

Application: 25-05-
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Exhibit No.: (PG&E-5)
Date: May 15, 2025
Witness(es): Various

PACIFIC GAS AND ELECTRIC COMPANY

2027 GENERAL RATE CASE

EXHIBIT (PG&E-5)

ENERGY SUPPLY

WORKPAPERS SUPPORTING

PREPARED TESTIMONY CHAPTERS 4-7

VOLUME 2 OF 2

(PUBLIC)



Pacific Gas and Electric Company
2027 General Rate Case
Workpapers Supporting
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations
(Public Version)
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Tim Wisdom

Date

Table 4-1
Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage
Expenses by Major Work Category
(Thousands of Nominal Dollars)

Line No.	MWC	Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	Reference
1	AB	Misc Expense	2,410	2,360	18	2,128	1,759	1,777	1,809	1,851	WP 4-3, Line 2
2	AK	Manage Environmental Oper	12,986	14,580	2,286	14,805	15,828	15,827	16,119	16,488	WP 4-3, Line 7
3	KK	Operate Fossil Generation	28,420	32,180	29,565	32,899	33,727	36,412	37,105	40,174	WP 4-3, Line 19
4	KL	Maint Fossil Generating Equip	2,238	2,303	2,948	2,934	2,906	2,934	2,988	3,057	WP 4-4, Line 35
5	KM	Maint Fossil Bldg, Grnd, Infrast	1,080	882	2,433	3,407	2,972	1,693	1,728	1,763	WP 4-4, Line 41
6	KQ	Operate Alternative Gen	1,608	807	4,312	3,906	6,745	6,549	6,670	6,823	WP 4-4, Line 57
7	KR	Maint AltGen Generating Equip	430	657	338	911	465	470	479	490	WP 4-5, Line 76
8	KS	Maint AltGen Bldg, Grnd, Infrast	137	62	126	346	941	1,320	1,344	5,000	WP 4-5, Line 90
9	MA	Energy Storage Expense	21	37	(10)	16	57	172	178	185	WP 4-5, Line 93
10	OM	Operational Management			(137)	(55)	(119)	(302)	(313)	(325)	WP 4-5, Line 103
11	OS	Operational Support									WP 4-6, Line 112
12	Total		49,329	54,193	57,248	61,297	65,279	66,852	68,107	75,507	Sum Lines 1-11

Table 4-2
Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage
Expenses by Major Work Category
(Thousands of Base Year Dollars)

Line No.	MWC	Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast
1	AB	Misc Expense			19					
2	AK	Manage Environmental Oper	2,986	2,761	2,434	2,174	1,759	1,765	1,770	1,774
3	KK	Operate Fossil Generation	15,660	16,705	16,416	15,214	15,828	15,727	15,770	15,802
4	KL	Maint Fossil Generating Equip	35,959	38,149	31,422	33,478	33,727	36,182	36,302	38,503
5	KM	Maint Fossil Bldg, Grnd, Infrast	2,856	2,747	3,129	2,979	2,906	2,916	2,924	2,930
6	KQ	Operate Alternative Gen	1,320	1,021	2,602	3,509	2,972	1,682	1,691	1,690
7	KR	Maint AltGen Generating Equip	2,013	971	4,582	3,978	6,745	6,508	6,525	6,539
8	KS	Maint AltGen Bldg, Grnd, Infrast	548	782	360	926	465	467	468	470
9	MA	Energy Storage Expense		71	135	349	941	1,312	1,315	4,792
10	OM	Operational Management	158	367	(11)	17	57	171	174	177
11	OS	Operational Support	23	41	(147)	(56)	(119)	(300)	(306)	(311)
12	Total		61,524	63,616	60,940	62,567	65,279	66,429	66,633	72,366

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Recorded and Forecast Expense by Planning Order
(Thousands of Dollars)

