

FINAL IMPACT EVALUATION

Small/Medium Commercial Sector
Program Year 2019

Appendices

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STANDARDIZED REPORTING TABLES

Gross Lifecycle Savings (MWh)

PA	Standard Report Group	Ex Ante	Ex Post	GRR	% Ex Ante	Eval
		Gross	Gross		Gross Pass Through	
PGE	PASS THROUGH	201,628	201,628	1.00	100.0%	
PGE	PGE - AG IRRIGATION	118,668	38,030	0.32	0.0%	0.32
PGE	PGE - AGRICULTURAL PUMP VFD	34,798	81,676	2.35	0.0%	2.35
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	2,740	2,740	1.00	100.0%	
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0	0			
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	11	7	0.64	0.0%	0.64
PGE	Total	357,845	324,081	0.91	57.1%	0.78
SCE	PASS THROUGH	43,678	43,678	1.00	100.0%	
SCE	SCE - AGRICULTURAL PUMP VFD	9,888	9,607	0.97	0.0%	0.97
SCE	Total	53,566	53,285	0.99	81.5%	0.97
SCG	PASS THROUGH	1,103	1,103	1.00	100.0%	
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0	0			
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0	0			
SCG	Total	1,103	1,103	1.00	100.0%	
SDGE	PASS THROUGH	2,870	2,870	1.00	100.0%	
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	321	321	1.00	100.0%	
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0	0			
SDGE	Total	3,191	3,191	1.00	100.0%	
MCE	PASS THROUGH	55	55	1.00	100.0%	
MCE	Total	55	55	1.00	100.0%	
LCE	PASS THROUGH	51	51	1.00	100.0%	
LCE	Total	51	51	1.00	100.0%	
Statewide		415,810	381,765	0.92	60.7%	0.79

Net Lifecycle Savings (MWh)

					% Ex Ante			Eval	Eval
		Ex Ante	Ex Post		Net Pass	Ex Ante	Ex Post	Ex Ante	Ex Post
PA	Standard Report Group	Net	Net	NRR	Through	NTG	NTG	NTG	NTG
PGE	PASS THROUGH	134,388	134,388	1.00	100.0%	0.67	0.67		
PGE	PGE - AG IRRIGATION	65,279	23,892	0.37	0.0%	0.55	0.63	0.55	0.63
PGE	PGE - AGRICULTURAL PUMP VFD	22,619	26,839	1.19	0.0%	0.65	0.33	0.65	0.33
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	1,781	1,781	1.00	100.0%	0.65	0.65		
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0	0						
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	7	4	0.60	0.0%	0.65	0.61	0.65	0.61
PGE	Total	224,074	186,905	0.83	60.8%	0.63	0.58	0.57	0.42
SCE	PASS THROUGH	29,173	29,173	1.00	100.0%	0.67	0.67		
SCE	SCE - AGRICULTURAL PUMP VFD	6,427	4,935	0.77	0.0%	0.65	0.51	0.65	0.51
SCE	Total	35,600	34,108	0.96	81.9%	0.66	0.64	0.65	0.51
SCG	PASS THROUGH	742	742	1.00	100.0%	0.67	0.67		
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0	0						
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0	0						
SCG	Total	742	742	1.00	100.0%	0.67	0.67		
SDGE	PASS THROUGH	1,893	1,893	1.00	100.0%	0.66	0.66		
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	241	241	1.00	100.0%	0.75	0.75		
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0	0						
SDGE	Total	2,133	2,133	1.00	100.0%	0.67	0.67		
MCE	PASS THROUGH	49	49	1.00	100.0%	0.90	0.90		
MCE	Total	49	49	1.00	100.0%	0.90	0.90		
LCE	PASS THROUGH	33	33	1.00	100.0%	0.65	0.65		
LCE	Total	33	33	1.00	100.0%	0.65	0.65		
Statewide		262,632	223,970	0.85	64.1%	0.63	0.59	0.58	0.43

Gross Lifecycle Savings (MW)

PA	Standard Report Group	Ex Ante Gross	Ex Post Gross	GRR	% Ex Ante Gross Pass Through	Eval GRR
PGE	PASS THROUGH	26.8	26.8	1.00	100.0%	
PGE	PGE - AG IRRIGATION	94.2	17.0	0.18	0.0%	0.18
PGE	PGE - AGRICULTURAL PUMP VFD	17.8	10.0	0.56	0.0%	0.56
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	0.0	0.0			
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0.0	0.0			
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	0.0	0.0	0.64	0.0%	0.64
PGE	Total	138.8	53.8	0.39	19.3%	0.24
SCE	PASS THROUGH	7.0	7.0	1.00	100.0%	
SCE	SCE - AGRICULTURAL PUMP VFD	4.9	1.5	0.31	0.0%	0.31
SCE	Total	11.9	8.5	0.72	59.0%	0.31
SCG	PASS THROUGH	0.0	0.0	1.00	100.0%	
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0.0	0.0			
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0.0	0.0			
SCG	Total	0.0	0.0	1.00	100.0%	
SDGE	PASS THROUGH	0.4	0.4	1.00	100.0%	
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	0.2	0.2	1.00	100.0%	
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0.0	0.0			
SDGE	Total	0.5	0.5	1.00	100.0%	
MCE	PASS THROUGH	0.0	0.0	1.00	100.0%	
MCE	Total	0.0	0.0	1.00	100.0%	
LCE	PASS THROUGH	0.0	0.0	1.00	100.0%	
LCE	Total	0.0	0.0	1.00	100.0%	
Statewide		151.2	62.9	0.42	22.7%	0.24

Net Lifecycle Savings (MW)

PA	Standard Report Group	Ex Ante	Ex Post	NRR	% Ex Ante Net Pass	Ex Ante	Ex Post	Eval	Eval
		Net	Net		Through	NTG	NTG	Ex Ante NTG	Ex Post NTG
PGE	PASS THROUGH	17.7	17.7	1.00	100.0%	0.66	0.66		
PGE	PGE - AG IRRIGATION	51.8	10.7	0.21	0.0%	0.55	0.63	0.55	0.63
PGE	PGE - AGRICULTURAL PUMP VFD	11.6	3.3	0.28	0.0%	0.65	0.33	0.65	0.33
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	0.0	0.0						
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0.0	0.0						
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	0.0	0.0	0.60	0.0%	0.65	0.61	0.65	0.61
PGE	Total	81.1	31.6	0.39	21.8%	0.58	0.59	0.57	0.52
SCE	PASS THROUGH	4.7	4.7	1.00	100.0%	0.67	0.67		
SCE	SCE - AGRICULTURAL PUMP VFD	3.2	0.8	0.25	0.0%	0.65	0.51	0.65	0.51
SCE	Total	7.8	5.5	0.70	59.7%	0.66	0.64	0.65	0.51
SCG	PASS THROUGH	0.0	0.0	1.00	100.0%	0.75	0.75		
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0.0	0.0						
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0.0	0.0						
SCG	Total	0.0	0.0	1.00	100.0%	0.75	0.75		
SDGE	PASS THROUGH	0.3	0.3	1.00	100.0%	0.66	0.66		
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	0.1	0.1	1.00	100.0%	0.75	0.75		
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0.0	0.0						
SDGE	Total	0.4	0.4	1.00	100.0%	0.68	0.68		
MCE	PASS THROUGH	0.0	0.0	1.00	100.0%	0.90	0.90		
MCE	Total	0.0	0.0	1.00	100.0%	0.90	0.90		
LCE	PASS THROUGH	0.0	0.0	1.00	100.0%	0.65	0.65		
LCE	Total	0.0	0.0	1.00	100.0%	0.65	0.65		
Statewide		89.3	37.5	0.42	25.5%	0.59	0.60	0.57	0.52

Gross Lifecycle Savings (MTherms)

PA	Standard Report Group	Ex Ante Gross	Ex Post Gross	GRR	% Ex Ante Gross Pass Through	Eval GRR
PGE	PASS THROUGH	69,528	69,528	1.00	100.0%	
PGE	PGE - AG IRRIGATION	0	0			
PGE	PGE - AGRICULTURAL PUMP VFD	0	0			
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	0	0			
PGE	PGE - OZONE LAUNDRY EQUIPMENT	1,222	1,221	1.00	0.0%	1.00
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	13,578	8,670	0.64	0.0%	0.64
PGE	Total	84,328	79,420	0.94	82.4%	0.67
SCE	PASS THROUGH	787	787	1.00	100.0%	
SCE	SCE - AGRICULTURAL PUMP VFD	0	0			
SCE	Total	787	787	1.00	100.0%	
SCG	PASS THROUGH	61,641	61,641	1.00	100.0%	
SCG	SCG - OZONE LAUNDRY EQUIPMENT	5,103	5,656	1.11	0.0%	1.11
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	7,540	8,504	1.13	0.0%	1.13
SCG	Total	74,285	75,801	1.02	83.0%	1.12
SDGE	PASS THROUGH	374	374	1.00	100.0%	
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	0	0			
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	4,654	1,658	0.36	0.0%	0.36
SDGE	Total	5,028	2,032	0.40	7.4%	0.36
MCE	PASS THROUGH	-1	-1	1.00	100.0%	
MCE	Total	-1	-1	1.00	100.0%	
LCE	PASS THROUGH	0	0			
LCE	Total	0	0			
Statewide		164,427	158,039	0.96	80.5%	0.80

Net Lifecycle Savings (MTherms)

		Ex Ante	Ex Post		% Ex Ante			Eval	Eval
PA	Standard Report Group	Net	Net	NRR	Net Pass Through	Ex Ante NTG	Ex Post NTG	Ex Ante NTG	Ex Post NTG
PGE	PASS THROUGH	45,354	45,354	1.00	100.0%	0.65	0.65		
PGE	PGE - AG IRRIGATION	0	0						
PGE	PGE - AGRICULTURAL PUMP VFD	0	0						
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	0	0						
PGE	PGE - OZONE LAUNDRY EQUIPMENT	794	734	0.92	0.0%	0.65	0.60	0.65	0.60
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	8,457	5,311	0.63	0.0%	0.62	0.61	0.62	0.61
PGE	Total	54,605	51,399	0.94	83.1%	0.65	0.65	0.63	0.61
SCE	PASS THROUGH	512	512	1.00	100.0%	0.65	0.65		
SCE	SCE - AGRICULTURAL PUMP VFD	0	0						
SCE	Total	512	512	1.00	100.0%	0.65	0.65		
SCG	PASS THROUGH	42,643	42,643	1.00	100.0%	0.69	0.69		
SCG	SCG - OZONE LAUNDRY EQUIPMENT	3,317	4,756	1.43	0.0%	0.65	0.84	0.65	0.84
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	4,901	6,554	1.34	0.0%	0.65	0.77	0.65	0.77
SCG	Total	50,861	53,952	1.06	83.8%	0.68	0.71	0.65	0.80
SDGE	PASS THROUGH	251	251	1.00	100.0%	0.67	0.67		
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	0	0						
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	3,025	1,285	0.42	0.0%	0.65	0.78	0.65	0.78
SDGE	Total	3,276	1,536	0.47	7.7%	0.65	0.76	0.65	0.78
MCE	PASS THROUGH	-1	-1	1.00	100.0%	0.90	0.90		
MCE	Total	-1	-1	1.00	100.0%	0.90	0.90		
LCE	PASS THROUGH	0	0						
LCE	Total	0	0						
Statewide		109,253	107,398	0.98	81.2%	0.66	0.68	0.64	0.73

Gross First Year Savings (MWh)

PA	Standard Report Group	Ex Ante Gross	Ex Post Gross	GRR	% Ex Ante Gross Pass Through	Eval GRR
PGE	PASS THROUGH	19,294	19,294	1.00	100.0%	
PGE	PGE - AG IRRIGATION	5,933	1,901	0.32	0.0%	0.32
PGE	PGE - AGRICULTURAL PUMP VFD	10,545	8,843	0.84	0.0%	0.84
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	548	548	1.00	100.0%	
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0	0			
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	1	0	0.64	0.0%	0.64
PGE	Total	36,321	30,587	0.84	54.6%	0.65
SCE	PASS THROUGH	6,836	6,836	1.00	100.0%	
SCE	SCE - AGRICULTURAL PUMP VFD	1,299	918	0.71	0.0%	0.71
SCE	Total	8,136	7,754	0.95	84.0%	0.71
SCG	PASS THROUGH	150	150	1.00	100.0%	
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0	0			
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0	0			
SCG	Total	150	150	1.00	100.0%	
SDGE	PASS THROUGH	304	304	1.00	100.0%	
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	32	32	1.00	100.0%	
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0	0			
SDGE	Total	336	336	1.00	100.0%	
MCE	PASS THROUGH	14	14	1.00	100.0%	
MCE	Total	14	14	1.00	100.0%	
LCE	PASS THROUGH	13	13	1.00	100.0%	
LCE	Total	13	13	1.00	100.0%	
Statewide		44,970	38,854	0.86	60.5%	0.66

Net First Year Savings (MWh)

		Ex Ante	Ex Post		% Ex Ante			Eval	Eval
PA	Standard Report Group	Net	Net	NRR	Net Pass Through	Ex Ante NTG	Ex Post NTG	Ex Ante NTG	Ex Post NTG
PGE	PASS THROUGH	12,848	12,848	1.00	100.0%	0.67	0.67		
PGE	PGE - AG IRRIGATION	3,264	1,195	0.37	0.0%	0.55	0.63	0.55	0.63
PGE	PGE - AGRICULTURAL PUMP VFD	6,854	2,906	0.42	0.0%	0.65	0.33	0.65	0.33
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	356	356	1.00	100.0%	0.65	0.65		
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0	0						
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	0	0	0.60	0.0%	0.65	0.61	0.65	0.61
PGE	Total	23,322	17,305	0.74	56.6%	0.64	0.57	0.61	0.38
SCE	PASS THROUGH	4,512	4,512	1.00	100.0%	0.66	0.66		
SCE	SCE - AGRICULTURAL PUMP VFD	845	472	0.56	0.0%	0.65	0.51	0.65	0.51
SCE	Total	5,356	4,983	0.93	84.2%	0.66	0.64	0.65	0.51
SCG	PASS THROUGH	100	100	1.00	100.0%	0.66	0.66		
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0	0						
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0	0						
SCG	Total	100	100	1.00	100.0%	0.66	0.66		
SDGE	PASS THROUGH	200	200	1.00	100.0%	0.66	0.66		
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	24	24	1.00	100.0%	0.75	0.75		
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0	0						
SDGE	Total	224	224	1.00	100.0%	0.67	0.67		
MCE	PASS THROUGH	12	12	1.00	100.0%	0.90	0.90		
MCE	Total	12	12	1.00	100.0%	0.90	0.90		
LCE	PASS THROUGH	8	8	1.00	100.0%	0.65	0.65		
LCE	Total	8	8	1.00	100.0%	0.65	0.65		
Statewide		29,023	22,632	0.78	62.2%	0.65	0.58	0.62	0.39

Gross First Year Savings (MW)

PA	Standard Report Group	Ex Ante Gross	Ex Post Gross	GRR	% Ex Ante Gross Pass Through	Eval GRR
PGE	PASS THROUGH	2.4	2.4	1.00	100.0%	
PGE	PGE - AG IRRIGATION	4.7	0.8	0.18	0.0%	0.18
PGE	PGE - AGRICULTURAL PUMP VFD	5.4	1.2	0.21	0.0%	0.21
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	0.0	0.0			
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0.0	0.0			
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	0.0	0.0	0.64	0.0%	0.64
PGE	Total	12.5	4.4	0.35	19.0%	0.20
SCE	PASS THROUGH	0.9	0.9	1.00	100.0%	
SCE	SCE - AGRICULTURAL PUMP VFD	0.6	0.2	0.26	0.0%	0.26
SCE	Total	1.6	1.1	0.70	59.6%	0.26
SCG	PASS THROUGH	0.0	0.0	1.00	100.0%	
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0.0	0.0			
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0.0	0.0			
SCG	Total	0.0	0.0	1.00	100.0%	
SDGE	PASS THROUGH	0.0	0.0	1.00	100.0%	
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	0.0	0.0	1.00	100.0%	
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0.0	0.0			
SDGE	Total	0.1	0.1	1.00	100.0%	
MCE	PASS THROUGH	0.0	0.0	1.00	100.0%	
MCE	Total	0.0	0.0	1.00	100.0%	
LCE	PASS THROUGH	0.0	0.0	1.00	100.0%	
LCE	Total	0.0	0.0	1.00	100.0%	
Statewide		14.1	5.5	0.39	23.8%	0.20

Net First Year Savings (MW)

PA	Standard Report Group	Ex Ante	Ex Post	NRR	% Ex Ante Net Pass	Ex Ante	Ex Post	Eval	Eval
		Net	Net		Through	NTG	NTG	Ex Ante NTG	Ex Post NTG
PGE	PASS THROUGH	1.6	1.6	1.00	100.0%	0.66	0.66		
PGE	PGE - AG IRRIGATION	2.6	0.5	0.21	0.0%	0.55	0.63	0.55	0.63
PGE	PGE - AGRICULTURAL PUMP VFD	3.5	0.4	0.11	0.0%	0.65	0.33	0.65	0.33
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	0.0	0.0						
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0.0	0.0						
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	0.0	0.0	0.60	0.0%	0.65	0.61	0.65	0.61
PGE	Total	7.7	2.5	0.32	20.4%	0.61	0.57	0.60	0.46
SCE	PASS THROUGH	0.6	0.6	1.00	100.0%	0.66	0.66		
SCE	SCE - AGRICULTURAL PUMP VFD	0.4	0.1	0.21	0.0%	0.65	0.51	0.65	0.51
SCE	Total	1.0	0.7	0.68	60.1%	0.66	0.64	0.65	0.51
SCG	PASS THROUGH	0.0	0.0	1.00	100.0%	0.75	0.75		
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0.0	0.0						
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0.0	0.0						
SCG	Total	0.0	0.0	1.00	100.0%	0.75	0.75		
SDGE	PASS THROUGH	0.0	0.0	1.00	100.0%	0.66	0.66		
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	0.0	0.0	1.00	100.0%	0.75	0.75		
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0.0	0.0						
SDGE	Total	0.0	0.0	1.00	100.0%	0.68	0.68		
MCE	PASS THROUGH	0.0	0.0	1.00	100.0%	0.90	0.90		
MCE	Total	0.0	0.0	1.00	100.0%	0.90	0.90		
LCE	PASS THROUGH	0.0	0.0	1.00	100.0%	0.65	0.65		
LCE	Total	0.0	0.0	1.00	100.0%	0.65	0.65		
Statewide		8.7	3.2	0.37	25.5%	0.62	0.58	0.61	0.46

Gross First Year Savings (MTherms)

PA	Standard Report Group	Ex Ante Gross	Ex Post Gross	GRR	% Ex Ante Gross Pass Through	Eval GRR
PGE	PASS THROUGH	8,258	8,258	1.00	100.0%	
PGE	PGE - AG IRRIGATION	0	0			
PGE	PGE - AGRICULTURAL PUMP VFD	0	0			
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	0	0			
PGE	PGE - OZONE LAUNDRY EQUIPMENT	122	122	1.00	0.0%	1.00
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	679	434	0.64	0.0%	0.64
PGE	Total	9,059	8,813	0.97	91.2%	0.69
SCE	PASS THROUGH	197	197	1.00	100.0%	
SCE	SCE - AGRICULTURAL PUMP VFD	0	0			
SCE	Total	197	197	1.00	100.0%	
SCG	PASS THROUGH	6,090	6,090	1.00	100.0%	
SCG	SCG - OZONE LAUNDRY EQUIPMENT	510	566	1.11	0.0%	1.11
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	377	425	1.13	0.0%	1.13
SCG	Total	6,977	7,081	1.01	87.3%	1.12
SDGE	PASS THROUGH	46	46	1.00	100.0%	
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	0	0			
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	465	166	0.36	0.0%	0.36
SDGE	Total	511	212	0.41	9.0%	0.36
MCE	PASS THROUGH	0	0	1.00	100.0%	
MCE	Total	0	0	1.00	100.0%	
LCE	PASS THROUGH	0	0			
LCE	Total	0	0			
Statewide		16,744	16,303	0.97	87.1%	0.79

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	PASS THROUGH	5,387	5,387	1.00	100.0%	0.65	0.65		
PGE	PGE - AG IRRIGATION	0	0						
PGE	PGE - AGRICULTURAL PUMP VFD	0	0						
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	0	0						
PGE	PGE - OZONE LAUNDRY EQUIPMENT	79	73	0.92	0.0%	0.65	0.60	0.65	0.60
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	423	266	0.63	0.0%	0.62	0.61	0.62	0.61
PGE	Total	5,889	5,726	0.97	91.5%	0.65	0.65	0.63	0.61
SCE	PASS THROUGH	128	128	1.00	100.0%	0.65	0.65		
SCE	SCE - AGRICULTURAL PUMP VFD	0	0						
SCE	Total	128	128	1.00	100.0%	0.65	0.65		
SCG	PASS THROUGH	4,235	4,235	1.00	100.0%	0.70	0.70		
SCG	SCG - OZONE LAUNDRY EQUIPMENT	332	476	1.43	0.0%	0.65	0.84	0.65	0.84
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	245	328	1.34	0.0%	0.65	0.77	0.65	0.77
SCG	Total	4,812	5,038	1.05	88.0%	0.69	0.71	0.65	0.81
SDGE	PASS THROUGH	31	31	1.00	100.0%	0.67	0.67		
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	0	0						
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	303	129	0.42	0.0%	0.65	0.78	0.65	0.78
SDGE	Total	333	159	0.48	9.3%	0.65	0.75	0.65	0.78
MCE	PASS THROUGH	0	0	1.00	100.0%	0.90	0.90		
MCE	Total	0	0	1.00	100.0%	0.90	0.90		
LCE	PASS THROUGH	0	0						
LCE	Total	0	0						
Statewide		11,162	11,051	0.99	87.6%	0.67	0.68	0.64	0.74

APPENDIX AB:

STANDARDIZED PER UNIT SAVINGS

Per Unit (Quantity) Gross Energy Savings (kWh)

PA	Standard Report Group	Pass Through	% ER Ex Ante	% ER Ex Post	Average EUL (yr)	Ex Post Lifecycle	Ex Post First Year	Ex Post Annualized
PGE	PGE - AG IRRIGATION	0	0.0%	0.0%	20.0	3,044.5	152.2	152.2
PGE	PGE - AGRICULTURAL PUMP VFD	0	0.0%	0.0%	3.3	1,964.3	212.7	595.2
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	0.0	0.0	0.0
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	0	0.0%	0.0%	20.0	0.0	0.0	0.0
PGE	PASS THROUGH	1	0.1%		16.5	170.5	16.3	16.2
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	1	0.0%		5.0	195,728.3	39,145.7	39,145.7
SCE	SCE - AGRICULTURAL PUMP VFD	0	0.0%	0.0%	7.6	1,825.5	174.4	239.9
SCE	PASS THROUGH	1	0.0%		5.6	4,645.3	727.0	727.0
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	0.0	0.0	0.0
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0	0.0%	0.0%	20.0	0.0	0.0	0.0
SCG	PASS THROUGH	1	0.7%		7.6	0.5	0.1	0.1
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	0.0	0.0	0.0
SDGE	PASS THROUGH	1	0.0%		5.0	22.0	2.3	2.3
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	1	0.0%		10.0	2,566.0	256.6	256.6
MCE	PASS THROUGH	1	0.0%		4.0	1,047.1	261.8	261.8
LCE	PASS THROUGH	1	0.0%		4.0	1,582.3	395.6	395.6

Per Unit (Quantity) Gross Energy Savings (Therms)

PA	Standard Report Group	Pass Through	% ER Ex Ante	% ER Ex Post	Average EUL (yr)	Ex Post Lifecycle	Ex Post First Year	Ex Post Annualized
PGE	PGE - AG IRRIGATION	0	0.0%	0.0%	20.0	0.0	0.0	0.0
PGE	PGE - AGRICULTURAL PUMP VFD	0	0.0%	0.0%	3.3	0.0	0.0	0.0
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	392.7	39.3	39.3
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	0	0.0%	0.0%	20.0	47.7	2.4	2.4
PGE	PASS THROUGH	1	0.1%		16.5	58.8	7.0	7.0
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	1	0.0%		5.0	0.0	0.0	0.0
SCE	SCE - AGRICULTURAL PUMP VFD	0	0.0%	0.0%	7.6	0.0	0.0	0.0
SCE	PASS THROUGH	1	0.0%		5.6	83.7	21.0	21.0
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	435.6	43.6	43.6
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0	0.0%	0.0%	20.0	78.8	3.9	3.9
SCG	PASS THROUGH	1	0.7%		7.6	30.5	3.0	3.0
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	140.0	14.0	14.0
SDGE	PASS THROUGH	1	0.0%		5.0	2.9	0.4	0.4
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	1	0.0%		10.0	0.0	0.0	0.0
MCE	PASS THROUGH	1	0.0%		4.0	-13.8	-3.5	-3.5
LCE	PASS THROUGH	1	0.0%		4.0	0.0	0.0	0.0

Per Unit (Quantity) Net Energy Savings (kWh)

PA	Standard Report Group	Pass Through	% ER Ex Ante	% ER Ex Post	Average EUL (yr)	Ex Post Lifecycle	Ex Post First Year	Ex Post Annualized
PGE	PGE - AG IRRIGATION	0	0.0%	0.0%	20.0	1,912.7	95.6	95.6
PGE	PGE - AGRICULTURAL PUMP VFD	0	0.0%	0.0%	3.3	645.5	69.9	195.6
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	0.0	0.0	0.0
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	0	0.0%	0.0%	20.0	0.0	0.0	0.0
PGE	PASS THROUGH	1	0.1%		16.5	113.6	10.9	10.8
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	1	0.0%		5.0	127,223.4	25,444.7	25,444.7
SCE	SCE - AGRICULTURAL PUMP VFD	0	0.0%	0.0%	7.6	937.8	89.6	123.2
SCE	PASS THROUGH	1	0.0%		5.6	3,102.6	479.8	479.8
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	0.0	0.0	0.0
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0	0.0%	0.0%	20.0	0.0	0.0	0.0
SCG	PASS THROUGH	1	0.7%		7.6	0.4	0.0	0.0
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	0.0	0.0	0.0
SDGE	PASS THROUGH	1	0.0%		5.0	14.5	1.5	1.5
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	1	0.0%		10.0	1,924.5	192.4	192.4
MCE	PASS THROUGH	1	0.0%		4.0	942.4	235.6	235.6
LCE	PASS THROUGH	1	0.0%		4.0	1,028.5	257.1	257.1

Per Unit (Quantity) Net Energy Savings (Therms)

PA	Standard Report Group	Pass Through	% ER Ex Ante	% ER Ex Post	Average EUL (yr)	Ex Post Lifecycle	Ex Post First Year	Ex Post Annualized
PGE	PGE - AG IRRIGATION	0	0.0%	0.0%	20.0	0.0	0.0	0.0
PGE	PGE - AGRICULTURAL PUMP VFD	0	0.0%	0.0%	3.3	0.0	0.0	0.0
PGE	PGE - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	235.9	23.6	23.6
PGE	PGE - WATER HEATING TANKLESS WATER HEATER	0	0.0%	0.0%	20.0	29.2	1.5	1.5
PGE	PASS THROUGH	1	0.1%		16.5	38.4	4.6	4.6
PGE	PGE - GLYCOL PUMP VFD PASS THROUGH	1	0.0%		5.0	0.0	0.0	0.0
SCE	SCE - AGRICULTURAL PUMP VFD	0	0.0%	0.0%	7.6	0.0	0.0	0.0
SCE	PASS THROUGH	1	0.0%		5.6	54.4	13.6	13.6
SCG	SCG - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	366.3	36.6	36.6
SCG	SCG - WATER HEATING TANKLESS WATER HEATER	0	0.0%	0.0%	20.0	60.7	3.0	3.0
SCG	PASS THROUGH	1	0.7%		7.6	21.1	2.1	2.1
SDGE	SDGE - OZONE LAUNDRY EQUIPMENT	0	0.0%	0.0%	10.0	108.5	10.9	10.9
SDGE	PASS THROUGH	1	0.0%		5.0	1.9	0.2	0.2
SDGE	SDGE - AGRICULTURAL PUMP VFD PASS THROUGH	1	0.0%		10.0	0.0	0.0	0.0
MCE	PASS THROUGH	1	0.0%		4.0	-12.4	-3.1	-3.1
LCE	PASS THROUGH	1	0.0%		4.0	0.0	0.0	0.0

APPENDIX AC:

