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Final Appendices

2014 Custom Impact Evaluation Industrial, Agricultural, and Large Commercial

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Appendix A

ATR Deliverable

This appendix contains a set of impact evaluation result tables that are consistently reported across all CPUC 2014 impact evaluations. This provides access to comparable estimates across a range of impact studies, such as the commercial downstream lighting evaluation and the combined residential and commercial HVAC evaluation. The results presented here are for the Industrial, Agricultural and Large Commercial (IALC) 2014 Custom Impact Evaluation. There are a total of 12 tables that present impact results using various combinations of the following key statistics:

- Energy metric
  - Electric energy savings
  - Natural gas energy savings
  - Coincident peak demand savings
- Evaluation results
  - Lifecycle savings
  - First year savings
  - Gross impact results
  - Net impact results
  - Program administrator-specific and statewide results

Gross Lifecycle Savings (MWh)

PA	Standard Report Group	Ex-Ante Gross	Ex-Post Gross	GRR	% Ex-Ante Gross Pass Through	Eval GRR
PGE	PGE	2,684,381	1,843,061	0.69	0.0%	0.69
PGE	PGE - Pass Through	57,074	57,074	1.00	100.0%	
PGE	**Total**	**2,741,455**	**1,900,135**	**0.69**	**2.1%**	**0.69**
SCE	SCE	3,032,021	1,945,774	0.64	0.0%	0.64
SCE	SCE - Pass Through	115,313	115,313	1.00	100.0%	
SCE	**Total**	**3,147,334**	**2,061,086**	**0.65**	**3.7%**	**0.64**
SCG	SCG	0	0			
SCG	**Total**	**0**	**0**			
SDGE	SDGE	561,005	392,038	0.70	0.0%	0.70
SDGE	SDGE - Pass Through	5,378	5,378	1.00	100.0%	
SDGE	**Total**	**566,384**	**397,416**	**0.70**	**0.9%**	**0.70**
	Statewide	***6,455,172***	***4,358,638***	***0.68***	***2.8%***	***0.67***

Net Lifecycle Savings (MWh)

PA	Standard Report Group	Ex-Ante Net	Ex-Post Net	NRR	% Ex-Ante Net Pass Through	Ex-Ante NTG	Ex-Post NTG	Eval Ex-Ante NTG	Eval Ex-Post NTG
PGE	PGE	1,822,320	939,961	0.52	0.0%	0.68	0.51	0.68	0.51
PGE	PGE - Pass Through	37,590	37,590	1.00	100.0%	0.66	0.66		
PGE	**Total**	**1,859,910**	**977,551**	**0.53**	**2.0%**	**0.68**	**0.51**	**0.68**	**0.51**
SCE	SCE	1,910,655	895,056	0.47	0.0%	0.63	0.46	0.63	0.46
SCE	SCE - Pass Through	76,913	76,913	1.00	100.0%	0.67	0.67		
SCE	**Total**	**1,987,568**	**971,969**	**0.49**	**3.9%**	**0.63**	**0.47**	**0.63**	**0.46**
SCG	SCG	0	0						
SCG	**Total**	**0**	**0**						
SDGE	SDGE	345,587	199,939	0.58	0.0%	0.62	0.51	0.62	0.51
SDGE	SDGE - Pass Through	3,227	3,227	1.00	100.0%	0.60	0.60		
SDGE	**Total**	**348,814**	**203,166**	**0.58**	**0.9%**	**0.62**	**0.51**	**0.62**	**0.51**
	Statewide	***4,196,292***	***2,152,687***	***0.51***	***2.8%***	***0.65***	***0.49***	***0.65***	***0.49***

Gross Lifecycle Savings (MW)

PA	Standard Report Group	Ex-Ante Gross	Ex-Post Gross	GRR	% Ex-Ante Gross Pass Through	Eval GRR
PGE	PGE	466.0	382.4	0.82	0.0%	0.82
PGE	PGE - Pass Through	5.2	5.2	1.00	100.0%	
PGE	**Total**	**471.2**	**387.6**	**0.82**	**1.1%**	**0.82**
SCE	SCE	456.2	232.6	0.51	0.0%	0.51
SCE	SCE - Pass Through	21.0	21.0	1.00	100.0%	
SCE	**Total**	**477.3**	**253.6**	**0.53**	**4.4%**	**0.51**
SCG	SCG	0.0	0.0			
SCG	**Total**	**0.0**	**0.0**			
SDGE	SDGE	95.1	66.5	0.70	0.0%	0.70
SDGE	SDGE - Pass Through	1.0	1.0	1.00	100.0%	
SDGE	**Total**	**96.1**	**67.5**	**0.70**	**1.0%**	**0.70**
	Statewide	***1,044.6***	***708.8***	***0.68***	***2.6%***	***0.67***

Net Lifecycle Savings (MW)

PA	Standard Report Group	Ex-Ante Net	Ex-Post Net	NRR	% Ex-Ante Net Pass Through	Ex-Ante NTG	Ex-Post NTG	Eval Ex-Ante NTG	Eval Ex-Post NTG
PGE	PGE	324.7	195.0	0.60	0.0%	0.70	0.51	0.70	0.51
PGE	PGE - Pass Through	3.5	3.5	1.00	100.0%	0.66	0.66		
PGE	**Total**	**328.2**	**198.5**	**0.60**	**1.1%**	**0.70**	**0.51**	**0.70**	**0.51**
SCE	SCE	286.7	107.0	0.37	0.0%	0.63	0.46	0.63	0.46
SCE	SCE - Pass Through	14.3	14.3	1.00	100.0%	0.68	0.68		
SCE	**Total**	**301.0**	**121.3**	**0.40**	**4.8%**	**0.63**	**0.48**	**0.63**	**0.46**
SCG	SCG	0.0	0.0						
SCG	**Total**	**0.0**	**0.0**						
SDGE	SDGE	57.1	33.9	0.59	0.0%	0.60	0.51	0.60	0.51
SDGE	SDGE - Pass Through	0.6	0.6	1.00	100.0%	0.60	0.60		
SDGE	**Total**	**57.7**	**34.5**	**0.60**	**1.0%**	**0.60**	**0.51**	**0.60**	**0.51**
	Statewide	***686.9***	***354.3***	***0.52***	***2.7%***	***0.66***	***0.50***	***0.66***	***0.49***

Gross Lifecycle Savings (MTherms)

PA	Standard Report Group	Ex-Ante Gross	Ex-Post Gross	GRR	% Ex-Ante Gross Pass Through	Eval GRR
PGE	PGE	250,649	171,574	0.68	0.0%	0.68
PGE	PGE - Pass Through	1,680	1,680	1.00	100.0%	
PGE	**Total**	**252,328**	**173,253**	**0.69**	**0.7%**	**0.68**
SCE	SCE	1,772	1,141	0.64	0.0%	0.64
SCE	SCE - Pass Through	-4	-4	1.00	100.0%	
SCE	**Total**	**1,768**	**1,137**	**0.64**	**-0.2%**	**0.64**
SCG	SCG	205,217	110,214	0.54	0.0%	0.54
SCG	**Total**	**205,217**	**110,214**	**0.54**	**0.0%**	**0.54**
SDGE	SDGE	15,225	10,642	0.70	0.0%	0.70
SDGE	SDGE - Pass Through	-23	-23	1.00	100.0%	
SDGE	**Total**	**15,202**	**10,620**	**0.70**	**-0.1%**	**0.70**
	Statewide	***474,515***	***295,224***	***0.62***	***0.3%***	***0.62***

Net Lifecycle Savings (MTherms)

PA	Standard Report Group	Ex-Ante Net	Ex-Post Net	NRR	% Ex-Ante Net Pass Through	Ex-Ante NTG	Ex-Post NTG	Eval Ex-Ante NTG	Eval Ex-Post NTG
PGE	PGE	170,931	87,503	0.51	0.0%	0.68	0.51	0.68	0.51
PGE	PGE - Pass Through	1,038	1,038	1.00	100.0%	0.62	0.62		
PGE	**Total**	**171,969**	**88,541**	**0.51**	**0.6%**	**0.68**	**0.51**	**0.68**	**0.51**
SCE	SCE	756	525	0.69	0.0%	0.43	0.46	0.43	0.46
SCE	SCE - Pass Through	-2	-2	1.00	100.0%	0.60	0.60		
SCE	**Total**	**753**	**522**	**0.69**	**-0.3%**	**0.43**	**0.46**	**0.43**	**0.46**
SCG	SCG	100,976	68,333	0.68	0.0%	0.49	0.62	0.49	0.62
SCG	**Total**	**100,976**	**68,333**	**0.68**	**0.0%**	**0.49**	**0.62**	**0.49**	**0.62**
SDGE	SDGE	9,416	5,428	0.58	0.0%	0.62	0.51	0.62	0.51
SDGE	SDGE - Pass Through	-14	-14	1.00	100.0%	0.60	0.60		
SDGE	**Total**	**9,403**	**5,414**	**0.58**	**-0.1%**	**0.62**	**0.51**	**0.62**	**0.51**
	Statewide	***283,100***	***162,810***	***0.58***	***0.4%***	***0.60***	***0.55***	***0.60***	***0.55***

Gross First Year Savings (MWh)

PA	Standard Report Group	Ex-Ante Gross	Ex-Post Gross	GRR	% Ex-Ante Gross Pass Through	Eval GRR
PGE	PGE	193,704	133,004	0.69	0.0%	0.69
PGE	PGE - Pass Through	4,141	4,141	1.00	100.0%	
PGE	**Total**	**197,845**	**137,146**	**0.69**	**2.1%**	**0.69**
SCE	SCE	223,009	143,145	0.64	0.0%	0.64
SCE	SCE - Pass Through	13,866	13,866	1.00	100.0%	
SCE	**Total**	**236,875**	**157,011**	**0.66**	**5.9%**	**0.64**
SCG	SCG	0	0			
SCG	**Total**	**0**	**0**			
SDGE	SDGE	41,935	29,295	0.70	0.0%	0.70
SDGE	SDGE - Pass Through	379	379	1.00	100.0%	
SDGE	**Total**	**42,314**	**29,674**	**0.70**	**0.9%**	**0.70**
	Statewide	***477,034***	***323,831***	***0.68***	***3.9%***	***0.67***

Net First Year Savings (MWh)

PA	Standard Report Group	Ex-Ante Net	Ex-Post Net	NRR	% Ex-Ante Net Pass Through	Ex-Ante NTG	Ex-Post NTG	Eval Ex-Ante NTG	Eval Ex-Post NTG
PGE	PGE	133,126	67,832	0.51	0.0%	0.69	0.51	0.69	0.51
PGE	PGE - Pass Through	2,723	2,723	1.00	100.0%	0.66	0.66		
PGE	**Total**	**135,849**	**70,555**	**0.52**	**2.0%**	**0.69**	**0.51**	**0.69**	**0.51**
SCE	SCE	143,175	65,847	0.46	0.0%	0.64	0.46	0.64	0.46
SCE	SCE - Pass Through	9,387	9,387	1.00	100.0%	0.68	0.68		
SCE	**Total**	**152,561**	**75,233**	**0.49**	**6.2%**	**0.64**	**0.48**	**0.64**	**0.46**
SCG	SCG	0	0						
SCG	**Total**	**0**	**0**						
SDGE	SDGE	25,881	14,941	0.58	0.0%	0.62	0.51	0.62	0.51
SDGE	SDGE - Pass Through	227	227	1.00	100.0%	0.60	0.60		
SDGE	**Total**	**26,108**	**15,168**	**0.58**	**0.9%**	**0.62**	**0.51**	**0.62**	**0.51**
	Statewide	***314,518***	***160,956***	***0.51***	***3.9%***	***0.66***	***0.50***	***0.66***	***0.49***

Gross First Year Savings (MW)

PA	Standard Report Group	Ex-Ante Gross	Ex-Post Gross	GRR	% Ex-Ante Gross Pass Through	Eval GRR
PGE	PGE	31.8	26.1	0.82	0.0%	0.82
PGE	PGE - Pass Through	0.4	0.4	1.00	100.0%	
PGE	**Total**	**32.3**	**26.5**	**0.82**	**1.3%**	**0.82**
SCE	SCE	32.7	16.7	0.51	0.0%	0.51
SCE	SCE - Pass Through	2.7	2.7	1.00	100.0%	
SCE	**Total**	**35.3**	**19.3**	**0.55**	**7.5%**	**0.51**
SCG	SCG	0.0	0.0			
SCG	**Total**	**0.0**	**0.0**			
SDGE	SDGE	6.7	4.7	0.70	0.0%	0.70
SDGE	SDGE - Pass Through	0.1	0.1	1.00	100.0%	
SDGE	**Total**	**6.8**	**4.8**	**0.70**	**1.0%**	**0.70**
	Statewide	***74.4***	***50.6***	***0.68***	***4.2%***	***0.67***

Net First Year Savings (MW)

PA	Standard Report Group	Ex-Ante Net	Ex-Post Net	NRR	% Ex-Ante Net Pass Through	Ex-Ante NTG	Ex-Post NTG	Eval Ex-Ante NTG	Eval Ex-Post NTG
PGE	PGE	22.3	13.3	0.60	0.0%	0.70	0.51	0.70	0.51
PGE	PGE - Pass Through	0.3	0.3	1.00	100.0%	0.66	0.66		
PGE	**Total**	**22.5**	**13.6**	**0.60**	**1.2%**	**0.70**	**0.51**	**0.70**	**0.51**
SCE	SCE	20.9	7.7	0.37	0.0%	0.64	0.46	0.64	0.46
SCE	SCE - Pass Through	1.8	1.8	1.00	100.0%	0.69	0.69		
SCE	**Total**	**22.7**	**9.5**	**0.42**	**8.1%**	**0.64**	**0.49**	**0.64**	**0.46**
SCG	SCG	0.0	0.0						
SCG	**Total**	**0.0**	**0.0**						
SDGE	SDGE	4.0	2.4	0.60	0.0%	0.60	0.51	0.60	0.51
SDGE	SDGE - Pass Through	0.0	0.0	1.00	100.0%	0.60	0.60		
SDGE	**Total**	**4.1**	**2.4**	**0.60**	**1.0%**	**0.60**	**0.51**	**0.60**	**0.51**
	Statewide	***49.3***	***25.5***	***0.52***	***4.4%***	***0.66***	***0.50***	***0.66***	***0.49***

Gross First Year Savings (MTherms)

PA	Standard Report Group	Ex-Ante Gross	Ex-Post Gross	GRR	% Ex-Ante Gross Pass Through	Eval GRR
PGE	PGE	17,565	12,028	0.68	0.0%	0.68
PGE	PGE - Pass Through	120	120	1.00	100.0%	
PGE	**Total**	**17,684**	**12,147**	**0.69**	**0.7%**	**0.68**
SCE	SCE	132	85	0.64	0.0%	0.64
SCE	SCE - Pass Through	0	0	1.00	100.0%	
SCE	**Total**	**132**	**85**	**0.64**	**-0.2%**	**0.64**
SCG	SCG	13,770	7,384	0.54	0.0%	0.54
SCG	**Total**	**13,770**	**7,384**	**0.54**	**0.0%**	**0.54**
SDGE	SDGE	1,400	979	0.70	0.0%	0.70
SDGE	SDGE - Pass Through	-2	-2	1.00	100.0%	
SDGE	**Total**	**1,398**	**977**	**0.70**	**-0.2%**	**0.70**
	Statewide	***32,985***	***20,593***	***0.62***	***0.4%***	***0.62***

Net First Year Savings (MTherms)

PA	Standard Report Group	Ex-Ante Net	Ex-Post Net	NRR	% Ex-Ante Net Pass Through	Ex-Ante NTG	Ex-Post NTG	Eval Ex-Ante NTG	Eval Ex-Post NTG
PGE	PGE	12,059	6,134	0.51	0.0%	0.69	0.51	0.69	0.51
PGE	PGE - Pass Through	74	74	1.00	100.0%	0.62	0.62		
PGE	**Total**	**12,134**	**6,208**	**0.51**	**0.6%**	**0.69**	**0.51**	**0.69**	**0.51**
SCE	SCE	61	39	0.64	0.0%	0.46	0.46	0.46	0.46
SCE	SCE - Pass Through	0	0	1.00	100.0%	0.60	0.60		
SCE	**Total**	**61**	**39**	**0.64**	**-0.3%**	**0.46**	**0.46**	**0.46**	**0.46**
SCG	SCG	6,788	4,578	0.67	0.0%	0.49	0.62	0.49	0.62
SCG	**Total**	**6,788**	**4,578**	**0.67**	**0.0%**	**0.49**	**0.62**	**0.49**	**0.62**
SDGE	SDGE	849	499	0.59	0.0%	0.61	0.51	0.61	0.51
SDGE	SDGE - Pass Through	-1	-1	1.00	100.0%	0.60	0.60		
SDGE	**Total**	**848**	**498**	**0.59**	**-0.2%**	**0.61**	**0.51**	**0.61**	**0.51**
	Statewide	***19,830***	***11,323***	***0.57***	***0.4%***	***0.60***	***0.55***	***0.60***	***0.55***

Appendix B

Detailed Program Administrator Results and Site Specific GRR and NTGR Results

B.1 Detailed Program Administrator Results

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

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

Figure B-1 through Figure B-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 estimates[1] with the ex-post evaluated MMBtu estimates 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 150 projects are included in the figures (PG&E = 43, SCE = 42, SDGE = 35, and SCG = 30). Some of the plots isolate points with ex-ante savings estimates below 1,000,000 and 500,000 MMBtu 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 B-1: PG&E Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates by Fuel Type