Line No.	MWC	Planning Order	Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	Reference
1	AB	5278303	Elkhorn Ribbon Cutting	0	0	18	0	0	0	0	0	
2	AB	Total		0	0	18	0	0	0	0	0	Line 1
3												
4	AK	5015792	GBS Manage Environmental Operations	627	542	567	759	610	616	628	642	
5	AK	5016229	GBS Manage Environmental Operations	467	589	451	422	329	332	338	346	
6	AK	5016233	HBGS Manage Environmental Operations	1,316	1,228	1,268	947	820	828	843	863	
7	AK	Total		2,410	2,360	2,286	2,128	1,759	1,777	1,809	1,851	Lines 4-6
8												
9	KK	5015793	GBS Operate Fossil Generation Facilities	4,140	4,500	4,830	5,284	5,571	5,627	5,731	5,862	
10	KK	5015949	HBGS Operate Fossil Generation Facilities	3,538	3,793	4,131	3,951	4,549	4,595	4,680	4,787	
11	KK	5015950	GBS Operate Fossil Generation Facilities	4,989	5,045	5,786	5,579	5,404	5,458	5,559	5,686	
12	KK	5043611	PCC 15860 - Portfolio Strategy - Fossil	48	52	42	33	0	0	0	0	
13	KK	5043758	SCV - 13959 - Gateway Gen Sta - MWC KK	185	193	115	-37	52	0	0	0	
14	KK	5043760	SCV - 14535 - Humboldt Bay GS - MWC KK	168	228	39	-65	15	0	0	0	
15	KK	5043761	SCV - 14536 - Colusa Gen Sta - MWC KK	-81	770	228	-38	92	0	0	0	
16	KK	5062956	GBS O&M - Fleet Rentals	0	0	27	0	0	0	0	0	
17	KK	5062957	HBGS O&M - Fleet Rentals	0	0	140	98	145	147	150	153	
18	KK	5062958	GBS O&M - Fleet Rentals	0	0	32	0	0	0	0	0	
19	KK	Total		12,986	14,580	15,369	14,805	15,828	15,827	16,119	16,488	Lines 9-18
20												
21	KL	5015794	GBS Maint Fossil Generating Equip	4,172	4,194	5,067	4,589	4,343	4,387	4,468	4,570	
22	KL	5016230	GBS Maint Fossil Generating Equip	4,916	6,819	4,457	5,285	5,134	5,189	5,284	5,405	
23	KL	5016234	HBGS Maint Fossil Generating Equip	3,093	2,966	3,662	4,789	4,915	4,965	5,066	5,172	
24	KL	5021910	GBS Piping Repair/Mitigation	1	0	2	4	0	0	0	0	
25	KL	5021917	GBS Piping Repair/Mitigation	1	81	4	0	0	0	0	0	
26	KL	5037616	Cost Model Adjustment-KL				1					
27	KL	5236248	HBGS Annual Engine Outages	1,924	2,429	2,205	3,008	2,321	2,968	3,038	3,316	
28	KL	5246184	GBS LTSA Outages	5,479	4,509	5,472	5,083	5,171	5,229	5,310	6,506	
29	KL	5247633	GBS Spring Outages	1,373	2,601	1,825	2,183	2,751	3,230	3,306	3,568	
30	KL	5247923	GBS Spring Outages	1,603	1,543	2,023	1,775	2,808	4,077	4,173	4,586	
31	KL	5248293	GBS LTSA Outages	5,857	7,038	4,786	6,182	6,293	6,367	6,470	7,051	
32	KL	5254673	HBGS Annual Turbo Charger Maintenance	3								
33	KL	5275572	HBGS IT Level Support for Remote Access		0	63		-9				
34	KL	5285016	GBS 2024 Incident Response									
35	KL	Total		28,420	32,180	29,565	32,899	33,727	36,412	37,105	40,174	Lines 22-34
36												

Pacific Gas and Electric Company
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Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Recorded and Forecast Expense by Planning Order
(Thousands of Dollars)