RESPONSE TO RECOMMENDATIONS

EM&V Impact Study Recommendations

Study Title: 2019 Small/Medium Commercial Impact Evaluation

Study Manager: CPUC

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
POL1	PG&E, SCG and SDG&E	5	<p>The addition of ozone laundry equipment is generally an effective technology for reducing hot water used by laundry equipment, resulting in energy savings. With ozone laundry equipment in place, laundry cycles are typically completed using less hot water, and the hot water temperature setpoint for the water heating system is lowered. Both factors combined contribute to a reduction in natural gas used to heat water, in a water heater or boiler that provides hot water to a given laundry facility. Furthermore, the ozone that is introduced into the water supply used by laundry equipment enhances sanitation, including the destruction of microorganisms, like bacteria and viruses, that can cause disease.</p> <p>The measures' dual effectiveness in combating climate change through energy savings and reducing the likelihood of contagious disease outbreaks makes this technology highly attractive as a program offering.</p>	<p>We recommend that this technology not only continue to be offered by the programs, but that the PAs' increase participation levels through additional marketing and outreach supporting uptake of ozone laundry equipment.</p>		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
POL2	PG&E, SCG and SDG&E	5	<p>Out of a total sample size of 35 sites we sampled 1 San Diego Gas and Electric (SDG&E) project, with a program-based savings estimate that accounts for 37% of all reported savings across all PAs.</p> <p>While this project had great potential to save energy using ozone laundry equipment, the customer did not substantially adjust the hot water use per laundry load or change the water temperature settings, which resulted in a gross savings realization rate for this project of just 5%. While the resulting downward effect on the overall realization rate is substantial, the statewide result is still decent at nearly 80% of the reported savings. However, the effect on realized SDG&E savings is much greater, resulting in a realization rate of just 36%.</p> <p>It is also notable that this business does not appear to be eligible to participate. This participating business supplies linens and work uniforms. The relevant SDG&E worksheet only allows</p>	<p>We recommend that large-scale projects of this nature are better served through a custom program channel where site-level reported savings are adequately vetted through the program application process. Using a custom channel instead of a deemed program approach would likely have produced a more reliable estimate of PA-reported savings for this project. Custom program projects typically undergo a more rigorous verification of operating conditions that are in-turn incorporated within the project saving estimates.</p>		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
			participation in fitness, nursing home, correctional and hotel/motel facilities.			
POL3	PG&E, SCG and SDG&E	5	Ozone laundry equipment installations are not always properly screened for eligibility requirements. We found that two of our sample points replaced existing ozone laundry equipment with new equipment. The replaced ozone laundry equipment have equivalent functionality to the newly installed ozone laundry equipment, resulting in no savings being realized by the grid. CPUC policy does not allow programs to install like-for-like energy efficiency replacements. It is also notable that the program standards exclude eligibility for replacing ozone laundry equipment.	The program's application and review process should be enhanced to better screen projects against eligibility requirements and exclusions.		
POL4	PG&E, SCG and SDG&E	5	The percent reduction in hot water use, the number of laundry cycles per day and the reduction in hot water temperature settings generally brought down the resulting realization rate for SDG&E.	We recommend that the programs strengthen program requirements surrounding percent reduction in hot water use, number of laundry cycles per day and the reduction in hot water temperature settings to ensure adequate savings for all participating projects.		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
POL5	PG&E, SCG and SDG&E	5	<p>We selected ex post model-based parameters to present in Chapter 5 on the basis that they would be most useful to any future workpaper updates. In fact, several of the factors we presented do currently contribute to workpaper-based savings estimates. Also shown are ex post unit energy savings values expressed in a way that parallels ex ante workpaper values that are applied to the tracking data (expressed per pound of laundry machine capacity).</p>	<p>In support of any future workpaper updates for ozone laundry measures, it is recommended that the PA workpaper team mines this data source and applies our findings where feasible and, as noted above, modify program requirements to ensure all projects deliver adequate program savings. Furthermore, our evaluation team has assembled a model for estimating ozone laundry equipment savings, and in doing so has amassed industry knowledge, tools and experience that can be shared with the workpaper team in order to hopefully improve the accuracy of resulting workpaper-based savings estimates and better align PA and evaluation results.</p>		
POL6	PG&E, SCG and SDG&E	5	<p>In some cases we found that the gross impact sample and participants in the program tracking data do not always</p>	<p>We recommend that the program either better screen businesses for eligibility based on business type, or if warranted, expand the</p>		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
			<p>conform with program business type eligibility requirements.</p> <p>Interestingly, these eligibility criteria are found to vary across PA workpapers, but the universe of eligible businesses includes hotel/motel, health facilities, nursing homes, correctional facilities and fitness centers. Within the sample exceptions to this include a commercial laundry, a party rental store, a linen and work apparel supplier and lodging facilities (that are not hotel/motels). In fact, we even observed business type exceptions to the eligible business list using business type variables available in the program tracking system.</p>	availability of businesses that can participate. We also recommend better alignment among the PA workpapers in terms of businesses that are eligible and a consensus on why.		
PPVFD1	PG&E, SCG and SDG&E	5	<p>We found that VFD controls installed through the programs are not being properly screened in many cases for eligibility criteria. Out of a total sample size of 45 pumps, commonly observed reasons for failing eligibility requirements includes the installation of speed controls in the following cases:</p> <ul style="list-style-type: none"> 5 pumps run fewer than 1,000 hours per year 	The program's application and review process should be enhanced to better screen projects against eligibility requirements and exclusions.		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
			<ul style="list-style-type: none"> 2 pumps pump well water into a water storage reservoir or trucks 12 pumps have settings that are at or near full load 4 pumps that previously ran uncontrolled. <p>Many of the VFDs are installed on new pumps that irrigate trees that have been planted in the last couple of years; this results in low run hours, many below 500 hours per year.</p>			
PPVFD2a	PG&E, SCG and SDG&E	5	<p>In most cases, pump operations can be readily characterized using interval billing data, such as hourly demand measurements for a given pump. In fact, our evaluation applied interval billing data as a key model input used to determine VFD savings.</p>	<p>We recommend that the programs make use of interval billing data for characterizing pump operations, including use of those data to derive updated estimates of deemed savings for the pump VFD measure, and as screening criteria for pump run hours.</p>		
PPVFD2b	PG&E, SCG and SDG&E			<p>The PAs should continue to track and report Service Account IDs (SAID) of meters that are affected by VFD installation. Overall, the PAs did a good job of identifying the affected</p>		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
				customers meters and accounts where loads were affected by VFD installation, but there were a few instances where this was not the case. Best practice would be to ensure that each record in the tracking system has a SAID that corresponds with the installed VFD/pump.		
PPVFD3	PG&E, SCG and SDG&E	5	Beside the potential to save energy, there are other common reasons that farmers will decide to install VFD controls on crop irrigation pumps. In fact, some pumps cannot continue to be operated without the VFD due to operational requirements, such as the use of VFD controls to automatically adjust pump speed in response to pressure settings, or due to sand contamination in the well water column that can be controlled using VFD pump speed settings. Another common reason is that the VFD pump gives the farmer the ability to monitor and control the pump remotely, from a desk in their office. Furthermore, the VFD pumps can save on equipment maintenance and extend	<p>For these reasons, we recommend that the appropriate baseline be determined as a function of pump type and size.</p> <p>Current deemed savings estimates assume a throttle valve flow control baseline, in which partially closed valves are used to control pump flow. However, this assumed baseline ignores the fact that VFD flow controls are commonly installed, even without the influences of program intervention.</p>		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
			the life of the pump. This results in a high free ridership rate for VFD controls because a considerable number of farmers indicate that they would have installed VFD controls independent of the program / incentive.			
PPVFD4a	PG&E, SCG and SDG&E	5	The workpaper-based estimates of savings currently draw results from a database of legacy custom and new construction projects involving pump VFDs. Our evaluation has assembled stipulated parameter values and results, including the following: operating hours, pump load distribution, assumed baseline condition, motor efficiency, VFD efficiency, pump OPE and the assumed affinity law exponent. Our evaluation also reported metric-based per-unit results that should prove useful to workpaper updates, in addition to updating the parameters noted above.	We recommend that the results of this evaluation, and any trends observed, should be considered for any workpaper updates for the agricultural pump VFD measures, in order to improve the accuracy of future workpaper estimates.		
PPVFD4b	PG&E, SCG and SDG&E	5		The program's application and review process should be expanded to increase the range of irrigation pump performance information captured in the ex ante tracking databases. We recommend that the PAs consider including fields within the project application forms for estimated pump runtime, the acreage of the field to be served by the pump, the crop being served, irrigation end-point type		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
				(drip, sprinkler, flood), OPE, etc. The PAs should make use of those data to fine tune ex ante savings values to better represent the pumping conditions/water requirements. It might be possible, for example, to support crop-specific savings estimates and to better customize expected pump loads based on water requirement by crop, pump capacity and acreage.		
PPVFD4c	PG&E, SCG and SDG&E	5		We recommend that the PAs consider using an enhanced deemed measure savings algorithm that provides for some reasonable level of customization for relevant input parameters. Based on observations during this evaluation, we believe that irrigation pumps are better suited as a quasi-prescriptive (partially-deemed) measure rather than a fully deemed measure. The diversity of sample points and results suggests that irrigated fields, and the VFDs that serve		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
				them, are unique to each farm, but nonetheless trends may be leveraged that can lead to more accurate savings claims. To that effect, crop-specific irrigation requirements, for example, could be used to better characterize and differentiate the measure savings algorithms. Continuing to use a database of legacy ex ante pump VFD results will likely continue to misrepresent realized program savings.		
PPVFD5	PG&E, SCG and SDG&E	5	Across both the PG&E and SCE samples (45 pumps), there were only 2 pumps where evaluation-based EUL assignments matched those applied by the PAs in the tracking system. The utilities are failing to properly set EUL values to 1/3 of the EUL of an appropriate pump description from DEER for retrofit add-on projects (where the RUL of the pump informs the EUL of the VFD measure, based on host equipment policy). The PAs are also not successfully differentiating EULs based	The PAs should apply greater due diligence in populating tracking system-based EULs and better classify participating projects as new pump installations versus retrofit add-on installations. The utilities EUL estimates demonstrate some level of confusion surrounding proper use of DEER database resources.		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
			on the pumps being new, where application of a 10-year EUL is appropriate.			
AG1	PG&E	5	The agricultural drip irrigation measure is no longer offered through Pacific Gas and Electric (PG&E) programs. PG&E gradually altered the measure's eligibility requirements to accommodate specific irrigation technologies and crop types for which low-pressure irrigation was not yet a standard practice. By sunseting the final eligible technology—drip tape irrigation at farms growing field vegetables—PG&E has deemed low-pressure irrigation to be standard practice throughout northern California.	We recommend that the agricultural irrigation realization rates and NTGRs presented in this evaluation report should not be applied prospectively to other agricultural irrigation measures. The drip irrigation measure was uniquely conducive to downstream distribution at scale. As a result, its gross and net performance does not serve as a reliable proxy for other agricultural measures such as irrigation pump upgrades.		
AG2	PG&E	5	The PA models for estimating savings were found to lack key parameters critical for accurately characterizing irrigation needs and resulting savings. These gaps generally led to a reduction in our evaluated savings relative to the PA reported savings. For example, almost all of the 19 evaluated drip irrigation projects were a unique	Should the drip irrigation measure reemerge, we recommend that future deemed savings estimates claims should be derived using evaluation data and results. The PAs should leverage findings from previous evaluations to refine model inputs and assumptions, correct		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
			combination of the following parameters which were not considered in the PAs' reported savings calculation: pre-project crop type, pre-project irrigation method, and post-project crop type. Each of these parameters can significantly affect irrigation requirements and subsequent savings from drip irrigation installations. Therefore, because the PAs' reported savings did not consider these factors, the savings values were inaccurate and generally overstated.	errors and omissions, and otherwise improve the accuracy of reported savings for drip irrigation technologies. This will ensure better alignment between reported savings and evaluation-based savings results.		
AG3	PG&E	5	The PA reported savings overstated how long the equipment will last following installation. PG&E assumes the equipment will last 20 years based on the default value considered for agricultural irrigation pumps. We found that the drip irrigation equipment are often replaced more frequently than the pumps to conserve both water and energy.	While the evaluated drip irrigation measure is no longer offered by PG&E, we recommend for future measures that involve drip irrigation or similar upgrades that useful life estimates should reflect the expected life of the program-installed irrigation emitters, not the associated irrigation pump.		
TWH1	PG&E and SCG	5	For many of the tankless water heaters evaluated, program tracking data did not provide sufficient information. For approximately 45% of projects in the population, we did not have sufficient	We recommend that the PAs require participating distributors and partnering contractors to collaboratively collect and submit basic information for each		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
			participant contact data to verify water heater installations or evaluate savings. As a result, we expanded our evaluation recruitment pool and ultimately exceeded the target sample count. We are encouraged by the slight improvement in recent tracking data quality as compared to our previous experiences.	customer ultimately receiving the equipment or other program support. As noted above, this appears to be most challenging to accomplish for installed equipment that are delivered by the programs through retail or other equipment supplier sources, in contrast with equipment that are installed directly by contractors and should therefore be an area of focus for implementing this recommendation. This basic information is critical for the PAs, the CPUC, and its contractors to verify installations and maintain the integrity of ratepayer incentive dollars.		
TWH2	PG&E and SCG	5	We determined that 9 of the 51 evaluated projects either never saved energy or no longer save energy. Three claimed projects occurred at facilities that have since permanently closed, and six projects were claimed at service addresses that had no evidence of recent tankless water heater installations. These	We recommend that programs should require participating distributors and partnering contractors to submit more comprehensive installation documentation (e.g., invoices, commissioning reports) and photographs to prove measure		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
			projects resulted in zero savings and significantly reduced overall realized program savings.	installation, quantity, size, fuel source, and efficiency. This appears to be most challenging to accomplish for installed equipment that are delivered by the programs through retail or other equipment supplier sources, in contrast with equipment that are installed directly by contractors, and should therefore be an area of focus for implementing this recommendation.		
TWH3	PG&E and SCG	5	Twenty-nine of the 51 evaluated projects applied incorrect per-unit savings values or misclassified the type of facility in which the measure was installed. Correcting these errors resulted in slightly lower estimated savings.	We recommend that the PAs' redouble efforts to ensure that reported savings estimates are based on the correct application of per-unit deemed savings values. We attribute these observed errors to the following: erroneous application of the wrong result, or mis-specification of the facility type, climate zone, water heater size, or efficiency tier.		

ID		Section	Conclusion	Recommendation	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
TWH4	PG&E and SCG	5	<p>We found that water heaters operated at different temperatures than assumed in the applicable workpapers, which negatively affected the savings estimates. However, we also found that the installed water heaters were rated at higher efficiencies than assumed.</p> <p>Overall, the positive effects from increased efficiency outweighed the negative effects due to operating temperatures, resulting in an overall increase in savings.</p>	<p>We recommend that future workpaper revisions incorporate recent evaluation results when available. This will ensure better alignment between reported savings and evaluation-based savings. We note that the evaluated DHW temperatures presented in Table 5-36 include five cases of closed-loop systems that reduced the TWH's change in temperature. These five points should be excluded from prospective workpaper values if the programs screen out ineligible closed-loop systems as intended.</p>		

APPENDIX A:

UPDATES TO NTG FRAMEWORK

This Appendix describes updates that the evaluation team made to the Nonresidential Net-to-Gross (NTG) framework for downstream programs during for the 2018 evaluation cycle. Evaluators have used this framework with minor modifications since the 2006-2008 evaluation cycle. Team members from both the Group A and Group D evaluation teams coordinated to develop changes that the evaluation team incorporated into the Small Commercial and Lighting evaluations that resulted in an alternative to the PAI-1 score. The evaluation team used these changes for the PY2019 evaluations for the Small Commercial and Nonresidential Lighting evaluations.

Over the last several evaluation cycles, Net-to-Gross (NTG) analysis for Nonresidential programs has used a Self-Report Approach (SRA) that is based on the results of self-report telephone surveys with program participants. The Nonresidential Working Group originally developed the existing Nonresidential Net-to-Gross (NTG) framework during the 2006-2008 evaluation cycle and updated it modestly during the 2010-2012 cycle. They designed the approach to fully comply with the California Energy Efficiency Evaluation: Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals¹ (Protocols) and the Guidelines for Estimating Net-To-Gross Ratios Using the Self-Report Approaches (Guidelines), as demonstrated in the Nonresidential NTGR Methods (Appendix D-1 to the full WO033 Custom Final Report).

¹ The TecMarket Works Team. California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. Directed by the CPUC's Energy Division, and with guidance from Joint Staff, April 2006.

A-1 STANDARDIZED NONRESIDENTIAL NTG ALGORITHM IMPROVEMENTS

A-1-1 Previous Algorithm and Rationale

The standardized Nonresidential NTG framework incorporates a 0 to 10 scoring system for key questions used to estimate the NTGR. It consists of a 3-score structure, with each score representing a different way of characterizing program influence:

- **Program attribution index 1 (PAI-1)** score that reflects the influence of the most important of various program and non-program-related elements in the customer's decision to select the specific program measure at the time they did. Program influence through vendor recommendations is also incorporated in this score.
- **Program attribution index 2 (PAI-2)** score that captures the perceived importance of the program (whether rebate, recommendation, training, or other program intervention) relative to non-program factors in the decision to implement the specific measure that was eventually adopted or installed. This score is determined by asking respondents to assign importance values to both the program and most important non-program influences so that the two total 10. The program influence score is reduced in half if respondents say they had already made their decision to install the specific program qualifying measure before they learned about the program.
- **Program attribution index 3 (PAI-3)** score that captures the likelihood of various actions the customer might have taken at the time they did, and in the future, if the program had not been available (the counterfactual).

The resulting self-reported NTGR in most cases is simply the average of the PAI-1, PAI-2, and PAI-3 values, divided by 10. The one exception to this is when the respondent indicates a 10 in 10 probability of installing the same equipment at the same time in the absence of the program, in which case the NTGR is based on the average of the PAI-2, and PAI-3 values only. The reasoning is that the customer has responded with absolute certainty that the program did not influence their decision making through their responses to PAI-3, whereas responses to the PAI-1 score typically indicate some level of program influence despite efforts to check and resolve the consistency of their responses.

The rationale for using three separate scores (triangulation²), rather than relying on a single metric, is as follows. The objective of the NTGR analysis is to determine the fraction of the gross savings that occurred because of the program. One minus this score is interpreted as freeridership. Some questions are designed to measure the counterfactual by asking the participant several questions about what they would have done in the absence of the program. Other questions attempt to get at the direct influence of the rebate and other forms of assistance on the decision to install efficient equipment. As part of this set of questions, the respondent is prompted to consider other possible non-program influences that might have played a role in the decision. Still other questions attempt to establish the chronology of when the participant first heard about the program and their decision to install the efficient equipment. These three different types of questions are trying to measure three slightly different things with some being more difficult than others for the respondent to assess. For example, it is easier for the respondent to recall whether they found out about the availability of the rebate before or after they decided to buy the efficient equipment than it is to imagine what they would have done in the absence of the program or assess the influence of the rebate. Nevertheless, all three types of questions provide information about the influence of the program that decision makers should find both meaningful and useful.

One of the problems inherent in asking program participants if they would have installed the same equipment or adopted the same energy-saving practices without the program is that we are asking them to recall what has happened in the past. Worse than that is the fact that what we are really asking them, among other things, is report on a hypothetical situation, what they would have done in the absence of the program. In many cases, the respondent may simply not know and/or cannot know what would have happened in the absence of the program. Even if the customer has some idea of what would have happened, there is, of necessity, uncertainty about it. The situation just described is a circumstance ripe for invalid answers (low construct validity) and answers with low reliability, where reliability is defined as the likelihood that a respondent will give the same answer to the same question whenever or wherever

² Triangulation, using a variety of research methods and data sources, is a strategy adopted ideally before the data are collected and reduces the risk of systematic biases. In some cases, the decision to use triangulation is adopted after the data are collected and found robust enough to support this approach.

it is asked. It is well known in the interview literature that the more factual and concrete the information the survey requests, the more accurate responses are likely to be. Where we are asking for motivations and processes in hypothetical situations that occurred in the past, there is room for bias. Using a framework that combines scores based on three different concepts mutes the impact of such bias and increases the accuracy of the resulting NTGR for each project evaluated.

A-1-2 Changes Since the 2006-2008 Evaluation Cycle and Next Steps

The **PAI- 1** score has evolved since the original specification in 2008. The 2008 version called for the score to be based on the highest rating for a program element. Since most decisionmakers would choose to rate at least one program element highly, this often resulted in a PAI-1 score that was significantly higher than either the PAI-2 or PAI-3 scores, and in some cases, led to the elimination of PAI-1 due to it being an outlier. The score was revised in the 2010-2012 cycle to be based on the highest rating for a program influence divided by the sum of the highest-rating for a program influences plus the highest rating for a non-program influence, multiplied by 10. This revised normalized structure solved the problem with outlier results but led to a different issue due to the normalization process yielding mid-range values approximating 5 in nearly all cases, since most decisionmakers give a high score to at least one program element and one non-program element. This issue was flagged in the 2013-2015 Program Performance Assessment of the Nonresidential Downstream Programs, with a recommendation that PAI-1 be eliminated from the NTGR calculation until an alternative formulation could be developed.

The 2017 evaluation of Deemed measures continued use of this standard SRA framework with relatively minor modifications to NTG survey question batteries. Based on the 2013-2015 Program Performance Assessment recommendation, the PAI-1 score was eliminated from the NTG ratio computation. *The Nonresidential NTG Working Group was re-established, in part, to identify an alternative to the current PAI-1 scoring structure.*

A-2 ALTERNATIVE TO CURRENT PAI-1 SCORING STRUCTURE

A-2-1 Issues with Current PAI-1 Score

As discussed previously, a number of issues with the PAI-1 score have emerged in previous evaluations. The observations below are specific to the 2017 Deemed evaluations where these problems resulted in a decision to exclude the PAI-1 score from the NTGR calculation.

The inclusion of the PAI-1 score biased the NTGR towards a value of 0.5. The PAI-1 score tended to converge to a value of around 5. Overall, the PAI-1 score averaged 4.9, with over 80% of the individual scores within 0.5 of that mean (i.e., between 4.4 and 5.4). This was likely due to respondents rating at least one program and one non-program factor very high. Respondents gave a 9 or 10 rating to at least one program factor 72% of the time, and at least one non-program factor 80% of the time. Furthermore, 66% of the time, the respondent's highest rated program and non-program factors were rated equally. Averaging in the PAI-1 score with PAI-2 and PAI-3 will therefore reduce the NTGR.

PAI-1 scores did not appear to be correlated with “no program” responses indicating free ridership. When PAI-1 scores were compared to other survey questions that would indicate a high likelihood for free ridership, they did not correlate well to these metrics. Specifically, we examined the relationship between PAI-1 and two survey questions that we felt were strong indications of free ridership:

N2: Did your organization make the decision to install this new equipment before, after, or at the same time as you became aware of the program rebate?

N6: Now I would like you to think one last time about what action you would have taken if the program had not been available. Which of the following alternatives would you have been MOST likely to do?

- 1 Install/Delamp fewer units
- 2 Install standard efficiency equipment or whatever required by code
- 3 Installed equipment more efficient than code but less efficient than what you installed through the program

- 4 Done nothing (keep existing equipment as is)
- 5 Done the same thing I would have done as I did through the program
- 6 Repair/rewind or overhaul the existing equipment
- 77 Something else (specify what _____)

The first question (N2) concerns the timing of the decision to install the measure relative to when they became aware of program rebates. For this question, higher levels of free ridership would be expected for those that already made the decision to install their new equipment before they became aware of the program rebate, and PAI-1 scores would be substantially lower for this response than the other two responses. Our expectation was to see significant increases in the PAI scores for the Same Time and After responses, compared to the Before response. This was the case for PAI-2 and PAI-3 scores, however, the PAI-1 scores changed by only 0.08 points.

Another telling indication of program influence is the self-reported action that participants say they would have taken had the program not existed in question N6. Respondents were asked what they would have been most likely to do if the program had not been available. Two common responses were “done nothing and keep existing equipment as is”, and “done the same thing I would have done as I did through the program”. One would expect relatively high PAI scores for the “done nothing” and relatively low PAI scores for the “done the same thing” responses. The PAI-2 and PAI-3 scores did meet this expectation, but the PAI-1 score differed by only 0.10 points.

Non-program factors may actually be program factors. What we may think is a non-program factor, may actually be a marketing message of the program. For example, better lighting quality may be considered a non-program factor. However, this may be something the program promotes. Therefore, it may be that the influence of better lighting quality on their decision may have been due to the program.

Similarity in concept between PAI-1 and PAI-2 scores. The PAI-1 and PAI-2 scores are based on a similar concept of program influence and are based on self-reported influence scores for individual program and non-program elements. While both scores are intended to represent different ways of

characterizing program influence, there is a high degree of similarity between them. Including both scores in the NTGR calculation amounts to assigning a two-thirds weight to similar program influence metrics and reduces the importance of the PAI-3 “no program” score in the overall calculation. It is possible that PAI-1 may represent another aspect of program influence that PAI-2 may not be capturing, but quantifying this is difficult to do, and it could be equally likely that instead they are capturing the same influence, accounting for double attribution of program influence. Additionally, removing PAI-1 will give a more consistent representation of program influence across respondents.

A-2-2 Alternatives to the PAI-1 Score

We examined a few different alternatives to the PAI_1 score and then calculated the resulting NTGR using each alternative by averaging it with the PAI_2 and PAI_3 scores. The alternatives we considered were as follows:

NTGR 2a – PAI-1 alternative 1 = ratio of average program element score to sum of average program plus non-program element scores. Average all the program element scores and divide by the average of all the program element scores plus the average of the non-program element scores. For example:

Program scores = 10, 8, 7, 6, 6 = average of 7.4

Nonprogram = 9, 9, 4, 4, 4 = average of 6.0

PAI_1 = $7.4 / (7.4 + 6.0) = 0.55$

NTGR 2b – PAI-1 alternative 2 = Ratio of number of highly rated program factors to highly rated non-program factors

Identify the number of scores that rate an 8 or higher and set the PAI score equal to the ratio of the number of high program scores to high program and non-program scores. For example:

Program scores = 10, 8, 7, 6, 6 = 3 high scores

Nonprogram = 9, 9, 4, 4, 4 = 2 high scores

$$\text{PAI}_1 = 3 / (3+2) = 0.6$$

If you get no high scores, then NTG = 0.5

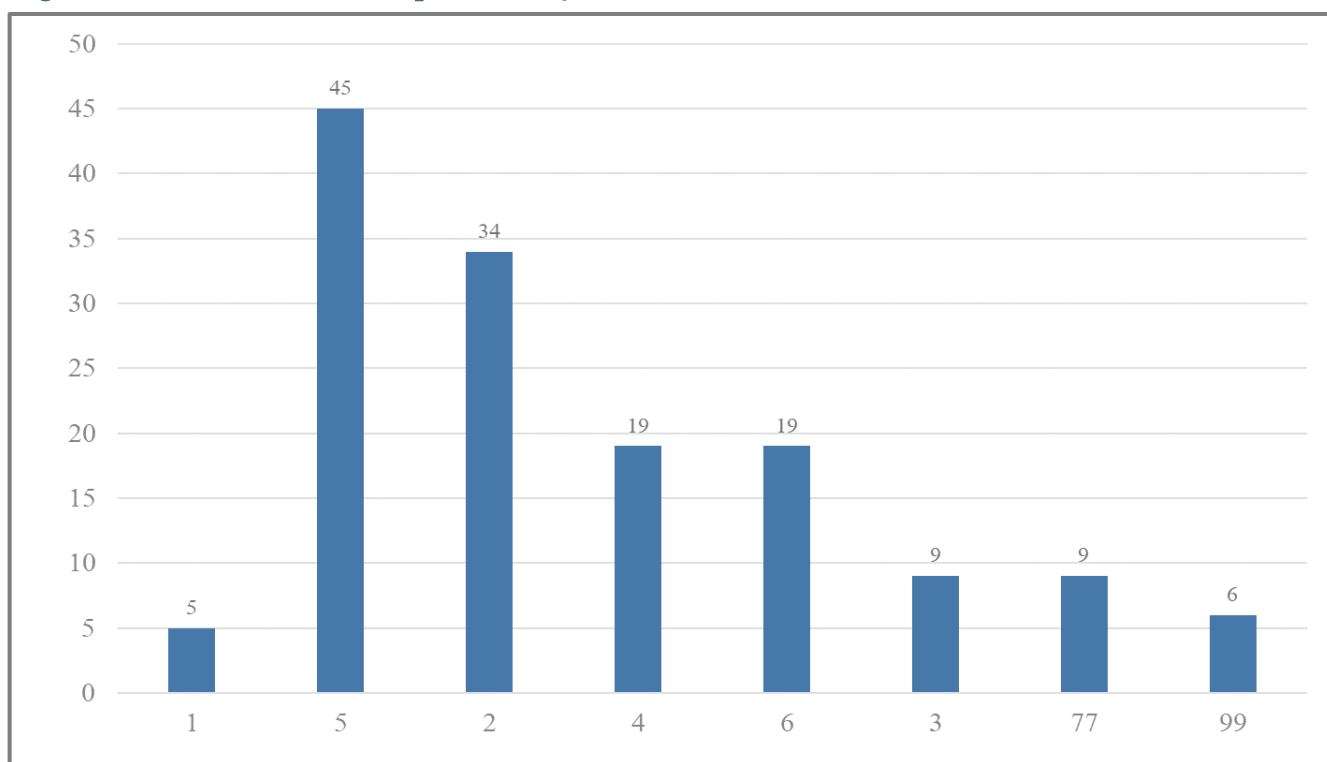
NTGR_2c – PAI-1 alternative 3 = Assign value based on No Program actions (N6). This Approach uses the N6 value and assigns a PAI score as follows.

