental measure costs for an ER measure.

Scores range from 2.46 to 2.82 in the pre-2013 period and from 2.29 to 3.11 in the 2013+ period. These mean scores indicate that incentives are generally being calculated correctly but incentive caps are sometimes applied inappropriately and, as discussed previously, project application incentives do not always match the tracking system.

Finally, Table E-5 provides a breakdown for measures where incentive caps were applied and how frequently those caps were applied appropriately.

Table E-5: Incentive Assessment by PA and Customer Agreement Date

Parameter Examined	PA Incentive Calculation Appropriateness Ratings (1 = Does not meet basic expectations, 5 = Consistently exceeds expectations)							
	Pre-2013 Customer Agreement Date				2013+ Customer Agreement Date			
	PG&E	SCE	SCG	SDG&E	PG&E	SCE	SCG	SDG&E
Number of Measures Assessed	42	50	22	56	27	14	20	9
Percent of Measures with PA Incentive Level Documented in the Tracking System	95%	98%	100%	100%	100%	100%	100%	100%
Mean Tracking System Incentive Amount	$235,536	$90,119	$184,820	$36,412	$52,795	$64,115	$46,388	$25,831
Median Tracking System Incentive Amount	$85,922	$43,386	$71,128	$14,568	$36,118	$41,437	$14,699	$505
Percent of Measures with PA Incentive Level Documented in the Project Application File	98%	98%	100%	100%	100%	100%	100%	100%
Percent of Measures with Matched PA Incentive Level in the Tracking System and Project Application File	76%	92%	86%	77%	85%	100%	95%	56%
Assessment of PA Incentive Calculation Appropriateness Rating								
Number of Measures with Incentive Calculation Appropriateness Ratings (N)	42	50	22	56	27	14	20	9
Mean Incentive Calculation Appropriateness Rating	2.79	2.46	2.82	2.50	2.59	2.29	2.65	3.11
Median Incentive Calculation Appropriateness Rating	3	3	3	3	3	3	3	4
Assessment of PA Use of Incentive Caps								
Number of Measures with PA Incentive Caps Assessed (N)	18	14	14	10	8	6	15	1
Incentives capped at 50% of the total project cost	8	10	9	6	6	4	13	-
Incentives capped at 50% of the incremental cost	3	-	3	2	1	-	2	-
Incentives capped at 75% of the incremental cost	1	-	-	-	-	-	-	-
Incentives capped at 100% of the incremental cost	-	-	-	-	-	-	-	-
Incentives capped at program allowed maximum	4	-	1	2	-	-	-	-
OTHER: 80% Incentive cap applied	-	3	-	-	1	1	-	1
OTHER: Tracking and project documentation incentive mismatch	2	1	-	-	-	-	-	-
OTHER: Miscellaneous	-	-	1	-	-	1	-	-
Number of Measures with PA Incentive Caps Verified (N)	18	14	14	10	8	6	15	1
Appropriate incentive cap applied	89%	71%	79%	80%	88%	50%	87%	100%
Mean Incentive Calculation Appropriateness Rating	3.13	2.40	3.00	3.00	3.14	2.67	2.77	3.00
Median Incentive Calculation Appropriateness Rating	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Inappropriate incentive cap applied	11%	29%	21%	20%	13%	50%	13%	-
Mean Incentive Calculation Appropriateness Rating	2.00	1.75	1.00	1.00	1.00	1.33	1.00	-
Median Incentive Calculation Appropriateness Rating	2.0	1.5	1.0	1.0	1.0	1.0	1.0	-