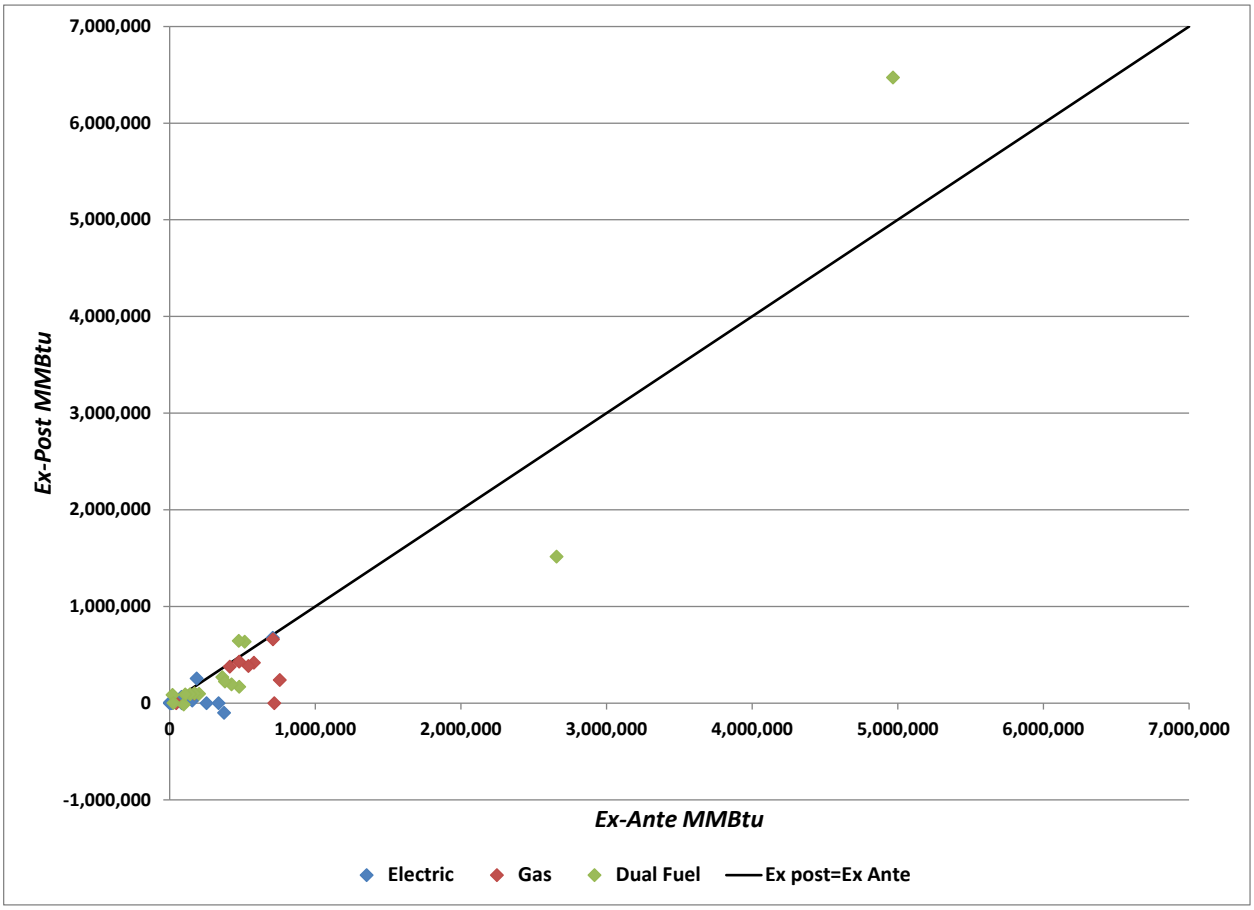


Figure B-2: PG&E Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates by Fuel Type (<1,000,000 MMBtu Detail)

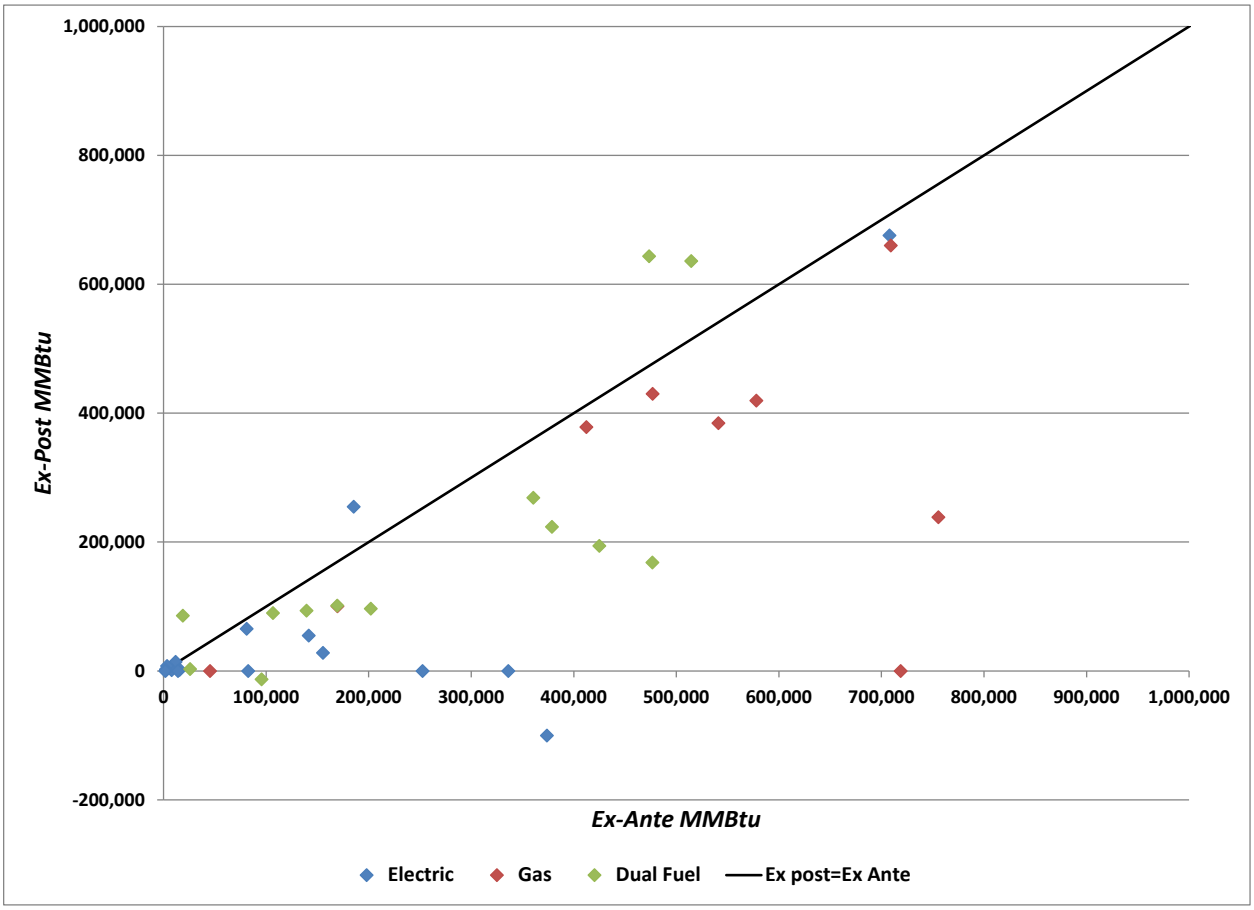


Figure B-3: SCE: Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates

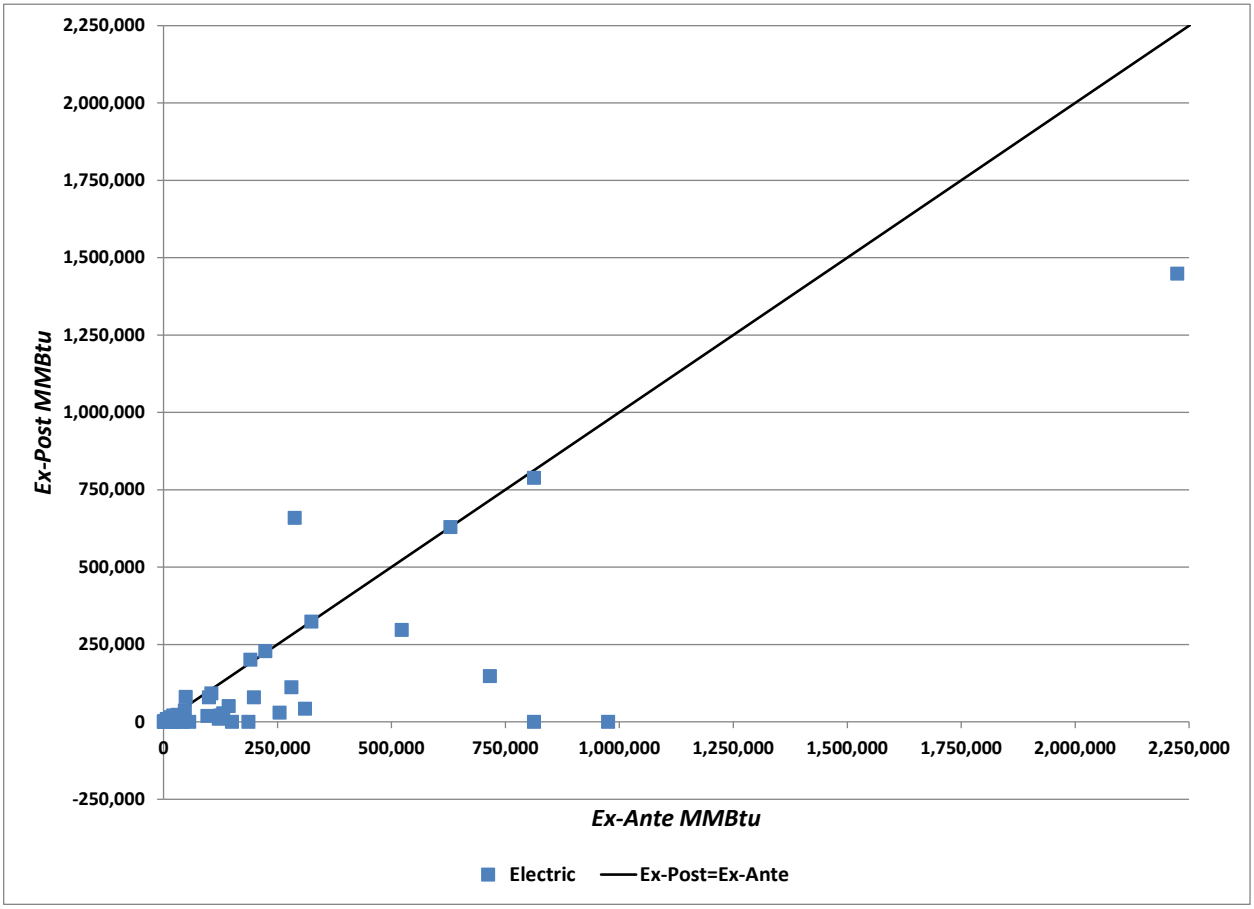


Figure B-4: SDG&E Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates by Fuel Type

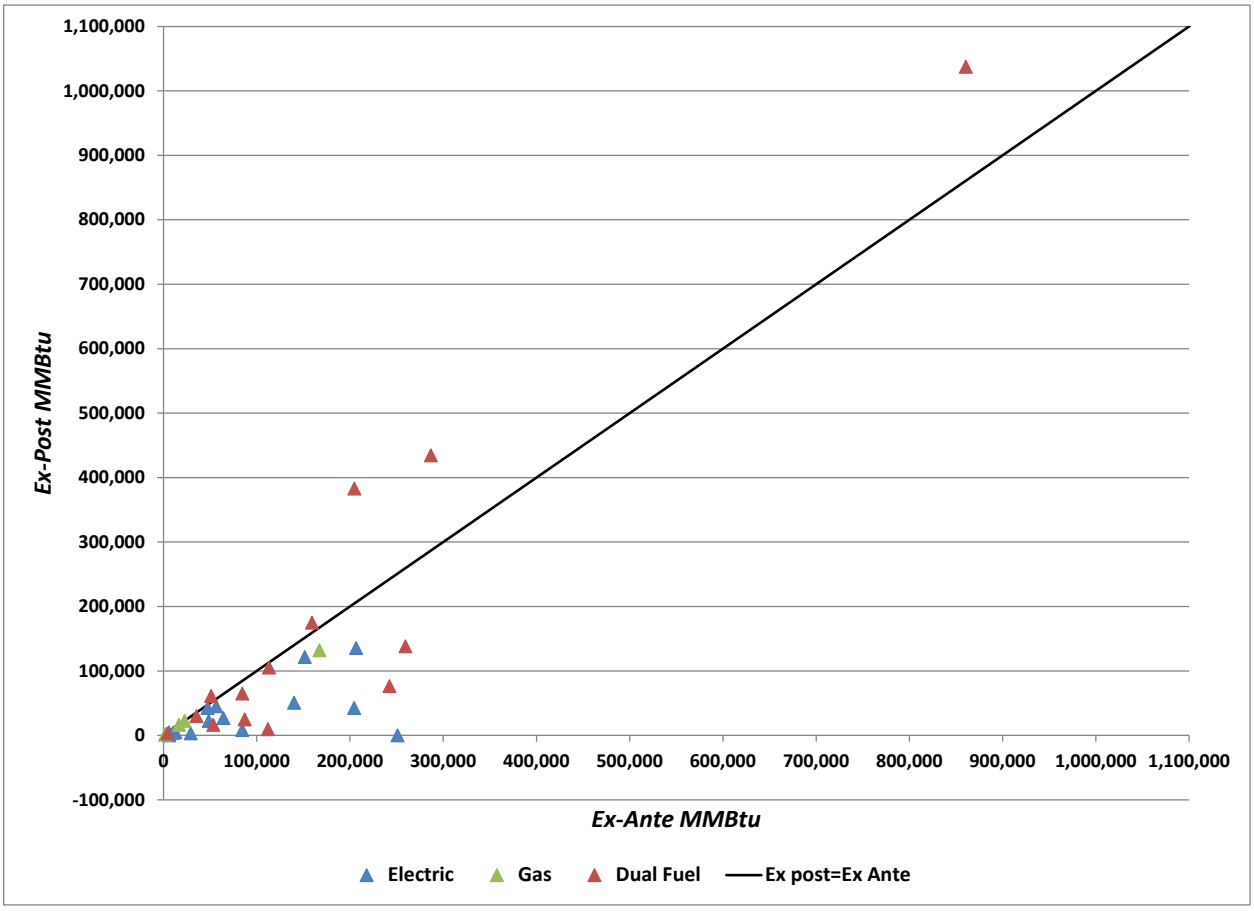


Figure B-5: SDG&E Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates by Fuel Type (<500,000 MMBtu Detail)

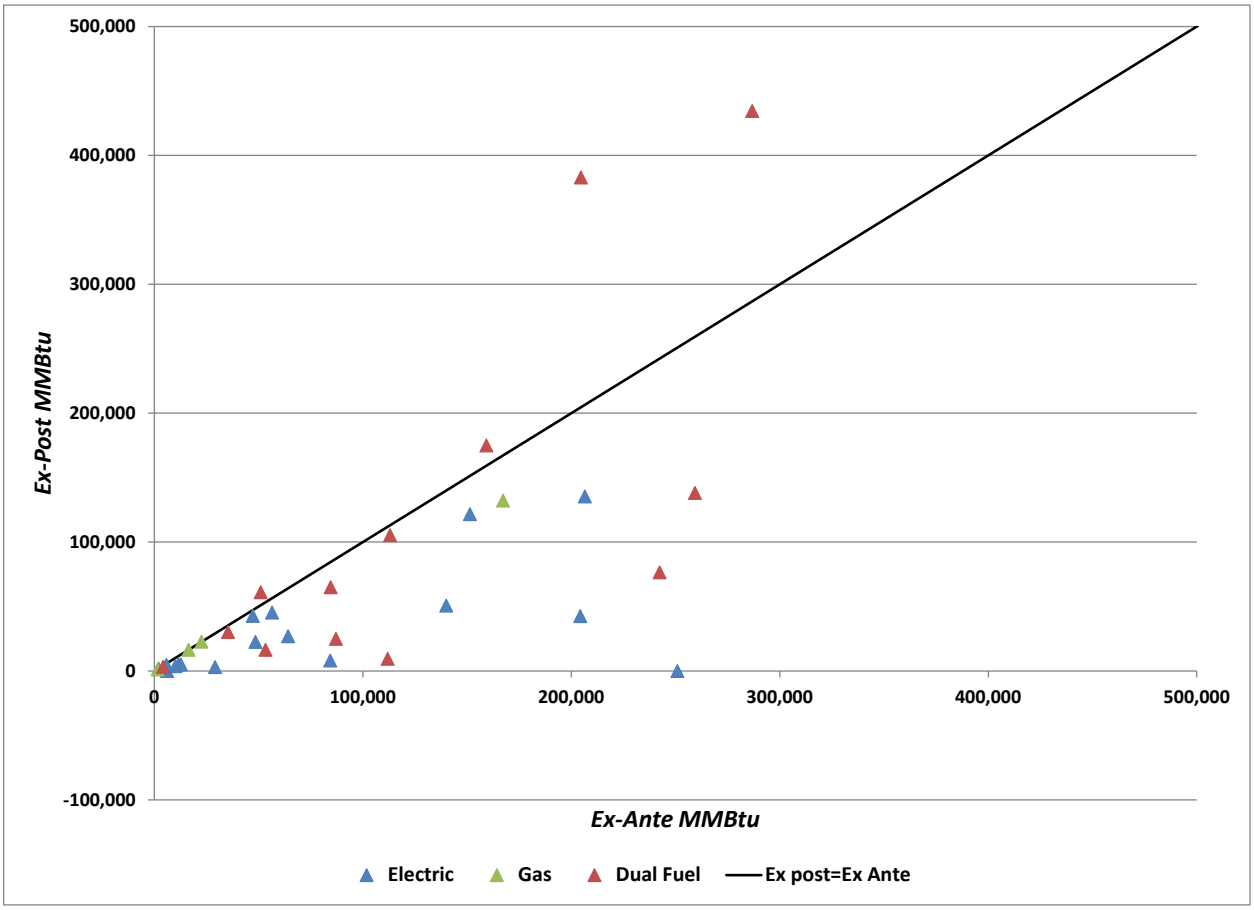
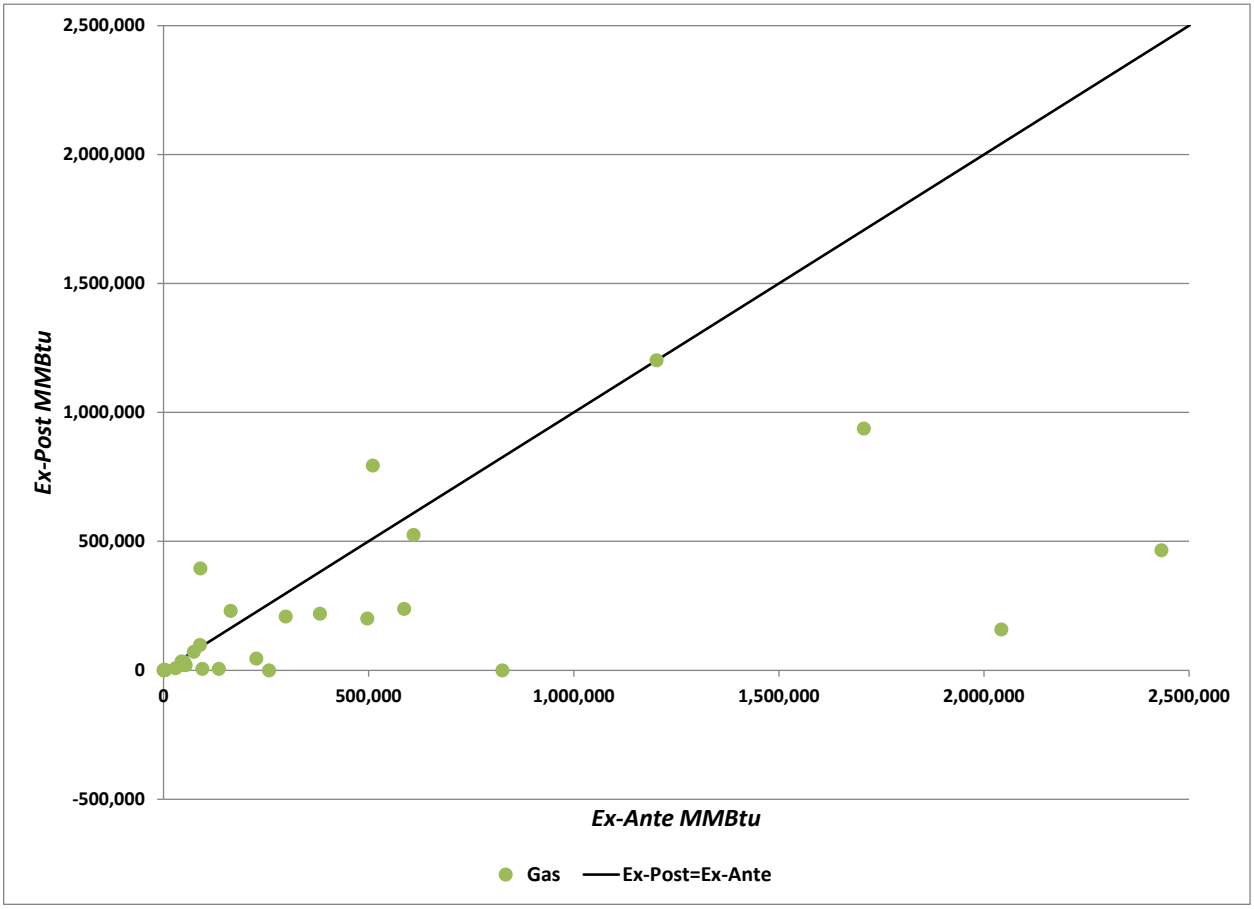