- If N6 = 2,4 then NTGR = 1
 - 2 Install standard efficiency equipment or whatever required by code
 - 4 Done nothing (keep existing equipment as is)
- If N6=5 then NTGR = 0
 - 5 Done the same thing I would have done as I did through the program
- If N6=1, then NTGR = 1.00 minus the % share they would have installed
 - 1 Install/Delamped fewer units
- If N6=3, then NTGR = 0.75
 - 3 Installed equipment more efficient than code but less efficient than what you installed through the program
- IF N6=6, NTGR=missing – this is an Accelerated Replacement and the efficiency of the action is unknown, therefore this response is excluded from the analysis
 - 6 Repair/rewind or overhaul the existing equipment
- If N6=77, the response is reviewed and a judgment made regarding the likely NTGR level, usually a 0, 0.5 or 1
 - 77 Something else (specify what _____)

The overall NTGR_2c is the average of PAI-2, PAI-3, and PAI-N6.

Figure A-1 below shares results from the 2017 Deemed evaluations for question N6. The response category with the largest share is category 5 (Done the same thing I would have done as I did through the program, 45%). Other categories that were commonly selected were 2 (Install standard efficiency equipment or whatever required by code, 34%), 4 (Done nothing, 19%) and 6 (Repair/rewind or overhaul the existing equipment, 19%).

Figure A-1: Distribution of Responses to Question N6 in Small Commercial Evaluation



NTGR 2d – PAI-1 alternative 4 = Preponderance of Evidence approach. If there is significant evidence of free ridership, the value is set to 0, if there is significant evidence of program influence, the value is set to 1, or else the PAI-1 alternative algorithm of choice is used to determine the NTGR. Here is the algorithm.

First calculate PAI_2 and PAI_3 and use question N6 shown earlier:

If PAI_2 ≥ 7 then NTG_2 = 1

Else if PAI_2 ≤ 3 then NTG_2 = -1

Else NTG_2 = 0

If PAI_3 ≥ 7 then NTG_3 = 1

Else if PAI_3 ≤ 3 then NTG_3 = -1

Else NTG_3 = 0

IF N6 = 2, 4 (and possibly more options) then NTG_6 = 1

Else if N6 = 5 (and possibly more options) then NTG_6 = -1

Else NTG_6 = 0

THEN:

If sum of NTG_{2,3,6} ≥ 2 , then NTGR = 1 (so in other words you have at least 2 indicators of being net, and no contradictions)

Else, if sum of NTG_{2,3,6} ≤ -2 , then NTGR = 0, (so in other words you have at least 2 indicators of being a free rider, and no contradictions)

ELSE = NTGR = the standard calculation (the average of PAI₂, PAI₃ and the PAI-1 alternative algorithm of choice)

A-2-3 Comparison of Results Across Methods

The following two figures graphically illustrate the NTGR results across methods, based on the data collected in the 2017 Deemed evaluations.

Figure A-2 illustrates the distribution of NTGR values for each of the methods tested. Note that NTGR is based on the approach used in the 2017 Deemed evaluation and represents the average of the PAI-2 and PAI-3 scores. NTGR_wPAI1 is the historic 3 score framework, and NTGR_2a through NTGR_2d are the variants described above.

Figure A-2: Distribution of NTGRs Across Alternative Methods

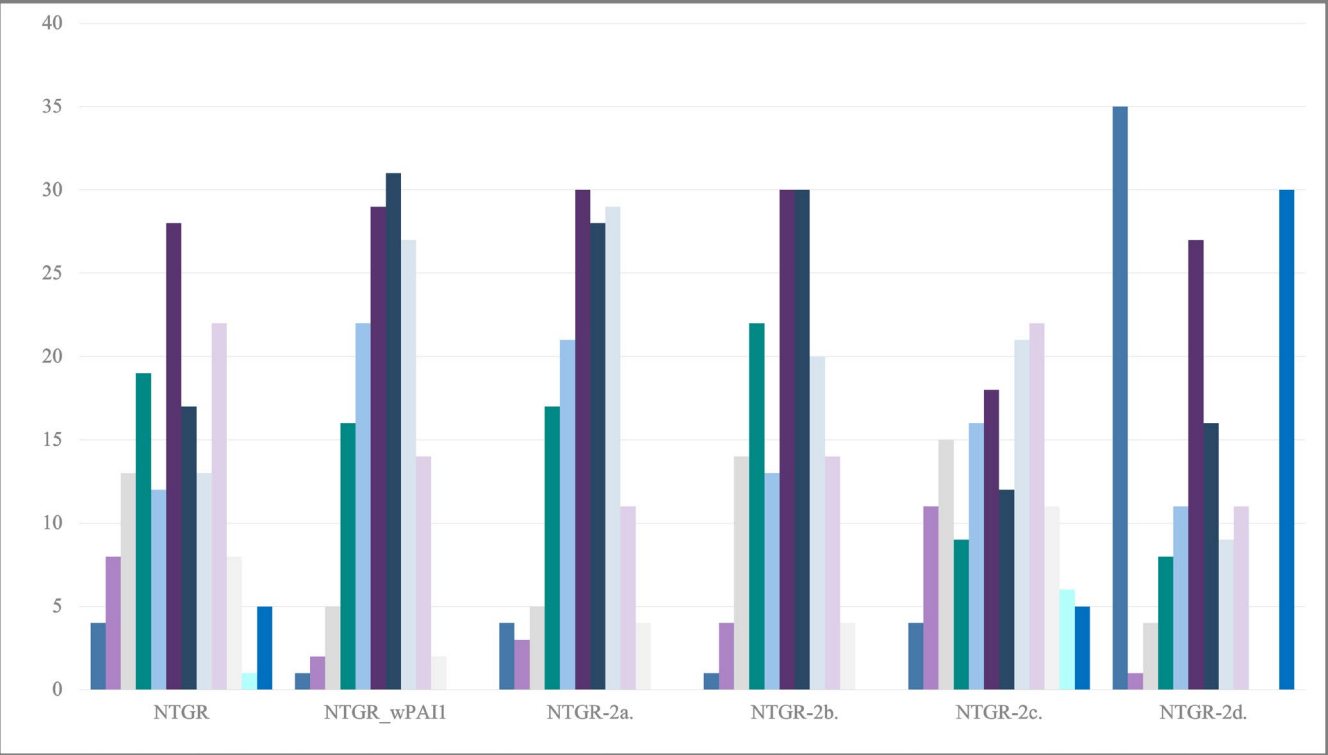
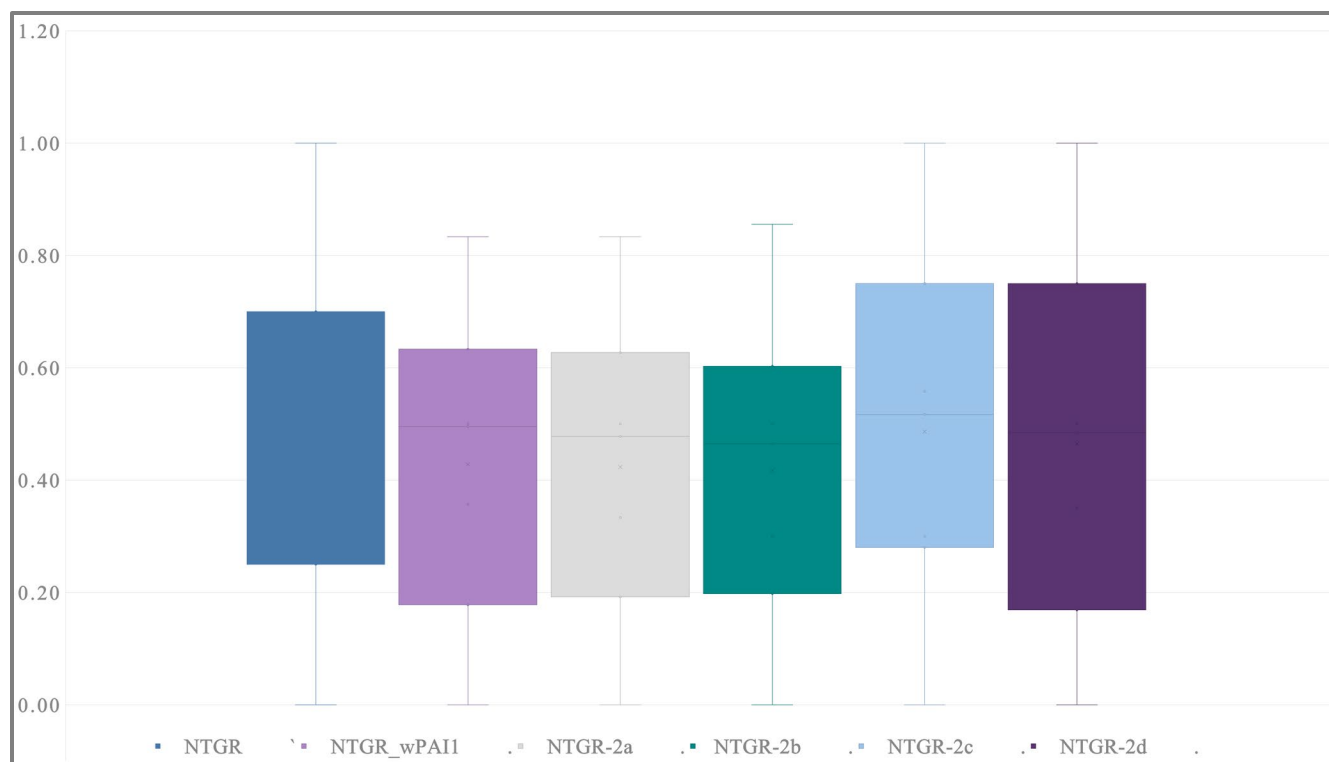


Figure A-3 below provides mean NTGR values and 90% confidence intervals across all six cases. The whiskers indicate the range of values analyzed.

Figure A-3: NTGR Mean Values and Confidence Intervals Across Alternative Methods



The following observations can be made from these two figures:

➤ **From Figure A-2:**

- NTGR_wPAI1 – note the clustering of NTGRs around the mid-range values of 0.4 to 0.7. This illustrates the issue with the PAI_1. In contrast, the NTGR case, which is based on PAI-2 and PAI-3 only, has a wider distribution of values.
- NTGR_2a and NTGR_2b are still relatively narrowly distributed around the 0.5 value, while NTGR_2c and NTGR_2d show much wider variance. Similarly, NTGR_2a and NTGR_2b have relatively narrow standard deviations, while those for NTGR_2c and NTGR_2d are significantly wider.
- NTGR_2c values are well-distributed and more homogeneous while NTGR_2d values tend toward the extreme 0 and 1 values in many instances.

- **In Figure A-3, it is striking how relatively similar the mean NTGR values are, and likely reflects the contribution of the PAI-2 and PAI-3 scores (2/3 weight) in all cases.**

A-2-4 Method Change

The core NTGR algorithm has been revised and the current PAI-1 score has been replaced with the N6-based score in NTGR_2c – PAI-1 alternative 3. This option leverages the counterfactual information from the survey more fully, with 2 of three scores derived from it. Further, as noted above, the NTGR_2c values have desirable qualities in that they are more normally distributed across each of the scoring intervals and have higher inter-item correlations.

The three PAI scores using the NTGR_2c approach all represent very different approaches and uses of survey information, whereas the other approaches still have the issue of the revised PAI-1 and PAI-2 scores utilizing similar information. We also feel there are some issues with the other alternate PAI_1 scores such as:

NTGR 2a – PAI-1 alternative 1 = ratio of average program element score to sum of average program plus non-program element scores. Consider the following example where an individual was highly influenced by a couple program factors, not at all influenced by the other program factors, and only moderately influenced by the non-program factors

Program scores = 10, 10, 0, 0, 0 = average of 4

Non-program scores = 4, 4, 4, 4, 4 = average of 4

PAI_1 = $4/(4+4) = 0.5$

One could argue that the NTGR in this case should be very high because there was clear influence of the program by more than one factor, and no other factor seemed to be very influential. Yet the NTGR is 0.5, inconsistent with this observation. We do not like this alternative because of this issue, where low factor scores can offset high influential factors. A customer does not need all factors to be influential for the program to have influenced their decision.

NTGR 2b – PAI-1 alternative 2 = Ratio of number of highly rated program factors to highly rated non-program factors. This alternative tells us if there were multiple factors that influenced their decision, and how many influential program versus non program factors there are. But it does not tell us which

of the influential factors were the most influential, and what may have really driven their decision. Even though a customer may rate two factors a 10 does not mean they were equally influential. The PAI-2 score does address this, however. So, the PAI-2 score on its own is a more accurate representation of attribution than this approach.

NTGR 2d – PAI-1 alternative 4 = Preponderance of Evidence approach. If there is significant evidence of free ridership, the value is set to 0, if there is significant evidence of program influence, the value is set to 1, or else the PAI-1 alternative algorithm of choice is used to determine the NTGR. The issue with this approach is that it uses PAI-2 and PAI-3 in its construction, so it's obviously highly correlated with those values and does not provide as independent a result as, say, using the N6 questions in NTGR_2c.

Given the replacement of PAI-1, for projects that report a high level of vendor influence, it is necessary to incorporate vendor influence into one of the other scores. One option is to include it in PAI-3, and another alternative is to develop a fourth score that reflects vendor influence only.

APPENDIX B:

PARTICIPANT PHONE SURVEY

<%CONTACT> – This variable should contain the decision makers name; probably the farmer

<%Business> – This variable should contain the business name

<%Utility> -- This variable should contain the relevant utility; either PG&E or SCE

<%Program> -- This variable should contain the name of the relevant program; for example, IDEEA365 or Commercial Deemed Incentives

<%Measure_x> -- This variable contains a readable measure description that includes the pump type and pump horsepower; for example, variable frequency drive flow controls for a 125 horsepower booster pump.

<%Measure_x_Date> -- This variable contains a readable installation date description; for example, December 6, 2019.

<%City> -- This variable contains the city name.

VFD1 should be the record and application randomly selected for evaluation

VFD2 should be the second randomly selected record for evaluation, when populated (as some FarmIDs will only be associated with a single record)

VFDx should always be 1 for all measures, including all VFDs installed under a given FarmID

Participant Survey for CPUC PY2019

Small Commercial Evaluation

INTRODUCTION AND FINDING CORRECT RESPONDENT

OUTCOME1

This is %n calling on behalf of the CPUC, from Quantum Energy Analytics. THIS IS NOT A SALES CALL NOR A SERVICE CALL. May I please speak with ...<%CONTACT> ...<%OLDCONTACT> ... <%BUSINESS> ... the person at your organization that is most knowledgeable about your participation in <%UTILITY>'s <%PROGRAM> program. !__[IF NEEDED]...This is a fact-finding survey only, authorized by the California Public Utilities Commission.

READ IF NEEDED: This call concerns variable frequency drive flow controls that your business purchased in 2019.

XX	BEGIN THE INTERVIEW	Continue
101	NO ANSWER	Record response and attempt again at a later time
102	BUSY	Record response and attempt again at a later time
111	CHANGED NUMBER	Record new number and attempt again
107	ANSWERING MACHINE / VOICE MAIL	Record response and attempt again at a later time
104	CALLBACK-Specific	Record response and schedule time to callback
105	CALLBACK-General	Record response and get best time to callback
5	NON-WORKING NUMBER	Record response and resolve record
6	NON-BUSINESS NUMBER	Record response and T&T
14	OTHER PHONE PROBLEM / FAX / MODEM	Record response and resolve record
12	REFUSAL	Record response and T&T
19	ASKED TO BE PLACED ON DNC LIST	Record response and T&T
15	LANGUAGE/HEARING PROBLEM	Record response and T&T
10	CLAIMS TO HAVE BEEN PREVIOUSLY INTERVIEWED	Record response and T&T
94	MAXIMUM CALL ATTEMPTS	Record response and resolve record
900	DUPLICATE PHONE NUMBER	DO NOT LOAD - RESOLVE RECORD
999	INVALID PHONE NUMBER	DO NOT LOAD - RESOLVE RECORD
Thank & Terminate PBLOCK NO ONE	Thank you for your time. For this study, we need to speak to someone about your organization's installation of energy efficient equipment that your organization installed through <%UTILITY>'s <%PROGRAM> program.	END

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

Q1B [IF YOU ARE TRANSFERRED TO ANOTHER PERSON OTHER THAN THE BEST CONTACT]
Who would be the person most familiar about your organization's participation in <%UTILITY>'S
<%PROGRAM> program? [ENTER NEW CONTACT NAME AND MOVE ON]

[IF NEEDED] This is not a sales call.

[IF NEEDED] This is a fact-finding survey only, and responses will not be connected with your firm in any way. The California Public Utilities Commission wants to better understand how businesses think about and manage their energy consumption.

READ IF NEEDED: This call concerns variable frequency drive flow controls that your business purchased in 2019.

77	There is no one here who can help you	T&T
02	CALL BACK TO REACH PROPER PARTY	Record response and get best time to callback
1	Continue Q1B until you find appropriate contact person, record as &NEW CONTACT NAME	Intro3:s

[IF BEST CONTACT IS AVAILABLE]
Hello, my name is _____%n_____ and I am calling on behalf of the California Public Utilities Commission from Quantum Energy Analytics. THIS IS NOT A SALES CALL. We are interested in speaking with the person most knowledgeable about your organization's participation in ...
Intro3:S <%UTILITY>'s <%PROGRAM> program during 2019...I was told that would be you.
...Your organization participated in <%UTILITY>'s <%PROGRAM> by installing variable frequency drive flow controls in 2019.

Through this program, your organization installed a....

<%MEASURE_1> on <MEASURE_1_DATE>

AND IF NEEDED: and a.....

<%MEASURE_2> on <MEASURE_2_DATE>

Are you the best person to speak to about your organization's participation in this program?

[If you need to provide validation for this survey, provide the following contact name and number: Mona Dzvova, California Public Utilities Commission 415-703-1231/
mona.dzvova@cpuc.ca.gov and the following website: www.cpuc.ca.gov/eevalidation]

1	Yes	DISPLAY
2	No, there is someone else	PBLOCK Hi
3	No and I don't know who to refer you to	Thank&Terminate
5	A contractor handles this	CNAME
99	Don't know/refused	Thank&Terminate

CNAME May I please have the name and contact information of your contractor?

1	Yes – RECORD	Record Response and T&T
88	Refused	Thank&Terminate
99	Don't Know	Thank&Terminate

PBLOCK Hi Who would be the person at this location who is most knowledgeable about this facility's energy using equipment? [Enter New Contact Name and phone number and move on.]

77	Record Name, as &CONTACT, and Phone as &PHONE	May I
88	Refused	Thank&Terminate
99	Don't know	Thank&Terminate

May I May I speak with him/her?

77	Yes	Intro3:s
88	No (not available right now@, set cb)	Get best time to callback

Before we start, I would like to inform you that for quality control purposes, this call may be monitored by my supervisor.

DISPLAY Today we're conducting a very important study on the energy needs and perceptions of businesses like yours. We are interested in how businesses like yours think about and manage their energy consumption.

Your input will allow the California Public Utilities Commission to build and maintain better energy saving programs for customers like you. And we would like to remind you, your responses will not be connected with your business in any way.

SCREENER

VERIFY For verification purposes only, may I please have your name?

77	Get name	Bus_Name
88	Refused	Bus_Name
99	Don't know	Bus_Name

DISPLAY For the sake of expediency, I will refer to<%UTILITY>'s <%PROGRAM> ...program as the PROGRAM, and to variable speed flow controls as the VFD(s).

BUS_NAME First, I'd like to ask you a question about your business. Our records show your business name as: <%BUSINESS>. Is that correct?

1	Yes	V1
2	No	Bus Correct
88	Refused	V1
99	Don't Know	V1

BUS_CORRECT What is the correct name for your business?

&BUS_CORRECT	Corrected Business	V1
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ROLE OF CONTRACTORS

V1 Did you use a contractor/vendor to install the VFD(s) that were purchased through the program?

1	Yes	V2
2	No	AA3
88	Refused	AA3
99	Don't Know	AA3

If V1 = 1 then ask; else skip to AA3

V2 How did you come into contact with the contractor/vendor?

1	They contacted you	V2b
2	You contacted them	V3
3	You had worked with them before	V2a
77	OTHER - Record	V3
88	Refused	V3
99	Don't Know	V3



Ask if V2 = 3; else skip to V2b

V2a In relation to this project, did the contractor/vendor approach you about your energy efficient equipment retrofit/installation?

1	Yes	V2ab
2	No	V3
88	Refused	V3
99	Don't Know	V3

Ask if V2a=1 else skip to V2b

V2ab Did the contractor/vendor recommend purchasing VFD flow controls instead of standard flow controls, such as throttling valve controls?

1	Yes	V2b
2	No	V2b
88	Refused	V2b
99	Don't Know	V2b

Ask if V2 = 1 or V2a = 1; else skip to V3

V2b On a scale of 0 - 10, with 0 being NOT AT ALL LIKELY and 10 is VERY LIKELY, how likely is it that your organization would have installed this new equipment had the contractor/vendor not contacted you?

1	0-10 response	V3
88	Refused	V3
99	Don't Know	V3

V3 Did the contractor/vendor tell you about or recommend the program?

1	Yes	V3a
2	No	AA3
88	Refused	AA3
99	Don't Know	AA3

V3a. Did you install what your contractor/vendor recommended?

1	Yes	V4
2	No	V4
88	Refused	V4
99	Don't Know	V4

Ask if V3 = 1; else skip to AA3

V4 Prior to coming into contact with the contractor/vendor, did your organization have plans to install the VFD(s)?

1	Yes	V4a
2	No	V4a
88	Refused	V4a
99	Don't Know	V4a

V4a Using the same scale of 0 - 10 as before, how likely is it that your organization would have installed the new VFD(s) had the contractor/vendor not recommended it?

1	0-10 response	V40
88	Refused	V40
99	Don't Know	V40

NOTE: We are skipping this question for VFDs:

V4b Using the same scale, how likely is it that your organization would have installed the VFD(s) with the same level of efficiency if the contractor/vendor had not recommended to do so?

1	0-10 response	V40
88	Refused	V40
99	Don't Know	V40

V40 On a scale of 0 - 10, with 0 being not at all important and 10 being very important, how important was the input from the contractor you worked with in deciding which specific equipment to install?

1	0-10 response	AA3
88	Refused	AA3
99	Don't Know	AA3

NET TO GROSS BATTERY

DISPLAY

For the sake of expediency, during this next battery we will be referring to the program as THE PROGRAM and we will be referring to the installation of the variable frequency drive flow controls we discussed earlier as THE VFD(s).

There are usually a number of reasons why an organization like yours decides to participate in energy efficiency programs like this one. In your own words, can you tell me why you decided to participate in this program?

AA3

1	To replace old or outdated equipment	AA3a
2	As part of a planned remodeling, build-out, or expansion	N2
3	To gain more control over how the equipment was used	N2
4	Maintenance downtime/associated expenses for old equipment were too high	AA3a
5	Had process problems and were seeking a solution	N2
6	To improve equipment performance	N2
7	To improve production as a result of the change in equipment	N2
8	To comply with codes set by regulatory agencies	N2
9	To improve visibility/plant safety	N2
10	To comply with company policies regarding regular equipment retrofits or remodeling	AA3a
11	To get a rebate from the program	N2
12	To protect the environment	N2
13	To reduce energy costs	N2
14	To reduce energy use/power outages	N2
15	To update to the latest technology	N2
16	To improve the comfort level of the facility	N2
77	RECORD VERBATIM	N2
88	Don't know	N2
99	Refused	N2

IF AA3=1, 4 or 10 THEN ASK. ELSE N2

AA3a Had the equipment that you replaced reached the end of its useful life?

1	Yes	N2
2	No	N2
88	Refused	N2
99	Don't know	N2

N2 Did your organization make the decision to install this new VFD(s) before after, or at the same time as you became aware that rebates [IF NEEDED: to reduce the cost of the measure] were available through the PROGRAM?

1	Before	N3a
2	After	N3a
3	Same time	N3a
88	Refused	N3a
99	Don't know	N3a

Next, I'm going to ask you to rate the importance of the program as well as other factors that might have influenced your decision to install the VFD(s). There are many equipment features that you may consider in your purchase decisions other than energy efficiency. These might include such features as the performance of the equipment or how necessary it is for current operations. However, in the following questions, we are interested specifically in how the program might or might not have affected your decisions about the energy efficiency of the equipment. That is, we are interested in what influenced you to choose the VFD(s) you did rather than a other flow control options. Using a scale of 0 to 10 where 0 means not at all important and 10 means extremely important, how would you rate the importance of...

DISPLAY

N3a The age or condition of the old equipment

#	Record 0 to 10 score ()	N3b
66	Equipment is new, no old equipment	N3b
88	Refused	N3b
99	Don't know	N3b

N3b Availability of the PROGRAM rebate [IF NEEDED: to reduce the cost of the measure]

#	Record 0 to 10 score ()	N3d
88	Refused	N3d
99	Don't know	N3d



If V1 = 1 THEN ASK; ELSE SKIP TO N3e

N3d Recommendation from an equipment vendor that sold you the equipment and/or installed it for you

#	Record 0 to 10 score ()	N3e
88	Refused	N3e
99	Don't know	N3e

N3e Your previous experience with similar types of energy efficient projects?

#	Record 0 to 10 score ()	N3f
88	Refused	N3f
99	Don't know	N3f

N3f Your previous experience with <%UTILITY>'s program or a similar utility program?

#	Record 0 to 10 score ()	N3h
88	Don't know	N3h
99	Refused	N3h

N3h Information from the Program, Utility, or Program Administrator Marketing materials?

#	Record 0 to 10 score ()	N3j
88	Refused	N3j
99	Don't know	N3j

N3j Standard practice in your business/industry

#	Record 0 to 10 score ()	N3l
88	Refused	N3l
99	Don't know	N3l

N3l Endorsement or recommendation by your account rep?

#	Record 0 to 10 score ()	N3m
88	Refused	N3m
99	Don't know	N3m

N3m Corporate policy or guidelines

#	Record 0 to 10 score ()	N3n
88	Refused	N3n
99	Don't know	N3n

N3n Payback or return on investment of installing the VFD(s)

#	Record 0 to 10 score ()	N3o
88	Refused	N3o
99	Don't know	N3o

N3o Improved product quality

#	Record 0 to 10 score ()	N3r
88	Refused	N3r
99	Don't know	N3r

N3r Compliance with your business's normal irrigation or equipment replacement practices?

#	Record 0 to 10 score ()	N3s
88	Refused	N3s
99	Don't know	N3s

N3s Were there any other factors we haven't discussed that were influential in your decision to install VFD(s)?

1	Nothing else influential	P1
77	Record verbatim	N3ss
88	Refused	P1
99	Don't know	P1

ASK IF N3s = 77

N3ss Using the same zero to 10 scale, how would you rate the influence of this factor?

#	Record 0 to 10 score ()	P1
88	Refused	P1
99	Don't know	P1

PAYBACK BATTERY

ASK P1 if N3n >=7; else SKIP to N41 (including the DISPLAY before N41)

What financial calculations does your business typically make before proceeding with the installation of energy efficient equipment like the VFD(s) you installed through the program?

P1

1	Payback	P2A
2	Return on investment	P2B
77	Record VERBATIM	P3
88	Don't know	P3
99	Refused	P3

What is your threshold in terms of the payback or return on investment your company uses before deciding to proceed with installing energy efficient equipment like the VFD(s) you installed through the program? Is it...

P2A

1	0 to 6 months	P3
2	6 months to 1 year	P3
3	1 to 2 years	P3
4	2 to 3 years	P3
5	3 to 5 years	P3
6	Over 5 years	P3
88	Don't know	P3
99	Refused	P3

P2B What is your ROI?

1	Record ROI ;	P3
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Did the rebate move your energy efficient equipment project within this acceptable range?

P3

1	Yes	P4
2	No	N41
88	Don't know	N41
99	Refused	N41

If P3 = 1 THEN ASK; ELSE SKIP TO P3A

On a scale of 0 to 10, with a zero meaning NOT AT ALL IMPORTANT and 10 meaning Very Important, how important in your decision was it that the project was in the acceptable range?

P4

#	Record 0 to 10 score ()	N41
88	Refused	N41
99	Don't know	N41

DISPLAY

Next, with regard to your decision to install the VFD(s) *instead of either less energy efficient or standard efficiency equipment*, I would like you to rate the importance of the PROGRAM as opposed to other Non-program factors that may have influenced your decision.

BELOW List the following items if they received a rating of 7 or higher

IF there are at least 1 program and 1 nonprogram factor, then say:

“Program-related factors include:”

<%N3B> Availability of the PROGRAM rebate	List if N3b>=7
<%N3H> Information from the Program, Utility, or Program Administrator Marketing materials	List if N3h>=7
<%N3L> Endorsement or recommendation by your account rep?	List if N3L>=7

“And Non-Program factors include:”

<%N3E> Previous experience with this measure	List if N3e>=7
<%N3F> Previous experience with this program	List if N3f>=7
<%N3J> Standard practice in your business/industry	List if N3j>=7
<%N3M> Corporate policy or guidelines	List if N3m>=7
<%N3O> To improve product quality	List if N3o>=7
<%N3R> Compliance with your business's normal irrigation or equipment replacement practices	List if N3r>=7



DISPLAY If you were given 10 points to award in total, how many points would you give to the importance of the program and how many points would you give to these other non-program factors in choosing to install VFD(s) rather than alternative flow controls?

N41 How many of the ten points would you give to the importance of the PROGRAM in your decision?

#	Record 0 to 10 score ()	N42
88	Refused	N42
99	Don't know	N42

N42 and how many points would you give to all of these other non-program factors?

#	Record 0 to 10 score ()	N41P
88	Refused	N41P
99	Don't know	N41P

If N41 < 88 and N41 < 99 and N42 < 88 and N42 < 99, compute N41 + N42.