Line No.	MWC	Planning Order	Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	Reference
37	KM	5015796	GGs Maint Fossil Bldg, Grnd, Infrast.	9	149	382	510	277	280	285	292	
38	KM	5016232	CGS Maint Fossil Bldg, Grnd, Infrast.	2,039	2,081	2,184	2,317	2,468	2,493	2,539	2,597	
39	KM	5016236	HBGS Maint Fossil Bldg, Grnd, Infrast.	190	73	382	107	180	161	164	168	
40	KM	5037615	Cost Model Adjustment-KM	0	0	0	0	1	0	0	0	
41	KM Total			2,238	2,303	2,948	2,934	2,906	2,934	2,988	3,057	Lines 38-40
42												
43	KQ	5021915	CSUEB Fuel Cell Operations (GRC)	142	82	0	0	0	0	0	0	
44	KQ	5021926	SF State Fuel Cell Operations (GRC)	263	108	0	0	0	0	0	0	
45	KQ	5021929	Vaca-Dixon PV Operations (GRC)	108	74	65	63	74	75	77	78	
46	KQ	5029754	Cantua PV Operations GRC	81	64	95	78	75	76	77	79	
47	KQ	5029757	Five Points PV Operations GRC	59	81	98	40	92	93	94	97	
48	KQ	5029760	Gates 1 PV Operations GRC	39	128	123	73	76	77	79	80	
49	KQ	5029763	Giffen PV Operations GRC	64	50	61	49	48	49	50	51	
50	KQ	5029766	Guernsey PV Operations GRC	42	56	111	106	102	103	105	108	
51	KQ	5029789	Huron PV Operations GRC	70	53	89	64	86	87	89	91	
52	KQ	5029792	Stroud PV Operate GRC	102	72	127	115	76	77	78	80	
53	KQ	5029795	West Gates PV Operations GRC	31	25	42	17	10	10	10	10	
54	KQ	5029798	Westside PV Operations GRC	78	90	129	113	164	166	169	173	
55	KQ	5037624	Cost Model Adjustment-KQ	0	0	0	0	0	0	0	0	
56	KQ	5063469	Elkhorn BESS - Operate GRC	0	0	1,493	2,690	2,167	880	900	916	
57	KQ Total			1,080	882	2,433	3,407	2,972	1,693	1,728	1,763	Lines 43-56
58												
59	KR	5014670	AT&T Solar Maintenance	50	41	32	112	215	0	0	0	
60	KR	5021914	CSUEB Fuel Cell Maintenance (GRC)	183	214	0	0	0	0	0	0	
61	KR	5021925	SF State Fuel Cell Maintenance (GRC)	346	193	0	0	0	0	0	0	
62	KR	5021928	Vaca-Dixon PV Maintain Gen Fac (GRC)	16	14	23	50	54	55	56	57	
63	KR	5025055	AltGen SCV - MWC KR Maint AltGen Gen	0	0	0	0	0	0	0	0	
64	KR	5029753	Cantua PV Maint Gen Eq GRC	94	46	53	83	160	161	164	168	
65	KR	5029756	Five Points PV Maint Gen Eq GRC	53	70	183	77	180	182	186	190	
66	KR	5029759	Gates 1 PV Maint Gen EQ GRC	22	62	46	38	133	135	137	140	
67	KR	5029762	Giffen PV Maint Gen EQ GRC	21	18	34	54	81	83	85	85	
68	KR	5029764	Guernsey PV Maint Gen EQ GRC	68	29	249	329	327	330	336	344	
69	KR	5029768	Huron PV Maint Gen EQ GRC	39	10	99	221	98	99	101	103	
70	KR	5029791	Stroud PV Maint Gen EQ GRC	659	26	250	138	99	100	102	104	
71	KR	5029794	West Gates PV Maint Gen EQ GRC	13	15	57	40	25	25	25	26	
72	KR	5029797	Westside PV Maint Gen EQ GRC	42	489	180	120	108	109	111	114	
73	KR	5037614	Cost Model Adjustment-KR	0	0	0	0	0	0	0	0	
74	KR	5060450	SCV - 14733 RENEWABLES O&M - MWC KR	0	-422	-37	-65	47	0	0	0	
75	KR	5063470	Elkhorn BESS - Maintain GRC	0	0	3,142	2,708	5,220	5,272	5,369	5,492	
76	KR Total			1,608	807	4,312	3,906	6,745	6,549	6,670	6,823	Lines 59-75

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Recorded and Forecast Expense by Planning Order
(Thousands of Dollars)