Figure B-6: SCG: Ex-Ante vs. Ex-Post MMBtu-based Savings Estimates



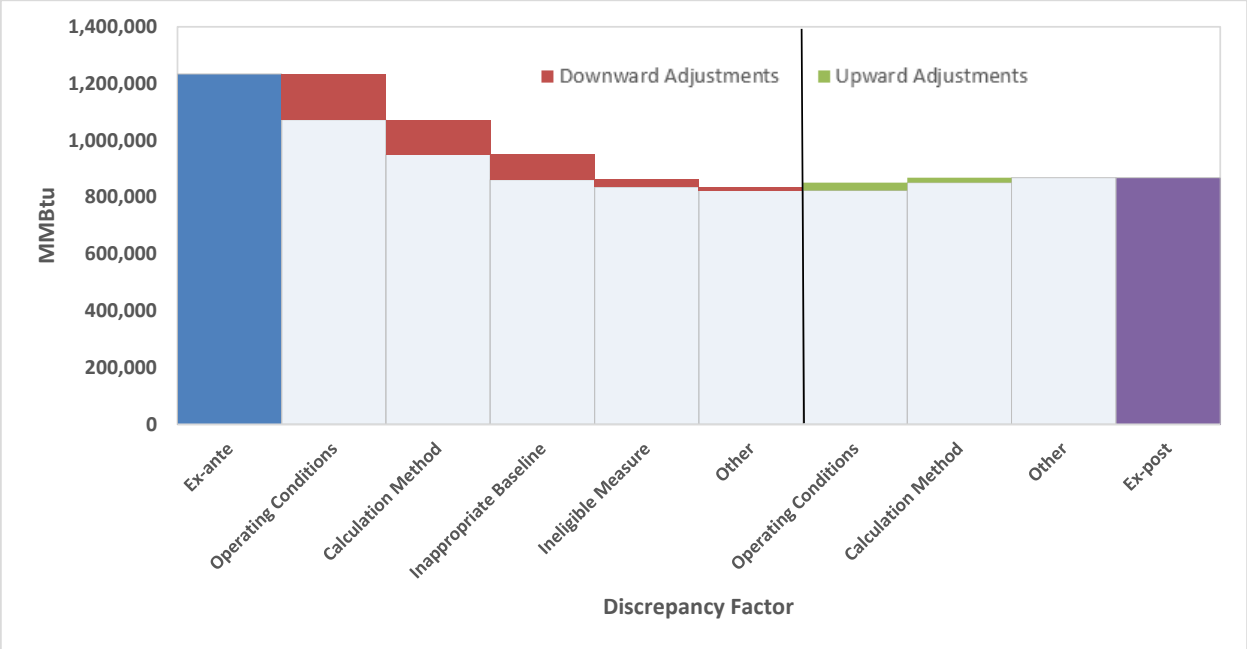
B.2 Discrepancy Analysis

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, 192 records associated with the impact sample of 150 projects were examined (3 Million MMBtu ex-ante savings). Across all PAs, the evaluation found no discrepancies for 17 records (0.2 MMBtu ex-ante savings were not

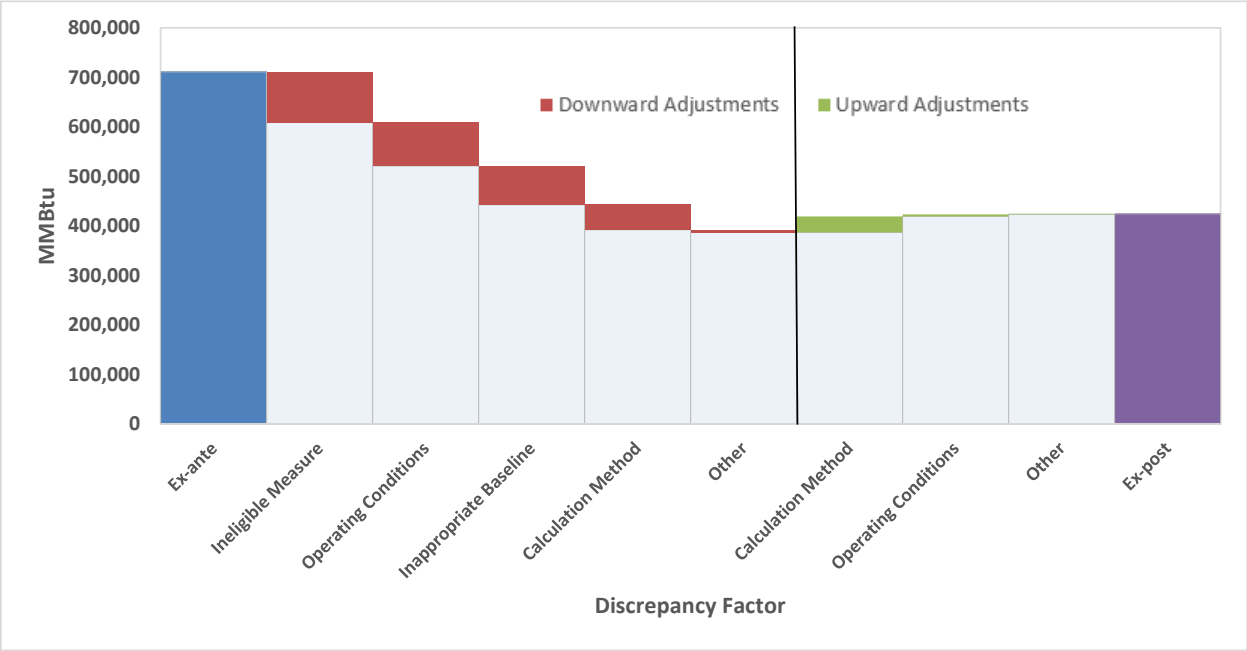
adjusted.) For the balance of 175 records and 2.8 MMBtu ex-ante savings, ex-post estimates were different from ex-ante MMBtu estimates. For some records only downward adjustments were observed, while in others only upward adjustments were observed, and in some instances both downward and upward adjustments were applied. A summary of these adjustments is presented for each PA in Figure B-7 through Figure B-10. Figure B-7 shows that the most substantial downward adjustments for sampled PG&E projects were for operating conditions (-13 percent), calculation methods (-10 percent), and inappropriate baseline (-7 percent). Altogether, the downward discrepancies for PG&E sampled projects led to a 33 percent reduction in ex-ante savings estimates, while the upward discrepancies accounted for a 4 percent boost, resulting in a net downward adjustment of 30 percent.

Figure B-7: Ex-Post Upward and Downward Adjustments to Ex-Ante MMBtu for Sampled Projects - PG&E



For sampled SCE projects, Figure B-8 shows that the most substantial downward adjustments were for ineligible measures (-14 percent), operating conditions (-12 percent), inappropriate baseline (-11 percent), and calculation methods (-7 percent). The downward discrepancies for all SCE sampled projects led to a 46 percent reduction in ex-ante savings estimates, and the upward discrepancies accounted for a 5 percent increase, resulting in a net downward adjustment of 40 percent.

Figure B-8: Ex-Post Upward and Downward Adjustments to Ex-Ante MMBtu for Sampled Projects - SCE



For SDG&E, Figure B-9 shows that the largest downward adjustments for sampled projects were for operating conditions (-11 percent) and calculation methods (-6 percent). Overall, the downward discrepancies for SDG&E sampled projects led to a 31 percent reduction in ex-ante savings estimates, and a 13 percent increase from upward discrepancies, resulting in a net downward adjustment of 18 percent.

Figure B-9: Ex-Post Upward and Downward Adjustments to Ex-Ante MMBtu for Sampled Projects - SDG&E

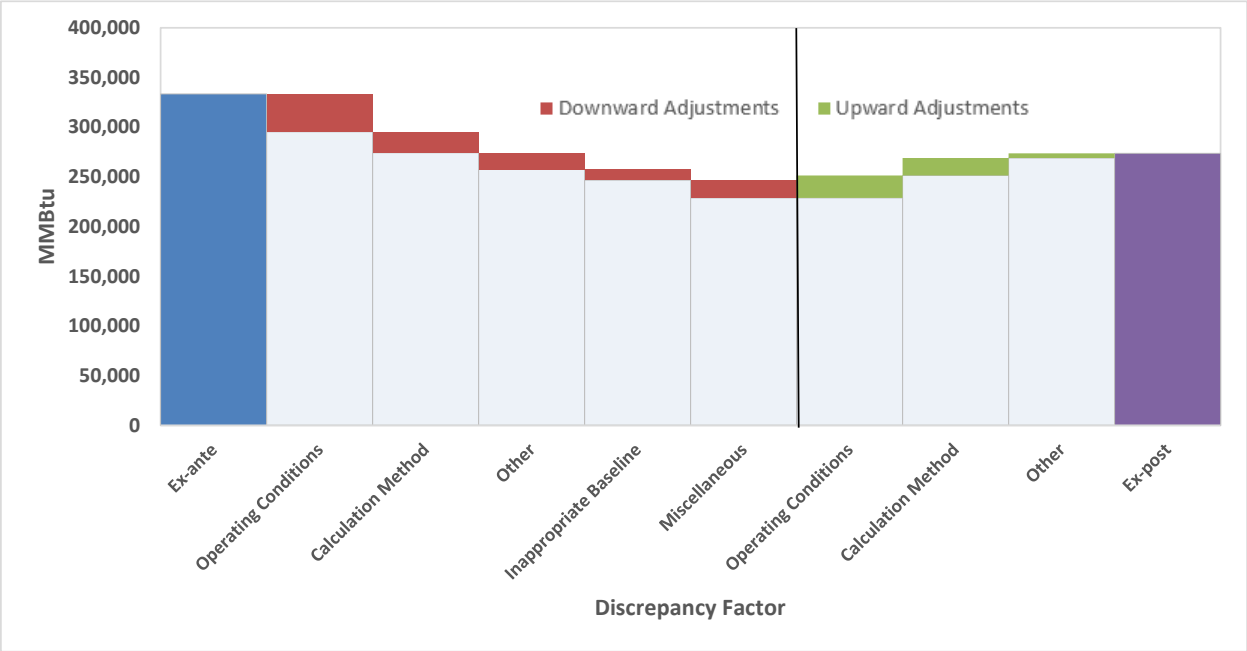
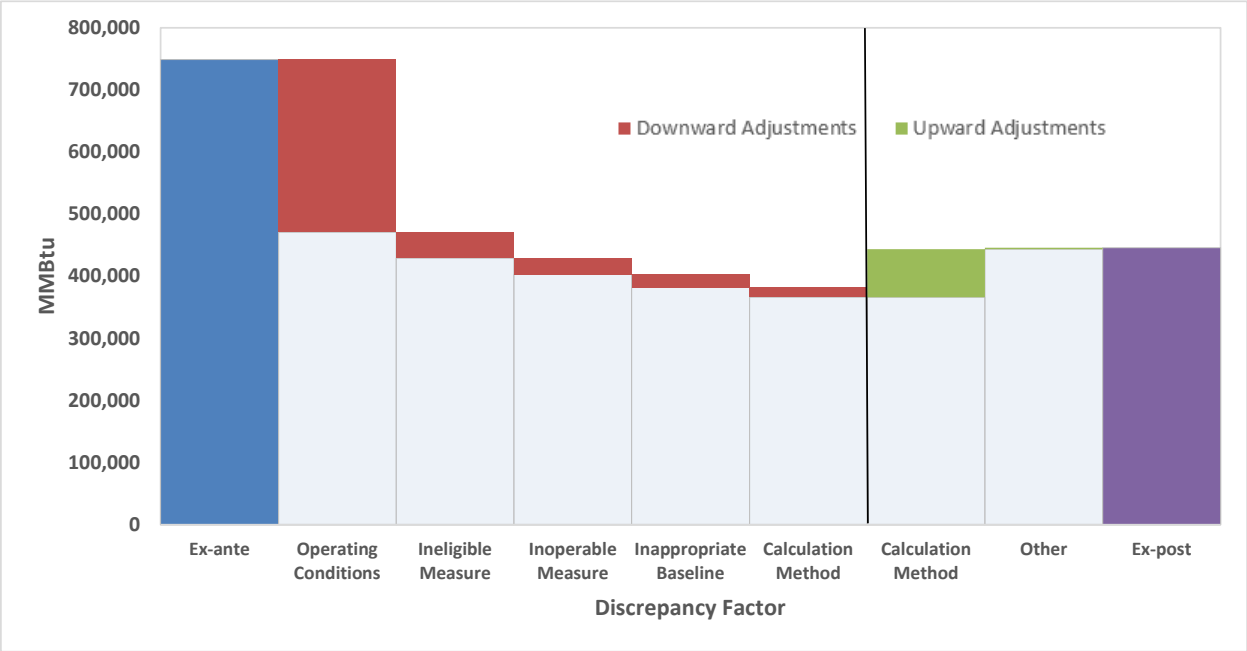


Figure B-10 shows that the most substantial downward adjustments for sampled SCG projects were for operating conditions (-37 percent) and ineligible measures (-6 percent). Altogether, the downward discrepancies for SCG sampled projects led to a 51 percent reduction in ex-ante savings estimates, while the upward discrepancies accounted for an 11 percent boost, resulting in a net downward adjustment of 40 percent.

Figure B-10: Ex-Post Upward and Downward Adjustments to Ex-Ante MMBtu for Sampled Projects - SCG



B.3 Site Specific GRR and NTGR Results

The site specific results in the tables below display the ex-ante and the ex-post evaluated savings estimates, both first year (FY) and lifecycle (LC) GRRs, and the project-level NTGRs for each of the 150 IALC M&V points evaluated in the 2014 Custom sample. Additionally, the table lists the PA 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 MMBtu 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 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 there are multiple measures in a project, and those measures have different EULs, this calculation results in a weighted average EUL at the project level.
- If the project is classified as early retirement, then the lifecycle savings estimates incorporate the first and second baseline calculations. This allows the reporting of an "effective EUL" instead of an EUL plus an RUL (which may not apply the same to all the measures in the project).
- Lifecycle savings can be calculated from first year savings by simply multiplying the first year savings times the "effective EUL."