While N41+N42 < 10, display:

__ We want these two sets of numbers to equal 10.

<%N41> for Program influence and

<%N42> for Non Program factors

DISPLAY Next, I would like for you to consider the importance of the PROGRAM in your decision to install the VFD(s) *at the time you did* rather than waiting to install new equipment sometime in the future, regardless of the type of flow controls you selected. Please rate the importance of the program on this timing decision as opposed to other non-program factors that may have influenced your decision.

If Needed - else skip...

If you were given 10 points to award in total, how many points would you give to the importance of the program and how many points would you give to these other non-program factors in your decision to install the VFD(s) at the time you did rather than waiting to install new flow controls sometime in the future.

N41P How many of the ten points would you give to the importance of the PROGRAM in your decision TO INSTALL THE VFD(s) AT THE TIME YOU DID?

#	Record 0 to 10 score ()	N42P
88	Refused	N42P
99	Don't know	N42P

N42P and how many points would you give to all of these other non-program factors?

#	Record 0 to 10 score ()	REPLACE
88	Refused	REPLACE
99	Don't know	REPLACE

If N41P < 88 and N41P < 99 and N42P < 88 and N42P < 99, compute N41P + N42P. While N41P+N42P < 10, display:

__ We want these two sets of numbers to equal 10.

<%N41P> for Program influence and

<%N42P> for Non Program factors

ASK ALL

REPLACE Was the installation of this the VFD(s) a replacement of existing equipment or does the VFD/do the VFDs serve a new irrigation pump/new irrigation pumps?

1	Replace/Modification/Retrofit	DISPLAY
2	Add-on	DISPLAY
88	Refused	DISPLAY
99	Don't know	DISPLAY

DISPLAY Now I would like you to think about the action you would have taken with regard to the installation of this equipment if the program had not been available.

IF REPLACE(1) Then Ask N5; Else Skip to N5aa

Using a likelihood scale from 0 to 10, where 0 is not at all likely and 10 is extremely likely, if THE PROGRAM had NOT BEEN AVAILABLE, what is the likelihood that you would have installed exactly the same program-qualifying VFD(s) that you did for this project regardless of when you would have installed it?

N5

#	Record 0 to 10 score ()	N5B
88	Refused	N5B
99	Don't know	N5B



N5b Using the same scale as before, if the program had not been available, what is the likelihood that you would have done this project at the same time as you did?

#	Record 0 to 10 score ()	N6
88	Refused	N6
99	Don't know	N6

IF REPLACE(2) THEN ASK; ELSE SKIP TO N6

N5aa Using a likelihood scale from 0 to 10, where 0 is Not at all likely and 10 is Extremely likely, if THE PROGRAM had NOT BEEN AVAILABLE, what is the likelihood that you would have installed exactly the same VFD(s) at the same time as you did?

#	Record 0 to 10 score ()	N6
88	Don't know	N6
99	Refused	N6

ADDITIONAL BASELINE INPUT

N6 Now I would like you to think one last time about what action you would have taken if the program had not been available. Which of the following alternatives would you have been MOST likely to do?

1	Install fewer VFDs	N6aa
2	Install standard efficiency equipment or whatever is required by code	N6aa
3	Installed equipment more efficient than code but less efficient than what you installed through the program	N6aa
4	Done nothing (keep existing equipment as is)	N6ba
5	Done the same thing I would have done as I did through the program	N6aa
6	Repair/rewind or overhaul the existing equipment	N6a
77	Something else (specify what)	N6ca
88	Don't know	N6ca
99	Refused	N6ca

If N6 = 1,2,3,5 ASK, ELSE N6ba

N6aa Would you have [FILL IN RESPONSE TO N6 for N6 = 1,2, 3, 5] at the same time as you did under the program, within a year, or at a later time?

1	Same time	N6a
2	Within one year	N6a
3	At a later time	N6ab
88	Don't know	N6a
99	Refused	N6a

N6ab How many years later would it have been?

77	Record VERBATIM	N6a
88	Don't know	N6ac
99	Refused	N6a

N6ac Would it have been....

1	Less than one year	N6a
2	About a year	N6a
3	A couple of years	N6a
4	A few years	N6a
5	More than four years	N6a
88	Don't know	N6a
99	Refused	N6a

If N6 = 4 THEN ASK, ELSE N6ca

N6ba How long would you have waited to replace your equipment?

1	Less than one year	N6a
2	About a year	N6a
3	A couple of years	N6a
4	A few years	N6a
5	More than four years	N6a
88	Don't know	N6a
99	Refused	N6a

IF N6=77, 88, 99 THEN ASK, ELSE N6a

Would you still have replaced your equipment at the same time as you did under the program, within a year, or at a later time?

N6ca

1	Same time	N6a
2	Within one year	N6a
3	At a later time	N6cb
88	Don't know	N6a
99	Refused	N6a

N6cb How many years later would it have been?

77	Record VERBATIM	N6a
88	Don't know	N6cc
99	Refused	N6a

N6cc Would it have been...

1	Less than one year	N6a
2	About a year	N6a
3	A couple of years	N6a
4	A few years	N6a
5	More than four years	N6a
88	Don't know	N6a
99	Refused	N6a

Ask if N6(1) else skip to N6b;

How many fewer VFDs would you have installed? (It is okay to take an answer such as ...HALF...or 10 percent fewer ... etc.)

N6a

77	RECORD VERBATIM	ER2
88	Refused	ER2
99	Refused	ER2

Ask if N6(3) else skip to N6C

Can you tell me what model or efficiency level you were considering as an alternative? (It is okay to take an answer such as ... 10 percent more efficient than code or 10 percent less efficient than the program equipment)

N6b

77	RECORD VERBATIM	ER2
88	Don't know	ER2
99	Refused	ER2

Ask if N6(6) else skip to ER2

N6c How long do you think the repaired equipment would have lasted before requiring replacement?

77	RECORD VERBATIM	ER2
88	Don't know	ER2
99	Refused	ER2

EARLY REPLACEMENT BATTERY
IF REPLACE(1) AND N6c IS UNRECORDED;

How many more years do you think the VFD(s) would have gone before failing and requiring replacement?

ER2

77	Estimated Remaining Useful Life (in years)	ER6
88	Don't know	ER6
99	Refused	ER6

IF AA3 = 4, THEN ASK

ER6 How much downtime did you experience in the past year?

77	Downtime Estimate (in weeks)	ER9
88	Don't know	ER9
99	Refused	ER9

ER9 In your opinion, based on the economics of operating this equipment, for how many more years could you have kept this equipment functioning?

Yrs	Estimated Remaining Useful Life	ER15
88	Don't know	ER15
99	Refused	ER15

IF AA3 = 8, THEN ASK

ER15 Can you briefly describe the specific code/regulatory requirements that this project addressed?

77	RECORD VERBATIM	ER19
88	Don't know	ER19
99	Refused	ER19

IF AA3 = 10, THEN ASK

Can you briefly describe the specific company policies regarding regular/normal maintenance/replacement policy(ies) that were relevant to this project? Or briefly describe the specific company policies regarding regular equipment retrofits and remodeling?

ER19

77	RECORD VERBATIM	Vendor name
88	Don't know	Vendor name
99	Refused	Vendor name

Ask if V1(1)

Earlier you stated that you had a vendor/contractor that helped you with the installation of the VFD(s) that was/were installed through the <%UTILITY> Program. Could you provide me with their name and phone number?

Vendor Name

1	Cannot provide	MoreVFDs
77	Record Name, Phone Number, Email Address or any other information they can provide. More is better.	MoreVFDs
88	Refused	MoreVFDs
99	Don't know	MoreVFDs

ASK IF MORE THAN 2 PUMPS PER FARMID, ELSE GO TO END

MoreVFDs In addition to the VFD installation(s) we described earlier, according to our records your business installed additional VFDs in 2019 through <%Utility>'s energy efficiency programs.

This includes....

<%MEASURE_3> on <MEASURE_3_DATE>

AND IF NEEDED: and a.....

<%MEASURE_4> on <MEASURE_4_DATE>

AND IF NEEDED: and a.....

<%MEASURE_x> on <MEASURE_x_DATE>

And thinking about the decision making to install the VFD measures that you just shared with us, do you think the answers you provided generally apply to the additional VFD installation(s)?

1	Yes	END
2	No	END
3	Other, record verbatim	END
99	Don't know/refused	END

END	Those are all the questions I have for you today. On behalf of the CPUC, I would like to thank you very much for your kind cooperation. Have a good day.	
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APPENDIX C:

VENDOR NTG PHONE SURVEY

Vendor NTG Survey Instrument – Tankless Water Heaters

Introduction

AA1 This is <% Interviewer? calling on behalf of the CPUC [California Public Utilities Commission] from <<ERS>> regarding your firm's involvement with the sales and/or installations of ...<Tankless Water Heaters>... through ...<UTILITY'S Commercial Deemed Incentive PROGRAM> ... between January 1, 2019 and December 31, 2019. Our records indicate that ...<%CONTACT>... would be the person most knowledgeable about this. Are they available?

- 1 Yes A2
- 2 No AA2

AA2 Who would be the person most knowledgeable about your firm's involvement with ...<UTILITY'S Commercial Deemed Incentive PROGRAM> during 2019?

- 1 Record name and start over

A1 <%UTILITY>... has indicated that your firm implements the <%Commercial Deemed Incentives PROGRAM> and was involved in selling and/or installing energy-efficient...<%Tankless WHs> throughout their service territory during 2019. Is this correct?

- 1 Yes A1.1
- 2 No Thank and Terminate

[DO NOT READ: The following question will determine if we ask about influences on their recommendations. Please be sure to be thorough with this question. If they truly only installed this equipment, then a "No" is fine]

A1.2 Great, we are trying to understand the water heater market in general. This includes standard and energy efficient models. Can you please give us a quick overview of the types of water heaters that you stock for Commercial customers?

RECORD ANSWER HERE:

A2 According to <%UTILITY>, your firm promotes and sells program-qualifying tankless water heaters through the <%UTILITY> Commercial Deemed Incentives Program. Is that correct??

- 1 Yes A3
- 2 No A11

[READ: Throughout the remainder of this survey, for the sake of brevity, I'm going to refer to the program qualifying equipment that you sell as "Tankless Water Heaters".]

The focus of this survey is on your business' sales and promotional practices of <% Tankless Water Heaters> **before** the COVID-19 shutdown. Please answer the following questions based on your business' approach during 2019; that is, before the COVID-19 shutdown.

A3 Now, I'm going to ask you about the various strategies you might have used to sell program-qualified Tankless Water Heaters. Please indicate which ones you have used. [READ]

- ☐ Upsell contractors to purchase program-qualified units
- ☐ Upsell customers to purchase program-qualified units
- ☐ Conduct training workshops for contractors

- ___ Increase marketing of program-qualified units
- ___ Reduce the prices of program-qualified units
- ___ Increase the stocking or assortment of program-qualified units
- ___ Increase signage on sales floor
- ___ Discuss the benefits of program-qualified units with contractors
- ___ Discuss the benefits of program-qualified units with customers
- ___ Other (Please describe: _____)

Next, I am going to ask you to rate the importance of the various UTILITY PROGRAM and NON-PROGRAM factors in influencing your decision to recommend Tankless Water Heaters to contractors and your other customers. Think of the degree of importance as being shown on a scale with equally spaced units from 0 to 10, where 0 means not at all important and 10 means very important, so that an importance rating of 8 shows twice as much influence as a rating of 4.

A4 Using this 0-to-10 scale, please rate the following in terms of their importance in your **decision to recommend** Tankless Water Heaters to contractors and your other customers.

(Do not read – note that these are the program factors)

- | | |
|---------------------------------------------|------------------------------|
| a. Program incentive | Record 0 to 10 score (_____) |
| b. Program promotional materials | Record 0 to 10 score (_____) |
| c. Program-provided training of sales staff | Record 0 to 10 score (_____) |
| d. Information from <%UTILITY> website | Record 0 to 10 score (_____) |

(Do not read – note that these are the non-program factors)

- | | |
|--------------------------------------------------------------------------------|------------------------------|
| e. Increased awareness of Tankless WH benefits among contractors and customers | Record 0 to 10 score (_____) |
|--------------------------------------------------------------------------------|------------------------------|

- f. Reduced Tankless WH prices from Manufacturers
Record 0 to 10 score (_____)
- g. Availability of manufacturers' promotional rebates/spiffs
Record 0 to 10 score (_____)
- h. Information about the cost-effectiveness of more efficient units
Record 0 to 10 score (_____)
- i. Increased stocking of high-efficiency Tankless WH Record 0 to 10 score (_____)
- j. Past participation in <%UTILITY> rebate or audit program
Record 0 to 10 score (_____)

A4a. Was there another way the <Commercial Deemed Incentive Program> influenced your recommendations regarding your promotion of program-qualified Tankless Water Heaters?

RECORD ANSWER HERE:

A4aa. Using a 0 to 10 scale, how important was this factor's influence on your Tankless WH recommendations?

Record 0 to 10 score (_____) A5

Next, I am going to ask you to rate the importance of the <Commercial Deemed Incentive Program> in general in influencing your decision to recommend Tankless Water Heaters to <%UTILITY> contractors and customers.

A5 Using this 0 to 10 scale where 0 is NOT AT ALL IMPORTANT and 10 is EXTREMELY IMPORTANT, how important was the <Commercial Deemed Incentive Program>, including incentives as well as program services and information, in influencing your decision to recommend that <%UTILITY> contractors and customers purchase the energy efficiency Tankless water heaters at this time?

Record 0 to 10 value (_____) A5a

Next, I would like you to rate the importance of the PROGRAM FACTORS as a group in your decision to implement these sales strategies as opposed to other NON-PROGRAM FACTORS as a group that might have influenced your decision.

Program factors include: [READ IN A MINIMUM OF TWO PROGRAM FACTORS, SELECTED BY CHOOSING THOSE THAT RECEIVED THE HIGHEST TWO SCORES AMONG ALL PROGRAM COMPONENTS IN THE PROGRAM COMPONENTS SECTION]

Non-program factors include: [READ IN A MINIMUM OF TWO NON-PROGRAM FACTORS, SELECTED BY CHOOSING THOSE THAT RECEIVED THE HIGHEST TWO SCORES AMONG ALL NON-PROGRAM COMPONENTS IN THE PROGRAM COMPONENTS SECTION.]

A5a. Now, if you were given 10 points to award in total, how many points would give to the importance of the program factors as a group and how many points would you give to the non-program factors as a group?

Program Factors Record 0 to 10 score (_____) A6

Non-Program Factors Record 0 to 10 score (_____) A6

A6 And using a 0-to-10 likelihood scale where 0 is NOT AT ALL LIKELY and 10 is EXTREMELY LIKELY, if the Commercial Deemed Incentive Program, including incentives as well as program

services and information, had not been available, what is the likelihood that you would have recommended this specific **Tankless water heater** measure to <%UTILITY>'s contractors and customers?

Record 0 to 10 score (_____) A7

A7 Approximately, in what percent of sales situations did you recommend this **Tankless water heater** MEASURE before you learned about the **Commercial Deemed Incentive Program**?

% Record PERCENTAGE A8

A8 And approximately in what percent of sales situations do you recommend this **Tankless water heater** MEASURE now that you have worked with the **Commercial Deemed Incentive Program**?

% Record PERCENTAGE A9

A9 And what role, if any, has the <%UTILITY>'s **Commercial Deemed Incentive Program** played in increasing your recommendations of **Tankless Water Heaters** since you began working with the **Commercial Deemed Incentive Program**?

RECORD ANSWER HERE:

A10 Approximately, what percentage of your sales over the last 12 months of this **Tankless Water Heater** installed in <%UTILITY>'s service territory are energy efficient models that qualify for incentives from the program?

% Record PERCENTAGE A11

A11 On a 0 to 100 percent scale, in what percent of sales situations do you encourage your contractors and customers in <%UTILITY>'s territory to purchase program qualifying **tankless water heaters**?

% Record PERCENTAGE A11a

IF A11 << 100;

A11a In what situations do you NOT encourage your contractors and customers to purchase energy efficient **tankless water heaters** if they qualify for a rebate? Why is that?

RECORD ANSWER HERE:

A12 Of those installations of **Tankless water heaters** in <%UTILITY>'s service territory that qualify for incentives, approximately what percentage do not receive the incentive?

RECORD ANSWER HERE:

IF A12 >> 0;

A13 Why do you think they do not receive the incentive?

RECORD ANSWER HERE:

A14 Do you also sell **Tankless water heaters** in areas where contractors and other customers do not have access to incentives for energy efficient models?

1 Yes A14A

2 No A16



A14a. And what role, if any, have the California utilities' rebate programs played in your decision to promote and sell Tankless Water Heaters in areas where contractors/customers do not have access to incentives for energy efficient models?

RECORD ANSWER HERE:

A15 About what percent of your sales of **Tankless water heaters** are represented by these areas where incentives are not offered?

RECORD ANSWER HERE:

IF A15 > 10% & A15 < 100%;

A15a And approximately what percentage of your sales of **Tankless water heaters** in these areas are the energy efficient models that would qualify for incentives in <%UTILITY>'s service territory?

RECORD ANSWER HERE:

A16 Have you changed your stocking practices as a result of the <%UTILITY> Program?

1 Yes A16a

2 No A17

A16a How so?

RECORD ANSWER HERE:



IF A14=1

A17 Do you promote energy efficient **Tankless water heaters** equally in areas with and without incentives?

1 Yes A18

2 No A18

A18 For the commercial program, we are trying to better understand the flow of benefits to distributors, contractors and customers. We understand that the Utility provides the incentives to you the distributor. How do your contractors and/or customers receive these benefits?

RECORD ANSWER HERE:

END Those are all the questions I have for you today. Thank you very much for your time.

END OF SURVEY

APPENDIX D:

GROSS IMPACT DATA COLLECTION

FORMS

This appendix includes the data collection forms used for each of the measures included in this evaluation:

- Process Ozone Laundry
- Process Pumping Variable Speed Drives (VFDs)
- Agricultural Irrigation
- Tankless Water Heaters

D-1 PROCESS OZONE LAUNDRY

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Project Information		
IOU		
ApplicationCode or ProjectID		
Program ID		
Program Name		
Point of Sale Purchase?		
IOU Claim ID(s)	Measure 1:	
	Measure 2:	
IOU Measure Description	Measure 1:	Put units from tracking system below
	Measure 2:	<Normalizing Unit>
Number of Units Installed (connected washing machine capacity)	Measure 1:	Pounds of material processed
	Measure 2:	Pounds of material processed
Project Application Date		
Project Installation Date		Engineer update below as needed [ENTER]:
Business Name		
Business Street Address		
Business City		
Facility Contact Name		
Facility Contact Phone Number		
Facility Contact E-mail Address		
Corporate Contact Name		
Corporate Contact Phone Number		
Corporate Contact E-mail Address		
Vendor Business Name		
Vendor Contact Name		
Vendor Contact Phone Number		
Vendor Contact E-mail Address		
Site Information		
Assigned Engineer Name		
Assigned Engineer Firm		
Customer Rep. Agrees to Take Pictures Y/N		
Engineer E-Mail Address to Send Pictures		
Site Visit Consent Granted Y/N		
Date of First On-Site Visit		
Utility Meter Information		
Account Number from Tracking Data		Engineer update below as needed [ENTER]:
Measure 1:		
Measure 2:		

Recruitment Checklist

Application # _____

Meeting	
Location of Meeting	
Directions to Meeting Spot	
Date of Meeting	
Time of Meeting	
Site Contact Name	
Site Contact Phone Number	
Site Contact E-mail	
O3 Laundry Controls Information	
Is there a central control system for the laundry area?	
Do you log information about laundry loads processed (dry weight, lbs/ wash,	
Can you share that with us?	
A full month of pre-retrofit and post-retrofit laundry load dry weight information is ideal	
Do you log information about water consumption (could be utility bills, etc.)?	
Can you share that with us? A full month's data would be ideal	
Decision Maker Contact Information	
Explain that we are also interested in a separate conversation with the project decision maker that ultimately made the facility choice to purchase ozone laundry equipment (likely someone at corporate unless a smaller independent operation)	
Decision maker name	
Decision maker telephone number(s)	
Decision maker e-mail	
Best time to reach or schedule an appointment	
Project Information Requested from Participants	
Describe how facility operations and laundry in particular has been affected by COVID	
How long has your business been in operation at this location?	
Besides the new ozone laundry installation are there other changes to the facility since 2018 that might account for changes in natural gas usage at the facility? If so, describe:	

Business Activity

Application # _____

[Circle One Below]	What is the main business ACTIVITY at this facility?
1	Offices (non-medical)
2	Restaurant/Food Service
3	Food Store (grocery/liquor/convenience)
4	Agricultural (farms, greenhouses)
5	Retail Stores
6	Warehouse
7	Health Care
8	Education
9	Lodging (hotel/rooms)
10	Public Assembly (church, fitness, theatre, library, museum, convention)
11	Services (hair, nail, massage, spa, gas, repair)
12	Industrial (food processing plant, manufacturing)
13	Laundry (Coin Operated, Commercial Laundry Facility, Dry Cleaner)
14	Condo Assoc./Apartment Mgr (Garden Style, Mobile Home Park, High-rise, Townhouse)
15	Public Service (fire/police/postal/military)
77	Other / Record Business Activity [ENTER] =====>

Provide additional comments as needed [ENTER] =====>

Provide specifics on activity [ENTER] =====>
(i.e., industrial bakery or commercial greenhouse)

Short NTG Battery

(page 1 of 4)

Application # _____

<=== Enter Application Code

[Answer for Measure #1]**[Answer for Measure #2]**

Now we'd like to ask you some questions about your decision to purchase your ozone laundry equipment. Specifically, we are interested in why you chose to install ozone laundry equipment. First, did your organization make the decision to install ozone laundry equipment before, after, or at the same time as you became aware that rebates were available through the PROGRAM? [IF NEEDED: to reduce the cost of the measure]

[Circle One Entry]**[Circle One Entry]**

First, did your organization make the decision to install ozone laundry equipment before, after, or at the same time as you became aware that rebates were available through the PROGRAM? [IF NEEDED: to reduce the cost of the measure]

1	Before	1	Before
2	After	2	After
3	Same time	3	Same time
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

[Ask ALL]**[Answer for Measure #1]****[Answer for Measure #2]**

I'd like you to consider the importance of the program and all program related factors such as the program rebate; and the program information and recommendations you have received from your utility, account representative and program administrator. We are interested in how these program related factors affected your decision about the ozone laundry equipment you installed. That is, we are interested in what influenced you to choose to install ozone laundry equipment.

Using a scale of 0 to 10 where 0 means not at all important and 10 means extremely important, how would you rate the importance of these program related factors.

(Enter Score)**(Enter Score)**

Using a scale of 0 to 10 where 0 means not at all important and 10 means extremely important, how would you rate the importance of these program related factors.

#	Record 0 to 10 score _____	#	Record 0 to 10 score _____
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Short NTG Battery

(page 2 of 4)

Application # _____

<=== Enter Application Code

[Ask ALL]

[Answer for Measure #1]

[Answer for Measure #2]

Now I'd like you to consider a number of factors I will call the "non-program factors". These include reasons unrelated to the program that may have influenced you to choose to install ozone laundry equipment, such as choosing your equipment ...

because it was standard practice in your industry,
because of previous experience with similar equipment,
because of corporate policies or guidelines,
or other reasons that were not related to the program

Using the same scale of 0 to 10 where 0

means not at all important and 10

[Enter Score] means extremely important, how would you rate the importance of these "non-program" factors.

[Enter Score]

Using the same scale of 0 to 10 where 0 means not at all important and 10 means extremely important, how would you rate the importance of these "non-program" factors.

#	Record 0 to 10 score _____	#	Record 0 to 10 score _____
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

[Ask ALL]

[Answer for Measure #1]

[Answer for Measure #2]

Next, I would like you to compare the importance of the program related factors to the other Non-program factors that may have influenced your decision.

If you were given 10 points to award in total, how many points would you give to the importance of the program related factors versus the other non-program factors in choosing to install ozone laundry equipment?

[Enter Score] How many of the ten points would you give to the importance of the PROGRAM factors in your decision?

[Enter Score]

How many of the ten points would you give to the importance of the PROGRAM factors in your decision?

#	Record 0 to 10 score _____	#	Record 0 to 10 score _____
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Short NTG Battery

(page 3 of 4)

Application # _____		<=== Enter Application Code	
[Ask ALL]			
[Answer for Measure #1] Using a likelihood scale from 0 to 10, where 0 is not at all likely and 10 is extremely likely, if THE PROGRAM had NOT BEEN AVAILABLE, what is the likelihood that you would have installed exactly the same program-qualifying ozone laundry equipment that you did for this project, regardless of when you would have installed it?		[Answer for Measure #2] Using a likelihood scale from 0 to 10, where 0 is not at all likely and 10 is extremely likely, if THE PROGRAM had NOT BEEN AVAILABLE, what is the likelihood that you would have installed exactly the same program-qualifying ozone laundry equipment that you did for this project, regardless of when you would have installed it?	
[Enter Score]		[Enter Score]	

#	Record 0 to 10 score _____	#	Record 0 to 10 score _____
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

[Ask ALL]			
[Answer for Measure #1] Now I would like you to think about what action you would have taken if the program had not been available. Which of the following alternatives would you have been MOST likely to do if the program had not been available?		[Answer for Measure #2] Which of the following alternatives would you have been MOST likely to do if the program had not been available?	
(Circle One Entry)		(Circle One Entry)	

1	Waited longer to install ozone laundry equipment	1	Waited longer to install ozone laundry equipment
2	Install whatever is required by code	2	Install whatever is required by code
3	Install non-program qualifying ozone laundry equipment	3	Install non-program qualifying ozone laundry equipment
4	Done nothing (keep existing equipment as is)	4	Done nothing (keep existing equipment as is)
5	Installed the same ozone laundry equipment	5	Installed the same ozone laundry equipment
6	Upgrade existing laundry equipment	6	Upgrade existing laundry equipment
7	Make operation changes	7	Make operation changes
77	Something else _____ (Specify below)	77	Something else _____ (Specify below)
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

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EE Measure Installation Verification

Application # _____

[Ask ALL]

[Answer for Measure #1]

[Answer for Measure #2]

[Circle One Entry] Did you replace a previously installed ozone laundry system with a new ozone laundry system?

[Circle One Entry] Did you replace a previously installed ozone laundry system with a new ozone laundry system?

1	Yes
2	No
3	Other / Provide Related Commentary Below [ENTER]

1	Yes
2	No
3	Other / Provide Related Commentary Below [ENTER]

[If 1/yes above, then provide additional comments]
Provide additional comments to explain [ENTER] ==>

Application # _____

[Ask ALL]

[Answer for Measure #1]

[Answer for Measure #2]

[Circle One Entry] Is the newly installed Ozone laundry system operable at this time?

[Circle One Entry] Is the newly installed Ozone laundry system operable at this time?

1	Yes
2	No
3	Other / Provide Related Commentary Below [ENTER]

1	Yes
2	No
3	Other / Provide Related Commentary Below [ENTER]

[If 2/No above, then provide additional comments]
Provide additional comments to explain [ENTER] ==>

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[Ask ALL]

[Answer for Measure #1]

[Circle One Entry]

Do you ever reset the temperature or bypass Ozone laundry use for certain wash cycles?

1	Yes
2	No
3	Other / Provide Related Commentary Below [ENTER]

[If 1/Yes above, then provide additional comments]

Provide additional comments to explain [ENTER] ==>
Including frequency or percentage of loads
and specify unique operating conditions
relative to normal/typical loads

[Answer for Measure #2]

[Circle One Entry]

Do you ever reset the temperature or bypass Ozone laundry use for certain wash cycles?