Line No.	MWC	Planning Order	Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	Reference
77												
78	KS	5021924	SF State Fuel Cell Maintain Buildings (G	0	0	0	0	0	0	0	0	
79	KS	5021927	Vaca-Dixon PV Maintain Buildings (GRC)	0	52	14	40	32	32	32	33	
80	KS	5029752	Cantua PV Maint Bldgs & Grnd GRC	55	69	19	37	43	43	44	45	
81	KS	5029755	Five Points PV Maint Bldgs & Gmd GRC	54	80	23	36	41	41	42	43	
82	KS	5029758	Gates 1 Maint Bldgs & Grnds GRC	40	125	125	40	40	40	41	42	
83	KS	5029761	Giffen PV Maint Bldgs & Grnds GRC	35	42	17	33	39	39	40	41	
84	KS	5029765	Guernsey PV Maint Bldgs & Grnds GRC	60	78	35	514	59	59	60	62	
85	KS	5029767	Huron PV Maint Bldgs & Grnds GRC	57	57	18	32	48	49	50	51	
86	KS	5029790	Stroud PV Maint Bldgs & Grnds GRC	52	61	22	35	49	49	50	51	
87	KS	5029793	West Gates PV Maint Bldgs & Grnds GRC	24	30	16	36	40	40	41	42	
88	KS	5029796	Westside PV Maint Bldg & Grnds GRC	55	64	18	34	39	40	40	41	
89	KS	5063471	Elkhorn BESS- Mnt Bldg & Infra GRC	0	0	30	75	37	37	38	39	
90	KS	KS Total		430	657	338	911	465	470	479	490	Lines 78-89
91												
92	MA	5285372	PG Energy Storage	0	62	126	346	941	1,320	1,344	5,000	WP 4-146
93	MA	MA Total		0	62	126	346	941	1,320	1,344	5,000	Line 92
94												
95	OM	5033728	Oper Mgmt Oth PGEN PCC 12676	68	184				140	145	151	
96	OM	5034339	Oper Mgmt Oth PGEN Cap OH Cr	-7	-14	-37	-36	-53	-263	-273	-283	
97	OM	5043269	Oper Mgmt Steam 12676	22	112				202	209	217	
98	OM	5043310	Oper Mgmt Steam Cap OH Cr	-2								
99	OM	5044312	Oper Mgmt Oth PGEN PCC 11566	16	18	8	32	88	26	27	28	
100	OM	5047672	Oper Mgmt PGEN PCC 13733	35	13	18	20	21	22	23	23	
101	OM	5047673	Oper Mgmt PGEN PCC 12692	5	11				44	46	47	
102	OM	5050912	Oper Mgmt Steam 11566			-10	16	57	172	178	185	Lines 95-102
103	OM	OM Total		137	324	-10	16	57	172	178	185	

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Natural Gas and Solar Generation Operations
Recorded and Forecast Expense by Planning Order
(Thousands of Dollars)

Line No.	MWC	Planning Order	Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	Reference
104												
105	OS	5033934	Oper Suppt Oth P GEN PCC 14703	133	228	135	159	317	82	85	88	
106	OS	5033935	Oper Suppt Oth P GEN PCC 15056	22								
107	OS	5034369	Oper Suppt Oth P GEN Cap OH Cr	-286	-287	-720	-710	-1,036	-1,113	-1,155	-1,198	
108	OS	5043213	Oper Suppt Steam 14703		19							
109	OS	5043311	Oper Suppt Steam Cap OH Cr	-38								
110	OS	5047671	Oper Suppt Oth P GEN PCC 14705	132	76	448	495	600	606	629	652	
111	OS	5050913	Oper Suppt Steam PCC 14703	57					123	128	133	
112	OS Total			21	37	-137	-55	-119	-302	-313	-325	Lines 105-111
113												
114	Total			49,329	54,193	57,248	61,297	65,279	66,852	68,107	75,507	Line 2+7+19+35+41+57+76+90+93+103+112

Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Expense Walk by Major Work Category AK
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	1,759		WP 4-3, Line 7
2		Escalation	18	Includes labor and non-labor escalation	Line 1 x WP 4-21, Line 3
3		Adjustment	0	Misc O&M	Remaining adjustments
4		Total Net Change	18		Lines 2 + 3
5					
6	2025	Forecast	1,777		Line 1 + Line 4 and WP 4-3, Line 7
7		Escalation	33	Includes labor and non-labor escalation	Line 6 x WP 4-21, Line 3
8		Adjustment	0	Misc O&M	Remaining adjustments
9		Total Net Change	33		Lines 7 + 8
10					
11	2026	Forecast	1,809		Line 6 + Line 9 and WP 4-3, Line 7
12		Escalation	41	Includes labor and non-labor escalation	Line 11 x WP 4-21, Line 3
13		Adjustment	0	Misc O&M	Remaining adjustments
14		Total Net Change	42		Line 12 + 13
15					
16	2027	Forecast	1,851		Lines 11 + 14 and WP 4-3, Line 7