PA	ItronID	Application or ProjectID	Associated ClaimIDs	SampleStratum	First Year Project-Level Positive Ex-Ante				FY GRR Project Level		Effective EUL		Lifecycle GRR Project Level		NTGR
					GrosskWPositive	GrosskWhPositive	GrossThermsPositive	GrossMBtuPositive	FY GRR MBtu	FY GRR kW	Ex Ante	Ex Post	LC GRR MMBtu	LC GRR kW	
PGE	E40001	TAA0012972	PGE-27366269	2	0.00	0.00	385,387.00	38,538.70	1.09		15.0	10.0	0.73		0.82
PGE	E40002	2K12087394	PGE-8106595	2	0.00	0.00	359,339.00	35,933.90	0.00		20.0	20.0	0.00		-
PGE	E40003	2K10039961	PGE-6358755; PGE-6358756	3	0.00	1,333,761.00	146,764.00	28,332.78	0.68		15.0	10.0	0.46		0.80
PGE	E40004	TAA0013036	PGE-27406335;	3	277.80	2,433,126.00	0.00	24,912.78	-0.27	-0.27	15.0	15.0	-0.27	-0.27	0.73
PGE	E40005	NC0124386	PGE-9168305; PGE-9168304	3	0.00	22,347.00	187,072.00	18,936.01	0.79		20.0	15.0	0.59		-
PGE	E40006	TAA0012773	PGE-27179218	3	0.00	0.00	144,370.00	14,437.00	1.00		14.0	6.7	0.48		0.23
PGE	E40007	2K12123474	PGE-8592150	3	157.79	1,382,246.00	0.00	14,152.82	0.77	0.77	10.0	5.0	0.39	0.39	0.33
PGE	E40011	2K13150877	PGE-27419987	4	0.00	784,000.00	39,200.00	11,947.38	-0.14		8.0	8.0	-0.14		-
PGE	E40016	NC0126587	PGE-21431262; PGE-21431261	4	0.00	14,873.00	83,100.00	8,462.28	0.80		20.0	15.0	0.60		0.57
PGE	E40021	2K13217595	PGE-23241507	4	0.00	3,337.00	69,374.00	6,971.57	0.89		20.0	15.0	0.67		0.57
PGE	E40030	TAA0012913	PGE-27269919	4	61.38	526,984.80	0.00	5,395.80	0.81	0.83	15.0	15.0	0.81	0.83	-
PGE	E40121	NC0125528	PGE-9357358	5	13.00	76,892.00	0.00	787.30	1.19	3.22	15.0	15.0	1.19	3.22	-
PGE	E40217	UAA0021330	PGE-27298699	5	0.73	23,089.61	0.00	236.41	1.04	3.85	11.0	10.0	0.94	3.50	0.20
PGE	E40244	NC0128490	PGE-27096294	5	16.20	17,844.00	0.00	182.70	1.51	-0.04	15.0	9.3	0.94	-0.02	0.50
PGE	E40252	NC0126226	PGE-16797667	5	13.30	14,912.00	0.00	152.68	0.46	0.09	15.0	10.0	0.30	0.06	0.21
PGE	E40351	NC0087873	PGE-4504603	1	2,350.90	5,906,021.00	1,055,525.00	166,024.25	0.57	0.57	16.0	16.0	0.57	0.57	0.47
PGE	E40352	NC0086214	PGE-5592982	3	42.40	217,039.00	273,689.00	29,591.16	1.36	9.04	16.0	16.0	1.36	9.04	0.40
PGE	E40501	EI00001746	PGE-27921631; PGE-27921630	1	134.74	1,763,766.70	3,130,421.00	331,101.31	0.98	0.96	15.0	20.0	1.30	1.29	0.67
PGE	E40503	EI00002128	PGE-27986145	2	9.30	79,544.00	635,112.00	64,325.65	0.49	0.58	8.0	20.0	1.24	1.45	0.48
PGE	E40507	EI00002146	PGE-28007338	2	0.00	0.00	506,543.00	50,654.30	0.65		14.0	20.0	0.93		0.90
PGE	E40508	NC0124966	PGE-23287357	2	0.00	0.00	503,619.00	50,361.90	0.43		15.0	11.0	0.32		0.63
PGE	E40510	TAA0014356	PGE-27961053	2	228.20	3,620,119.00	0.00	37,066.40	0.69	0.35	5.0	10.0	1.38	0.69	0.60
PGE	E40511	2K13160750	PGE-9277255	2	0.00	0.00	360,727.30	36,072.73	0.76		15.0	14.0	0.71		0.71
PGE	E40514	2K1318565C	PGE-27162287	2	89.07	1,195,028.00	117,972.00	24,033.09	1.12	0.41	15.0	10.0	0.75	0.28	0.25
PGE	E40515	EI00002182	PGE-28007822	2	0.00	0.00	317,885.00	31,788.50	0.90		15.0	15.0	0.90		0.63
PGE	E40516	NC0114006	PGE-6705838	2	7.10	62,021.00	311,439.00	31,778.93	0.35	1.39	15.0	15.0	0.35	1.39	0.90
PGE	E40520	TAA0013288	PGE-27534318	3	0.00	0.00	274,826.00	27,482.60	0.72		15.0	19.0	0.92		0.70
PGE	E40524	EI00002127	PGE-27986137	3	251.23	2,188,862.88	0.00	22,411.77	0.00	0.00	15.0	15.0	0.00	0.00	0.57
PGE	E40533	EI00000813	PGE-27556613	3	0.00	0.00	169,633.30	16,963.33	0.88		10.0	6.7	0.59		-
PGE	E40536	EI00002043	PGE-27953997	3	171.42	1,643,992.10	0.00	16,832.84	0.00	0.00	15.0	3.5	0.00	0.00	-
PGE	E40555	TAA0013596	PGE-27675581	4	117.84	1,011,620.10	0.00	10,357.98	0.18	0.20	15.0	15.0	0.18	0.20	0.38
PGE	E40587	2K1235537C	PGE-8963499	4	0.00	0.00	64,697.00	6,469.70	0.00		7.0	5.0	0.00		-
PGE	E40589	TAA0013861	PGE-27751606	4	68.69	447,104.50	17,102.70	6,288.17	0.93	0.94	3.0	14.7	4.54	4.59	-
PGE	E40603	EI00001482	PGE-27814716	4	0.00	537,673.00	0.00	5,505.23	0.00		15.0	11.0	0.00		-
PGE	E40620	TAA0013814	PGE-27739091; PGE-27739088	4	34.00	301,695.00	18,371.00	4,926.16	0.11	-0.41	5.2	5.0	0.11	-0.35	0.49
PGE	E40786	UAA0024620	PGE-27457462	5	14.87	140,930.80	0.00	1,442.99	0.38	-0.37	11.0	3.3	0.12	-0.11	0.20
PGE	E40961	EI00001990	PGE-27948541	5	7.95	51,746.20	0.00	529.83	0.15	0.11	15.0	15.0	0.15	0.11	0.61
PGE	E41108	TAA0013274	PGE-27529143	5	0.00	21,452.00	0.00	219.65	2.30		15.0	15.0	2.30		0.38
PGE	E41157	NC0128746	PGE-27127080	5	6.20	15,115.00	0.00	154.76	1.04	3.09	15.0	10.0	0.69	2.06	0.17
PGE	E41163	UAA0028203	PGE-27568873	5	2.49	14,447.86	0.00	147.93	0.00	0.00	11.0	10.0	0.00	0.00	0.50
PGE	E41503	NC0125468	PGE-27742757	2	686.00	4,321,245.00	0.00	44,245.23	0.95	1.01	16.0	16.0	0.95	1.01	0.68
PGE	E41520	NC0070316	PGE-27951487	4	179.30	512,597.00	14,144.00	6,662.88	0.84	0.53	16.0	16.0	0.84	0.53	0.34
PGE	E41555	NC0130026	PGE-27497241	5	0.00	85,441.00	0.00	874.83	0.00		16.0	13.0	0.00		-
NTGR-Only Completes															
PGE	E40014	2K0807666C		4	0.00	9,769.00	97,948.00	9,894.82							0.45
PGE	E40026	2K1317493C		4	0.00	0.00	63,778.00	6,377.80							0.50
PGE	E40031	2K13213157		4	60.80	526,326.40	0.00	5,389.06							0.56
PGE	E40087	UAA0021352		5	12.79	107,491.70	0.00	1,100.61							0.23
PGE	E40129	EI00000362		5	32.04	70,927.00	0.00	726.22							0.26
PGE	E40209	UAA0023810		5	3.08	26,724.84	0.00	273.64							0.67
PGE	E40304	NC0126808		5	0.70	3,252.00	0.00	33.30							0.48
PGE	E40502	EI00000861		2	0.00	0.00	1,017,935.00	101,793.50							0.43
PGE	E40504	EI00002222		2	0.00	0.00	590,078.00	59,007.80							0.43
PGE	E40506	NC0119386		2	0.00	0.00	515,705.00	51,570.50							0.05
PGE	E40512	NC0113987		2	10.20	89,177.00	337,342.00	34,647.28							0.90
PGE	E40513	NC0114007		2	7.50	66,050.00	335,545.00	34,230.79							0.90
PGE	E40519	EI00002000		3	286.16	2,748,709.00	0.00	28,144.03							0.67
PGE	E40525	2K12135373		3	408.70	2,108,003.00	0.00	21,583.84							1.00
PGE	E40528	EI00002224		3	170.36	1,902,094.60	0.00	19,475.55							0.33
PGE	E40541	STPB042636		3	0.00	0.00	6,930.00	693.00							0.67
PGE	E40574	2K11070284		4	76.80	604,736.00	11,813.00	7,373.19							0.60
PGE	E40583	2K13206860		4	83.96	662,738.90	0.00	6,785.78							0.83
PGE	E41504	NC0091274		2	746.60	1,757,794.00	156,698.00	33,667.85							0.05
PGE	E41505	NC0121607		3	293.40	2,475,319.00	0.00	25,344.79							0.57

PA	ItronID	Application or ProjectID	Associated ClaimIDs	SampleStratum	First Year Project-Level Positive Ex-Ante				FY GRR Project Level		Effective EUL		Lifecycle GRR Project Level		NTGR
					GrosskWPositive	GrosskWhPositive	GrossThermsPositive	GrossMBtuPositive	FY GRR MBtu	FY GRR kW	Ex Ante	Ex Post	LC GRR MMBtu	LC GRR kW	
SCE	F40001	500270763	SCE2014_Q2_0632861	1	623.60	5,290,778.00	0.00	54,172.28	0.00	0.00	15.0	15.0	0.00	0.00	-
SCE	F40002	500190415	SCE2014_Q1_0442537	1	543.94	4,660,478.00	0.00	47,718.63	0.62	0.65	15.0	5.0	0.21	0.22	0.70
SCE	F40003	500273367	SCE2014_Q1_0442546; SCE2014_Q1_0442549	1	165.12	4,178,487.50	0.00	42,783.53	1.00	1.00	14.7	14.7	1.00	1.00	0.46
SCE	F40008	500290108	SCE2014_Q1_0442521; SCE2014_Q1_0442522	2	84.05	1,872,884.00	0.00	19,176.46	2.41	1.40	15.0	14.2	2.29	1.44	0.43
SCE	F40010	500302889	SCE2014_Q1_0441119; SCE2014_Q1_0441115; SCE2014_Q1_0441116	2	109.89	1,585,907.20	0.00	16,238.10	0.35	0.36	17.3	20.0	0.40	0.41	0.31
SCE	F40011	500300811	SCE2014_Q2_0632555; SCE2014_Q2_0632558	2	0.00	1,272,833.30	0.00	13,032.54	0.79		11.0	5.0	0.36		0.50
SCE	F40017	500287450	SCE2014_Q2_0632501	3	127.30	1,099,925.40	0.00	11,262.14	0.00	0.00	5.0	3.5	0.00	0.00	-
SCE	F40019	500177223	SCE2014_Q2_0632462	3	109.17	934,945.10	0.00	9,572.90	0.44	1.00	13.0	5.0	0.17	0.38	0.63
SCE	F40025	500377423	SCE2014_Q2_0632491	3	91.89	788,811.20	0.00	8,076.64	0.13	0.13	15.0	10.0	0.08	0.08	0.50
SCE	F40052	500370342	SCE2014_Q1_0513956	4	28.74	241,990.10	0.00	2,477.74	0.00	0.00	10.0	10.0	0.00	0.00	0.37
SCE	F40054	500375684	SCE2014_Q2_0633061	4	27.03	230,900.30	0.00	2,364.19	0.00	0.00	10.0	10.0	0.00	0.00	0.25
SCE	F40059	500116086	SCE2014_Q2_0633117	4	114.55	205,116.00	0.00	2,100.18	0.00	0.00	20.0	20.0	0.00	0.00	0.23
SCE	F40150	500369797	SCE2014_Q2_0633127	5	8.76	65,269.10	0.00	668.29	0.00	0.00	15.0	15.0	0.00	0.00	0.23
SCE	F40185	500473712	SCE2014_Q2_0632892	5	0.00	47,856.00	0.00	490.00	1.26		15.0	15.0	1.26		0.48
SCE	F40242	500488508	SCE2014_Q2_0630463	5	2.89	25,306.00	0.00	259.11	0.41	0.41	10.0	3.3	0.14	0.14	0.25
SCE	F40321	500408673	SCE2014_Q1_0488168	5	0.00	5,961.50	0.00	61.04	1.13		15.0	15.0	1.13		-
SCE	F40338	500242221	SCE2014_Q2_0632657	5	0.57	4,990.00	0.00	51.09	0.76	0.77	12.0	12.0	0.76	0.77	0.25
SCE	F40451	500000186	SCE2014_Q2_0631039	1	644.10	3,611,969.00	-43,138.00	32,669.15	0.57	0.55	16.0	16.0	0.57	0.55	0.50
SCE	F40452	500176007	SCE2014_Q1_0442377	3	177.00	972,491.00	-5,760.00	9,381.34	0.00	0.00	16.0	15.0	0.00	0.00	0.28
SCE	F40501	500000282	SCE2014_Q4_0944768	1	1,677.20	14,480,423.00	0.00	148,265.05	0.81	0.80	15.0	12.0	0.65	0.64	0.32
SCE	F40502	500341780	SCE2014_Q4_0928590	1	706.92	6,349,496.00	0.00	65,012.49	0.00	0.00	15.0	15.0	0.00	0.00	-
SCE	F40503	IDSM-10-000129	SCE2014_Q4_0929169	1	843.43	5,290,116.60	0.00	54,165.50	0.97	0.77	15.0	15.0	0.97	0.77	0.20
SCE	F40504	500186138	SCE2014_Q4_0928659	1	526.01	3,787,272.00	0.00	38,777.88	0.22	0.19	8.0	5.0	0.14	0.12	0.67
SCE	F40516	500339475	SCE2014_Q3_0774967; SCE2014_Q3_0774325	2	326.38	1,671,388.40	0.00	17,113.35	1.00	1.00	18.9	18.9	1.00	1.00	0.60
SCE	F40517	500188692	SCE2014_Q4_0929053	2	258.10	1,656,819.00	0.00	16,964.17	0.12	0.09	15.0	15.0	0.12	0.09	0.68
SCE	F40524	500216781	SCE2014_Q3_0785412; SCE2014_Q3_0785037; SCE2014_Q3_0785033	2	127.00	1,157,087.00	0.00	11,847.41	1.03	1.27	18.9	18.7	1.02	1.29	-
SCE	F40525	500392339	SCE2014_Q4_0929205	2	140.27	1,212,079.60	0.00	12,410.48	0.00	0.00	15.0	3.5	0.00	0.00	-
SCE	F40526	500465496	SCE2014_Q4_0927198; SCE2014_Q4_0927199; SCE2014_Q4_0927197	2	323.13	1,189,538.20	0.00	12,179.68	0.37	0.66	16.3	17.7	0.40	0.69	0.00
SCE	F40536	500392333	SCE2014_Q3_0783812; SCE2014_Q3_0783833	3	108.30	850,741.20	0.00	8,710.74	0.21	0.56	15.0	15.0	0.21	0.56	0.34
SCE	F40546	500548180	SCE2014_Q4_0928256	3	77.32	689,921.00	0.00	7,064.10	1.01	1.03	6.9	11.3	1.66	1.61	0.57
SCE	F40547	500231735	SCE2014_Q3_0783834	3	74.89	683,560.00	0.00	6,998.97	0.88	0.87	15.0	15.0	0.88	0.87	0.29
SCE	F40551	500154722	SCE2014_Q4_0929697	3	75.76	649,096.30	0.00	6,646.10	0.80	0.80	15.0	15.0	0.80	0.80	1.00
SCE	F40557	500458689	SCE2014_Q3_0783757	3	72.95	626,276.10	0.00	6,412.44	0.31	0.31	15.0	10.0	0.20	0.20	0.50
SCE	F40624	500193850	SCE2014_Q4_0928859; SCE2014_Q4_0928862	4	96.01	226,569.50	0.00	2,319.85	0.48	-0.08	18.6	13.0	0.33	-0.15	0.52
SCE	F40626	PCXA-12-000005	SCE2014_Q3_0770194; SCE2014_Q3_0770195	4	24.10	256,242.00	0.00	2,623.66	1.00	1.00	8.0	8.0	1.00	1.00	-
SCE	F40629	ERCX-13-000012	SCE2014_Q4_0929585; SCE2014_Q4_0929716	4	0.00	198,298.90	0.00	2,030.38	0.75		15.0	15.0	0.75		0.53
SCE	F40635	500522312	SCE2014_Q4_0927906	4	28.20	239,295.00	0.00	2,450.14	1.17	0.00	10.0	5.0	0.59	0.00	0.25
SCE	F40893	500478968	SCE2014_Q4_0927080	5	4.62	33,710.00	0.00	345.16	0.73	1.00	10.0	3.3	0.24	0.33	0.25
SCE	F41041	500553929	SCE2014_Q3_0785469	5	8.99	12,567.50	0.00	128.68	1.62	1.16	15.0	15.0	1.62	1.16	0.32
SCE	F41502	500517763	SCE2014_Q4_0944856	2	147.11	1,240,374.00	0.00	12,700.19	1.05	1.10	15.0	15.0	1.05	1.10	0.43
SCE	F41517	500000708	SCE2014_Q4_0946308	4	150.30	284,323.00	0.00	2,911.18	0.79	0.34	16.0	16.0	0.79	0.34	0.36
SCE	F41531	500249669	SCE2014_Q3_0785435	5	41.00	85,089.00	292.00	900.43	1.05	0.29	16.0	16.0	1.05	0.29	0.63