1	Yes
2	No
3	Other / Provide Related Commentary Below [ENTER]

Application # _____

[Ask ALL]

[Answer for Measure #1]

[Write Down Response]

Record Make, Model and Other Equipment Specifications

1	Make _____
2	Model _____
3	Rated Washer Capacity _____ pounds
4	Take and send pictures?
5	Maximum Flow Rate _____ gpm

Provide additional comments as needed below

[Answer for Measure #2]

[Write Down Response]

Record Make, Model and Other Equipment Specifications

1	Make _____
2	Model _____
3	Rated Washer Capacity _____ pounds
4	Take and send pictures?
5	Maximum Flow Rate _____ gpm

Provide additional comments as needed below

Post-Installation Washing Machines and Wash Cycles

Application # _____

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Circle One Entry)	How many washing machines are served by the ozone machine?	(Circle One Entry)	How many washing machines are served by the ozone machine?
1	_____ washing machines	1	_____ washing machines
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
	_____		_____
	_____		_____
	_____		_____
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
[Write Down Response]	Record Make, Model and Other Washing Machine Specifications	[Write Down Response]	Record Make, Model and Other Washing Machine Specifications
1	Make _____	1	Make _____
2	Model _____	2	Model _____
3	Rated Capacity _____ pounds dry weight laundry	3	Rated Capacity _____ pounds dry weight laundry
4	Modified Energy Factor _____ MEF	4	Modified Energy Factor _____ MEF
5	Take and send pictures	5	Take and send pictures
6	Front or top loading? _____	6	Front or top loading? _____
Provide additional comments as needed below		Provide additional comments as needed below	
_____		_____	
_____		_____	
_____		_____	
_____		_____	

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Write down response)	What is the capacity of the average clothes washing machine, expressed in pounds of dry weight laundry? Alternatively, what is the volume of the average washing machine in cubic feet of capacity?	(Write down response)	What is the capacity of the average clothes washing machine, expressed in pounds of dry weight laundry? Alternatively, what is the volume of the average washing machine in cubic feet of capacity?
1	_____ pounds dry weight laundry	1	_____ pounds dry weight laundry
2	_____ cubic feet	2	_____ cubic feet
	_____		_____
	_____		_____
	_____		_____
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask ALL]

[Answer for Measure #1]

[Answer for Measure #2]

Approximately what percentage of washing machine capacity is used on average per wash cycle (now)? [GET BEST ESTIMATE]

(Circle One Entry)

(Circle One Entry)

Approximately what percentage of washing machine capacity is used on average per wash cycle (now)? [GET BEST ESTIMATE]

1	_____ %	1	_____ %
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask ALL]

[Answer for Measure #1]

[Answer for Measure #2]

During the detergent/washing stage of each wash cycle is the water cold, warm or hot (now)? [GET BEST ESTIMATE]

(Circle One Entry)

(Circle One Entry)

During the detergent/washing stage of each wash cycle is the water cold, warm or hot (now)? [GET BEST ESTIMATE]

1	Cold	1	Cold
2	Warm	2	Warm
3	Hot	3	Hot
4	Water Temperature _____ Deg F	4	Water Temperature _____ Deg F
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

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[Ask ALL]

[Answer for Measure #1]

(Circle One Entry)

During the rinsing stage of each wash cycle is the water cold, warm or hot (now)? [GET BEST ESTIMATE]

[Answer for Measure #2]

(Circle One Entry)

During the rinsing stage of each wash cycle is the water cold, warm or hot (now)? [GET BEST ESTIMATE]

1	Cold	1	Cold
2	Warm	2	Warm
3	Hot	3	Hot
4	Water Temperature _____ Deg F	4	Water Temperature _____ Deg F
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask ALL]

[Answer for Measure #1]

(Circle One Entry)

Approximately how many gallons of hot water are consumed per wash cycle (now)? [GET BEST ESTIMATE]

[Answer for Measure #2]

(Circle One Entry)

Approximately how many gallons of hot water are consumed per wash cycle (now)? [GET BEST ESTIMATE]

1	Gals of hot water consumed: _____ gallons	1	Gals of hot water consumed: _____ gallons
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

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[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Circle One Entry)	What is the hot water temperature setpoint of the boiler or other water heating system that feeds the ozone laundry system/washers (now)? [GET BEST ESTIMATE]	(Circle One Entry)	What is the hot water temperature setpoint of the boiler or other water heating system that feeds the ozone laundry system/washers (now)? [GET BEST ESTIMATE]
1	Hot water temperature: _____ deg. F	1	Hot water temperature: _____ deg. F
2	Take and send pictures	2	Take and send pictures
3	Other / Provide Related Commentary Below:	3	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Circle One Entry)	Approximately how many cycles of laundry are washed per day across all washing machines served by this ozone laundry machine (now)?	(Circle One Entry)	Approximately how many cycles of laundry are washed per day across all washing machines served by this ozone laundry machine (now)?
1	Cycles per Day: _____ cycles	1	Cycles per Day: _____ cycles
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Circle One Entry)	Approximately how many days per week is laundry washed (now)?	(Circle One Entry)	Approximately how many days per week is laundry washed (now)?
1	Days per week: _____ days	1	Days per week: _____ days
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask ALL]

[Answer for Measure #1]

(Circle One Entry) Approximately how old is the average laundry machine in use (now)?

[Answer for Measure #2]

(Circle One Entry) Approximately how old is the average laundry machine in use (now)?

1	Age in years: _____ years	1	Age in years: _____ years
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Post-Installation Water Heating

Application # _____

[Ask ALL]

[Answer for Measure #1]

[Answer for Measure #2]

(Circle One Entry) How is water currently heated that serves the ozone laundry and washing machines?

(Circle One Entry) How is water currently heated that serves the ozone laundry and washing machines?

1	Gas boiler(s)	1	Gas boiler(s)
2	Gas storage water heater(s)	2	Gas storage water heater(s)
3	Gas Tanklless water heater(s)	3	Gas Tanklless water heater(s)
4	Take and send pictures	4	Take and send pictures
5	Other / Provide Related Commentary Below:	5	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask ALL]

[Answer for Measure #1]

[Answer for Measure #2]

[Write Down Response]

Record Make, Model and Other Water Heating Specifications

[Write Down Response]

Record Make, Model and Other Water Heating Specifications

1	Make _____	1	Make _____
2	Model _____	2	Model _____
3	Rated Capacity _____ Btu	3	Rated Capacity _____ Btu
4	Combustion efficiency _____ %	4	Combustion efficiency _____ %

Provide additional comments as needed below

Provide additional comments as needed below

Application # _____

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

[Ask ALL]

[Answer for Measure #1]

[Answer for Measure #2]

(Circle One Entry)

Approximately how old is the water heating system in use (now)?

(Circle One Entry)

Approximately how old is the water heating system in use (now)?

1	Age in years: _____ years	1	Age in years: _____ years
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask ALL]

[Answer for Measure #1]

[Answer for Measure #2]

(Circle One Entry)

Are you able to record information at this time for the <UTILITY> gas meter that serves the water heating (now)?

(Circle One Entry)

Are you able to record information at this time for the <UTILITY> gas meter that serves the water heating (now)?

1	Meter number on meter face: _____	1	Meter number on meter face: _____
2	Take and send picture of meter face?	2	Take and send picture of meter face?
3	Other / Provide Related Commentary Below:	3	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Circle All that Apply) In addition to the water heating system serving the laundry machines, are there other gas using equipment on the same <UTILITY> gas meter, such as gas space heating equipment or gas cooking equipment (now)?		(Circle All that Apply) In addition to the water heating system serving the laundry machines, are there other gas using equipment on the same <UTILITY> gas meter, such as gas space heating equipment or gas cooking equipment (now)?	
1	Other water heating equipment	1	Other water heating equipment
2	Gas space heating equipment	2	Gas space heating equipment
3	Gas cooking equipment	3	Gas cooking equipment
4	Describe other gas using equipment on <UTILITY> gas meter below:	4	Describe other gas using equipment on <UTILITY> gas meter below:
5	Water heater or boiler serving laundry is on a dedicated <UTILITY> meter	5	Water heater or boiler serving laundry is on a dedicated <UTILITY> meter
6	Other / Provide Related Commentary Below:	6	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Circle All that Apply) Does the water heating system that serves the laundry machines also provide hot water for other uses in the building (now)?		(Circle All that Apply) Does the water heating system that serves the laundry machines also provide hot water for other uses in the building (now)?	
1	Used for cleaning	1	Used for cleaning
2	Used for cooking	2	Used for cooking
3	Used for bathing	3	Used for bathing
4	Describe other hot water uses below:	4	Describe other hot water uses below:
5	Water heating system is used exclusively to serve the laundry equipment	5	Water heating system is used exclusively to serve the laundry equipment
6	Other / Provide Related Commentary Below:	6	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Pre-Installation Washing Machines and Wash Cycles

Application # _____

[Ask if washing machines where replaced at time as ozone laundry installation]
[Answer for Measure #1] [Answer for Measure #2]

(Circle One Entry)	Was the number of washing machines in operation before the installation of the ozone machine the same as current?	(Circle One Entry)	Was the number of washing machines in operation before the installation of the ozone machine the same as current?
1	Same number of washing machines	1	Same number of washing machines
2	Fewer washing machines _____ number	2	Fewer washing machines _____ number
3	More washing machines _____ number	3	More washing machines _____ number
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask if washing machines where replaced at time as ozone laundry installation]
[Answer for Measure #1] [Answer for Measure #2]

(Write down response)	What was the capacity of the average clothes washing machine, expressed in pounds of dry weight laundry (then)? Alternatively, what was the volume of the average washing machine in cubic feet of capacity (then)?	(Write down response)	What was the capacity of the average clothes washing machine, expressed in pounds of dry weight laundry (then)? Alternatively, what was the volume of the average washing machine in cubic feet of capacity (then)?
1	_____ pounds dry weight laundry	1	_____ pounds dry weight laundry
2	_____ cubic feet	2	_____ cubic feet
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

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[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
Approximately what percentage of washing machine capacity was used on average per wash cycle (then)? [GET BEST ESTIMATE]		Approximately what percentage of washing machine capacity was used on average per wash cycle (then)? [GET BEST ESTIMATE]	
(Circle One Entry)		(Circle One Entry)	
1	_____ %	1	_____ %
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>	

Application # _____

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
During the detergent/washing stage of each wash cycle was the water cold, warm or hot (then)? [GET BEST ESTIMATE]		During the detergent/washing stage of each wash cycle was the water cold, warm or hot (then)? [GET BEST ESTIMATE]	
(Circle One Entry)		(Circle One Entry)	
1	Cold	1	Cold
2	Warm	2	Warm
3	Hot	3	Hot
4	Water Temperature _____ Deg F	4	Water Temperature _____ Deg F
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>	

Application # _____

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

[Ask ALL]

[Answer for Measure #1]

(Circle One Entry)

During the rinsing stage of each wash cycle was the water cold, warm or hot (then)? [GET BEST ESTIMATE]

[Answer for Measure #2]

(Circle One Entry)

During the rinsing stage of each wash cycle was the water cold, warm or hot (then)? [GET BEST ESTIMATE]

1	Cold	1	Cold
2	Warm	2	Warm
3	Hot	3	Hot
4	Water Temperature _____ Deg F	4	Water Temperature _____ Deg F
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask ALL]

[Answer for Measure #1]

(Circle One Entry)

Approximately how many gallons of hot water were consumed per wash cycle (then)? [GET BEST ESTIMATE]

[Answer for Measure #2]

(Circle One Entry)

Approximately how many gallons of hot water were consumed per wash cycle (then)? [GET BEST ESTIMATE]

1	Gals of hot water consumed: _____ gallons	1	Gals of hot water consumed: _____ gallons
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Circle One Entry)	What was the hot water temperature setpoint of the boiler or other water heating system that fed the washing machines (then)? [GET BEST ESTIMATE]	(Circle One Entry)	What was the hot water temperature setpoint of the boiler or other water heating system that fed the washing machines (then)? [GET BEST ESTIMATE]
1	Hot water temperature: _____ deg. F	1	Hot water temperature: _____ deg. F
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>	

Application # _____

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Circle One Entry)	Approximately how many cycles of laundry were washed per day across all washing machines (then)?	(Circle One Entry)	Approximately how many cycles of laundry were washed per day across all washing machines (then)?
1	Cyles per Day: _____ cycles	1	Cyles per Day: _____ cycles
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>	

Application # _____

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Circle One Entry)	Approximately how many days per week was laundry washed (then)?	(Circle One Entry)	Approximately how many days per week was laundry washed (then)?
1	Days per week: _____ days	1	Days per week: _____ days
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know
Provide additional comments as needed [ENTER] ==>			

Pre-Installation Water Heating

Application # _____

[Ask All]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Circle One Entry)	Was the same water heating system and <UTILITY> gas meter used to supply the laundry equipment prior to ozone laundry system installation?	(Circle One Entry)	Was the same water heating system and <UTILITY> gas meter used to supply the laundry equipment prior to ozone laundry system installation?
1	Same water heating system was in place then	1	Same water heating system was in place then
2	Same <UTILITY> gas meter supplied hot water to laundry machines	2	Same <UTILITY> gas meter supplied hot water to laundry machines
3	Different -- Gas boiler(s)	3	Different -- Gas boiler(s)
4	Different -- Gas storage water heater(s)	4	Different -- Gas storage water heater(s)
5	Different -- Gas Tanklless water heater(s)	5	Different -- Gas Tanklless water heater(s)
6	Different <UTILITY> gas meter supplied hot water to laundry machines	6	Different <UTILITY> gas meter supplied hot water to laundry machines
7	Other / Provide Related Commentary Below:	7	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask if water heating system was replaced at time of ozone laundry installation]			
[Answer for Measure #1]		[Answer for Measure #2]	
[Write Down Response]	Record Previous Hot Water System Make, Model and Other Water Heating Specifications	[Write Down Response]	Record Previous Hot Water System Make, Model and Other Water Heating Specifications
1	Make _____	1	Make _____
2	Model _____	2	Model _____
3	Rated Capacity _____ Btu	3	Rated Capacity _____ Btu
4	Combustion efficiency _____ %	4	Combustion efficiency _____ %
Provide additional comments as needed below		Provide additional comments as needed below	

Application # _____

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

[Ask if water heating system was replaced at time of ozone laundry installation]

[Answer for Measure #1]

[Answer for Measure #2]

(Circle One Entry) Approximately how old was the water heating system that was replaced (then)?

(Circle One Entry) Approximately how old was the water heating system that was replaced (then)?

1	Age in years: _____ years	1	Age in years: _____ years
2	Other / Provide Related Commentary Below:	2	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Application # _____

[Ask if water heating system was replaced at time of ozone laundry installation]

[Answer for Measure #1]

[Answer for Measure #2]

(Circle One Entry) Was the replaced water heating system on the same <UTILITY> meter (then)?

(Circle One Entry) Was the replaced water heating system on the same <UTILITY> meter (then)?

1	Yes	1	Yes
2	No	2	No
3	Other / Provide Related Commentary Below:	3	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

2020 Laundry System Operation by Measure

Measure # _____

Application # _____

Month of 2020	Where there any months in 2020 with normal or typical levels of laundry use? [Check All that Apply]	For months with atypical or abnormal levels of laundry use, express laundry loads as fraction relative to normal use? [Enter Fractions]	Describe what led to these differences? [Enter Explanation]	Is laundry use by month in 2020 generally comparable with laundry use in 2019? [Check All that Apply]	For months with differing laundry use in 2020, express laundry loads as fraction relative to 2019 use? [Enter Fractions]	Is laundry use by month in 2020 generally comparable with laundry use in 2018? [Check All that Apply]	For months with differing laundry use in 2020, express laundry loads as fraction relative to 2018 use? [Enter Fractions]
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

2020 Laundry System Operation by Measure

Measure # _____

Application # _____

Month of 2020	Were there any months in 2020 with a normal or typical mix of fabric in the wash loads? [Check All that Apply]	For months with an unusual mix of fabric explain what led to these differences? [Enter Explanation]	Are you able to articulate how the fabric mix is different? [Enter Explanation]	Is the mix of fabric by month in 2020 generally comparable with the fabric mix in 2019? [Check All that Apply]	For months with differing fabric mix in 2020, describe what led to the differences relative to 2019? [Enter Explanation]	Is the mix of fabric by month in 2020 generally comparable with the fabric mix in 2018? [Check All that Apply]	For months with differing fabric mix in 2020, describe what led to the differences relative to 2018? [Enter Explanation]
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

2020 Facility Natural Gas Use

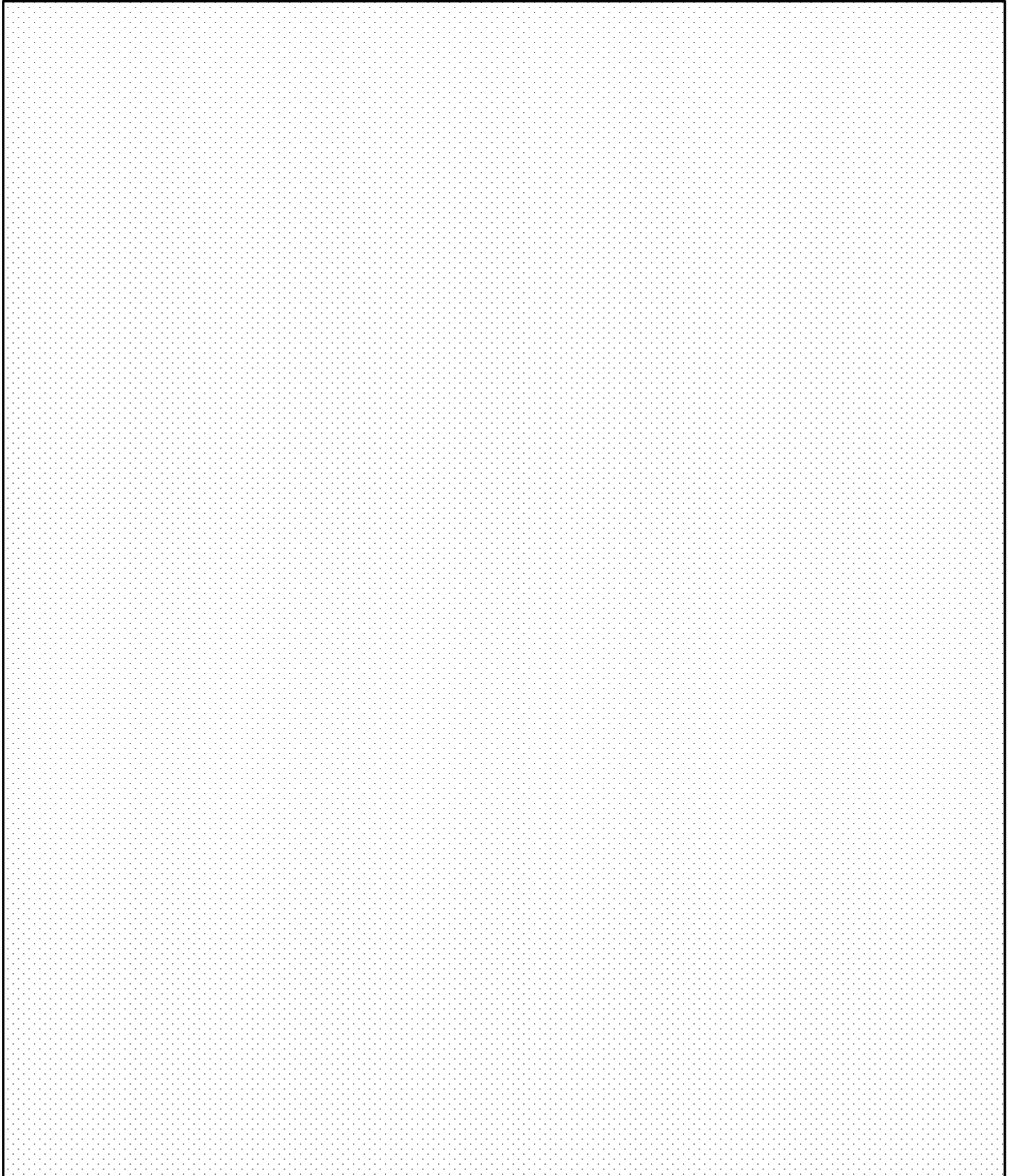
Measure # _____

Application # _____

Month of 2020	Where there any months in 2020 with normal or typical levels of natural gas use across all usage, such as cleaning, bathing, cooking, heating, etc.? [Check All that Apply]	For months with atypical or abnormal levels of natural gas use, express natural gas usage as fraction relative to normal use? [Enter Fractions]	Describe what led to these differences? [Enter Explanation]	Other than ozone laundry differences, do you think natural gas use by month in 2020 is generally comparable with natural gas use in 2019? [Check All that Apply]	For months with differing natural gas use in 2020, express natural gas use as fraction relative to 2019 use? [Enter Fractions]	Other than ozone laundry differences, do you think natural gas use by month in 2020 is generally comparable with natural gas use in 2018? [Check All that Apply]	For months with differing natural gas use in 2020, express natural gas use as fraction relative to 2018 use? [Enter Fractions]
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							

Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]

Provide of sketch of the Laundry Operation, depicting the ozone system and related washing machines

A large rectangular area filled with a fine grid pattern, intended for a sketch of the Laundry Operation. The grid is composed of small, evenly spaced dots or squares, providing a guide for drawing.

[illegible]



D-2 PROCESS PUMPING VARIABLE SPEED DRIVES (VFDs)

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

Project Information		
IOU		
ApplicationCode or ProjectID		
Program ID		
Program Name		
Point of Sale Purchase?		
IOU Claim ID(s)	Measure 1:	
	Measure 2:	
IOU Measure Description	Measure 1:	
	Measure 2:	
Number of Units Installed	Measure 1:	
	Measure 2:	
Project Application Date		
Project Installation Date		Engineer update below as needed [ENTER]:
Business Name		
Business Street Address		
Business City		
Facility Contact Name		
Facility Contact Phone Number		
Facility Contact E-mail Address		
Decision Maker Contact Name		
Decision Maker Contact Phone Number		
Decision Maker Contact E-mail Address		
Vendor Business Name		
Vendor Contact Name		
Vendor Contact Phone Number		
Vendor Contact E-mail Address		
Site Information		
Assigned Engineer Name		
Assigned Engineer Firm		
Customer Rep. Agrees to Take Pictures Y/N		
Engineer E-Mail Address to Send Pictures		
Site Visit Consent Granted Y/N		
Date of First On-Site Visit		
Utility Meter Information		
Account Number from Tracking Data	Measure 1:	
Dedicated Electric Meter for Pump Measure 1 Y/N		
If no, describe other loads on meter including		
Associated Electric Meter Number for Measure 1		
Account Number from Tracking Data	Measure 2:	
Dedicated Electric Meter for Pump Measure 2 Y/N		
If no, describe other loads on meter including		
Associated Electric Meter Number for Measure 2		

Put units from tracking system below

<NormUnit>

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

On-Site Recruitment Checklist

Application # _____

Meeting	
Location of Meeting	
Directions to Meeting Spot	
Date of Meeting	
Time of Meeting	
Site Contact Name	
Site Contact Phone Number	
Site Contact E-mail	
VFD Measure #1	
Is the pump/VFD served by a dedicated electric meter, or are there other loads such as pumps on the same electric meter?	
If shared load -- what other loads are on the electric meter including horsepower associated with additional pumps?	
VFD Measure #2	
Is the pump/VFD served by a dedicated electric meter, or are there other loads such as pumps on the same electric meter?	
If shared load -- what other loads are on the electric meter including horsepower associated with additional pumps?	
VFD Information	
Does VFD Have Trending Capability?	
If yes, do you trend data, such as kWh every hour, VFD Hz, etc?	
Can you share that with us?	
If yes, can you trend data for us, including kWh every hour, VFD Hz, etc?	
Decision Maker Contact Information	
Explain that we are also interested in a separate conversation with the project decision maker that ultimately made the farmers choice to purchase VFD pump controls (likely the farmer him/herself)	
Possibly offer a \$100 incentive to gain full cooperation for both data collection elements	
Decision maker name	
Decision maker telephone number(s)	
Decision maker e-mail	
Best time to reach or schedule an appointment	
Project Information Requested from Participants	
Describe how farm operations and irrigation in particular has been affected by COVID	
Monthly pumped water data for last three years	

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

Business Activity

Application # _____

[Circle One Below]	What is the main business ACTIVITY at this facility?	
1	Offices (non-medical)	
2	Restaurant/Food Service	
3	Food Store (grocery/liquor/convenience)	
4	Agricultural (farms, greenhouses)	
5	Retail Stores	
6	Warehouse	
7	Health Care	
8	Education	
9	Lodging (hotel/rooms)	
10	Public Assembly (church, fitness, theatre, library, museum, convention)	
11	Services (hair, nail, massage, spa, gas, repair)	
12	Industrial (food processing plant, manufacturing)	
13	Laundry (Coin Operated, Commercial Laundry Facility, Dry Cleaner)	
14	Condo Assoc./Apartment Mgr (Garden Style, Mobile Home Park, High-rise, Townhouse)	
15	Public Service (fire/police/postal/military)	
77	Other / Record Business Activity [ENTER] ==>	
Provide additional comments as needed [ENTER] ==>		
Provide specifics on activity [ENTER] ==> (i.e., industrial bakery or commercial greenhouse)		

EE Measure Replacement Battery

(page 1 of 4)

Application # _____		<=== Enter Application Code						
[Answer for Measure #1] Along with the new VFD, was a new pump also installed at the same time? [Circle One Entry] [PROBE TO FIND CORRECT RESPONSE BELOW]		[Answer for Measure #2] Along with the new VFD, was a new pump also installed at the same time? [PROBE TO FIND CORRECT RESPONSE BELOW]						
1	Replaced existing pump	1	Replaced existing pump					
2	Added a new pump	2	Added a new pump					
3	Added VFD to existing pump	3	Added VFD to existing pump					
88	Refused	88	Refused					
99	Don't know	99	Don't know					
Provide additional comments as needed [ENTER] ==>		<table border="1" style="width: 100%; height: 100px;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>						
[Ask for any new VFD added to an existing pump; ANSWER #3 ABOVE]								
[Answer for Measure #1] Approximately how old is the pump being controlled by the VFD? Would you say... (Circle One Entry)		[Answer for Measure #2] Approximately how old is the pump being controlled by the VFD? Would you say... (Circle One Entry)						
4	Less than 5 years old	4	Less than 5 years old					
5	Between 5 and 10 years old	5	Between 5 and 10 years old					
6	Between 10 and 15 years old	6	Between 10 and 15 years old					
7	More than 15 years old	7	More than 15 years old					
8	Stated age _____ years	8	Stated age _____ years					
88	Refused	88	Refused					
99	Don't know	99	Don't know					
Provide additional comments as needed [ENTER] ==>		<table border="1" style="width: 100%; height: 100px;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>						

EE Measure Replacement Battery

(page 2 of 4)

Application # _____ <=== Enter Application Code

[Ask for any new VFD added to an existing pump; ANSWER #3 ABOVE]
 [Answer for Measure #1] [Answer for Measure #2]

[Circle One Entry] How would you describe the condition of the pump being controlled by the VFD? Would you say it is in... [Circle One Entry] How would you describe the condition of the pump being controlled by the VFD? Would you say it is in...

9	Poor condition	9	Poor condition
10	Fair condition	10	Fair condition
11	Good condition	11	Good condition
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

[Ask for any new VFD added to an existing pump; ANSWER #3 ABOVE]
 [Answer for Measure #1] [Answer for Measure #2]

[Circle One Entry] How many years are left in the pump itself until you will replace it? [Circle One Entry] How many years are left in the pump itself until you will replace it?

12	Remaining pump life _____ years	12	Remaining pump life _____ years
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

EE Measure Replacement Battery

(page 3 of 4)

Application # _____ <=== Enter Application Code

[Ask for any new VFD added to an existing pump; ANSWER #3 ABOVE]

[Answer for Measure #1] [Answer for Measure #2]

[Circle One Entry]	What type of pump flow controls were in place BEFORE the VFD was installed?	[Circle One Entry]	What type of pump flow controls were in place BEFORE the VFD was installed?
13	None; pump was uncontrolled	13	None; pump was uncontrolled
14	Throttle valve controls	14	Throttle valve controls
15	VFD controls	15	VFD controls
16	Other / Provide Related Commentary Below:	16	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

[Ask for any new VFD added to an existing pump; ANSWER #3 ABOVE]

[Answer for Measure #1] [Answer for Measure #2]

(Circle One Entry)	Approximately how old were the replaced pump flow controls? Would you say...	(Circle One Entry)	Approximately how old were the replaced pump flow controls? Would you say...
17	Less than 5 years old	17	Less than 5 years old
18	Between 5 and 10 years old	18	Between 5 and 10 years old
19	Between 10 and 15 years old	19	Between 10 and 15 years old
20	More than 15 years old	20	More than 15 years old
21	Stated age _____ years	21	Stated age _____ years
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

EE Measure Replacement Battery

(page 4 of 4)

Application # _____<==== Enter Application Code

[Ask for any new VFD added to an existing pump; ANSWER #3 ABOVE]

[Answer for Measure #1]

[Answer for Measure #2]

[Circle One Entry]	How would you describe the condition of the replaced pump flow controls? Would you say the controls were ...	[Circle One Entry]	How would you describe the condition of the replaced pump flow controls? Would you say the controls were ...
22	Not working	22	Not working
23	In poor condition	23	In poor condition
24	In fair condition	24	In fair condition
25	In good condition	25	In good condition
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

EE VFD Battery

(page 1 of 4)

Application # _____		<=== Enter Application Code	
[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
[Circle One Entry]	What was the main reason you decided to control your pump flow using a VFD?	[Circle One Entry]	What was the main reason you decided to control your pump flow using a VFD?
26	Existing controls were not functioning adequately	26	Existing controls were not functioning adequately
27	Using alternative controls was not a feasible solution (such as throttling or running an uncontrolled pump)	27	Using alternative controls such as throttling or running an uncontrolled pump was not a feasible solution
28	The pump and VFD were sold as an integrated unit	28	The pump and VFD were sold as an integrated unit
29	Wanted improved pump performance or functionality	29	Wanted improved pump performance or functionality
30	Wanted remote monitoring and control capability	29	Wanted improved pump performance or functionality
31	Wanted automatic speed controls	31	Wanted improved pump performance or functionality
32	Other / Provide Related Commentary Below:	32	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know
Provide additional comments as needed [ENTER] ==>		<div style="border: 1px solid black; height: 40px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%;"></div>	

EE VFD Battery

(page 2 of 4)

Application # _____	<=== Enter Application Code							
[Ask ALL]								
<p>[Answer for Measure #1]</p> <p>[Circle One Entry] At the time of VFD installation, was the program or rebate important or influential in your decision to purchase a VFD?</p>	<p>[Answer for Measure #2]</p> <p>[Circle One Entry] At the time of VFD installation, was the program or rebate important or influential in your decision to purchase a VFD?</p>							
33	Yes	33	Yes					
34	No	34	No					
35	Other / Provide Related Commentary Below:	35	Other / Provide Related Commentary Below:					
88	Refused	88	Refused					
99	Don't know	99	Don't know					
<p>Provide additional comments as needed [ENTER] ==></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="height: 20px;"></td></tr> <tr><td style="height: 20px;"></td></tr> <tr><td style="height: 20px;"></td></tr> <tr><td style="height: 20px;"></td></tr> <tr><td style="height: 20px;"></td></tr> </table>								

EE VFD Battery

(page 3 of 4)

Application #

<=== Enter Application Code

[Ask ALL]

[Answer for Measure #1]

If not for the program/rebate, approximately how much longer would you have waited to install VFD flow controls? Would you say...