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Natural Gas and Solar Generation Operations
Expense Walk by Major Work Category KK
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	15,828		WP 4-3, Line 19
2		Escalation	160	Includes labor and non-labor escalation	Line 1 x WP 4-21, Line 3
3		Adjustment	-160	Standard Cost Variance Adjustment	WP 4-21, Lines 12-15
4		Total Net Change	0		Lines 2 + 3
5					
6	2025	Forecast	15,827		Lines 1 + Line 4 and WP 4-3, Line 19
7		Escalation	291	Includes labor and non-labor escalation	Line 6 x WP 4-21, Line 3
8		Adjustment	0	Misc O&M	
9		Total Net Change	291		Lines 7 + 8
10					
11	2026	Forecast	16,119		Lines 6 + Line 9 and WP 4-3, Line 19
12		Escalation	369	Includes labor and non-labor escalation	Line 11 x WP 4-21, Line 3
13		Adjustment	0	Misc O&M	
14		Total Net Change	369		Line 12 + 13
15					
16	2027	Forecast	16,488		Lines 11 + Line 14 and WP 4-3, Line 19

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Natural Gas and Solar Generation Operations
Expense Walk by Major Work Category KL
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	33,727		WP 4-4, Line 35
2		Escalation		Includes labor and non-labor escalation on Non LTSA	Line 1 (less LTSA costs) x WP 4-21, Line 3
3		Adjustment	225	Increase in LTSA Costs	WP 4-3, Lines 28 and 31
4		Adjustment	132	Increase in GGS and CGS Outage costs	WP 4-3, Lines 29 and 30 less escalation
5		Adjustment	1,693	Misc O&M	Remaining adjustments
6		Total Net Change	635		Sum of Lines 2-5
7			2,685		
8	2025	Forecast			Line 1 + Line 6 and WP 4-4, Line 35
9		Escalation	36,412	Includes labor and non-labor escalation on Non LTSA	Line 8 (less LTSA costs) x WP 4-21, Line 3
10		Adjustment	457	Increase in LTSA Costs	WP 4-3, Lines 28 and 31
11		Adjustment	184	Increase in GGS and CGS Outage costs	WP 4-3, Lines 29 and 30 less escalation
12		Adjustment	38	Misc O&M	Remaining adjustments
13		Total Net Change	15		Sum of Lines 9-12
14			693		
15	2026	Forecast			Line 8 + Line 13 and WP 4-4, Line 35
16		Escalation	37,105	Includes labor and non-labor escalation on Non LTSA	Line 15 (less LTSA costs) x WP 4-21, Line 3
17		Adjustment	823	Increase in LTSA Costs	WP 4-3, Lines 28 and 31
18		Adjustment	1,777	Increase in GGS and CGS Outage costs	WP 4-3, Lines 29 and 30 less escalation
19		Adjustment	504	Misc O&M	Remaining adjustments
20		Total Net Change	-34		Sum of Lines 16-19
21			3,070		
22	2027	Forecast			Line 15 + Line 20 and WP 4-4, Line 35
			40,174		

(PG&E-5)

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Expense Walk by Major Work Category KM
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	2,906		WP 4-4, Line 41
2		Escalation	29	Includes labor and non-labor escalation	Line 1 x WP 4-21, Line 3
3		Adjustment	-1	Misc O&M	Remaining adjustments
4		Total Net Change	29		Lines 2 + 3
5					
6	2025	Forecast	2,934		Line 1 + Line 4 and WP 4-4, Line 41
7		Escalation	54	Includes labor and non-labor escalation	Line 6 x WP 4-21, Line 3
8		Adjustment	0	Misc O&M	Remaining adjustments
9		Total Net Change	54		Lines 7 + 8
10					
11	2026	Forecast	2,988		Line 6 + Line 9 and WP 4-4, Line 41
12		Escalation	68	Includes labor and non-labor escalation	Line 11 x WP 4-21, Line 3
13		Adjustment	0	Misc O&M	Remaining adjustments
14		Total Net Change	69		Line 12 + 13
15					
16	2027	Forecast	3,057		Line 11 + Line 14 and WP 4-4, Line 41