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					GrosskWPositive	GrosskWhPositive	GrossThermsPositive	GrossMBtuPositive	FY GRR MBtu	FY GRR kW	Ex Ante	Ex Post	LC GRR MMBtu	LC GRR kW	
NTGR-Only Completes															
SCE	F40004	500392337		2	403.99	3,490,471.50	0.00	35,738.94							0.53
SCE	F40012	500381171		2	155.01	1,320,699.40	0.00	13,522.64							0.60
SCE	F40013	500197487		2	143.83	1,242,670.90	0.00	12,723.71							0.53
SCE	F40014	500196651		2	0.00	1,194,280.00	0.00	12,228.23							0.29
SCE	F40016	500224959		3	57.92	1,125,408.50	0.00	11,523.06							0.27
SCE	F40022	500350233		3	95.70	821,564.70	0.00	8,412.00							0.50
SCE	F40024	CRCX-11-000160		3	0.00	795,160.60	0.00	8,141.65							0.81
SCE	F40032	500391280		3	66.93	574,603.70	0.00	5,883.37							0.50
SCE	F40040	500290028		4	41.70	391,482.00	0.00	4,008.38							0.69
SCE	F40046	500344918		4	33.23	291,797.60	0.00	2,987.72							0.70
SCE	F40050	500409282		4	31.93	260,859.00	0.00	2,670.94							0.27
SCE	F40142	500384086		5	28.83	68,761.00	0.00	704.04							0.63
SCE	F40518	500375422		2	187.58	1,643,201.00	0.00	16,824.74							0.60
SCE	F40522	500626076		2	150.60	1,301,076.00	0.00	13,321.72							0.44
SCE	F40523	500588493		2	144.72	1,250,289.50	0.00	12,801.71							0.44
SCE	F40555	500193649		3	218.52	630,631.00	0.00	6,457.03							0.70
SCE	F40570	500204061		4	12.56	494,572.00	0.00	5,063.92							0.66
SCE	F40630	ACXF-12-000011		4	30.12	250,658.00	0.00	2,566.49							0.56
SCE	F40668	500517063		5	21.06	167,898.00	0.00	1,719.11							0.33
SCE	F40969	MBCX-14-000048		5	3.24	21,475.00	0.00	219.88							0.40
SCE	F41108	MBCX-14-000283		5	3.49	6,961.90	0.00	71.28							0.40
SCE	F41503	500111856		3	170.00	925,518.00	0.00	9,476.38							0.28
SCG	G40001	5001180823	2013*SCG3715*5001180823*10	2	0.00	0.00	1,021,000.00	102,100.00	0.08		20.0	20.0	0.08		0.67
SCG	G40002	5001168854	2013*SCG3715*5001168854*10	2	0.00	0.00	391,014.00	39,101.40	0.61		15.0	10.0	0.41		0.75
SCG	G40003	5001173682	2013*SCG3710*5001173682*10; 2013*SCG3710*5001173682*20	3	0.00	0.00	148,940.00	14,894.00	0.93		20.0	15.0	0.70		0.80
SCG	G40004	5001185713	2013*SCG3710*5001185713*10	4	0.00	0.00	90,331.00	9,033.10	0.28		6.0	8.0	0.37		0.25
SCG	G40005	5001170776	2013*SCG3715*5001170776*10	4	0.00	0.00	81,872.00	8,187.20	1.41		20.0	20.0	1.41		0.33
SCG	G40012	5001185711	2013*SCG3710*5001185711*10	4	0.00	0.00	48,740.00	4,874.00	0.22		6.0	8.0	0.29		0.25
SCG	G40018	5001225844	2013*SCG3715*5001225844*10	5	0.00	0.00	24,892.00	2,489.20	0.65		20.0	20.0	0.65		-
SCG	G40021	5001170875	2013*SCG3715*5001170875*10	5	0.00	0.00	21,942.00	2,194.20	1.05		20.0	15.0	0.79		-
SCG	G40039	5001222651	2013*SCG3710*5001222651*10	5	0.00	0.00	3,135.00	313.50	0.38		11.0	5.0	0.17		-
SCG	G40501	5001191471	2013*SCG3710*5001191471*10	1	0.00	0.00	1,216,150.00	121,615.00	0.19		20.0	20.0	0.19		0.67
SCG	G40502	5001171784	2013*SCG3715*5001171784*10	1	0.00	0.00	1,138,132.00	113,813.20	0.55		15.0	15.0	0.55		-
SCG	G40503	5001169476	2013*SCG3719*5001169476*10; 2013*SCG3719*5001169476*20	2	0.00	0.00	833,160.00	83,316.00	1.00		14.4	14.4	1.00		-
SCG	G40504	5001198377	2013*SCG3715*5001198377*10	2	0.00	0.00	413,070.00	41,307.00	0.00		20.0		0.00		-
SCG	G40505	5001203287	2013*SCG3715*5001203287*10	2	0.00	0.00	406,460.00	40,646.00	0.86		15.0	15.0	0.86		0.53
SCG	G40506	5001176334	2013*SCG3710*5001176334*10; 2013*SCG3710*5001176334*30	3	0.00	0.00	257,248.00	25,724.80	0.00		10.0	10.0	0.00		0.33
SCG	G40507	5001172718	2013*SCG3715*5001172718*10	3	0.00	0.00	254,973.00	25,497.30	1.56		20.0	20.0	1.56		0.62
SCG	G40508	10237359	2013*SCG3757*10237359*689368	3	0.00	0.00	248,438.00	24,843.80	0.67		20.0	12.0	0.40		0.67
SCG	G40510	5001210467	2013*SCG3715*5001210467*10	3	0.00	0.00	190,649.00	19,064.90	0.77		20.0	15.0	0.58		0.72
SCG	G40511	5001172977	2013*SCG3715*5001172977*10	3	0.00	0.00	179,134.00	17,913.40	4.41		5.0	5.0	4.41		-
SCG	G40512	5001171768	2013*SCG3710*5001171768*10; 2013*SCG3710*5001171768*20	3	0.00	0.00	150,744.00	15,074.40	0.60		15.0	5.0	0.20		0.73
SCG	G40513	5001167909	2013*SCG3710*5001167909*10	4	0.00	0.00	122,330.00	12,233.00	0.04		11.0	11.0	0.04		0.67
SCG	G40519	5001228448	2013*SCG3710*5001228448*10	4	0.00	0.00	67,121.00	6,712.10	0.97		11.0	11.0	0.97		0.43
SCG	G40520	10235914	2013*SCG3757*10235914*397406	4	0.00	0.00	63,004.00	6,300.40	0.14		15.0	6.7	0.06		0.41
SCG	G40522	5001227712	2013*SCG3719*5001227712*10	4	0.00	0.00	59,242.00	5,924.20	1.11		15.0	15.0	1.11		0.59
SCG	G40526	5001229954	2013*SCG3715*5001229954*10	4	0.00	0.00	47,862.00	4,786.20	0.65		10.0	6.7	0.43		0.70
SCG	G40570	5001167718	2013*SCG3710*5001167718*10	5	0.00	0.00	4,634.00	463.40	0.41		8.0	8.0	0.41		0.67
SCG	G40578	5001177981	2013*SCG3710*5001177981*10	5	0.00	0.00	2,049.00	204.90	0.88		11.4	11.4	0.88		0.55
SCG	G40628	5001187039	2013*SCG3710*5001187039*10	5	0.00	0.00	1,040.00	104.00	0.86		3.0	3.0	0.86		0.57
SCG	G40632	5001187280	2013*SCG3710*5001187280*10	5	0.00	0.00	1,040.00	104.00	0.94		3.0	3.0	0.94		0.57
SCG	G40639	5001187844	2013*SCG3710*5001187844*10	5	0.00	0.00	1,040.00	104.00	0.93		3.0	3.0	0.93		0.57

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NTGR-Only Completes															
SCG	G40006	5001182857		4	0.00	0.00	66,645.00	6,664.50							0.68
SCG	G40007	5001170967		4	0.00	0.00	64,328.00	6,432.80							0.43
SCG	G40008	5001172067		4	0.00	0.00	62,667.00	6,266.70							0.78
SCG	G40014	5001168736		5	0.00	0.00	40,690.00	4,069.00							0.63
SCG	G40019	5001171461		5	0.00	0.00	23,677.00	2,367.70							0.14
SCG	G40026	5001176862		5	0.00	0.00	16,363.00	1,636.30							0.50
SCG	G40028	5001232549		5	0.00	0.00	14,546.00	1,454.60							0.46
SCG	G40509	5001224798		3	0.00	0.00	227,611.00	22,761.10							0.63
SCG	G40514	5001168390		4	0.00	0.00	118,008.00	11,800.80							0.73
SCG	G40517	5001225694		4	0.00	0.00	85,764.00	8,576.40							0.38
SCG	G40521	5001196687		4	0.00	0.00	62,720.00	6,272.00							0.53
SCG	G40528	5001182711		5	0.00	0.00	46,333.00	4,633.30							0.60
SCG	G40580	5001174131		5	0.00	0.00	1,899.00	189.90							0.55
SCG	G40581	5001174479		5	0.00	0.00	1,899.00	189.90							0.55
SCG	G40592	5001178948		5	0.00	0.00	1,899.00	189.90							0.55
SCG	G40600	5001197007		5	0.00	0.00	1,597.00	159.70							0.57
SCG	G40633	5001187286		5	0.00	0.00	1,040.00	104.00							0.57
SCG	G40650	5001188086		5	0.00	0.00	1,040.00	104.00							0.57
SCG	G40653	5001238990		5	0.00	0.00	1,040.00	104.00							0.57
SDGE	H40001	11-02-003	2013*SDGE3117E*5001099275*20; 2013*SDGE3117E*5001099250*10; 2013*SDGE3117E*5001099250*30; 2013*SDGE3117E*5001099250*40; 2013*SDGE3117E*5001099275*10; 2013*SDGE3117E*5001099250*20	1	534.00	3,524,515.00	69,176.00	43,005.11	0.84	0.76	6.7	12.0	1.52	1.37	0.40
SDGE	H40002	3125_69A	2013*SDGE3117E*5001228174*20; 2013*SDGE3117E*5001228174*10	2	16.00	437,951.00	116,699.00	16,154.08	0.95	0.65	15.0	5.0	0.32	0.22	0.85
SDGE	H40003	5481	2013*SDGE3231*5001190507*10; 2013*SDGE3231*5001190507*20	3	180.03	1,330,222.00	0.00	13,620.14	0.21	0.17	15.0	15.0	0.21	0.17	0.26
SDGE	H40004	5415-1	2013*SDGE3220*5001198502*10; 2013*SDGE3220*5001198502*20	3	25.84	911,436.00	0.00	9,332.19	0.36	0.10	15.0	15.0	0.36	0.10	0.40
SDGE	H40006	5329	2013*SDGE3231*5001150204*10	3	0.00	824,367.00	0.00	8,440.69	0.19		10.0	5.0	0.10		0.18
SDGE	H40009	3125_82	2013*SDGE3117E*5001228664*10; 2013*SDGE3117E*5001228664*20	3	31.00	412,267.00	15,872.00	5,808.40	0.86	0.65	15.0	5.0	0.29	0.22	0.85
SDGE	H40011	5032-1	2013*SDGE3231*5001119422*50; 2013*SDGE3231*5001119422*30	4	0.00	202,987.00	14,799.00	3,558.28	0.35		15.0	13.0	0.31		-
SDGE	H40013	5384-1	2013*SDGE3220*5001194415*10	4	0.00	394,625.00	0.00	4,040.57	0.63		12.0	8.8	0.46		0.46
SDGE	H40018	5698-1	2013*SDGE3231*5001225014*10	4	0.00	0.00	27,374.00	2,737.40	1.00		6.0	6.0	1.00		0.13
SDGE	H40022	5664-1	2013*SDGE3220*5001217092*10	5	21.70	189,403.00	0.00	1,939.30	0.77	1.46	15.0	2.0	0.10	0.19	0.65
SDGE	H40034	4950-1	2013*SDGE3231*5001105242*10	5	23.90	83,045.00	0.00	850.30	0.39	0.34	15.0	15.0	0.39	0.34	-
SDGE	H40048	5512-1	2013*SDGE3220*5001197520*10	5	1.08	39,789.20	0.00	407.40	0.00	0.00	15.0	5.0	0.00	0.00	0.69
SDGE	H40081	5001201372	2013*SDGE3222*5001201372*20; 2013*SDGE3222*5001201372*70; 2013*SDGE3222*5001201372*10; 2013*SDGE3222*5001201372*50; 2013*SDGE3222*5001201372*30; 2013*SDGE3222*5001201372*40; 2013*SDGE3222*5001201372*80; 2013*SDGE3222*5001201372*60; 2013*SDGE3222*5001201372*90	1	957.00	4,265,205.00	136,996.00	57,371.03	1.09	0.87	15.0	16.6	1.21	0.96	-
SDGE	H40083	5001187735	2013*SDGE3222*5001187735*30; 2013*SDGE3222*5001187735*10; 2013*SDGE3222*5001187735*80; 2013*SDGE3222*5001187735*100; 2013*SDGE3222*5001187735*70; 2013*SDGE3222*5001187735*50; 2013*SDGE3222*5001187735*20; 2013*SDGE3222*5001187735*40; 2013*SDGE3222*5001187735*60; 2013*SDGE3222*5001187735*90	3	98.60	408,009.00	16,023.00	5,779.90	0.59	0.12	14.6	19.0	0.77	0.16	0.51
SDGE	H40501	3125_92	2013*SDGE3220*5001158978*20; 2013*SDGE3220*5001158978*10	2	82.00	775,709.00	146,810.00	22,623.48	0.93	0.65	5.0	5.0	0.93	0.65	0.85
SDGE	H40502	5708	2013*SDGE3220*5001215894*10; 2013*SDGE3220*5001215894*20	2	134.50	1,016,156.00	68,842.00	17,288.62	1.43	-0.22	15.0	5.6	0.53	-0.10	-
SDGE	H40503	5336-1	2013*SDGE3231*5001230011*20; 2013*SDGE3231*5001230011*10	2	177.00	1,633,644.00	0.00	16,726.88	0.00	0.00	15.0	15.0	0.00	0.00	0.52
SDGE	H40504	5001225083	2013*SDGE3222*5001225083*10	2	0.00	0.00	167,236.00	16,723.60	0.72		10.0	11.0	0.79		0.30

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					GrosskWPositive	GrosskWhPositive	GrossThermsPositive	GrossMBtuPositive	FY GRR MBtu	FY GRR kW	Ex Ante	Ex Post	LC GRR MMBtu	LC GRR kW	
SDGE	H40505	5612	2013*SDGE3220*5001224851*50; 2013*SDGE3220*5001224851*20; 2013*SDGE3220*5001224851*60	2	99.23	1,238,911.00	0.00	12,685.21	0.64	0.23	16.3	16.7	0.66	0.27	0.63
SDGE	H40506	5570-1	2013*SDGE3220*5001209748*10; 2013*SDGE3220*5001209748*20	3	7.80	491,989.00	24,210.00	7,458.48	0.08	0.72	15.0	15.0	0.08	0.72	0.35
SDGE	H40507	5719-1	2013*SDGE3231*5001227107*10; 2013*SDGE3231*5001249303*10	3	128.00	1,036,996.00	0.00	10,617.80	1.23	1.41	15.0	6.7	0.55	0.63	0.74
SDGE	H40508	5750	2013*SDGE3220*5001230502*20	3	112.53	985,720.00	0.00	10,092.79	0.80	0.17	15.0	15.0	0.80	0.17	0.58
SDGE	H40509	3125_43	2013*SDGE3117E*5001228443*10; 2013*SDGE3117E*5001228443*20	3	44.00	529,515.00	16,487.00	7,070.40	0.85	0.65	5.0	5.0	0.85	0.65	0.85
SDGE	H40510	5001175678	2013*SDGE3222*5001175678*40; 2013*SDGE3222*5001175678*20	4	0.00	550,547.00	0.00	5,637.05	1.00		10.0	8.0	0.80		0.45
SDGE	H40513	5706-1	2013*SDGE3220*5001225441*10	4	0.00	417,702.00	0.00	4,276.85	0.42		15.0	15.0	0.42		-
SDGE	H40516	5585-1	2013*SDGE3220*5001211515*10	4	0.00	0.00	37,731.00	3,773.10	1.00		6.0	6.0	1.00		0.58
SDGE	H40519	4810-1	2013*SDGE3220*5001072847*10	4	35.20	307,656.00	0.00	3,150.09	0.90	1.04	15.0	15.0	0.90	1.04	0.22
SDGE	H40523	5125-1	2013*SDGE3220*5001140431*10	4	35.00	225,786.40	0.00	2,311.83	0.15	-0.10	5.0	15.0	0.45	-0.29	0.38
SDGE	H40529	3124_28	2013*SDGE3117E*5001253538*10	5	0.00	196,705.00	0.00	2,014.06	0.12		5.0	15.0	0.36		0.33
SDGE	H40565	5446-1	2013*SDGE3220*5001187507*10	5	17.27	37,752.00	0.00	386.54	0.81	0.64	15.0	15.0	0.81	0.64	-
SDGE	H40592	5502-1	2013*SDGE3220*5001195704*10	5	1.40	13,085.60	0.00	133.98	0.89	0.22	15.0	15.0	0.89	0.22	-
SDGE	H40596	5802	2013*SDGE3220*5001236339*10	5	0.00	0.00	1,070.40	107.04	1.00		15.0	10.0	0.67		0.67
SDGE	H41502	5001193966	2013*SDGE3222*5001193966*10; 2013*SDGE3222*5001193966*30; 2013*SDGE3222*5001193966*50; 2013*SDGE3222*5001193966*40; 2013*SDGE3222*5001193966*70; 2013*SDGE3222*5001193966*20; 2013*SDGE3222*5001193966*60	2	323.00	1,225,172.00	10,949.00	13,639.44	1.65	0.46	15.0	17.0	1.87	0.52	-
SDGE	H41505	5001186797	2013*SDGE3222*5001186797*10; 2013*SDGE3222*5001186797*50; 2013*SDGE3222*5001186797*70; 2013*SDGE3222*5001186797*80; 2013*SDGE3222*5001186797*100; 2013*SDGE3222*5001186797*110; 2013*SDGE3222*5001186797*120; 2013*SDGE3222*5001186797*20; 2013*SDGE3222*5001186797*30; 2013*SDGE3222*5001186797*40; 2013*SDGE3222*5001186797*60; 2013*SDGE3222*5001186797*90	4	92.00	301,465.00	3,127.00	3,399.40	1.06	1.19	15.0	17.0	1.20	1.35	-
SDGE	H41522	5001205950	2013*SDGE3222*5001205950*10; 2013*SDGE3222*5001205950*40; 2013*SDGE3222*5001205950*20; 2013*SDGE3222*5001205950*60; 2013*SDGE3222*5001205950*50; 2013*SDGE3222*5001205950*80	5	10.10	24,855.00	247.00	279.19	0.63	0.95	15.0	17.5	0.73	1.11	0.65
NTGR-Only Completes															
SDGE	H40012	5030-1		4	52.51	420,098.00	0.00	4,301.38							0.54
SDGE	H40015	5594-1		4	0.00	0.00	37,382.00	3,738.20							0.74
SDGE	H40019	5408-1		4	51.52	245,338.00	832.00	2,595.22							0.19
SDGE	H40025	5679-1		5	22.41	157,994.00	0.00	1,617.70							0.28
SDGE	H40035	5672-1		5	0.00	73,990.00	831.40	840.72							0.67
SDGE	H40036	5511-1		5	5.37	77,296.00	0.00	791.43							0.69
SDGE	H40042	5514-1		5	5.04	50,483.80	0.00	516.90							0.69
SDGE	H40044	5531		5	0.00	0.00	4,673.00	467.30							0.36
SDGE	H40046	5067-1		5	3.87	42,358.10	0.00	433.70							0.45
SDGE	H40049	5662		5	3.19	38,463.00	0.00	393.82							0.57
SDGE	H40051	5513-1		5	1.15	34,229.00	0.00	350.47							0.69
SDGE	H40511	5028-1		4	74.78	496,667.50	0.00	5,085.38							0.42
SDGE	H40518	5764		4	41.99	328,541.00	0.00	3,363.93							0.30
SDGE	H40522	5485-1		4	0.00	0.00	24,066.00	2,406.60							0.69
SDGE	H40552	5035		5	0.00	56,882.00	0.00	582.41							0.33
SDGE	H40571	5394		5	0.00	29,534.00	0.00	302.40							0.72
SDGE	H41501	5001187229		2	284.80	491,235.00	15,831.00	6,612.86							0.42
SDGE	H41503	5001234666		3	0.00	517,219.00	0.00	5,295.81							0.50
SDGE	H41506	5001200769		4	45.60	307,590.00	2,783.00	3,427.71							0.44