(Circle One Entry)

[Answer for Measure #2]

If not for the program/rebate, approximately how much longer would you have waited to install VFD flow controls? Would you say...

(Circle One Entry)

36	Within a one-year period	36	Within a one-year period
37	Between 1 and 2 years	37	Between 1 and 2 years
38	Between 2 and 4 years	38	Between 2 and 4 years
39	4 or more years	39	4 or more years
40	Would never have installed a VFD	40	Would never have installed a VFD
41	Stated _____ years	41	Stated _____ years
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

EE VFD Battery

(page 4 of 4)

Application # _____		<=== Enter Application Code	
[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
[Circle One Entry]	What type of pump does the VFD control?	[Circle One Entry]	What type of pump does the VFD control?
41	Vertical turbine pump	39	Vertical turbine pump
42	Submersible pump	40	Submersible pump
43	Centrifugal pump	41	Centrifugal pump
44	Other / Provide Related Commentary Below:	30	Other / Provide Related Commentary Below:
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

[Ask ALL]			
[Answer for Measure #1]		[Answer for Measure #2]	
(Circle One Entry)	What is the horsepower rating of the pump that is being controlled by the VFD? Would you say...	(Circle One Entry)	What is the horsepower rating of the pump that is being controlled by the VFD? Would you say...
45	Less than 25 hp	42	Less than 25 hp
46	Between 25 and 50 hp	43	Between 25 and 50 hp
47	Between 50 and 100 hp	44	Between 50 and 100 hp
48	Between 100 and 200 hp	45	Between 100 and 200 hp
49	Between 200 and 300 hp	46	Between 200 and 300 hp
50	More than 300 hp	47	More than 300 hp
51	Rated capacity _____ hp	48	Rated capacity _____ hp
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Short NTG Battery

(page 1 of 4)

Application # _____	<=== Enter Application Code
---------------------	-----------------------------

<p>[Answer for Measure #1]</p> <p>Now we'd like to ask you some questions about your decision to purchase your VFD flow controls. Specifically, we are interested in why you chose that VFD flow controls rather than a less efficient flow control option.</p> <p>First, did your organization make the decision to install VFD flow controls before, after, or at the same time as you became aware that rebates were available through the PROGRAM? [IF NEEDED: to reduce the cost of the measure]</p>	<p>[Answer for Measure #2]</p> <p>First, did your organization make the decision to install VFD flow controls before, after, or at the same time as you became aware that rebates were available through the PROGRAM? [IF NEEDED: to reduce the cost of the measure]</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

[Circle One Entry]		[Circle One Entry]	
1	Before	1	Before
2	After	2	After
3	Same time	3	Same time
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

[Ask ALL]

<p>[Answer for Measure #1]</p> <p>I'd like you to consider the importance of the program and all program related factors such as the program rebate; and the program information and recommendations you have received from your utility, account representative and program administrator. We are interested in how these program related factors affected your decision about the VFD flow controls you installed. That is, we are interested in what influenced you to choose VFD flow controls you did rather than a less efficient flow control option.</p> <p>Using a scale of 0 to 10 where 0 means not at all important and 10 means extremely important, how would you rate the importance of these program related factors.</p>	<p>[Answer for Measure #2]</p> <p>Using a scale of 0 to 10 where 0 means not at all important and 10 means extremely important, how would you rate the importance of these program related factors.</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

(Enter Score)		(Enter Score)	
#	Record 0 to 10 score _____	#	Record 0 to 10 score _____
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Short NTG Battery

(page 2 of 4)

Application # _____	<=== Enter Application Code
---------------------	-----------------------------

[Ask ALL]

[Answer for Measure #1]

Now I'd like you to consider a number of factors I will call the "non-program factors". These include reasons unrelated to the program that may have influenced you to choose VFD flow controls rather than a less efficient flow control option, such as choosing your equipment ...

because it was standard practice in your industry,
because of previous experience with similar equipment,
because of corporate policies or guidelines,
or other reasons that were not related to the program

Using the same scale of 0 to 10 where 0 means not at all important and 10 means extremely important, how would you rate the importance of these "non-program" factors.

[Answer for Measure #2]

Using the same scale of 0 to 10 where 0 means not at all important and 10 means extremely important, how would you rate the importance of these "non-program" factors.

#	Record 0 to 10 score _____	#	Record 0 to 10 score _____
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

[Ask ALL]

[Answer for Measure #1]

Next, I would like you to compare the importance of the program related factors to the other Non-program factors that may have influenced your decision.

If you were given 10 points to award in total, how many points would you give to the importance of the program related factors versus the other non-program factors in choosing pump VFD flow controls, rather than a less efficient flow control option?

How many of the ten points would you give to the importance of the PROGRAM factors in your decision?

[Answer for Measure #2]

How many of the ten points would you give to the importance of the PROGRAM factors in your decision?

#	Record 0 to 10 score _____	#	Record 0 to 10 score _____
88	Refused	88	Refused
99	Don't know	99	Don't know

Provide additional comments as needed [ENTER] ==>

Short NTG Battery

(page 3 of 4)

Application # _____		<=== Enter Application Code	
[Ask ALL]			
[Answer for Measure #1]	[Answer for Measure #2]		
Using a likelihood scale from 0 to 10, where 0 is not at all likely and 10 is extremely likely, if THE PROGRAM had NOT BEEN AVAILABLE, what is the likelihood that you would have installed exactly the same program-qualifying VFD flow controls that you did for this project, regardless of when you would have installed it?	Using a likelihood scale from 0 to 10, where 0 is not at all likely and 10 is extremely likely, if THE PROGRAM had NOT BEEN AVAILABLE, what is the likelihood that you would have installed exactly the same program-qualifying VFD flow controls that you did for this project, regardless of when you would have installed it?		
[Enter Score]	[Enter Score]		
#	Record 0 to 10 score _____	#	Record 0 to 10 score _____
88	Refused	88	Refused
99	Don't know	99	Don't know
Provide additional comments as needed [ENTER] ==>		<div style="border: 1px solid black; height: 40px; width: 100%;"></div>	
[Ask ALL]			
[Answer for Measure #1]	[Answer for Measure #2]		
Now I would like you to think about what action you would have taken if the program had not been available. Which of the following alternatives would you have been MOST likely to do if the program had not been available?	Which of the following alternatives would you have been MOST likely to do if the program had not been available?		
(Circle One Entry)	(Circle One Entry)		
1	Waited longer to install VFD	1	Waited longer to install VFD
2	Install standard flow controls such as throttling valve controls	2	Install standard flow controls such as throttling valve controls
3	Install bypass controls	3	Install bypass controls
4	Done nothing (keep existing controls)	4	Done nothing (keep existing controls)
5	Installed the same VFD flow controls	5	Installed the same VFD flow controls
6	Repair the existing flow controls	6	Repair the existing flow controls
77	Something else _____ (Specify below)	77	Something else _____ (Specify below)
88	Refused	88	Refused
99	Don't know	99	Don't know
Provide additional comments as needed [ENTER] ==>		<div style="border: 1px solid black; height: 40px; width: 100%;"></div>	

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

2020 Pumping System Operation by Measure

Measure # _____
Application # _____
IOU Measure Description _____
Number of units installed # _____

Month of 2020	During what months did you irrigate using this pump? [Check All that Apply]	How many acres were served by this pump each month? [Enter Acres]	List crops grown that were served by this pump? [Enter Crops and Percentage of Area Served if More Than One Crop]	List crop age for each crop in years. [Enter Crops and Age]	List irrigation method served by this pump? [Enter Drip, Sprinkler, flood, etc. and Percentages of Area Served if More Than One Method is Used]	List water supply serving this pump? [Enter Well Water, District Main, etc. and Percentages of Area Served if More Than One Source was Used]	Describe any other pumps that irrigate the same acreage, and how/when those pumps operate relative to the pump w/ VFD.	Describe the field configuration? [Enter Number of Irrigation Sets and Associated Acres and Any Association with Each Crop]
January								
February								
March								
April								
May								
June								
July								
August								
September								
October								
November								
December								
	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

2019 Pumping System Operation by Measure

Measure # _____
Application # _____
IOU Measure Description _____
Number of units installed # _____

Month of 2019	During what months did you irrigate using this pump? [Check All that Apply]	How many acres were served by this pump each month? [Enter Acres]	List crops grown that were served by this pump? [Enter Crops and Percentage of Area Served if More Than One Crop]	List crop age for each crop in years. [Enter Crops and Age]	List irrigation method served by this pump? [Enter Drip, Sprinkler, flood, etc. and Percentages of Area Served if More Than One Method is Used]	List water supply serving this pump? [Enter Well Water, District Main, etc. and Percentages of Area Served if More Than One Source was Used]	Describe any other pumps that irrigate the same acreage, and how/when those pumps operate relative to the pump w/ VFD.	Describe the field configuration? [Enter Number of Irrigation Sets and Associated Acres and Any Association with Each Crop]
January								
February								
March								
April								
May								
June								
July								
August								
September								
October								
November								
December								
	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

2018 Pumping System Operation by Measure

Measure # _____
Application # _____
IOU Measure Description _____
Number of units installed # _____

Month of 2018	During what months did you irrigate using this pump? [Check All that Apply]	How many acres were served by this pump each month? [Enter Acres]	List crops grown that were served by this pump? [Enter Crops and Percentage of Area Served if More Than One Crop]	List crop age for each crop in years. [Enter Crops and Age]	List irrigation method served by this pump? [Enter Drip, Sprinkler, flood, etc. and Percentages of Area Served if More Than One Method is Used]	List water supply serving this pump? [Enter Well Water, District Main, etc. and Percentages of Area Served if More Than One Source was Used]	Describe any other pumps that irrigate the same acreage, and how/when those pumps operate relative to the pump w/ VFD.	Describe the field configuration? [Enter Number of Irrigation Sets and Associated Acres and Any Association with Each Crop]
January								
February								
March								
April								
May								
June								
July								
August								
September								
October								
November								
December								
	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]

2020 Pumping System Operation by Measure (part 2)

(page 1 of 2)

Measure # _____

Application # _____

IOU Measure Description _____

Number of units installed # _____

An important modeling feature we want to define concerns the the ***predominant modes of operation*** that we can define, based on feedback from the farmer, and defined as the pump operating at a certain speed and flow rate.

Predominant Modes of Operation	Motor speed [expressed as percent of full speed] (%)	Pumping Flow Rate (gpm)	VFD Frequency (Hz)	Pump Operating Pressure (psi)	VFD Settings [Manual versus Auto]
Mode 1					
Mode 2					
Mode 3					
Full speed/flow					
	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]

2020 Pumping System Operation by Measure (part 2)

(page 2 of 2)

Seasonal Operation by Mode	List Months with Common Irrigation Needs	Predominant Modes of Operation	Days per Week in Each Mode	Hours per Day in Each Mode	Percent of Irrigation During Weekday Afternoons
Spring		Mode 1			
		Mode 2			
		Mode 3			
		Full speed/flow			
Summer		Mode 1			
		Mode 2			
		Mode 3			
		Full speed/flow			
Fall		Mode 1			
		Mode 2			
		Mode 3			
		Full speed/flow			
Winter		Mode 1			
		Mode 2			
		Mode 3			
		Full speed/flow			
	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]	Provide additional comments as needed [ENTER BELOW]

EE Measure Installation Verification

Measure # _____
Application # _____
IOU Measure Description _____
Number of units installed # _____

[Circle One Entry]

Was the VFD installed and operable at the time of the interview?

1	Yes	
2	No	
3	Other / Provide Related Commentary [ENTER] ==>	

Provide additional comments as needed [ENTER] ==>

[If 2/No above, then provide additional comments]

Provide additional comments to explain [ENTER] ==>

EE Pumping System Specifications

Measure # _____
Application # _____
IOU Measure Description _____
Number of units installed # _____

[ENTER OBSERVED PUMP OPERATIONS]

[Circle One per Line or Write Down Units if Different]

Pump Type _____
Pumping Application _____
Current Operating Output Pressure _____
Current Operating Flow Rate _____

Vertical turbine Submersible Centrifugal
Booster pump Well pump
PSIG
gpm

[ENTER VFD OBSERVED OPERATIONS]

Current Operating Frequency _____
Current Operating Motor Speed _____
Cumulative Electric Usage _____
Cumulative Run Hours _____

Hz
rpm %
kWh
Hours

Provide additional comments as needed [ENTER] ==>

[ENTER RELEVANT WELL CHARACTERISTICS]

[Circle One per Line or Write Down Units if Different]

Well depth _____

Feet

Provide additional comments as needed [ENTER] ==>
Ask if well depth varies and if so describe

Please provide of sketch of the Pumping Operation/ Field, depicting pump configuration (On-site only)

A large rectangular area with a light gray dot grid pattern, intended for a sketch of the pumping operation or field configuration. The grid consists of small, evenly spaced dots forming a uniform background for the sketch.



D-3 AGRICULTURAL IRRIGATION

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

Category	Dialogue	Response	Additional notes
Introduction	Hello, is this #####?		
	[If yes] Hi, my name is _____, calling on behalf of PG&E about an irrigation conversion project that was rebated in 2019. Does this project sound familiar?		
Different Contact	[If no] Is there someone I can talk to who might be more familiar with the PG&E rebate application?		
	[If yes] Can I get that person's contact information?		
	[Record contact information]		[record name and number]
Introduction Continued	[If yes] Great! PG&E and the State of California are conducting a research study to assess the energy savings performance of irrigation conversions like the one that occurred at your farm.		
	My company, ERS, has been contracted to analyze the energy savings associated with irrigation conversion projects in order to improve PG&E's energy efficiency programs.		
	As part of the program assessment, we are reaching out to past participants to collect some information that will be helpful in determining actual energy savings.		
	Do you have approximately 15 minutes for this survey?		
	[If no] Would it be possible to schedule a time for this survey over the next couple of weeks? Or if you prefer, we can send you an email version of the survey.		[record date/time for callback] [or record email address]
Basic Project Details	[If yes] Ok great. First, I'd like to get a few basic details about the project.		
	According to our records, the project involved the conversion of ##### acres to a drip irrigation system. Is this correct?		
	[If no] Can you estimate the number of acres that underwent the irrigation conversion and were rebated by PG&E?		[record acreage]
	[If yes] Great. And just to confirm, our records indicate that the farm is located at #####. Is this correct?		
	[If no] Where is the farm located?		[record address and town]
	When did the irrigation project occur?		[record date]
	PG&E classified the project as a Sprinkler to Drip Irrigation conversion. Can you elaborate on what was actually installed through this project?		[record in their words]
Crop Details	Ok. Next, I want to confirm a couple of details about the farmland that was converted to drip irrigation.		
	What types of crops are currently grown on this acreage?		[record addt'l crops and their acreage here]
Irrigation Details	Ok. Next, I'll ask a few questions about your irrigating schedule.		
	At what month of the year does the crop growing season begin?		
	What month of the year does the crop growing season end?		
	Does irrigation occur outside the growing season?		
	[If yes] At what month of the year does irrigation begin?		
	[If yes] At what month does irrigation end?		
	Is the acreage divided into multiple sets for irrigation?		
	[If yes] How many sets?		[record number of sets]
	About how many times per month, on average, is each set irrigated over the course of the growing season?		[record number of irrigations]
	[Alternative] During the hottest/driest month, how many times is each set irrigated?		[record number of irrigations]
	For how many hours is each set typically irrigated at a time?		[record number of hours]
	Have your irrigation practices changed due to drought conditions in recent years? (if yes, explain how)		[record in their own words]
	What is the source of the irrigation water? (see dropdown: district water main, well, other (use notes), unknown)		
	How many pumps supply the water for the new irrigation system?		[record number of pumps]
	What is the total pumping horsepower for the new irrigation system?		[record total horsepower]
How are the irrigation pumps controlled? (see dropdown: constant speed, two-speed, soft start, VFD, other- use notes)			
About what discharge pressure do the irrigation pumps currently operate at?		[record in psi]	
Rebated System Details	Next, I'd like to get some information on the type of irrigation system you installed.		
	Can you provide the make and model of the emitters installed?		[record make/model]
	Do you recall the rated gallons-per-minute or gallons-per-hour of the emitters?		[indicate gpm or gph]
	Can you estimate the number of emitters per acre?		

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

Category	Dialogue	Response	Additional notes
Pre-project Details	Ok great. The next questions are about the farm before the new irrigation system was installed.		
	Was the farm's acreage divided into similar sets before the project?		
	[If no] How was the acreage divided before the project?		[record number of sets and acreage of each]
	Were similar crops grown at the farm before the new irrigation system was installed?		
	[If no] What crops were grown before the project?		[record old crop type - should be different from cell D24]
	[If either pre or post is deciduous] How old were the trees at the time of the project?		[record age]
	[If different crop] At what month of the year did the old crop's growing season begin?		[record month]
	[If different crop] At what month of the year did the old crop's growing season end?		[record month]
	[If different crop] Did irrigation occur outside of the growing season?		
	[If yes] In which month did the old crop's irrigation begin?		[record month]
	[If yes] In which month did the old crop's irrigation end?		[record month]
	What type of irrigation system was in place before the project? (see dropdown: flood, furrow, sprinkler, drip tape)		[record irrigation method]
	[If sprinkler] Do you recall the make, model, or nozzle color of the old sprinkler nozzles?		[record sprinkler make/model/color nozzle]
	[If flood/furrow] About how many inches deep did you flood the field during each irrigation?		[record irrigation depth in inches]
	How old was your existing irrigation equipment?		[record age in years]
	What condition was the exisitng irrigation equipment in?		
	How much longer do you think it would have lasted if you had not replaced it?		[record age in years]
	Is this your first time using drip tape as an irrigation method?		
	[If yes] How is functioning so far? When are you anticipating to replace it next?		
	[If no] How long/How many times have you used drip tape? How frequently do you typically replace your drip tape?		
	About how many times per month, on average, was each set irrigated over the course of the old crop's growing season?		[record number of irrigations]
	[Alternative] During the hottest/driest month, how many times was each set irrigated?		[record number of irrigations]
	For how many hours was each set typically irrigated at a time?		[record number of hours]
	Did the irrigation water come from a different source before the project?		
	[If yes] What was the source of the irrigation water?		[record water source]
	Was the irrigation pumping plant any different before the project?		
	[If yes] How many irrigation pumps supplied the water before the project?		[record number of pumps]
[If yes] What was the total horsepower of the irrigation pumps?		[record total horsepower]	
[If yes] How were the irrigation pumps controlled? (see dropdown: constant speed, two-speed, soft start, VFD, other- use notes)		[record pump control method]	
[If yes] Was the old pump powered by a PG&E electric meter?		[record yes/no; this response affects project eligibility]	
About what pressure did the irrigation pumps operate at before the project?		[record discharge psi]	
	Thank you for your time in helping to improve PG&E's programs.		

Phone survey date:	
--------------------	--

Reference Information if Needed	
Contact at CPUC	I'd be happy to direct you to our contact at the California Public Utilities Commission. Her name is Mona Dzvova, and she can be reached at mona.dzvova@cpuc.ca.gov.
Confidentiality	The information we collect during this study will be kept confidential to the California Public Utilities Commission and its contractors.
	The results of each site assessment will be aggregated and kept anonymous in any subsequent public reports.
	The information we collect will not in any way influence your past or future participation in any PG&E energy efficiency programs.
	The results of the study will in no way impact your PG&E electric bill.



D-4 TANKLESS WATER HEATERS

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

Category heading
Fill in
Auto-populated

General Info

ERS Site ID		
Visit Date & Time		
Field Engineer		
PA Site ID		
Facility/Customer Name		
Street Address		
City		
Building Type		
Climate Zone		
Contact		
Phone		
Project Installation Date		

BEFORE CONTACTING SITES - check if site area is affected by:

Wildfires ----->>>>>	https://www.fire.ca.gov/incidents/
	https://gispub.epa.gov/airnow/
Power Outages ----->>>>>	https://pgealerts.alerts.pge.com/updates/

Measure Data

ID#	Measure Description	Capacity (kBtu/h)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

	Question	Response detail	Response	Note
Introduction	Hello, my name is _____ and I'm calling from ERS on behalf of [PG&E/SCG]. My company has been contracted by the California Public Utilities Commission to analyze the energy savings associated with projects funded by [PG&E's/SCG's] Tankless Water Heater midstream incentive programs. The tankless water heater installation(s) for [Facility Name/Owner] in [Install Year] has been selected for this evaluation and we would greatly appreciate your participation in this important study.			
	Our records indicate that your organization installed [Describe size and quantity of TWHs] through the program on [Install Date]. Does this sound familiar? [If yes] record name and title of respondent and proceed [If no] Is there someone I can talk to who might be more familiar with this particular project? [Record contact information and retry.]	Record name and title of respondent [Site Contact]		Record contact info here
	Our original plan for the evaluation was to conduct a site visit to the facility to confirm measure installation and collection water heater operational data to estimate energy savings. However, to avoid any risks associated with exposure to the COVID-19 virus, we are conducting virtual assessments in place of site visits to gather data for our evaluation analysis. I would like to ask you a few questions about the project, the building characteristics, and the measure's operation prior to the COVID-19 pandemic to gather data for the evaluation. It would take approximately 30 minutes for this assessment.			
	Would now be a good time for you to talk? [If not, obtain the time that would work best for site contact]	Schedule time for call		
	You may have been contacted already by a [RMS call center] we are working with to complete surveys about the decision making process. Are you familiar with and could you speak to the decision to install this equipment?			
	[If no] Who could I speak to that would be familiar with this decision? (record contact information, and proceed) We are working with a [RMS call center] to complete interviews on the decision making process to install this equipment. They may reach out to [decision maker name] in the coming weeks. Today, I'd like to get a few basic details about the project and the installed water heater(s).	Record name and title of respondent [Decision Maker]		Record contact info here
	[If yes] We are working with a [RMS call center] to concurrently complete interviews on the decision making process, have you already been contacted by the [RMS call center]? [If yes] Ok great, then I only need to get some basic details about the project and the installed water heater(s) (complete gross data collection, not NTG survey) [If no] Ok great. First, I'd like to get a few basic details about the project and the installed water heater(s) (complete both gross and NTG survey)			

PY2019 SMALL/MEDIUM COMMERCIAL FINAL IMPACT REPORT

	Question	Response detail	Response	Note
Project Tracking & Facility Details	According to our records, the project occurred at [Site Address], Is this correct?	Confirm installation site, note if different		
	We see from our records that the tankless or "instantaneous" water heaters were installed in [Month/Year]. Is this correct?	Month/Year		
	Is your natural gas service provided by [Utility]? Is gas used for water heating?	Confirm correct utility		
	Can you provide the contact information of the vendor who assisted you with the project installation?	Provide contact info		Record contact info here
	Would you classify the building as a [Building Type]?	Record bldg type		Record bldg type here
Operational Details	What are the facility's typical hours of operation?	record day/wk/yr hours		
	Does the facility operate on holidays? Indicate holidays with no operation.	If no, list holidays		
	Is there any seasonality associated with the building operations that could have an impact on the energy bills?	If yes, explain		
	Do the new tankless water heaters serve a DHW circulation system/loop or use external storage tank?	If yes, record details on tank volume(s)		
	[if yes] What are the size or size(s) of the HW storage tanks			
	Do the tankless water heaters provide hot water for space heating? (if yes, TWH used for space heating are ineligible)	If yes, explain		
<p>As part of our energy study, we are hoping to gather information about the installed 'tankless' water heaters. (Methods: 1) video conference, or 2) photos of WHs/nameplates, etc or 3) over the phone have contact read out WH model numbers and other information)</p> <p><i>*If you choose to record the video conference; be sure to notify the contact and ask for their permission first. California is a two-party consent state for recording private or confidential conversations*</i></p> <p>1) Have the contact go to the water heaters (recently installed; 2019) to visually inspect (at least 3 WHs; if there are 3 or more sizes or models - randomly select one of each, up to 3)</p> <p>A) If the location had several water heaters installed that were incentivized;</p> <p>1) If they are willing, collect information on all of them, even if these were not in the sample.</p> <p>2) If they are hesitant have them only help you inspect the ones we sampled.</p> <p>3) If they have multiple water heaters of the same size that were incentivized AND they are hesitant to inspect all of them -> have them randomly select one to inspect.</p> <p>B) Have them take photos of the water nameplate(s)</p> <p>C) Have them get the hot water temperature (supply temperature) off the water heaters display (if it has one).</p>				

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[illegible]

*Temperature in will be based on default city water temperatures

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Pre-Existing Water Heating Technology & EUL Questions	What kind of water heaters were replaced by the new tankless water heaters? (Storage/tankless?)	Dropdown		
	Were fuel did your previous water heaters natural use, natural gas, propane, or electric?	Dropdown		
	(for Storage) What size were the storage water heaters? (for tankless) What was the rated heating capacity? (e.g., kBtu/h)	Record typical or average size if different sizes		
	How many water heaters were installed previously?	Record quantity of pre-existing water heaters		
	How old was your existing water heater equipment?†	Dropdown		
	What condition was the existing water heating equipment in?	Dropdown		
	How much longer do you think your existing water heater(s) would have lasted if you had not replaced it?	RUL estimate (in years)		
	How is your new tankless water heater(s) functioning so far?	Dropdown		
	When are you anticipating replacing your water heater(s) next?	Estimate in years		

† Use increments of 5 years for estimation

Conclusion	Thank you for taking the time to answer these questions today. We may call back in the future if we need further clarification on anything that was discussed.	No response required		
	Again, thank you for taking time to answer my questions.			

Reference Information if Needed

"This evaluation and the results of our measurement and verification will have no impact on the incentive you have already received, or your eligibility for future projects."

"Your responses will not affect your ability to participate in the program in the future. All information obtained in this evaluation will be strictly confidential."

"I am not selling anything. I simply want to estimate the impacts from the energy efficiency measure that was installed with assistance from this program."

Other Notes

APPENDIX E:

MEASURE NAME TO ESPI MAPPING

PA	ESPI_Category	Measure Description
PGE	AG IRRIGATION	Sprinkler to Drip irrigation - Field/Vegs (well and non well)
PGE	PROCESS OZONE LAUNDRY	Ozone Laundry
PGE	PROCESS PUMPING VFD	AGR WELL PUMPS (LTE 75HP) VFD - ENHANCED SPECIFICATIONS
PGE	PROCESS PUMPING VFD	BOOSTER PUMPS (GT 75HP TO LTE 150HP) VFD - ENHANCED SPECIFICATIONS, RETROFIT AND NEW CONSTRUCTION
PGE	PROCESS PUMPING VFD	BOOSTER PUMPS (LTE 75HP) VFD - ENHANCED SPECIFICATIONS, RETROFIT AND NEW CONSTRUCTION
PGE	PROCESS PUMPING VFD	Glycol Pump VFD- 10HP
PGE	PROCESS PUMPING VFD	Glycol Pump VFD- 25HP
PGE	PROCESS PUMPING VFD	Glycol Pump VFD- 7.5HP
PGE	PROCESS PUMPING VFD	Variable Frequency Drive on Agricultural Booster Pumps (<=150hp)
PGE	PROCESS PUMPING VFD	Variable Frequency Drive on Agricultural Well Pumps (<=300hp)
PGE	PROCESS PUMPING VFD	WELL PUMPS (GT 75HP TO LTE 600HP) VFD - ENHANCED SPECIFICATIONS, RETROFIT AND NEW CONSTRUCTION
PGE	REFRIGERATION CASE LED LIGHTING	LIN FT T2 LED LTBAR <= 5FT UNIT NO OCC SENS CTRL REPLACE MULT LAMP PROFILE
PGE	REFRIGERATION CASE LED LIGHTING	REFRIG CASE LTG-TIER 2 LED LIGHTBAR <= 5-FOOT UNIT NO OCC SENSOR CONTROL
PGE	REFRIGERATION CASE LED LIGHTING	REFRIG CASE LTG-TIER 2 LED LIGHTBAR > 5-FOOT UNIT NO OCC SENSOR CONTROL
PGE	WATER HEATING STORAGE WATER HEATER	Condensing Hot Water Heater 300-2500 kBTUh TE>94%
PGE	WATER HEATING STORAGE WATER HEATER	Condensing Hot Water Heater >2500 kBTUh TE>94%
PGE	WATER HEATING STORAGE WATER HEATER	Condensing Hot Water Heater, 300-2500 kBTUh, TE>94%
PGE	WATER HEATING STORAGE WATER HEATER	Condensing Hot Water Heater, >2500 kBTUh, TE>94%
PGE	WATER HEATING STORAGE WATER HEATER	Condensing domestic hot water heater with thermal efficiency > 90%. Minimum 75 kBTUh input rating
PGE	WATER HEATING STORAGE WATER HEATER	Forced Draft Hot Water Heater 300-2500 kBTUh TE>85%
PGE	WATER HEATING STORAGE WATER HEATER	Forced Draft Hot Water Heater >2500 kBTUh TE>83%
PGE	WATER HEATING STORAGE WATER HEATER	Forced Draft Hot Water Heater, 300-2500 kBTUh, TE>85%
PGE	WATER HEATING STORAGE WATER HEATER	Forced Draft Hot Water Heater, >2500 kBTUh, TE>83%
PGE	WATER HEATING TANKLESS WATER HEATER	Instantaneous Domestic Water Heater - Condensing > 200 kBTUh > 90% TE
PGE	WATER HEATING TANKLESS WATER HEATER	Instantaneous Domestic Water Heater - Condensing, > 200 kBTUh, > 90% TE
PGE	WATER HEATING TANKLESS WATER HEATER	Instantaneous Domestic Water Heater - Condensing; 76-200 kBTUh; TE > 90%
PGE	WATER HEATING TANKLESS WATER HEATER	Instantaneous Domestic Water Heater > 200 kBTUh > 85% TE
PGE	WATER HEATING TANKLESS WATER HEATER	Instantaneous Domestic Water Heater, > 200 kBTUh, > 85% TE
SCE	PROCESS PUMPING VFD	VFD on Ag Booster Pumps (<=150hp) NEW Express Pump
SCE	PROCESS PUMPING VFD	VFD on Ag Well Pumps (<=300hp) NEW Express Pump
SCE	PROCESS PUMPING VFD	VFD on Agricultural Booster Pumps (<=150hp) Pump
SCE	PROCESS PUMPING VFD	VFD on Agricultural Well Pumps (<=300hp) Pump
SCE	PROCESS PUMPING VFD	Variable Frequency Drive on Agricultural Booster Pumps (<=150hp)
SCE	PROCESS PUMPING VFD	Variable Frequency Drive on Agricultural Booster Pumps (<=150hp) NEW Express only
SCE	PROCESS PUMPING VFD	Variable Frequency Drive on Agricultural Well Pumps (<=300hp)
SCE	PROCESS PUMPING VFD	Variable Frequency Drive on Agricultural Well Pumps (<=300hp) NEW Express only
SCG	PROCESS OZONE LAUNDRY	Ozone Laundry
SCG	WATER HEATING CONTROLS	Demand-controlled DHW recirculation pump in commercial buildings
SCG	WATER HEATING STORAGE WATER HEATER	50 Gallon Medium Draw water heater with a rating of =0.64 UEF
SCG	WATER HEATING STORAGE WATER HEATER	Central System Natural Gas Storage Water Heater Tier II (>=90%TE)
SCG	WATER HEATING STORAGE WATER HEATER	Large Storage Water heater >= 75 kBTUh and/or TE >= 90%, UEF >= .76 for MD, UEF >= .80 for HD Units
SCG	WATER HEATING TANKLESS WATER HEATER	Small Tankless Water Heater, Tier 2 (UEF>=0.87), High Draw
SCG	WATER HEATING TANKLESS WATER HEATER	Tankless Water Heater <=200 MBtu/hr (Small / Medium), Tier 2 (>=0.87 UEF)
SCG	WATER HEATING TANKLESS WATER HEATER	TanklessWaterHeaters-Large(>200MBtuh)-Tier1(>=80%TE)
SCG	WATER HEATING TANKLESS WATER HEATER	TanklessWaterHeaters-Large(>200MBtuh)-Tier2(>=90%TE)
SDGE	PROCESS OZONE LAUNDRY	Ozone Laundry System (SWAP005A)
SDGE	PROCESS PUMPING VFD	VFD on New Agricultural Well Pumps for 300 HP and below
LCE	null	(1) 60in Retrofits in Low Temp Reach-in Display Cases LED
LCE	null	(1) 60in Retrofits in Medium Temp Reach-in Display Cases LED
LCE	null	(1) 72in Retrofits in Medium Temp Reach-in Display Cases LED
MCE	null	HUMIDISTAT CONTROL FOR ANTI-SWEAT HEATERS
PGE	null	0.5 GPM Flow Rate Laminar Flow Restrictor being installed on a 2.7 GPM Flow Rate Faucet Base Case
PGE	null	1 inch Insulation layer <= 1 inch pipe >15 psig steam Indoor
PGE	null	1 inch Insulation layer, 1 inch < pipe <= 4 inch, <=15 psig steam, Indoor
PGE	null	1 inch Insulation layer, 1 inch < pipe <= 4 inch, >15 psig steam, Indoor
PGE	null	1 inch Insulation layer, 1 inch < pipe <= 4 inch, >15 psig steam, Outdoor
PGE	null	1 inch Insulation layer, 1 inch < pipe <= 4 inch, Hot Water, Indoor
PGE	null	1 inch Insulation layer, 1 inch < pipe <= 4 inch, Hot Water, Outdoor
PGE	null	1 inch Insulation layer, <= 1 inch pipe, <=15 psig steam, Indoor
PGE	null	1 inch Insulation layer, <= 1 inch pipe, >15 psig steam, Indoor
PGE	null	1 inch Insulation layer, > 4 inch pipe, >15 psig steam, Indoor
PGE	null	1 inch Insulation layer, > 4 inch pipe, >15 psig steam, Outdoor
PGE	null	1 inch Insulation layer, > 4 inch pipe, Hot Water, Outdoor
PGE	null	1.0 GPM Flow Rate Laminar Flow Restrictor being installed on a 2.7 GPM Flow Rate Faucet Base Case
PGE	null	1.5 GPM Flow Rate Laminar Flow Restrictor being installed on a 2.7 GPM Flow Rate Faucet Base Case
PGE	null	15 - 29 cubic feet Glass-Door Reach-In Refrigerator
PGE	null	15 - 29 cubic feet Solid-Door Reach-In Freezer
PGE	null	15 - 29 cubic feet Solid-Door Reach-In Refrigerator
PGE	null	2.2 GPM Flow Rate Laminar Flow Restrictor being installed on a 2.7 GPM Flow Rate Faucet Base Case
PGE	null	30 - 49 cubic feet Glass-Door Reach-In Refrigerator
PGE	null	30 - 49 cubic feet Solid-Door Reach-In Freezer

PA	ESPI_Category	Measure Description
PGE	null	30 - 49 cubic feet Solid-Door Reach-In Refrigerator
PGE	null	50 cubic feet Solid-Door Reach-In Freezer
PGE	null	50 cubic feet Solid-Door Reach-In Refrigerator
PGE	null	< 15 cubic feet Glass-Door Reach-In Refrigerator
PGE	null	< 15 cubic feet Solid-Door Reach-In Freezer
PGE	null	< 15 cubic feet Solid-Door Reach-In Refrigerator
PGE	null	>50 cubic feet Glass-Door Reach-In Refrigerator
PGE	null	AG CL TO CL LT 0.96 PEI GT 50HP LTE 200HP
PGE	null	AG CL TO CL LT 0.96 PEI GTE 3HP LTE 50HP
PGE	null	AG, CL TO CL, LT 0.96 PEI, GT 50HP, LTE 200HP
PGE	null	AG, CL TO CL, LT 0.96 PEI, GTE 3HP, LTE 50HP
PGE	null	Commercial Combination Oven/Steamer 15 to 28 pan capacity (Electric)
PGE	null	Commercial Combination Oven/Steamer 15 to 28 pan capacity (Gas)
PGE	null	Commercial Combination Oven/Steamer < 15 pan capacity (Electric)
PGE	null	Commercial Combination Oven/Steamer < 15 pan capacity (Gas)
PGE	null	Commercial Combination Oven/Steamer > 28 pan capacity (Gas)
PGE	null	Commercial Conveyor Oven - Gas
PGE	null	Commercial Fryer (Electric)
PGE	null	Commercial Fryer (Gas)
PGE	null	Commercial Full-Size Convection Oven (Electric)
PGE	null	Commercial Full-Size Convection Oven (Gas)
PGE	null	Commercial Ice Machines IMH 300 to 800 lbs/day
PGE	null	Commercial Ice Machines IMH 801 to 1500 lbs/day
PGE	null	Commercial Ice Machines RCU 988 or greater lbs/day
PGE	null	Commercial Ice Machines RCU <988 lbs/day
PGE	null	Commercial Kitchen Demand Ventilation Controls
PGE	null	Commercial Pool Heaters
PGE	null	Commercial Rack Oven - Gas
PGE	null	Commercial Steam Cooker-Electric
PGE	null	Commercial Steam Cooker-Gas
PGE	null	Compressor: Multiplex - Air Cooled Condenser
PGE	null	Compressor: Multiplex - Air to Evaporative Cooled Condenser
PGE	null	Display Case Cooler Evaporator Fan ECM Motor replacing Shaded Pole Motor
PGE	null	Display Case Freezer Evaporator Fan ECM Motor replacing Shaded Pole Motor
PGE	null	ENERGY EFFICIENT COMMERCIAL CONVEYOR BROILERS 22-28 INCH WIDE CONVEYOR
PGE	null	ENERGY EFFICIENT COMMERCIAL CONVEYOR BROILERS >28 INCH WIDE CONVEYOR
PGE	null	ENERGY STAR GRIDDLE - GAS Per Len. Ft
PGE	null	FHP Single, Low Temperature Condensing Unit
PGE	null	FHP Single, Low Temperature Remote Condenser
PGE	null	FHP Single, Medium Temperature Condensing Unit
PGE	null	FHP Single, Medium Temperature Remote Condenser
PGE	null	Fitting Insulation <= 1 inch pipe, <=15 psig steam, Indoor
PGE	null	Fitting Insulation 1 inch < pipe <= 4 inch, <=15 psig steam, Indoor
PGE	null	Fitting Insulation 1 inch < pipe <= 4 inch, >15 psig steam, Indoor
PGE	null	Fitting Insulation 1 inch < pipe <= 4 inch, Hot Water, Indoor
PGE	null	Fitting Insulation > 4 inch pipe, >15 psig steam, Indoor
PGE	null	Fitting Insulation, 1 inch < pipe <= 4 inch, >15 psig steam, Outdoor
PGE	null	Fitting Insulation, 1 inch < pipe <= 4 inch, Hot Water, Outdoor
PGE	null	Fitting Insulation, > 4 inch pipe, >15 psig steam, Outdoor
PGE	null	Floating SST control on suction groups
PGE	null	HUMIDISTAT CONTROL FOR ANTI-SWEAT HEATERS
PGE	null	High Efficiency Ultra-Low Temperature (ULT -80 C) Freezers 15 to <24 ft3
PGE	null	High Efficiency Ultra-Low Temperature (ULT -80 C) Freezers 24 to 29 ft3
PGE	null	High Efficiency Ultra-Low Temperature (ULT, -80 C) Freezers, 15 to <24 ft3
PGE	null	High Efficiency Ultra-Low Temperature (ULT, -80 C) Freezers, 24 to 29 ft3
PGE	null	Insulated Holding Cabinet Full-Size
PGE	null	Insulated Holding Cabinet Half-Size
PGE	null	Insulated Holding Cabinet, Full-Size
PGE	null	Insulated Holding Cabinet, Half-Size
PGE	null	Low Temperature Display Case Anti-Sweat Heater (ASH) Controls
PGE	null	Low Temperature Open Vertical Night Cover
PGE	null	Low temp Narrow Coffin to Reach-in
PGE	null	Low-Flow Pre-Rinse Spray Valves, 1.15 gpm Flow Rate
PGE	null	Medium Temperature Open Case, Standard Efficiency to High Efficiency
PGE	null	Modulating Gas Valve for natural gas dryers for on-site commercial dryers
PGE	null	Motor: ECM Evaporator Display Case
PGE	null	Multiplex system, air-cooled condenser, control SCT to ambient + 12F TD, 70F min, backflood setpoint of 68F, var-speed fan control
PGE	null	Multiplex system, evap-cooled condenser, control SCT to wetbulb + 17F TD, 70F min, backflood setpoint of 68F, var-speed fan control
PGE	null	New Low Temperature Display Case with Doors

PA	ESPI_Category	Measure Description
PGE	null	New Medium Temperature Display Case with Doors
PGE	null	On-demand Hand Wrap Machine
PGE	null	REFRIG: AUTO CLOSER: COOLER
PGE	null	REFRIG: AUTO CLOSER: FREEZER
PGE	null	Steam Boiler, >2500 kBTUh, TE>80%
PGE	null	Steam Process Boiler
PGE	null	Submersible Well Pump System Overhaul (<=25hp)
PGE	null	Tier 2- 15% below Energy Star Minimum Speciation for Energy Efficient High Temperature Door-Type Commercial Dishwashers with water usage <= 0.76 gal/rack and idle energy rate <= 0.7 kW
PGE	null	Turbine Booster Pump System Overhaul (<=25hp)
PGE	null	Turbine Well Pump System Overhaul (<=25hp)
PGE	null	Vending Machine Controller
PGE	null	Vertical Ref Case, Med. Temp w/Night Covers: Open to Closed with LED
PGE	null	Vertical Ref Case, Med. Temp: Open w/ Night Covers to Closed (Retrofit)
PGE	null	Walk-in Cooler Evaporator Fan ECM Motor replacing Shaded Pole Motor
PGE	null	Walk-in Freezer Evaporator Fan ECM Motor replacing Shaded Pole Motor
PGE	null	Water Process Boiler
SCE	null	1.0 GPM Faucet Aerator replacing No Faucet Aerator
SCE	null	1.5 GPM Low Flow Showerhead replacing Standard Showerhead
SCE	null	15 - 29 cubic feet Glass-Door Reach-In Refrigerator
SCE	null	15 - 29 cubic feet Solid-Door Reach-In Freezer
SCE	null	15 - 29 cubic feet Solid-Door Reach-In Refrigerator
SCE	null	30 - 49 cubic feet Glass-Door Reach-In Refrigerator
SCE	null	30 - 49 cubic feet Solid-Door Reach-In Freezer
SCE	null	30 - 49 cubic feet Solid-Door Reach-In Refrigerator
SCE	null	< 15 cubic feet Solid-Door Reach-In Freezer
SCE	null	< 15 cubic feet Solid-Door Reach-In Refrigerator
SCE	null	= 5 Pans Full-Size Convection Oven
SCE	null	= 50 cubic feet Glass-Door Reach-In Refrigerator
SCE	null	= 50 cubic feet Solid-Door Reach-In Freezer
SCE	null	= 50 cubic feet Solid-Door Reach-In Refrigerator
SCE	null	>5 HP to 75 HP Variable Speed Drive on Process Fan Control
SCE	null	>50 cubic feet Glass-Door Reach-In Refrigerator
SCE	null	>= 50 cubic feet Solid-Door Reach-In Refrigerator
SCE	null	Add Door to Medium Temperature Open Vertical Display Case
SCE	null	Add Glass Door to Open Vertical Refrigerated Display Case Medium Temperature
SCE	null	Automatic Conveyor Broilers Belt Width 20-26""
SCE	null	Automatic Conveyor Broilers Belt Width >26""
SCE	null	Boilerless and Connectionless Steamer
SCE	null	Commercial Air-Cooled Multiplex Floating Head Pressure Control
SCE	null	Commercial Combination Oven/Steamer 15 to 28 pan capacity (Electric)
SCE	null	Commercial Combination Oven/Steamer < 15 pan capacity (Electric)
SCE	null	Commercial Electric Fryer: Cooking Efficiency >= 80%
SCE	null	Commercial Evap-Cooled Multiplex Floating Head Pressure Control
SCE	null	Commercial Ice Machines IMH 300 to 800 lbs/day Ice Machine
SCE	null	Commercial Ice Machines IMH 300 to 800 lbs/day-Super High-Efficiency Ice Machine
SCE	null	Commercial Ice Machines RCU 988 or greater lbs/day Ice Machine
SCE	null	Commercial Ice Machines RCU 988 or greater lbs/day-Super High-Efficiency Ice Machine
SCE	null	Commercial Ice Machines RCU <988 lbs/day Ice Machine
SCE	null	Commercial Ice Machines RCU <988 lbs/day-Super High-Efficiency Ice Machine
SCE	null	Commercial Ice Machines SCU >200 lbs/day-Super High-Efficiency Ice Machine
SCE	null	Commercial Multiplex Floating Suction Pressure Control
SCE	null	Cooking Efficiency =60% Commercial Electric Combination <15 Pans Oven
SCE	null	Cooking Efficiency > 80% Electric Fryer
SCE	null	Cooler Anti-Sweat Heater (ASH) Control
SCE	null	Display Case Cooler Evaporator Fan ECM Motor replacing Shaded Pole Motor
SCE	null	Electric Griddle
SCE	null	Energy efficient electric griddle
SCE	null	Floating Head Pressure Controls on Commercial Evap-Cooled Multiplex Refrigeration System
SCE	null	Floating Suction Pressure Controls on Commercial Multiplex Refrigeration System
SCE	null	Full Size (= 15 cu. ft) = 20 W/cu. ft Insulated Holding Cabinet
SCE	null	Full Size (>= 15 cu. ft) <= 20 W/cu. ft Insulated Holding Cabinet
SCE	null	Full Size <= 0.4 KW Insulated Holding Cabinet replacing ENERGY STAR Holding Cabinet
SCE	null	High efficiency commercial electric steam cooker
SCE	null	IND CL TO CL LT 0.96 PEI GTE 3HP LTE 50HP-High efficiency clean water pumps
SCE	null	Main Cooler Door Auto Closer
SCE	null	Main Freezer Door Auto Closer
SCE	null	Medium Temperature Display Case Anti-Sweat Heater (ASH) Controls
SCE	null	RF-20965
SCE	null	RI0001
SCE	null	Walk-In Cooler with Auto Door Closer

PA	ESPI_Category	Measure Description
SCE	null	Walk-In Freezer with Auto Door Closer
SCG	null	Automatic Conveyor Broilers Belt Width 20-26"
SCG	null	Automatic Conveyor Broilers Belt Width 20-26"-Gas Only-NV
SCG	null	Commercial Combination Oven-Gas 15-28 pan capacity
SCG	null	Commercial Combination Oven-Gas <15 pan capacity
SCG	null	Commercial Combination Oven-Gas >28pan capacity
SCG	null	Commercial Dishwasher-High Temperature Door-Type Tier 2-Gas Only
SCG	null	Commercial Fryer-Gas
SCG	null	Commercial Full-Size Convection Oven-Gas
SCG	null	Commercial Griddle-Gas per foot
SCG	null	Commercial Rack Oven-Gas
SCG	null	Commercial Steamer-Gas
SCG	null	CommercialBlr-DWH-Large(>200MBtuh)-Tier1(>=84%TE or 0.86%CE)
SCG	null	CommercialBlr-DWH-Large(>200MBtuh)-Tier1(>=84%TE)
SCG	null	CommercialBlr-DWH-Large(>200MBtuh)-Tier2(>=0.90%TE or 0.92%CE)
SCG	null	CommercialBlr-DWH-Large(>200MBtuh)-Tier2(>=90%TE)
SCG	null	CommercialBlr-DWH-Small(<=200MBtuh)-Tier2(>=87%EF)
SCG	null	CommercialBlr-DWH-Small(<=200MBtuh)-Tier2(>=90%EF)
SCG	null	EER Commercial Combination Oven-Gas 15-28 pan capacity
SCG	null	EER Commercial Combination Oven-Gas <15 pan capacity
SCG	null	EER Commercial Combination Oven-Gas >28 pan capacity
SCG	null	EER Commercial Fryer-Gas
SCG	null	EER Commercial Full-Size Convection Oven-Gas
SCG	null	EER Commercial Gas Conveyor Oven Large
SCG	null	EER Commercial Griddle-Gas per foot
SCG	null	EER Commercial Rack Oven-Gas
SCG	null	EER Commercial Steamer-Gas
SCG	null	Efficient Underfired Broiler
SCG	null	Faucet Aerator for Commercial Buildings, Private Lavatory - 0.5 GPM Flow Rate
SCG	null	Faucet Aerator for Commercial Buildings, Private Lavatory - 1.0 GPM Flow Rate
SCG	null	Faucet Aerator for Commercial Buildings, Public Lavatory - 0.5 GPM Flow Rate
SCG	null	Faucet Aerator, Bathroom Sink, 1.5 gpm - Com
SCG	null	Faucet Aerator, Bathroom Sink, Private, 1.0 gpm - Com
SCG	null	Faucet Aerator, Bathroom Sink, Public, 1.0 gpm - Com
SCG	null	Faucet Aerator, Kitchen Sink, 1.5 gpm - Com
SCG	null	Fitting Insulation 1" < pipe <= 4" >15 psig steam Outdoor
SCG	null	Fitting Insulation 1" < pipe <= 4" Hot Water Outdoor
SCG	null	Fitting Insulation > 4" pipe Hot Water Outdoor
SCG	null	Greenhouse Heat Curtain
SCG	null	Infrared Film for Greenhouses
SCG	null	Laminar Flow Restrictor - 0.5 GPM
SCG	null	Laminar Flow Restrictor - 1.0 GPM
SCG	null	Laminar Flow Restrictor - 1.5 GPM
SCG	null	Laminar Flow Restrictor - 2.2 GPM
SCG	null	Large Commercial Fitting Insulation 1" < pipe <= 4" Hot Water Outdoor
SCG	null	Large Commercial Fitting Insulation > 4" pipe Hot Water Outdoor
SCG	null	Large Commercial Pipe Insulation 1" Insulation 1" < pipe <= 4" <=15 psig steam Outdoor
SCG	null	Large Commercial Pipe Insulation 1" Insulation 1" < pipe <= 4" Hot Water Indoor
SCG	null	Large Commercial Pipe Insulation 1" Insulation 1" < pipe <= 4" Hot Water Outdoor
SCG	null	Large Commercial Pipe Insulation 1" Insulation <= 1" pipe Hot Water Indoor
SCG	null	Large Commercial Pipe Insulation 1" Insulation <= 1" pipe Hot Water Outdoor
SCG	null	Large Commercial Pipe Insulation 1" Insulation > 4" pipe <=15 psig steam Outdoor
SCG	null	Large Commercial Pipe Insulation 1" Insulation > 4" pipe Hot Water Indoor
SCG	null	Large Commercial Pipe Insulation 1" Insulation > 4" pipe Hot Water Outdoor
SCG	null	Low Flow Pre-Rinse Spray Valve, 0.75 - 1.07 GPM
SCG	null	Low Flow Pre-Rinse Spray Valve, < .75 GPM
SCG	null	Low Flow Showerhead, 1.5 gpm - Com
SCG	null	Low Flow Showerhead, 1.8 gpm - Com
SCG	null	Modulating Gas Valve for Com Dryers up to 200 lbs cap
SCG	null	NATURAL GAS POOL HEATER >=84% TE
SCG	null	Pipe Insulation 1" Insulation 1" < pipe <= 4" <=15 psig steam Indoor
SCG	null	Pipe Insulation 1" Insulation 1" < pipe <= 4" <=15 psig steam Outdoor
SCG	null	Pipe Insulation 1" Insulation 1" < pipe <= 4" >15 psig steam Indoor
SCG	null	Pipe Insulation 1" Insulation 1" < pipe <= 4" >15 psig steam Outdoor
SCG	null	Pipe Insulation 1" Insulation 1" < pipe <= 4" Hot Water Indoor
SCG	null	Pipe Insulation 1" Insulation 1" < pipe <= 4" Hot Water Outdoor
SCG	null	Pipe Insulation 1" Insulation <= 1" pipe Hot Water Indoor
SCG	null	Pipe Insulation 1" Insulation > 4" pipe >15 psig steam Indoor
SCG	null	Pipe Insulation 1" Insulation > 4" pipe Hot Water Outdoor
SCG	null	Pool Cover-Outdoor
SCG	null	ProcessBoiler-Steam->=83%CE)

PA	ESPI_Category	Measure Description
SCG	null	ProcessBoiler-Water-Tier1(>=85%CE)
SCG	null	Small Commercial Fitting Insulation 1'" < pipe <= 4'" Hot Water_Indoor
SCG	null	Small Commercial Pipe Insulation 1'" Insulation 1'" < pipe <= 4'" >15 psig steam_Indoor
SCG	null	Small Commercial Pipe Insulation 1'" Insulation 1'" < pipe <= 4'" Hot Water_Indoor
SCG	null	Small Commercial Pipe Insulation 1'" Insulation 1'" < pipe <= 4'" Hot Water_Outdoor
SCG	null	Small Commercial Pipe Insulation 1'" Insulation <= 1'" pipe Hot Water_Indoor
SCG	null	Small Commercial Pipe Insulation 1'" Insulation <= 1'" pipe Hot Water_Outdoor
SCG	null	Steam Trap Replacement - Commercial/Other
SCG	null	Tank Insulation - High Temperature Applic. (LF) 2 in, Indoor
SCG	null	Tank Insulation - High Temperature Applic. (LF) 2 in, Outdoor
SCG	null	Tank Insulation - Low Temperature Applic. (LF) 2 in, Indoor
SCG	null	Tank Insulation - Low Temperature Applic. (LF) 2 in, Outdoor
SCG	null	Water Heating -Commercial Pool Heater
SDGE	null	Food Service - Commercial Gas Fryer (SWFS011B)
SDGE	null	Food Service - Convection Oven-Electric (SWFS001B)
SDGE	null	Food Service - Convection Oven-Gas (SWFS001D)
SDGE	null	Food Service - Electric Combination Oven 15 to 28 Pans (Eff>=60) (SWFS003B)
SDGE	null	Food Service - Electric Combination Oven <15 Pans Oven (Eff >= 60) (SWFS003A)
SDGE	null	Food Service - Gas Combination Oven < 15 Pans Oven (Eff>=30) (SWFS003D)
SDGE	null	Food Service - Griddle-Gas (SWFS004B)
SDGE	null	Food Service - IceMach-Commercial Ice Machines IMH 300 to 799 lbs/day (SWFS006E)
SDGE	null	Food Service - IceMach-Commercial Ice Machines RCU 988 or greater lbs/day (SWFS006I)
SDGE	null	Food Service - IceMach-Commercial Ice Machines SCU >200 lbs/day (SWFS006C)
SDGE	null	Heating - Greenhouse Heat Curtain (SWBE001A)
SDGE	null	High Efficiency Ultra Low Temperature Freezer (>= 24 cubic feet)
SDGE	null	Public Lavatory Faucet FCV Commercial Buildings: 1.0 GPM - DI
SDGE	null	Refrigeration - Anti-Sweat Heater Controls
SDGE	null	Refrigeration - New Refrigeration Case w/Doors-Medium Temperature Case (SWCR021A)
SDGE	null	Refrigeration - New Refrigeration Case w/Doors-Special doors Low Temp
SDGE	null	Refrigeration - Special Doors with Low/No ASH on Low Temp Display Case
SDGE	null	Water Heating- Aerator Faucet for Commercial Buildings- Public - 0.5 gpm (SWWH019B)
SDGE	null	Water Heating- Aerator Faucet for Commercial Buildings- Public - 1.0 gpm (SWWH019A)

APPENDIX F:

RESPONSE TO COMMENTS

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Comment #	PA	Location	Page	Topic	Question/Comment	Evaluator Response
1	SDG&E		Page 5-8, CPUC PCG Meeting		The report discusses to consider deemed to custom rollover process. We discussed on the PCG call what "thresholds" or "triggers" could be recommended to better distinguish what could be applicable more for a custom application than deemed, including complexity, referencing the 4 largest projects from the impact evaluation, and incorporate further workpaper requirements. Please incorporate the items shared from the PCG call , as well as any other items for further clarity.	<p>Given current participation trends, the Quantum evaluation team recommends that most ozone laundry projects could be directed to deemed programs and a minority of projects be directed instead to custom. Some of the factors that might result in a project being better suited to custom includes: the large size and sophistication or complexity of a given project. However, there is also a regulatory component of the decision that might over-ride this evaluation focused conclusion.</p> <p>Furthermore, the effectiveness of the ozone laundry measure in leading to energy savings is predicated on the post-installation operations resulting in a reduction in hot water setpoint temperature and a reduction in the use of hot water in a given laundry cycle. However, no thresholds or expectations are established for percent reduction; such thresholds would normally be established using using eligiblity requirements. For example, the evaluation found that projects that did not reduce hot water use in a given laundry cycle by more than 80% tended to have lower realization rates, and hot water temperature reduction of less than 40 deg F also resulted in relatively low realization rates.</p>
2	SDG&E		Page 5-8, CPUC PCG Meeting		The evaluation noted that for SDGE_OzL_11, the customer "did not adjust hot water use per laundry load or change the water temperature settings". Does the evaluator have any insight on why that is? For example, was it due to lack of customer awareness/knowledge or customer preference?	We inquired further and were told that this was due, at least in-part, to lack of customer awareness surrounding changes in operations.
3	PG&E	Overarching		Overarching	PG&E commends the evaluation team for a well-written and thorough draft report. PG&E appreciates the level of content detail provided throughout, such as sample design, explanations of results, sample points, recommendations and supporting data to take action on recommendation, and the application of IESR tables. The draft report reflects best practices in technical report writing.	Thank you for your comments.
4	PG&E	Overarching		Overarching	The draft report contained a few typo's as well as slightly different formatting and font use (e.g., see Table 3-6 footnotes). Can the evaluation team please complete a final copy edit to correct any typo's and ensure consistent formatting before the final report is published?	
5	PG&E	Executive Summary	pp. 1-4	Results	On Page 1-3, there is a footnote that states "all net savings and net-to-gross ratios include the 0.05 market effects adder." However, for Tables 1-1 and 1-2, the evaluated NTGs are not equal to the evaluated net savings divided by evaluated gross savings. The evaluated NTGs appear to be less the 0.05 market effects adder. Can the evaluation team please re-calculate and enter the correct evaluated NTGs in both tables within the report? Can the evaluation team also add the same footnote underneath the two Tables for clarity?	In Tables 1-1 and 1-2, the NTG mentioned is the "evaluated NTG", without the market adder. It is what we estimated during the evaluation. The footnote is meant to alert the reader to the fact that the Evaluated Net Savings divided by the Evaluated Gross Savings represent NTGR plus the 0.05 market adder.
6	PG&E	Executive Summary	pp. 1-6	Process Pumps VFD	Within the recommendations for Agricultural Pump Variable Frequency Drives (VFDs), the report states that "5 pumps run fewer than 1,000 hours per year". PG&E Program considers an average over the life of the crops; younger crops use less water than older ones. For these 5 pumps, can the evaluation team please clarify the possible drivers for running fewer than 1,000 hours per year (e.g., type of crop, age of crop, acres served, etc.) and lessons learned for future workpaper updates or program improvements?	Some of the observed reasons for low run hours in our PY2018/PY2019 samples has included recently planted orchards, where the measure is a well pump but the farmers prefer using district water and where the farmer irrigates a given acreage with more than one pump.
7	PG&E	Executive Summary	pp. 1-6	Process Pumps VFD	Within the Recommendations for Agricultural Pump Variable Frequency Drives (VFDs), the report states that "12 pumps have settings are at or near full load". SWWP005 used automatic controls to determine motor speed. PG&E believes this technology should be promoted over the standard VFD (SWWP002). Can the evaluation team please share any thoughts on this idea?	To our knowledge most farmers use automatic controls to adjust speed in response to rotating irrigation set water requirements, expressed as pressure in the lines. Farmers target a given pressure at the irrigation end-points, even for the measures covered by SWWP002.