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
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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 sample of 339 projects (189 for 2013 evaluation effort plus 150 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* and the *Research Plan Addendum*[1] submitted to the CPUC for more information on specific tasks and overall project objectives.

[1] http://www.energydataweb.com/cpuc/deliverableView.aspx?did=1133&uid=0&tid=0&cid=
http://www.energydataweb.com/cpucFiles/pdaDocs/1307/IALC%20Research%20Plan%20AddendumPY2014_June2015_Final.pdf

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.**

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 "x" measures that comprise at least 75 percent of ex-ante savings claim values. Note that the top measures may not be the first numerically listed measures, e.g. Itron ID H40501-001 may have lower savings than H40501-002. 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

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

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.

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 + (1.27, or latest version), which can be downloaded from:

https://www1.eere.energy.gov/manufacturing/tech_assistance/softwaretoolregistration.asp?product=1

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 DEER2014 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

[3] http://www.deeresources.com/files/DEER2013codeUpdate/download/DEER2014UpdateDocumentation_2-12-2014.pdf

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 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 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]

[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. Direct link:

- IALC 2013 - EAR Overlap and ISP Guidance.xlsx[6]
- ProjectBasis_EULRUL_Evidencev1July172014.pdf[7]

http://energydataweb.com/cpucFiles/pdaDocs/1256/Evaluation%20Guidance%20Questions%20for%20Site%20Specific%20Analysis_2014_0918.pdf

6 Appendix D of this report

7 http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=5325

Appendix D

EAR and ISP Guidance

The tables below show a list of all 150 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.

ItronID	ItronRecordID	ISP Guidance	Any EAR Overlap (Yes/No)	EAR Guidance Applicability	All EAR Overlap Project IDs
E40001	E40001-001	No	Yes	True Match	X183
E40002	E40002-001	No	No		
E40003	E40003-001	No	No		
E40003	E40003-002	No	No		
E40004	E40004-001	No	Yes	Similar Measure	X217
E40005	E40005-001	Yes	Yes	Similar Measure	X154
E40005	E40005-002	Yes	Yes	Similar Measure	X154
E40006	E40006-001	No	Yes	Similar Measure	X018, X443
E40007	E40007-001	No	Yes	Similar Measure	X277
E40011	E40011-001	Yes	No		
E40016	E40016-001	Yes	Yes	Similar Measure	X154, X258
E40016	E40016-002	Yes	Yes	Similar Measure	X154, X258
E40021	E40021-001	Yes	No		
E40030	E40030-001	Yes	Yes	Similar Measure	X477, X274
E40121	E40121-001	No	No		
E40217	E40217-001	No	No		
E40244	E40244-001	No	No		
E40252	E40252-001	No	No		
E40351	E40351-001	Yes	No		
E40352	E40352-001	Yes	No		
E40501	E40501-001	No	Yes	True Match	X246
E40501	E40501-002	No	Yes	True Match	X246
E40503	E40503-001	No	Yes	Same Measure, Different Customer & Location, Same PA	X484
E40507	E40507-001	No	Yes	Same Measure, Same Customer, Different Location, Different PA	X290
E40508	E40508-001	Yes	No		
E40510	E40510-001	No	No		
E40511	E40511-001	No	Yes	True Match	X298
E40514	E40514-001	No	Yes	Related to Campus Cogen Only; Dissimilar Measures	X219
E40515	E40515-001	No	No		
E40516	E40516-001	Yes	Yes	Similar Measure	X065, X467, X477, X196, X274
E40520	E40520-001	Yes	No		
E40524	E40524-001	No	No		
E40533	E40533-001	Yes	Yes	Similar Measure	X086
E40536	E40536-001	Yes	Yes	Similar Measure	X245
E40555	E40555-001	Yes	Yes	Same Measure, Same Customer	X364
E40587	E40587-001	Yes	Yes	Same Measure	X375, X497
E40589	E40589-001	No	No		
E40603	E40603-001	Yes	No		
E40620	E40620-001	Yes	No		
E40620	E40620-002	Yes	No		
E40786	E40786-001	No	Yes	Same Measure	X032, X425
E40961	E40961-001	Yes	Yes	Similar Measure	X220, X238
E41108	E41108-001	Yes	No		
E41157	E41157-001	No	No		
E41163	E41163-001	Yes	Yes	Similar Measure	X032, X425, X431
E41503	E41503-001	No	No		
E41520	E41520-001	Yes	No		
E41555	E41555-001	No	No		
F40001	F40001-001	No	No		
F40002	F40002-001	No	No		
F40003	F40003-001	No	Yes	True Match	X215
F40003	F40003-002	No	Yes	True Match	X215
F40008	F40008-001	No	No		
F40008	F40008-002	Yes	Yes	Similar Measure	X351
F40010	F40010-001	No	No		
F40010	F40010-002	No	No		
F40011	F40011-001	No	Yes	Similar Measure	X451
F40011	F40011-002	No	Yes	Similar Measure	X451
F40017	F40017-001	Yes	Yes	Similar Measure	X129, X453
F40019	F40019-001	No	No		
F40025	F40025-001	Yes	Yes	ISP baseline study partially completed	X146, X359, X453
F40052	F40052-001	Yes	No		
F40054	F40054-001	No	No		
F40059	F40059-001	No	No		
F4010B	F4010B-003	No	No		
F40150	F40150-001	No	No		
F40185	F40185-001	No	No		
F40242	F40242-001	No	No		
F40321	F40321-001	No	No		
F40338	F40338-001	No	No		
F40451	F40451-001	Yes	No		
F40452	F40452-001	Yes	No		
F40501	F40501-001	Yes	Yes	Similar Measure	X192
F40502	F40502-001	No	No		
F40503	F40503-001	No	Yes	Similar Measure	X192
F40504	F40504-001	No	Yes	Similar Measure	X111, X385
F40516	F40516-001	Yes	Yes	Similar Measure	X048, X068, X097, X116, X120, X454
F40516	F40516-002	Yes	Yes	Similar Measure	X048, X068, X097, X116, X120, X454
F40517	F40517-001	Yes	Yes	Similar Measure	X378
F40524	F40524-001	No	Yes	True Match	X136

ItronID	ItronRecordID	ISP Guidance	Any EAR Overlap (Yes/No)	EAR Guidance Applicability	All EAR Overlap Project IDs
F40524	F40524-002	No	Yes	True Match	X136
F40525	F40525-001	Yes	Yes	Similar Measure	X129, X453
F40526	F40526-001	No	No		
F40526	F40526-002	No	No		
F40536	F40536-001	Yes	Yes	Same Measure	X274
F40536	F40536-002	Yes	Yes	Same Measure	X274
F40546	F40546-001	Yes	Yes	Similar Measure	X405, X217, X239, X328
F40547	F40547-001	No	Yes	Similar Measure	X217, X239, X328
F40551	F40551-001	No	Yes	Similar Measure	X029, X316
F40557	F40557-001	Yes	Yes	Same Measure, Same Customer	X146, X359, X453
F40624	F40624-001	No	No		
F40624	F40624-002	No	No		
F40626	F40626-001	No	Yes	True Match	X191
F40626	F40626-002	No	Yes	True Match	X191
F40629	F40629-001	Yes	No		
F40629	F40629-002	Yes	No		
F40635	F40635-001	No	Yes	Similar Measure	X529, X032, X425, X431
F40893	F40893-001	No	Yes	Similar Measure	X425
F41041	F41041-001	No	No		
F41502	F41502-001	Yes	No		
F41517	F41517-001	No	No		
F41531	F41531-001	No	No		
F40524B	F4524B-003	No	Yes	True Match	X316
F40526B	F4526B-003	No	No		
G40001	G40001-001	Yes	Yes	Similar Measure	X368
G40002	G40002-001	No	No		
G40003	G40003-001	Yes	Yes	Similar Measure	X067, X086, X089
G40003	G40003-002	No	No		
G40004	G40004-001	Yes	Yes	Same Measure	X497
G40005	G40005-001	No	No		
G40012	G40012-001	Yes	Yes	Same Measure	X497
G40018	G40018-001	No	No		
G40021	G40021-001	Yes	Yes	Similar Measure	X052
G40039	G40039-001	No	Yes	Similar Measure	X010
G40501	G40501-001	Yes	Yes	Similar Measure	X052, X368, X422
G40502	G40502-001	No	No		
G40503	G40503-001	Yes	Yes	True Match	X154
G40503	G40503-002	Yes	Yes	True Match	X154
G40504	G40504-001	Yes	Yes	Similar Measure	X052, X368, X422
G40505	G40505-001	No	Yes	True Match	X415
G40506	G40506-001	No	No		
G40506	G40506-002	No	No		
G40507	G40507-001	Yes	Yes	Similar Measure	X052, X368, X422
G40508	G40508-001	No	Yes	True Match	X443
G40510	G40510-001	No	Yes	Similar Measure	X090, X046
G40511	G40511-001	No	Yes	True Match	X021
G40512	G40512-001	No	Yes	Same Measure, Same Customer, Same Location, Different Project	X188, X214
G40512	G40512-002	No	Yes	Same Measure, Same Customer, Same Location, Different Project	
G40513	G40513-001	Yes	Yes	Similar Measure	X003
G40519	G40519-001	Yes	No		
G40520	G40520-001	No	Yes	Similar Measure	X018, X330, X298
G40522	G40522-001	No	No		
G40526	G40526-001	No	Yes	Similar Measure	X089
G40570	G40570-001	Yes	No		
G40578	G40578-001	Yes	Yes	True Match	X044
G40628	G40628-001	No	No		
G40632	G40632-001	No	No		
G40639	G40639-001	No	No		
H40001	H40001-001	No	No		
H40001	H40001-002	No	No		
H40002	H40002-001	No	Yes	Similar Measure	X370
H40002	H40002-002	No	Yes	Similar Measure	X370
H40003	H40003-001	No	No		
H40003	H40003-002	No	No		
H40004	H40004-001	Yes	Yes	Similar Measure	X405, X312
H40004	H40004-002	Yes	Yes	Similar Measure	X289
H40006	H40006-001	No	No		
H40009	H40009-001	No	Yes	Similar Measure	X370
H40009	H40009-002	No	Yes	Similar Measure	X370
H40011	H40011-001	No	Yes	Similar Measure	X469, X017
H40011	H40011-002	No	Yes	Similar Measure	X469, X017
H40013	H40013-001	No	No		
H40018	H40018-001	Yes	Yes	Similar Measure	X209
H4001B	H4001B-003	No	No		
H4001B	H4001B-004	No	No		
H4001C	H4001C-005	No	No		
H4001C	H4001C-006	No	No		
H40022	H40022-001	No	No		
H40034	H40034-001	Yes	No		
H40048	H40048-001	No	Yes	Similar Measure	X469, X017

ItronID	ItronRecordID	ISP Guidance	Any EAR Overlap (Yes/No)	EAR Guidance Applicability	All EAR Overlap Project IDs
H40081	H40081	Yes	Yes	True Match	X224
H40083	H40083	No	No		
H40501	H40501-001	No	Yes	Similar Measure	X370
H40501	H40501-002	No	Yes	Similar Measure	X370
H40502	H40502-001	No	No		
H40502	H40502-002	No	No		
H40503	H40503-001	Yes	No		
H40503	H40503-002	Yes	No		
H40504	H40504-001	Yes	No		
H40505	H40505-001	No	Yes	True Match	X460, X234
H40505	H40505-002	No	Yes	True Match	X460, X234
H40506	H40506-001	Yes	No		
H40506	H40506-002	Yes	No		
H40507	H40507-001	No	Yes	Similar Measure	X140
H40507	H40507-002	No	Yes	Similar Measure	X140
H40508	H40508-001	No	Yes	Similar Measure	X393
H40509	H40509-001	No	Yes	Similar Measure	X370
H40509	H40509-002	No	Yes	Similar Measure	X370
H40510	H40510-001	No	Yes	Similar Measure	X454, X464
H40510	H40510-002	No	Yes	Similar Measure	X454, X464
H40513	H40513-001	No	No		
H40516	H40516-001	Yes	Yes	Same Measure	X209
H40519	H40519-001	Yes	Yes	Similar Measure	X316
H40523	H40523-001	No	No		
H40529	H40529-001	Yes	Yes	True Match	X149
H40565	H40565-001	No	No		
H40592	H40592-001	No	No		
H40596	H40596-001	No	No		
H41502	H41502-ALL	No	No		
H41505	H41505-ALL	No	No		
H41522	H41522-ALL	No	No		
H40505B	H4505B-003	No	Yes	True Match	X460

Appendix E

PPA Scoring Guidelines for Site Reporting Forms

Each of the 150 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 12 individual ratings provided by the evaluation team for each project addressing three broad areas: baseline, calculation methodology, and inputs/assumptions. Within these three areas the PPA contains specific ex post observations on the PA provided *project documentation, descriptions, quality, accuracy and appropriateness. It also includes* related topics such as PA treatment of EUL, RUL and incentives relative to baseline selection. This appendix highlights the instructions for scoring each component of the PPA within the baseline, calculation methods, and inputs/assumptions sections of the Site Reporting Form.

E.1 Baseline Rating

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.
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 / 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; the baseline rationale is narrated with partial supporting documents.
5. 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 narrated with full supporting documentation

For natural replacement and ROB projects:

1. No documentation or discussion included 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. Regressive baseline selected without consideration.
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. Applicability and use of 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 as a narrative with referencing documentation. Normal replacement and upgrade practices described in detail with evidence included. Capability of baseline equipment to meet functional requirement provided. Applicability and use of 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 as a narrative referencing documentation. Normal replacement and upgrade practices described in detail with evidence included. Capability of baseline equipment to meet functional requirement provided. Applicability and use of non-regressive baseline explained with analysis. Additional research conducted to support baseline determination for the majority of the previously mentioned factors.

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 or EUL does not match the IOU tracking database value.
3. EUL from project documentation matches the DEER EUL. And the EUL may or may not match the IOU tracking database value.
4. EUL provided for measures for which DEER EUL is not available. One or more reliable source of EUL is used. And the EUL matches the IOU tracking database value.
5. EUL provided for measures for which DEER EUL is not available. The EUL claim is supported by additional research when other sources were not reliable. And the EUL matches the IOU tracking database value.

Rate RUL Documentation for ER projects

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, plausible arguments have been presented to support the RUL assignment, and the 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

For existing equipment (aka "in situ") equipment baseline

1. In situ equipment assumed as technical equipment baseline does not match the selected project baseline type (for instance, ROB, NR, NC, Capacity Expansion, or Major Renovation). For ER projects, the second baseline (for the EUL-RUL period) not identified.
2. In situ equipment assumed as technical equipment baseline does not match the selected project baseline type (for instance, ROB, NR, NC, Capacity Expansion, or Major Renovation). However, for ER projects, the second baseline is identified in project documentation.
3. In situ equipment appropriately selected as the technical equipment baseline for a proper ER, REA, or system optimization baseline type. For ER projects, the second baseline is accurately identified in project documentation and some narrative is provided.

4. In situ equipment appropriately selected as the technical equipment baseline for a proper ER, REA, or system optimization baseline type; baseline is supported with a minimum of two weeks of pre-retrofit M&V system data for key parameters and production. For ER projects, the second baseline is accurately identified in project documentation, and narrative and supporting documentation are provided.
5. In situ equipment appropriately selected as the technical equipment baseline for a proper ER, REA, or system optimization baseline type; baseline is supported with a full year of pre-retrofit M&V system data for ALL key system parameters and production. For ER projects, the second baseline is accurately identified in project documentation, and a narrative and supporting documentation with additional research are provided.