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Comment #	PA	Location	Page	Topic	Question/Comment	Evaluator Response
8	PG&E	Executive Summary	pp. 1-6	Process Pumps VFD	Within the Recommendations for Agricultural Pump Variable Frequency Drives (VFDs), the draft report states that "We recommend that the programs make use of interval billing data for characterizing pump operations, including use of those data to derive updated estimates of savings for the pump VFD measure, and as screening criteria for pump run hours." PG&E believes this to be a good suggestion for possible screening and to determine actual run-time hours.	Thank you for your comments.
9	PG&E	Executive Summary	pp. 1-6	Process Pumps VFD	Within the Recommendations for Agricultural Pump Variable Frequency Drives (VFDs), the draft report states that "Some pumps cannot continue to operate without the VFD due to operational requirements, such as the use of VFD controls to automatically adjust pump speed." Can the evaluation team please clarify what "VFD controls" include? Does the VFD include controls such as "pressure difference sensors" of flow sensors?	The operation of the pump varies by farm, but many of the farmers that we talked to used a pressure setting to control the pumps. On the VFD the farmer sets the desired pressure, for example 30 psi, and the VFD modulates the speed to achieve the desired performance.
10	PG&E	Executive Summary	pp. 1-7	Process Pumps VFD	Within the Recommendations for Agricultural Pump Variable Frequency Drives (VFDs), the draft report states that "Furthermore, the VFD pumps can save on equipment maintenance and extend the life of the pump." PG&E agrees that a VFD may extend the life of a motor and installation in general. At the same time, one must also consider that by adding another piece of equipment, the maintenance costs increases for a farmer. And in some cases, VFD's have such complicated controls that a user may not be qualified to operate it and bypass the measure altogether.	We agree, the maintenance costs and the more complicated controls may be barriers for some farmers to install the VFDs. Based on the survey responses many of the participants would have installed the VFDs without the incentive so we recommend that the utilities re-examine ISP to assess whether throttle valve controls represent the baseline for various pump type and size configurations and irrigation applications.
11	PG&E	Executive Summary	pp. 1-7	Process Pumps VFD	Within the Recommendations for Agricultural Pump Variable Frequency Drives (VFDs), the draft report states that "VFD flow controls may already be the most commonly installed approach for certain pump type and size combinations." Can the evaluation team please share any data that support this statement?	<p>The evaluation team can certainly document a finding from an April 2019 PG&E ISP study that found that VFD controls were more likely to be installed in pumps with a capacity greater than 100 HP than in smaller pumps. While we have an understanding of some of the reasons for this differentiation, such as inrush current mitigation, we are not comfortable with the ISP study data collection approach, analysis and conclusions.</p> <p>More generally this ISP study did not develop results as a function of pump type and size, which would have further illuminated differences in ISP by pump segment. For example, the ISP study does not have results that differentiate additional pump size categories for well pumps, such as 150-250 HP pumps, >250 HP, etc.</p> <p>Futhermore, the results were generated by assigning probabilities of VFD purchase based on likelihood of purchase ratings, and evaluators are not comfortable with the probabilities assigned. For example, a score of likely was assigned a 63% probability of purchase.</p> <p>For these reasons we think an ISP study update is warranted.</p>
12	PG&E	Executive Summary	pp. 1-7	Agricultural Irrigation	Within the Recommendations for Agricultural Irrigation, the draft report states that "Agricultural drip irrigation is no longer offered through Pacific Gas and Electric (PG&E) programs". PG&E thanks the evaluation team for acknowledging that this measure has been sunsetted and is considered Industry Standard Practice (ISP) for many crops.	Thank you for your comments.
13	PG&E	Executive Summary	pp. 1-8	Agricultural Irrigation	Within the Recommendations for Agricultural Irrigation, the draft report states that "We recommend that for measures that involve drip irrigation or similar equipment upgrades that the useful life estimates applied should reflect the expected life of the program installed equipment, not the associated irrigation pump." Given that PG&E has retired this measure, can the evaluation team please consider removing this recommendation or else re-phrasing the recommendation to be more generic for future application?	We have slightly rephrased the wording to make the recommendation more applicable to future irrigation offerings.

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Comment #	PA	Location	Page	Topic	Question/Comment	Evaluator Response
14	PG&E	Studied Measure Groups	pp. 2-5	Tankless Water Heater	Regarding Table 2-2: PY2019 Participation Summary – Expected Net Lifecycle Electric Savings (GWh), can the evaluation team please explain within the report why the numbers are very low for the water heating tankless water heater measure group?	Participation for this measure is largely constrained to gas equipment, and the associated 893 records with positive gas savings. The low electric savings in Table 2-2 is due to a lack of participation among electric equipment, and the associated 2 records with positive electric savings.
15	PG&E	Data Sources	pp. 3-13, 3-15	Ozone Laundry	Tables 3-3 and 3-4. Under PY2019 Tracking Population, both "Sites" and "Ex Ante Net Lifecycle Savings (MTherms)" had asterisks, but a footnote or reference explaining the asterisks could not be found. Can the evaluation team please add an explanation for each set of asterisks within the report?	Footnotes have been added that explains each asterisk.
16	PG&E	Data Sources	pp. 3-19	Process Pumps VFD	Table 3-6. PG&E commends the evaluator for explaining the actual counts (the triple asterisk) under the "Sample Design and Data Collection (Farmers)" column. This could easily have been missed and created confusion for a reader.	Thank you for your comments.
17	PG&E	Data Sources	pp. 3-25	Tankless Water Heater	Table 3-9. Under PY2019 Tracking Population, "Distributor Counts" column, "Distributor Counts" appears to be missing the single asterisk as there is a footnote about count of sites found directly underneath the table. Can the evaluation team please confirm whether or not the asterisk is missing, and if so, to add within the report?	Thanks for the observation. We have removed the single-asterisk footnote, as it was an unintentional carryover from the 2018 report.
18	PG&E	Sample Design and Data Collection	pp. 3-12 to 3-27	Sampling	For all measures where a strata is created, it is not clear if sample points were randomly selected within each strata and over-sampled in order to reach the target sample size, OR if all possible sample points were included and the completed actuals reflect sample points that responded to the request to participate. Can the evaluation team please clarify this point within the report?	In general, where measure populations by strata were sufficient in size and good contract information was available, a sample was pulled for gross impact recruitment; where insufficient a census was performed. In general for NTG sampling, a census was performed.
19	PG&E	Gross Results	pp. 5-4	Ozone Laundry	Under the statement that "one sample point out of the total sample size of 7 ozone laundry machines does not save energy," the draft report states that "This project had a relatively large sample-based weight due to the fact that the ex ante claim was roughly 4 times as large as the other 6 projects that we sampled. If not for this one sample point, the sample-weighted mean realization rate for PG&E would have exceeded 1.0, but was instead 0.69." PG&E acknowledges that program eligibility screening should be strengthened to exclude ineligible projects from participation. At the same time, PG&E hopes that the resulting lowered GRR does not impact the PAs ability to claim future savings for this measure when the sample point may not have been representative of the measure population.	This finding should not impact future saving claims.
20	PG&E	Gross Results	pp. 5-7	Typo	Within the paragraph that begins with "In Table 5-5, we present ...", the second sentence refers to "PG&E gross impact results", which may have been a typo and should have read, "SDG&E gross impact results." Can the evaluation team please confirm and correct this typo within the report?	Changed to SDG&E
21	PG&E	Gross Results	pp. 5-24	Process Pumps VFD	Table 5-15. Under the "Pump Peak Coinc. Factor" column, it shows there were 10 instances of this discrepancy. However, on pp. 5-25, within the second observation, it was stated that 9 well pumps were not observed to operate at the time of coincident peak. After reviewing Table 5-14 on pp. 5-23, it appears that PGE_Booster_9 may have been incorrectly indicated. Can the evaluation team please review and confirm the indicator, and correct within the report, if needed?	Both the table and the observation are correct. The indicators in the table indicate if the pump has a coincidence factor less than 0.5, while the observation is pointing out that there are 9 pumps that have zero peak demand savings. There is one pump that has a coincidence factor that is less than 0.5, so a 1 in the table, but the demand savings is greater than 0.

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Comment #	PA	Location	Page	Topic	Question/Comment	Evaluator Response
22	PG&E	Gross Results	pp. 5-3 to 5-52	Discrepancy Tables	PG&E commends the evaluation team for providing the excellent tables (e.g., Tables 5-2, 5-11, 5-15, 5-33, 5-40) describing the discrepancy factor per measure. These were useful to know what key drivers impacted the evaluated savings estimates up or down from report savings estimates. To allow an opportunity for PAs to identify possible areas of program improvements, can the evaluation team please provide, in a secure manner, a map of the evaluated sample point identifiers and its corresponding Claim ID or Project IDs to assist the PAs in researching specific projects (e.g., zero-savers); understanding any failures in project screening, if applicable; and identify opportunities for program improvement?	The CPUC has elected to not comply with this request. There is a desire to retain confidentiality of respondent reports.
23	PG&E	Net-to-Gross Analysis	pp. 6-3	Score PAI-2	Can the evaluation team please clarify within the report how N42 was accounted for in the PAI-2 Score?	N42 is not used in the PAI-2 score. N42 is asked as a consistency check to make sure that N41 + N42 = 10.
24	PG&E	Net-to-Gross Analysis	pp. 6-6	Ozone Laundry	Can the evaluation team please explain why the target number of sites (n=7) was not met? Are there ways that the PA and the evaluation team can improve future processes in order to meet the target sample size?	The target sample size for data collection of 7 sites was achieved, as shown in Table 3-3. However, the site contact was unable to provide responses to the NTG related questions in 4 instances. In three of these instances, the decision maker no longer worked for the company, and in the other instance we were unable to make contact with the decision maker. We attempted to supplement the NTG sample with other participants that had not already been visited, but because of the small participant population, we were only able to complete one additional NTG survey. We do coordinate with the PAs to assist us with data collection, but recruitment for these types of activities always provide challenges, particularly with small participant populations.
25	PG&E	Conclusions and Recommendations	pp. 8-2	Ozone Laundry	Regarding "Recommendation POL2", it is not clear if the evaluation report is recommending that the measure overall would be better served through a custom program channel, OR that eligibility requirements should be updated in a way such that some projects, such as large-scale projects, should run through a custom channel, while all others should run through a deemed channel. Can the evaluation team please clarify this recommendation within the report? If the latter, can the evaluation team please include suggestions on parameters or thresholds that can differentiate between a deemed versus custom channel?	Given current participation trends, the Quantum evaluation team recommends that most ozone laundry projects could be directed to deemed programs and a minority of projects be directed instead to custom. Some of the factors that might result in a project being better suited to custom includes: the large size and sophistication or complexity of a given project. However, there is also a regulatory component of the decision that might over-ride this evaluation focused conclusion.
26	PG&E	Conclusions and Recommendations	pp. 8-5	Process Pumps VFD	Regarding "Conclusion PPVD3", the evaluation team cited common reasons that farmers decide to install VFD controls, which results in "high free ridership rate for VFD controls because a considerable number of farmers indicate they would have installed VFD controls independent of the program / incentive." While PG&E acknowledges that this could indeed be the case, PG&E also recognizes that decision-making criteria may differ among customer segments (e.g., larger customers/projects versus smaller customers/projects). Can the report please acknowledge that the free ridership results may not be applicable to the customer population and may only apply to a customer segment? In addition, PG&E recommends that future evaluations consider a natural segmentation, for example based on size (e.g., acreage), and group the results accordingly.	That is a good point that decision making criteria could vary among larger versus smaller customers, and good to take into consideration for future evaluation sample designs as you suggest. The comments that you reference from the report are more focused on size of pump due to electric service requirements (i.e., current inrush considerations), the need for automated pressure adjustments with irrigation set rotation, and remote control of pumps (i.e., telemetry), among other factors. This comment also invokes concerns that the evaluation team has with the lack of sufficient pump type and size segmentation from a recently completed ISP study. We believe the ISP study/segmentation should be updated due to these concerns.
27	PG&E	Conclusions and Recommendations	pp. 8-10	Tankless Water Heater	Regarding "Conclusion TWH4 [Section 5]: We found that water heaters operated at different temperatures than assumed in the applicable workpapers, which negatively affected the savings estimates," can the evaluation team please confirm within the report if these are DEER model data (operating temperatures)?	Since the PG&E and SCG workpapers reference DEER models for unit energy savings derivation, we believe that the ex ante savings reflect temperatures assumed in DEER models.

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Comment #	PA	Location	Page	Topic	Question/Comment	Evaluator Response
28	PG&E	Appendix AA	pp. AA-1 to AA-13	Pass-thru savings	The evaluation included 69,528 MTherms of Gross Lifecycle Savings that were passed through for PG&E, representing 82.4% of the MTherms covered by the evaluation. There appeared to be similarly high percent of pass through for Therms in Net Lifecycle Savings, Gross First Year Savings, and Net First Year Savings. Can the evaluation team please clarify what measures were included in the passed through savings?	Appendix E contains the exhaustive list of measures that were assigned to the Small Commercial evaluation: evaluated measures appear first, with the corresponding ESPI category, followed by non-evaluated (pass through) measures, with ESPI category set to "null". Appendix AA shows results for the evaluated measures (by ESPI category), with all other measures lumped into a "passthrough" category for each PA. To the extent that some of the evaluated measures (e.g. SDG&E process pump VFD claims) were also passed through, they are specified in Appendix AA under "ESPI category_passthrough."
29	SCG		Page 1-5	Ozone Laundry	The evaluation results prove the measures' effectiveness in energy and water savings. The first subsection does not contain any recommendations, but rather just a finding. SoCalGas suggests changing the title of 1-5 to be Conclusions and Recommendations or remove the first subsection entirely. The second subsection could benefit from a more explicit explanation of why the one project would benefit from participating in a custom program, e.g., custom programs have a higher degree of customer engagement/education, etc.	<p>First the evaluation team would like to contest the statement that we concluded there was generally a reduction in combined hot and cold water use. In fact, a major primary source of prototypical laundry cycle information suggests that water use would generally increase.</p> <p>The evaluation team included a recommendation to continue offering ozone laundry and to increase participation using marketing and outreach.</p> <p>In the report we explain that custom program projects typically undergo a more rigorous verification of operating conditions that are in-turn incorporated within the project saving estimates.</p>
30	SCG		Page 1-6	Ozone Laundry	The finding states that there was evidence that 2 sites out of 35 replaced existing ozone laundry equipment with new equipment. Will Quantum Energy Analytics provide SoCalGas with specific information of these sites so the program advisors can learn from the situation for future program implementations? In retrospect, although this measure has been sunset from SoCalGas deemed savings program, it is common to not have a pre-inspections in deemed measure offerings.	<p>The CPUC has elected to not comply with this request. There is a desire to retain confidentiality of respondent reports.</p> <p>Regarding pre-inspection, we feel that is an important component of implementation that may actually be increasing in importance as measures move from downstream to midstream/upstream offerings, and perhaps as third-party implementation becomes more commonplace.</p>
31	SCG		Page 3-12	Ozone Laundry	It says, under the second Implications, "... we created certainty stratum..." Can Quantum Energy Analytics explain what "certainty" consists of? Table 3-3 shows Certainty as a measure group, but its meaning is unclear. Also, SoCalGas completed sample points only include Nursing Homes measure group, and zero for Certainty. Would it be not represented enough since other IOUs have a least one for each stratum?	<p>We changed the Table 3-3 heading to indicate strata instead of group.</p> <p>The certainty stratum consists of the largest projects for each PA.</p> <p>Attempts to achieve an SCG complete for the certainty stratum were unsuccessful. This means that the resulting SCG sample was not as representative as we would have hoped.</p> <p>Nursing homes in SCG territory account for 77% of total savings, and the completed sample indicates a GRR of 1.1. We felt that this was appropriate to apply to the entire population, rather than under-estimate achieved savings by passing through the claims for all sites other than nursing homes.</p>
32	SCG		Page 3-24	Ozone Laundry	It mentions that the evaluation team conducted professional interviews among six distributors representing 83% of PY2019 savings. However, table 3-9 shows 7 distributors and 84% savings.	Assume this comment is actually for Tankless Water Heaters. We have corrected the text to be consistent with the table.

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Comment #	PA	Location	Page	Topic	Question/Comment	Evaluator Response
33	SCG		Page 4-6	Ozone Laundry	The evaluation team accepts the workpaper-based EUL estimate of 10 years. Why does it require no further research to accept this? How was it accepted? Will the evaluators extend this proper EUL consideration for AEO equipment portfolio wide?	<p>The evaluation team searched DEER and did not locate an EUL estimate for ozone laundry from that source; this included review of the DEER2014 EUL table update. Additional brief searches did not uncover other sources for an EUL estimate. The workpaper references a source that is no longer available online for inspection. For these reasons evaluators simply accepted the workpaper value, which is standard operating procedure in evaluation work, once other potential sources have been eliminated.</p> <p>The evaluation made an exception to CPUC EUL policy surrounding add-on equipment (AOE), whereby the EUL is set equal to one-third of the EUL of the host equipment. In this case the host equipment are laundry machines, which can be readily replaced without substantially affecting ozone machine functionality and ability to deliver long-term savings. This special circumstance for ozone laundry machines may also be relevant to other AOE equipment, but such decisions should be made/applied on a case-by-case basis. The PAs might also be able to make a case for bypassing CPUC policy for certain measures under similar circumstances.</p>
34	SCG		Page 5-9	Ozone Laundry	It is mentioned that hot water temperature reduction settings played a role in low realization rate, in conjunction with a low number of wash cycles per day. Do the evaluators explore the information from the customers to see what was the drive? Would it be either due to lack of knowledge of the new technology or being unaware of the issue?	<p>In general a low reduction in hot water setpoint was due to the pre-installation setting being relatively low, for example 135 deg F; in general, for most points in the sample the post-installation setpoint temperature was somewhat, but not substantially lower than that.</p> <p>A low or high number of wash cycles is simply a matter of demand per laundry machine for linen washing.</p> <p>Therefore these drivers are not due to lack of awareness or knowledge.</p>
35	SCG		Section 8-1	Ozone Laundry	See comment for Page 1-5 above.	<p>First the evaluation team would like to contest the statement that we concluded there was generally a reduction in combined hot and cold water use. In fact, a major primary source of prototypical laundry cycle information suggests that water use would generally increase.</p> <p>The evaluation team included a recommendation to continue offering ozone laundry and to increase participation using marketing and outreach.</p> <p>In the report we explain that custom program projects typically undergo a more rigorous verification of operating conditions that are in-turn incorporated within the project saving estimates.</p>
36	SCG		Page 1-8	Tankless Water Heater	“Three claimed projects occurred at facilities that have since permanently closed, and six projects were claimed at service addresses that had no evidence of recent tankless water installations.” SoCalGas is interested to learn about the details of these projects to identify where the gaps are. Furthermore, although this is a PY2019 evaluation, the survey and research were done during the COVID-19 pandemic. Why there is no indication whether COVID-19 has any influence? Could there be an impact on a business that was found to be closed or the survey results that, in turn, would influence the net-to-gross ratio? SoCalGas’s midstream program will also be sunset at the end of April 2021 and will be replaced with the new Statewide Midstream Heating program, which will encompass a more thorough and comprehensive review process, including onsite inspection, to ensure that incidents like this will not occur.	<p>The CPUC has elected to not comply with this request for additional site-level information. There is a desire to retain confidentiality of respondent reports.</p> <p>Regarding the effects of COVID-19, we confirmed for the three closed businesses that the businesses were permanently closed, not temporarily due to the pandemic. For other projects, we asked the survey respondents to consider typical, pre-pandemic operating conditions. Many respondents indicated that the pandemic had not affected their DHW set-points or usage patterns, but for those that did indicate a COVID influence, we made sure to collect information related to pre-pandemic conditions.</p>

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Comment #	PA	Location	Page	Topic	Question/Comment	Evaluator Response
37	SCG		Page 3-21	Tankless Water Heater	As noted on page 3-21, the midstream delivery resulted in end use contact information (and possibly location) being a challenge. This is reinforced on pages 3-24 and 3-26. While it is possible these were initially at a service location in the tracking system, they may be moved to another location, use or out of state (among other explanations). Given this uncertainty, should it be agreed to leave them in to calculate a preliminary GRR. However, since there is uncertainty, the evaluator should use that same GRR to calculate a credit (it is understood that is the GRR applied to the (unknown with certainty) population. Thus the -20% negative effect on the GRR would become close to -4% if the preliminary GRR is 80%, and the final GRR for SCG would be 3% - figures not exact).	Since the tankless water heater measure is still being delivered in a midstream fashion, we believe the GRR--inclusive of the non-installs-- is representative of program performance and should be prospectively applied. Evaluation sampling is intended to ensure that the three SCG non-installs are representative of other unsampled SCG projects in the population. If any significant changes occur to program design, measure eligibility, or delivery method, we agree that the GRR could be reexamined to exclude the non-installs that are symptomatic of a midstream program.
38	SCG		Table 5-38	Tankless Water Heater	Table 5-38: The last 5 projects for SoCalGas show zero as the size of the installed equipment. Yet, ex-post savings and GRR are present. How were these evaluated? What baseline was used for these projects? Why couldn't the size of the equipment be identified? What do these zeros represent?	The capacities for the last 5 projects have been added to the table; apologies for the oversight.
39	SCG		Pages 5-50 and 5-51	Tankless Water Heater	The evaluation found that three projects installed systems with slightly different in size than the reported by the program and identified inconsistencies between workpaper-recommended UES and those reflected within the reported ex-ante savings claims. SoCalGas would like to know the detail of these projects. This should be part of SoCalGas' lessons-learned for future programs.	Please see response to comment 36.
40	SCG		Page 6-3	Tankless Water Heater	The PAI-2 score = N41/2, which discounts the importance of the program by 50% if the decision was made before. We expect the N41 score to be low anyway. Please consider removing this unsubstantiated score.	Thank you for the comment. The NTG scoring algorithm was developed by the Net-To-Gross working group several years ago and went through a considerable vetting process. A new working group was formed for the PY2018 evaluation and revisited and revised the algorithm, and decided to continue to use the N41 adjustment. Also, note that the effect of removing the adjustment based on the N41 score would only increase the NTGR by 0.02 for tankless water heaters.
41	SCG		Page 6-3	Tankless Water Heater	What is the use of the N42 score? Is it informative only? Would Quantum Energy Analytics consider using the PAI-N6 score only if it's valid instead of averaging with the PAI-1 and PAI-2 scores, as the same question is asked twice and some double counting results?	N42 is asked as a consistency check to make sure that N41 + N42 = 10. As mentioned above, the NTG algorithm went under review for PY2018 and the N6 score was added to the approach. We feel this question complements the other PAI scores and is not duplicative.
42	SCG	Section 3-1-2		Other	Section 1-1: Program administrators were mentioned but readers are not clear who they are since no IOUs names are included.	Footnotes were added to the top of chapter 1 and 2 to list the names of the IOUs as program administrators.
43	SCG	Section 3-1-2			Section 3-1-2: PG&E and SCG were not spelled out prior to this point.	In the footnote referenced in the line above we also provide the acronym for each program administrator in chapter 2.
44	SCG	Section 5-4	Page 3-12		The word "Furthermore" was used twice two consecutive paragraphs.	We removed the second use of furthermore.
45	SCG				Section 5-4: DHW is not defined or spelled out prior to this point.	Thanks for the observation; we have defined the DHW abbreviation at its first appearance in Section 4.4.

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Comment #	PA	Location	Page	Topic	Question/Comment	Evaluator Response
46	SCG	Overall			<p>Overall: There is no in-depth discussion on the COVID-19 pandemic and how it impacted customer operations, usage levels, etc. How did the remote gross data collection vs. the on-site collection due to COVID-19 hinder or aid the accuracy of the evaluation results? What areas were most affected and how?</p> <p>SCE will also review how we have calculated EUL estimates for Pumping Process measures as identified in the report.</p>	<p>Evaluators do not believe it is necessary within the body of the report to include discussion of the impacts of COVID. Evaluators have communicated this verbally to the PCG and during webinars, and included substantial discussion within the workplan.</p> <p>Impacts of COVID on customer operations varied by measure and sample point -- there were some temporary closures, some increases in production levels, some decreases in production levels, etc.; there were also a substantial number of points that were unaffected -- especially for the two agricultural measures.</p> <p>COVID did hinder evaluation data collection in some ways; for example, not always being able to observe conditions, and thus there was a greater reliance on customer reports, but also use of remote data collection approaches to facilitate direct observations for equipment nameplates, settings, etc.</p> <p>We don't believe that COVID aided data collection in any way, but did allow for field data collection cost savings, and for NTG the collection of data for a larger number of participating projects and/or decision makers.</p> <p>Regarding EUL; we appreciate the follow-through.</p>
47	SCG	Chapter 5	Pages 5-45 and 5-46	Tankless Water Heater	<p>This is in response to Page 5-45 and 5-46 of the report. The report states that the inlet water temperature of the cool water in the larger systems was higher than the workpaper assumption due to municipal water mixing with warm water from the return of the loop. The water heater calculator that the workpaper is based off of doesn't consider loop losses from a DHW loop system, and only considers how much energy it will take to heat up the makeup water to raise to the setpoint. Using a weighted average of makeup plus return temperature is not really accurate because you would also have to consider the additional losses from the loop that the workpaper does not consider.</p>	<p>We have made a couple revisions to the latest version of the Small Commercial report to account for the 5 closed-loop TWH systems evaluated in PY2019. Table 5-36 presents average DHW temperature values weighted by equipment capacity. These values do not directly affect the GRRs and NRRs but are presented for informational purposes. We agree with SCG that the closed-loop temperatures should not be included in these weighted averages, as the programs are intended to exclude closed-loop systems from participating, per the workpapers (notwithstanding the difficulties for a midstream program to do so). We therefore have added a footnote to Table 5-36, and have revised the TWH recommendations in Sections 1 and 8, to differentiate closed-loop from open-loop temperature averages.</p>
48	SCE			Overall scope of comments from SCE	<p>SCE organizes our comments along the major recommendations of this draft that are associated with Process Pumping Installations, which represents the overwhelming majority of SCE's evaluated ex ante claims examined in this draft report. It should be noted that SCE's Deemed Program for Small and Medium Commercial will sunset at the end of PY 2021.</p>	<p>Thank you for your comments.</p>

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49	SCE			Pump VFD -Project Screening, Application and Review (Conclusions and Recommendations are cited)	SCE has invested substantially in improving the quality of custom projects and has taken the statewide lead in codifying the qualification of custom project. On the deemed side, we work closely with Energy Division to revise workpapers that do not represent realistic estimates of measure savings. The study has highlighted gaps in the application of Measure Application Types which we will address for the Pumping Process measure and other deemed offerings as well. SCE will also review how we have calculated EUL estimates for Pumping Process measures as identified in the report. SCE supports the concept of enhancing deemed savings with existing customer data such as pump performance and meter data and expects that this idea will be examined by the program implementation team that takes these programs forward as they sunset.	We appreciate the follow-through on the evaluation-based recommendations.
50	SCE			Baseline Recommendations	As noted above, the idea of enhancing workpaper based savings with additional customer and project data makes sense for process pump measures and we expect these ideas to be implemented by third party programs going forward. The enhancement of our workpapers to account for pump type and size variations (and other parameters) makes sense to the extent that we do lose the benefits of low cost, deemed offerings versus a customized offering. Again, we expect these improvements to be studied closely by third party providers of small and medium programs as ours sunset.	We appreciate the follow-through on the evaluation-based recommendations.
51	SCE			Program Tracking Systems	SCE is updating or Customer Service system and we expect to implement these changes and improvements as identified in the Draft Report.	We appreciate the follow-through on the evaluation-based recommendations.
52	SCE			Workpaper Applications	SCE will integrate these results into our workpapers where appropriate. We anticipate that the statewide TRM process will reflect impact evaluation results as well as we transition to third-party programs.	We appreciate the follow-through on the evaluation-based recommendations.