For industry standard practice (ISP) equipment baseline

1. ISP specified as baseline, but documentation states that there is no ISP baseline for this industry OR neglects to identify what the proper ISP is OR assumes that the customer's in situ equipment is the proper ISP.
2. ISP specified as baseline; baseline equipment described has not been approved or accepted by CPUC as an appropriate technical baseline.
3. ISP specified as baseline; proper new (non-degraded) equipment and efficiency levels described and supported by market research.
4. ISP specified as baseline; proper equipment baseline selected from a previous CPUC-approved ISP baseline study, and the ISP application properly adjusted the baseline equipment and consumption.
5. ISP specified as baseline; proper equipment baseline selected from a previous CPUC-approved ISP baseline study and includes a narrative on ISP and non-regressive baseline.

For T-24, T-20, Federal regulations, building code compliant baseline selection (such as OSHPD), local code requirements, such as AQMD, Cal-OSHA, city or county codes, or environmental compliance

1. Identified the wrong code or improper jurisdiction.
2. Identified the proper code jurisdiction but identified incorrect or predecessor code.
3. Identified the proper code and applicable code year version for code compliance.
4. Identified the proper code and applicable code year version for code compliance; provided an excerpt of code, requirement or regulation.
5. Identified the proper code and applicable code year version for code compliance; provided an excerpt from the code, requirement or regulation and included narrative on research for determining the proper jurisdiction and version.

For customer or facility standard practice equipment baseline selection:

1. Measure described as customer standard practice; neglected to provide background narrative.
2. Baseline identified as a customer standard practice, but the narrative provided is incorrect or unsupported.
3. Baseline identified as a customer standard practice, and narrative provided explaining why measure is customer standard practice in comparison to their competitors' standard practice or industry standard practice (ISP).
4. Baseline identified as a customer standard practice, and narrative provided explaining why measure is customer standard practice in comparison to their competitors' standard practice or industry standard practice (ISP), and includes hierarchy of efficiency levels.
5. Baseline identified as a customer standard practice, and narrative provided explaining why measure is customer standard practice in comparison to their competitors' standard practice or industry standard practices (or ISP), and includes hierarchy of efficiency levels along with market research and dates of customer's corporate decision making.

Baseline Description (Equipment/Efficiency) Rating

1. Neither baseline equipment nor efficiency level was described in project documentation. Wrong baseline equipment selected for non-ER projects; wrong baseline equipment described for both baselines (RUL and EUL-RUL) for ER projects.
2. Baseline equipment inferred (in calculations), partially described, or baseline provided with no efficiency levels included 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; baseline efficiency levels identified.
5. Baseline equipment fully described and accurately identified; baseline efficiency levels identified; and fully described in project documentation.

Incentive Appropriateness Rating

1. Incentives incorrectly calculated, 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.

E.2 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. Additionally, 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, production data, etc.)
3. Calculation model uses site-specific values and reliable typical input values (such as flow rates, pressures, temperatures, weather data, production data, etc.)
4. Calculation model uses site-specific values supported by M&V, trend logs, SCADA, and production data as applicable; the model uses reliable typical input values (such as flow rates, pressures, temperatures, weather, production data, etc.)

5. Calculation model uses site-specific values which are reliable and supported by M&V, trend logs, SCADA, production data as applicable.

E.3 Inputs and Assumptions Rating

Rate Comprehensiveness of the Inputs and Assumptions

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, etc.) and assumptions (e.g., weather, production or seasonal adjustments, etc.)
3. Calculation model includes most relevant inputs (e.g., load factor, efficiency, flow, power factor, etc.) and assumptions (e.g., weather, production or seasonal adjustments, etc.)
4. Calculation model includes all relevant inputs (e.g., load factor, efficiency, flow, power factor, etc.) and assumptions (e.g., weather, production or seasonal adjustments, etc.)
5. Calculation model includes all relevant inputs (e.g., load factor, efficiency, flow, power factor, etc.) and assumptions (e.g., weather, production or seasonal adjustments performed, etc.), 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 impacts 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 conservative assumptions used in the calculations; includes research for assumptions.

Rate Accuracy of the Inputs and Assumptions

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

Appendix F

Additional Project Practices Assessment Findings

F.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. The PPA process provides impact-oriented findings and feedback to the PAs. The PPA process was 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 PA-specific results and supporting evidence for the bigger picture results and findings conveyed in Chapter 5. These additional results are focused on the Project Type Assessment and the Project Baseline Assessment.

F.2 Project Type Assessment

As discussed in Chapter 5, PA-specified project types were often overturned by the evaluator. For all PAs combined, there was some improvement in project type selection in the 2013+ period relative to the pre-2013 period (pre-2013: 59 percent agreement vs. 2013+: 64 percent agreement). SCE showed a decline in project type agreement in the 2013+ period (pre-2013: 59 percent agreement vs. 2013+: 29 percent agreement). PG&E project type agreement stayed constant over

[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.

the two time periods at 73 percent, while SCG and SDG&E both improved from 50 percent agreement in the pre-2013 period to 75 percent and 74 percent, respectively, in the 2013+ period.

Table F-1 through Table F-4 present PA-specific results detailing ex-ante versus ex-post project type designations. The green shaded cells along the diagonal indicate the number of measures that showed agreement between the PA and ex-post evaluation. Values in the red shaded cells are measures where the project type was reassigned by the evaluator. The most commonly overturned project types by PA are as follows:

- PG&E: Add-on, new construction, and replace on burnout
- SCE: Add-on, early replacement, and replace on burnout
- SCG: Add-on, early replacement, and new construction
- SDG&E: Add-on, early replacement, and replace on burnout

Table F-1: PA vs. Evaluation Specified Project Type by Customer Agreement Date – PG&E

			PG&E-Specified Project Type								
			Add-on	Capacity Expansion	Early Replacement	Major Renovation	New Construction	Natural Replacement	Replace on Burnout	System Optimization	Multiple
Pre-2013 Customer Agreement Date											
Number of measures evaluated (n)			15								
Frequency of PA-Specified Measure Type (n)			4	0	0	0	6	0	3	1	1
Evaluation-Specified Project Type	Frequency of Measure-Level Obs.	(n)									
	Add-on	3	2	0	0	0	0	0	1	0	0
	Capacity Expansion	0	0	0	0	0	0	0	0	0	0
	Early Replacement	0	0	0	0	0	0	0	0	0	0
	Major Renovation	0	0	0	0	0	0	0	0	0	0
	New Construction	6	0	0	0	0	6	0	0	0	0
	Natural Replacement	0	0	0	0	0	0	0	0	0	0
	Replace on Burnout	1	0	0	0	0	0	0	1	0	0
	System Optimization	3	1	0	0	0	0	0	1	1	0
	Multiple	2	1	0	0	0	0	0	0	0	1
2013+ Customer Agreement Date											
Number of measures evaluated (n)			33								
Frequency of PA-Specified Measure Type (n)			12	1	5	0	11	1	1	1	1
Evaluation-Specified Project Type	Frequency of Measure-Level Obs.	(n)									
	Add-on	7	7	0	0	0	0	0	0	0	0
	Capacity Expansion	2	0	1	0	0	1	0	0	0	0
	Early Replacement	4	0	0	4	0	0	0	0	0	0
	Major Renovation	0	0	0	0	0	0	0	0	0	0
	New Construction	9	0	0	0	0	9	0	0	0	0
	Natural Replacement	3	0	0	0	0	1	1	0	1	0
	Replace on Burnout	3	2	0	0	0	0	0	1	0	0
	System Optimization	3	2	0	1	0	0	0	0	0	0
	Multiple	2	1	0	0	0	0	0	0	0	1

Table F-2: PA vs. Evaluation Specified Project Type by Customer Agreement Date – SCE

			SCE-Specified Project Type								
			Add-on	Capacity Expansion	Early Replacement	Major Renovation	New Construction	Natural Replacement	Replace on Burnout	System Optimization	Multiple
Pre-2013 Customer Agreement Date											
Number of measures evaluated (n)			32								
Frequency of PA-Specified Measure Type (n)			15	0	4	0	5	0	5	1	2
Evaluation-Specified Project Type	Frequency of Measure-Level Obs.	(n)									
	Add-on	12	10	0	1	0	0	0	0	0	1
	Capacity Expansion	1	0	0	0	0	0	0	0	1	0
	Early Replacement	1	0	0	1	0	0	0	0	0	0
	Major Renovation	0	0	0	0	0	0	0	0	0	0
	New Construction	5	0	0	0	0	5	0	0	0	0
	Natural Replacement	4	0	0	1	0	0	0	2	0	1
	Replace on Burnout	4	0	0	1	0	0	0	3	0	0
	System Optimization	4	4	0	0	0	0	0	0	0	0
	Multiple	1	1	0	0	0	0	0	0	0	0
2013+ Customer Agreement Date											
Number of measures evaluated (n)			24								
Frequency of PA-Specified Measure Type (n)			7	0	5	0	3	0	5	1	3
Evaluation-Specified Project Type	Frequency of Measure-Level Obs.	(n)									
	Add-on	3	2	0	1	0	0	0	0	0	0
	Capacity Expansion	0	0	0	0	0	0	0	0	0	0
	Early Replacement	5	2	0	1	0	0	0	2	0	0
	Major Renovation	0	0	0	0	0	0	0	0	0	0
	New Construction	7	0	0	2	0	3	0	0	1	1
	Natural Replacement	2	0	0	0	0	0	0	2	0	0
	Replace on Burnout	4	0	0	1	0	0	0	1	0	2
	System Optimization	1	1	0	0	0	0	0	0	0	0
	Multiple	2	2	0	0	0	0	0	0	0	0

Table F-3: PA vs. Evaluation Specified Project Type by Customer Agreement Date – SCG

			SCG-Specified Project Type								
			Add -on	Capacity Expansion	Early Replacement	Major Renovation	New Construction	Natural Replacement	Replace on Burnout	System Optimization	Multiple
Pre-2013 Customer Agreement Date											
Number of measures evaluated (n)			12								
Frequency of PA-Specified Measure Type (n)			5	1	2	0	3	0	0	0	1
Evaluation-Specified Project Type	Frequency of Measure-Level Obs.	(n)									
	Add-on	3	3	0	0	0	0	0	0	0	0
	Capacity Expansion	1	0	0	0	0	1	0	0	0	0
	Early Replacement	0	0	0	0	0	0	0	0	0	0
	Major Renovation	0	0	0	0	0	0	0	0	0	0
	New Construction	3	0	1	0	0	2	0	0	0	0
	Natural Replacement	0	0	0	0	0	0	0	0	0	0
	Replace on Burnout	2	2	0	0	0	0	0	0	0	0
	System Optimization	1	0	0	1	0	0	0	0	0	0
	Multiple	2	0	0	1	0	0	0	0	0	1
2013+ Customer Agreement Date											
Number of measures evaluated (n)			20								
Frequency of PA-Specified Measure Type (n)			11	0	1	0	6	0	0	1	1
Evaluation-Specified Project Type	Frequency of Measure-Level Obs.	(n)									
	Add-on	9	9	0	0	0	0	0	0	0	0
	Capacity Expansion	1	0	0	0	0	1	0	0	0	0
	Early Replacement	1	0	0	1	0	0	0	0	0	0
	Major Renovation	1	1	0	0	0	0	0	0	0	0
	New Construction	4	0	0	0	0	4	0	0	0	0
	Natural Replacement	0	0	0	0	0	0	0	0	0	0
	Replace on Burnout	2	1	0	0	0	0	0	0	0	1
	System Optimization	1	0	0	0	0	0	0	0	1	0
	Multiple	1	0	0	0	0	1	0	0	0	0

Table F-4: PA vs. Evaluation Specified Project Type by Customer Agreement Date – SDG&E

			SDG&E-Specified Project Type								
			Add -on	Capacity Expansion	Early Replacement	Major Renovation	New Construction	Natural Replacement	Replace on Burnout	System Optimization	Multiple
Pre-2013 Customer Agreement Date											
Number of measures evaluated (n)			14								
Frequency of PA-Specified Measure Type (n)			7	0	1	0	1	0	0	3	2
Evaluation-Specified Project Type	Frequency of Measure-Level Obs.	(n)									
	Add-on	3	3	0	0	0	0	0	0	0	0
	Capacity Expansion	0	0	0	0	0	0	0	0	0	0
	Early Replacement	0	0	0	0	0	0	0	0	0	0
	Major Renovation	0	0	0	0	0	0	0	0	0	0
	New Construction	1	0	0	0	0	1	0	0	0	0
	Natural Replacement	1	1	0	0	0	0	0	0	0	0
	Replace on Burnout	1	0	0	1	0	0	0	0	0	0
	System Optimization	3	2	0	0	0	0	0	0	1	0
	Multiple	5	1	0	0	0	0	0	0	2	2
2013+ Customer Agreement Date											
Number of measures evaluated (n)			38								
Frequency of PA-Specified Measure Type (n)			17	0	2	0	7	0	10	1	1
Evaluation-Specified Project Type	Frequency of Measure-Level Obs.	(n)									
	Add-on	16	13	0	2	0	0	0	1	0	0
	Capacity Expansion	0	0	0	0	0	0	0	0	0	0
	Early Replacement	0	0	0	0	0	0	0	0	0	0
	Major Renovation	0	0	0	0	0	0	0	0	0	0
	New Construction	7	0	0	0	0	7	0	0	0	0
	Natural Replacement	1	0	0	0	0	0	0	0	0	1
	Replace on Burnout	7	0	0	0	0	0	0	7	0	0
	System Optimization	3	2	0	0	0	0	0	0	1	0
	Multiple	4	2	0	0	0	0	0	2	0	0

Table F-5 provides a list of all 71 records in which the PA-specified project type was overturned by the evaluators. The PAs are encouraged to examine individual final site reports (FSRs) to better understand why project types were overturned.

Table F-5: List of PA Records with Overturned Project Types

Itron Measure ID	PA Project Type	Ex-post Project Type	Itron Measure ID	PA Project Type	Ex-post Project Type
E40001-001	Replace on Burnout	Add-on	F40536-002	Early Replacement	New Construction
E40004-001	Early Replacement	System Optimization	F40557-001	System Optimization	New Construction
E40006-001	Replace on Burnout	System Optimization	F40624-001	Replace on Burnout	Natural Replacement
E40011-001	Add-on	Replace on Burnout	F40635-001	Add-on	Early Replacement
E40121-001	New Construction	Natural Replacement	F40893-001	Add-on	Early Replacement
E40510-001	Add-on	System Optimization	F4524B-003	Early Replacement	Add-on
E40514-001	Add-on	System Optimization	F4526B-003	Replace on Burnout	Natural Replacement
E40515-001	Add-on	System Optimization	G40001-001	New Construction	Capacity Expansion
E40520-001	Add-on	Multiple	G40003-001	Early Replacement	Multiple
E40536-001	Add-on	Multiple	G40004-001	Capacity Expansion	New Construction
E40587-001	Add-on	Replace on Burnout	G40005-001	Early Replacement	System Optimization
E41157-001	New Construction	Capacity Expansion	G40501-001	New Construction	Multiple
E41163-001	System Optimization	Natural Replacement	G40504-001	New Construction	Capacity Expansion
F40001-001	Add-on	Multiple	G40513-001	Add-on	Major Renovation
F40002-001	Add-on	System Optimization	G40519-001	Multiple	Replace on Burnout
F40011-001	Add-on	System Optimization	G40628-001	Add-on	Replace on Burnout
F40011-002	Add-on	System Optimization	G40632-001	Add-on	Replace on Burnout
F40017-001	Replace on Burnout	Natural Replacement	G40639-001	Add-on	Replace on Burnout
F40019-001	Add-on	System Optimization	H40002-001	System Optimization	Multiple
F40025-001	Multiple	New Construction	H40002-002	System Optimization	Multiple
F40052-001	Multiple	Replace on Burnout	H40004-002	Early Replacement	Add-on
F40054-001	Replace on Burnout	Early Replacement	H40034-001	Early Replacement	Replace on Burnout
F40059-001	System Optimization	Capacity Expansion	H40048-001	Early Replacement	Add-on
F40150-001	Add-on	Multiple	H40501-001	Add-on	Multiple
F40185-001	Replace on Burnout	Natural Replacement	H40501-002	Add-on	Multiple
F40242-001	Replace on Burnout	Early Replacement	H40502-001	Add-on	System Optimization
F40504-001	Early Replacement	Natural Replacement	H40502-002	Add-on	System Optimization
F40516-001	Multiple	Replace on Burnout	H40503-001	Replace on Burnout	Multiple
F40516-002	Early Replacement	Add-on	H40503-002	Replace on Burnout	Multiple
F40517-001	Early Replacement	Replace on Burnout	H40509-001	Add-on	System Optimization
F40524-001	Multiple	Natural Replacement	H40509-002	Add-on	System Optimization
F40524-002	Multiple	Add-on	H40513-001	Multiple	Natural Replacement
F40525-001	Early Replacement	Replace on Burnout	H40519-001	Add-on	Multiple
F40526-001	Add-on	System Optimization	H40529-001	Add-on	Natural Replacement
F40526-002	Add-on	Multiple	H40592-001	Replace on Burnout	Add-on
F40536-001	Early Replacement	New Construction			

F.3 Project Baseline Assessment

As discussed in Chapter 5, PA-specified baselines were also often overturned by the evaluator. Across all PAs, there is a marginal decline in the accuracy of project baseline selection in the 2013+ period relative to the pre-2013 period (pre-2013: 74 percent agreement vs. 2013+: 68 percent agreement). SCG showed an improvement in project baseline agreement in the 2013+ period, with the frequency of agreement increasing from 67 percent to 80 percent. SCE project baseline agreement stayed constant over the two time periods at 63 percent, while PG&E and SDG&E both declined (from 87 percent to 70 percent and from 93 percent to 63 percent, respectively).

Table F-6 through Table F-9 present PA-specific results detailing ex-ante versus ex-post project baseline designations. The green shaded cells along the diagonal indicate the number of measures that showed agreement between the PA and ex-post evaluation. Values in the red shaded cells are measures where the project baseline was reassigned by the evaluator. For all PAs, the large majority of overturned baselines were existing equipment.

Table F-6: PA vs. Evaluation Specified Project Baseline by Customer Agreement Date – PG&E

			PG&E-Specified Project Baseline								
			Existing Equipment	Title 24	Industry Standard Practice	Title 20	Customer / Facility Std. Prac.	Local AQMD/ Other Code	Federal Regulations	Other	Multiple
Pre-2013 Customer Agreement Date											
Number of measures evaluated (n)			15								
Frequency of PA Specified Baseline (n)			9	0	3	0	0	0	0	1	2
Evaluation-Specified Project Baseline	Frequency of Measure-Level	(n)									
	Existing equipment	8	8	0	0	0	0	0	0	0	0
	Title 24	0	0	0	0	0	0	0	0	0	0
	Industry standard practice	4	0	0	3	0	0	0	0	1	0
	Title 20	0	0	0	0	0	0	0	0	0	0
	Customer/facility std. practice	0	0	0	0	0	0	0	0	0	0
	Local AQMD/other code	0	0	0	0	0	0	0	0	0	0
	Federal regulations	0	0	0	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0	0	0	0
	Multiple	3	1	0	0	0	0	0	0	0	2
2013+ Customer Agreement Date											
Number of measures evaluated (n)			33								
Frequency of PA-Specified Measure Type (n)			16	1	10	0	1	0	0	1	4
Evaluation-Specified Project Baseline	Frequency of Measure-Level	(n)									
	Existing equipment	9	9	0	0	0	0	0	0	0	0
	Title 24	1	0	1	0	0	0	0	0	0	0
	Industry standard practice	11	2	0	8	0	0	0	0	1	0
	Title 20	0	0	0	0	0	0	0	0	0	0
	Customer/facility std. practice	2	1	0	0	0	1	0	0	0	0
	Local AQMD/other code	0	0	0	0	0	0	0	0	0	0
	Federal regulations	1	1	0	0	0	0	0	0	0	0
	Other	2	1	0	1	0	0	0	0	0	0
	Multiple	7	2	0	1	0	0	0	0	0	4

Table F-7: PA vs. Evaluation Specified Project Baseline by Customer Agreement Date – SCE

			SCE-Specified Project Baseline								
			Existing Equipment	Title 24	Industry Standard Practice	Title 20	Customer / Facility Std. Prac.	Local AQMD/ Other Code	Federal Regulations	Other	Multiple
Pre-2013 Customer Agreement Date											
Number of measures evaluated (n)			32								
Frequency of PA Specified Baseline (n)			22	5	1	0	0	0	0	2	2
Evaluation-Specified Project Baseline	Frequency of Measure-Level	(n)									
	Existing equipment	15	14	0	0	0	0	0	0	0	1
	Title 24	4	1	3	0	0	0	0	0	0	0
	Industry standard practice	4	4	0	0	0	0	0	0	0	0
	Title 20	0	0	0	0	0	0	0	0	0	0
	Customer/facility std. practice	0	0	0	0	0	0	0	0	0	0
	Local AQMD/other code	0	0	0	0	0	0	0	0	0	0
	Federal regulations	1	0	1	0	0	0	0	0	0	0
	Other	3	0	0	1	0	0	0	0	2	0
	Multiple	5	3	1	0	0	0	0	0	0	1
2013+ Customer Agreement Date											
Number of measures evaluated (n)			24								
Frequency of PA-Specified Measure Type (n)			15	4	1	0	0	0	0	1	3
Evaluation-Specified Project Baseline	Frequency of Measure-Level	(n)									
	Existing equipment	9	8	0	0	0	0	0	0	0	1
	Title 24	5	1	4	0	0	0	0	0	0	0
	Industry standard practice	7	5	0	1	0	0	0	0	0	1
	Title 20	0	0	0	0	0	0	0	0	0	0
	Customer/facility std. practice	0	0	0	0	0	0	0	0	0	0
	Local AQMD/other code	0	0	0	0	0	0	0	0	0	0
	Federal regulations	0	0	0	0	0	0	0	0	0	0
	Other	1	0	0	0	0	0	0	0	1	0
	Multiple	2	1	0	0	0	0	0	0	0	1

Table F-8: PA vs. Evaluation Specified Project Baseline by Customer Agreement Date – SCG

			SCG-Specified Project Baseline								
			Existing Equipment	Title 24	Industry Standard Practice	Title 20	Customer / Facility Std. Prac.	Local AQMD/ Other Code	Federal Regulations	Other	Multiple
Pre-2013 Customer Agreement Date											
Number of measures evaluated (n)			12								
Frequency of PA Specified Baseline (n)			7	0	1	2	0	0	0	1	1
Evaluation-Specified Project Baseline	Frequency of Measure-Level	(n)									
	Existing equipment	4	4	0	0	0	0	0	0	0	0
	Title 24	0	0	0	0	0	0	0	0	0	0
	Industry standard practice	3	2	0	1	0	0	0	0	0	0
	Title 20	1	0	0	0	1	0	0	0	0	0
	Customer/facility std. practice	0	0	0	0	0	0	0	0	0	0
	Local AQMD/other code	0	0	0	0	0	0	0	0	0	0
	Federal regulations	0	0	0	0	0	0	0	0	0	0
	Other	1	0	0	0	0	0	0	0	1	0
	Multiple	3	1	0	0	1	0	0	0	0	1
2013+ Customer Agreement Date											
Number of measures evaluated (n)			20								
Frequency of PA-Specified Measure Type (n)			13	0	4	0	0	1	0	2	0
Evaluation-Specified Project Baseline	Frequency of Measure-Level	(n)									
	Existing equipment	11	10	0	0	0	0	1	0	0	0
	Title 24	0	0	0	0	0	0	0	0	0	0
	Industry standard practice	5	1	0	4	0	0	0	0	0	0
	Title 20	0	0	0	0	0	0	0	0	0	0
	Customer/facility std. practice	0	0	0	0	0	0	0	0	0	0
	Local AQMD/other code	1	1	0	0	0	0	0	0	0	0
	Federal regulations	0	0	0	0	0	0	0	0	0	0
	Other	2	0	0	0	0	0	0	0	2	0
	Multiple	1	1	0	0	0	0	0	0	0	0

Table F-9: PA vs. Evaluation Specified Project Baseline by Customer Agreement Date – SDG&E

			SDG&E-Specified Project Baseline								
			Existing Equipment	Title 24	Industry Standard Practice	Title 20	Customer / Facility Std. Prac.	Local AQMD/ Other Code	Federal Regulations	Other	Multiple
Pre-2013 Customer Agreement Date											
Number of measures evaluated (n)			14								
Frequency of PA Specified Baseline (n)			12	0	0	0	0	0	0	0	2
Evaluation-Specified Project Baseline	Frequency of Measure-Level	(n)									
	Existing equipment	11	11	0	0	0	0	0	0	0	0
	Title 24	0	0	0	0	0	0	0	0	0	0
	Industry standard practice	1	1	0	0	0	0	0	0	0	0
	Title 20	0	0	0	0	0	0	0	0	0	0
	Customer/facility std. practice	0	0	0	0	0	0	0	0	0	0
	Local AQMD/other code	0	0	0	0	0	0	0	0	0	0
	Federal regulations	0	0	0	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0	0	0	0
	Multiple	2	0	0	0	0	0	0	0	0	2
2013+ Customer Agreement Date											
Number of measures evaluated (n)			38								
Frequency of PA-Specified Measure Type (n)			27	9	1	0	0	0	0	1	0
Evaluation-Specified Project Baseline	Frequency of Measure-Level	(n)									
	Existing equipment	17	17	0	0	0	0	0	0	0	0
	Title 24	8	1	6	0	0	0	0	0	1	0
	Industry standard practice	3	2	0	1	0	0	0	0	0	0
	Title 20	1	0	1	0	0	0	0	0	0	0
	Customer/facility std. practice	0	0	0	0	0	0	0	0	0	0
	Local AQMD/other code	0	0	0	0	0	0	0	0	0	0
	Federal regulations	2	0	2	0	0	0	0	0	0	0
	Other	2	2	0	0	0	0	0	0	0	0
	Multiple	5	5	0	0	0	0	0	0	0	0

Table F-10 provides a list of all 56 records in which the PA-specified project baseline was overturned by the evaluators. The PAs are encouraged to examine individual FSRs to better understand why project baselines were overturned.

Table F-10: List of PA Records with Overturned Project Baselines

Itron Measure ID	PA Project Baseline	Ex-post Project Baseline	Itron Measure ID	PA Project Baseline	Ex-post Project Baseline
E40011-001	Existing Equipment	Multiple	G40504-001	Local Code	Existing Equipment
E40021-001	Existing Equipment	Other	G40512-001	Existing Equipment	Multiple
E40030-001	ISP	Multiple	G40513-001	Existing Equipment	Local Code
E40252-001	Other	ISP	G40570-001	Existing Equipment	Multiple
E40510-001	Existing Equipment	Multiple	G40628-001	Existing Equipment	ISP
E40520-001	Existing Equipment	Multiple	G40632-001	Existing Equipment	ISP
E40524-001	ISP	Other	G40639-001	Existing Equipment	ISP
E40533-001	Existing Equipment	Cust/Facility ISP	H40003-001	Existing Equipment	Other
E40555-001	Other	ISP	H40003-002	Existing Equipment	Other
E40587-001	Existing Equipment	ISP	H40004-001	Existing Equipment	ISP
E40589-001	Existing Equipment	Federal Reg	H40034-001	Existing Equipment	ISP
E41163-001	Existing Equipment	ISP	H40048-001	Existing Equipment	Multiple
F40008-001	Existing Equipment	Multiple	H40502-001	Existing Equipment	Multiple
F40008-002	Existing Equipment	Multiple	H40502-002	Existing Equipment	Multiple
F40010-002	Existing Equipment	Multiple	H40503-001	Existing Equipment	Multiple
F40017-001	Existing Equipment	ISP	H40503-002	Existing Equipment	ISP
F40025-001	Existing Equipment	ISP	H40505-001	Existing Equipment	Multiple
F40052-001	Existing Equipment	ISP	H40505-002	Title 24	Federal Reg
F40059-001	Existing Equipment	ISP	H40510-002	Other	Title 24
F4010B-003	Existing Equipment	Title 24	H40513-001	Existing Equipment	Title 24
F40451-001	Title 24	Multiple	H40565-001	Title 24	Title 20
F40502-001	Existing Equipment	ISP	H4505B-003	Title 24	Federal Reg
F40503-001	ISP	Other			
F40517-001	Existing Equipment	ISP			
F40524-002	Multiple	Existing Equipment			
F40525-001	Existing Equipment	ISP			
F40526-001	Existing Equipment	Multiple			
F40536-001	Multiple	ISP			
F40536-002	Existing Equipment	ISP			
F40546-001	Multiple	Existing Equipment			
F40557-001	Existing Equipment	ISP			
F40624-001	Title 24	Federal Reg			
F40629-002	Existing Equipment	Title 24			
G40004-001	Title 20	Multiple			

Appendix G

Glossary

Add-on Retrofit (REA)* - The Add-on Retrofit project type category includes situations where new equipment has been installed onto an existing system as either an integral additional component or a substitution of a pre-existing component whose primary purpose is to improve overall efficiency of the system. Such a component must not be able to operate on its own nor be used to increase equipment capacity. Truly retro-commissioning type measures where no additional equipment is purchased or measures where a variable speed drive is added to an existing motor drive process will fall under this category. The life of REA measures are typically capped at the RUL of the pre-existing equipment when the measure is attached to the equipment or is required by code. A single baseline energy savings calculation, full measure cost, and a measure EUL with justification is required for this installation type.

Confidence Interval (CI) – A confidence interval is a measure of uncertainty of a sample statistic (e.g. the sample mean) where the interval given is likely to contain the true but unknown population parameter. Confidence intervals are presented at a given confidence level. For instance, a confidence interval given at 95 percent means that if the same population were sampled multiple times and confidence intervals are provided each time for the same sample statistic, the resulting intervals would include the true population parameter 95 percent of the time.

Custom Projects - Custom projects are those where the energy savings are calculated specifically for the individual project (D.11-07- 030 page 31); deemed measures have designated savings that apply to various categories of projects and are not calculated specifically for each site.

Early Retirement (ER or RET)* - The Early Retirement project type category includes measure installations where there is a preponderance of evidence that an energy efficiency program activity induced or accelerated equipment replacement. Early retirement measures must provide justification that the existing equipment being replaced would have continued to function and perform its original design intent for a period of time in absence of the replacement. This period of time is either the RUL (of not less than one year) based on actual existing equipment installation dates or the DEER default RUL. An installation date based RUL by itself will not be acceptable unless evidence of functionality to support that claim is provided. If existing equipment installation dates cannot be obtained justification of continued equipment operation for the duration of the DEER default RUL must be provided. Thus, the burden of proof to claim program-induced early retirement is not merely the need to demonstrate RUL of at least one year. A dual baseline energy savings calculation, full measure cost, incremental measure cost for the second baseline, a measure EUL with justification, existing equipment installation dates (if not using DEER default RUL), and an existing measure RUL with justification is required for this installation type. The second baseline for early retirement measures is the known code that will be in existence when the second baseline becomes effective. The second baseline will become effective after the initial RUL period is

exhausted, which could be one or more years after project installation is completed. In some cases the second baseline will not become effective until many years from now where the future governing code may not be defined. In these instances, use the latest completed code for the second baseline calculations (for example, 2013 Title 24 until a later version is completed).

Effective Useful Life (EUL)* - The Effective Useful Life (EUL) is an estimate of the median number of years that the measures installed under the program are still in place and operable. EUL values are for new equipment and are provided as years.

Error Ratio – The error ratio is the square root of the variance, where the variance is defined as the mean sum of squares. This terminology is consistent with that introduced in Chapter 13 of the Evaluation Framework Study.[1]

Ex-ante Savings – Ex-ante savings are estimates of project savings developed by the PA during the project application and approval process.

Ex-post Savings – Ex-post savings are estimates of project savings developed by the evaluator during the program evaluation.

First Year Gross Realization Rate (FY GRR) – The First Year Gross Realization Rate is the evaluation estimated gross impacts divided by the PA savings claims in the first year after measure implementation.

Gross Impacts – Gross impacts are the total evaluated savings (kWh, kW, or therms) realized from a given project.

Gross Realization Rate (GRR) – The Gross Realization Rate is the evaluation estimated gross impacts divided by the PA savings claims.

Industry Standard Practice (ISP) - For purposes of establishing a baseline for energy savings, industry standard practice is a choice that represents the typical equipment or commonly-used practice in that industry (not necessarily the predominantly used practice). In other words, Industry standard practice baselines are established to reflect typical actions absent the program.

Lifecycle Gross Realization Rate (LC GRR) – The Lifecycle Gross Realization Rate is the evaluation estimated gross impacts divided by the PA savings claims over the lifetime of the measure.

MMBtu - MMBtu is a measurement of energy that means one million British Thermal Units (Btus) and is a way of expressing total energy from both the electric and gas savings. 1 MMBtu =1,000,000 Btu, 1 Therm = 100,000 Btu source energy, 1 kWh = 10,239 Btu source energy. Conversion rates obtained from "2001 Energy Efficiency Standards for Residential and Non-residential Buildings, California Energy Commission," June 2001.

Net Impacts – Net impacts are the total evaluated savings (kWh, kW, or therms) realized from a given project and then adjusted by the net to gross ratio (NTGR) to account for savings attributable to the program.

Net to Gross Ratio (NTGR) - Net to Gross ratios are used to estimate and describe the "free ridership" that may be occurring within energy efficiency programs, that is, the degree to which customers would have installed the program measure or equipment even without the financial incentive (e.g., rebate) provided by the program.

New Construction (NC)* - The New Construction project type category includes new equipment that has been installed in a newly constructed area, in an area that has been subject to a major-

[1] http://www.calmac.org/publications/California_Evaluation_Framework_June_2004.pdf

renovation involving complete multi-system replacement or area re-construction, or equipment installed to increase the capacity of existing systems due to existing or anticipated new load handling requirements. A single baseline energy savings calculation, incremental measure cost, and a measure EUL with justification is required for this installation type.

Normal Replacement (NR)* - The Normal Replacement project type category includes measure installations where the existing equipment is still functional but does not qualify for early retirement. Normal replacement also applies when the new or replacement equipment has been installed due to normal remodeling or upgrading or replacement activities which are expected and undertaken in the normal course of business or ownership. In general, existing equipment that is still functional but has exceeded the proposed EUL, either from DEER or other sources, fall into this category. Normal replacement is also referred to as normal/natural turnover (note that some of the IOUs include NR in the ROB category above). A single baseline energy savings calculation, incremental measure cost, and a measure EUL with justification is required for this installation type.

Program Administrator (PA) - 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.

Relative Precision – Relative precision is the ratio of the precision of a given parameter value and the parameter value itself.

Remaining Useful Life (RUL)* - The Remaining Useful Life (RUL) is an estimate of the median number of years that equipment being replaced under the program would have remained in place and operable had the program intervention not caused the replacement. No EM&V studies have been conducted to determine this estimate. For calculated measures RUL is typically calculated by obtaining existing equipment installation dates to determine the age of the equipment, then subtracting this age from the estimated EUL from DEER. When existing equipment installation dates are not available the RUL of the existing equipment may be approximated as 1/3 of the newly proposed measure EUL (DEER default RUL = EUL / 3). For dual baseline measures, the remaining useful life period is also referred to as the first baseline period.

Replace on Burnout (ROB)* - The Replace on Burnout project type category includes situations when new or replacement equipment has been installed due to imminent or actual failure of pre-existing equipment. A single baseline energy savings calculation, incremental measure cost, and a measure EUL with justification is required for this installation type.

Second Baseline* - For dual baseline measures the Effective Useful Life minus Remaining Useful Life period is also referred to as the second baseline period.

* Definitions obtained from: Appendix 3 - Project Basis (RET, ROB, etc.), EUL/RUL Definitions & Preponderance of Evidence