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Expense Walk by Major Work Category KQ
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	2,972		WP 4-4, Line 57
2		Escalation	30	Includes labor and non-labor escalation	Line 1 x WP 4-21, Line 3
3		Adjustment	-1,309	Reduction due to staffing change from 7X24 schedule to 5X8	WP 4-4, Line 56 less escalation
4		Adjustment	0	Misc O&M	Remaining adjustments
5		Total Net Change	-1,279		Lines 2 + 3
6					
7	2025	Forecast	1,693		Line 1 + Line 5 and WP 4-4, Line 57
8		Escalation	31	Includes labor and non-labor escalation	Line 7 x WP 4-21, Line 3
9		Adjustment	4	Misc O&M	Remaining adjustments
10		Total Net Change	36		Lines 8 + 9
11					
12	2026	Forecast	1,728		Line 7 + Line 5 and WP 4-4, Line 57
13		Escalation	40	Includes labor and non-labor escalation	Line 12 x WP 4-21, Line 3
14		Adjustment	-5	Misc O&M	Remaining adjustments
15		Total Net Change	35		Line 13 + 14
16					
17	2027	Forecast	1,763		Line 12 + Line 5 and WP 4-4, Line 57

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Expense Walk by Major Work Category KR
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	6,745		WP 4-5, Line 76
2		Escalation	68	Includes labor and non-labor escalation	Line 1 x WP 4-21, Line 3
3		Adjustment	-217	Elimination of Ball Park Solar maintenance	WP 4-4, Line 59 less escalation
4		Adjustment	-48	Misc O&M	Remaining adjustments
5		Total Net Change	-197		Sum of Lines 2-4
6					
7	2025	Forecast	6,549		Line 1 + Line 5 and WP 4-5, Line 76
8		Escalation	121	Includes labor and non-labor escalation	Line 7 x WP 4-21, Line 3
9		Adjustment	1	Misc O&M	Remaining adjustments
10		Total Net Change	122		Lines 8 + 9
11					
12	2026	Forecast	6,670		Line 7 + Line 10 and WP 4-5, Line 76
13		Escalation	153	Includes labor and non-labor escalation	Line 12 x WP 4-21, Line 3
14		Adjustment	0	Misc O&M	Remaining adjustments
15		Total Net Change	153		Line 13 + 14
16					
17	2027	Forecast	6,823		Line 12 + Line 15 and WP 4-5, Line 76

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Expense Walk by Major Work Category KS
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	465		WP 4-5, Line 90
2		Escalation	5	Includes labor and non-labor escalation	Line 1 x WP 4-21, Line 3
3		Adjustment	0	Misc O&M	Remaining adjustments
4		Total Net Change	5		Lines 2 + 3
5					
6	2025	Forecast	470		Line 1 + Line 4 and WP 4-5, Line 90
7		Escalation	9	Includes labor and non-labor escalation	Line 6 x WP 4-21, Line 3
8		Adjustment	0	Misc O&M	Remaining adjustments
9		Total Net Change	9		Lines 7 + 8
10			479		
11	2026	Forecast	479		Line 6 + Line 9 and WP 4-5, Line 90
12		Escalation	11	Includes labor and non-labor escalation	Line 11 x WP 4-21, Line 3
13		Adjustment	0	Misc O&M	Remaining adjustments
14		Total Net Change	11		Lines 12 + 13
15					
16	2027	Forecast	490		Line 11 + Line 14 and WP 4-5, Line 90

2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Expense Walk by Major Work Category MA
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	941		WP 4-5, Line 93
2		Escalation	9	Includes labor and non-labor escalation	Line 1 x WP 4-21, Line 3
3		Adjustment	370	Misc Adj	Remaining adjustments
4		Total Net Change	379		Line 2 + 3
5					
6	2025	Forecast	1,320		Line 1 + Line 4 and WP 4-5, Line 93
7		Escalation	24	Includes labor and non-labor escalation	Line 6 x WP 4-21, Line 3
8		Adjustment	0	Misc Adj	Remaining adjustments
9		Total Net Change	24		Line 7 + 8
10					
11	2026	Forecast	1,344		Line 6 + Line 9 and WP 4-5, Line 93
12		Escalation	31	Includes labor and non-labor escalation	Line 11 x WP 4-21, Line 3
13		Adjustment	3,625	Electric Generation and Storage Development	WP 4-5, Line 92
14		Total Net Change	3,656		Line 12 + 13
15					
16	2027	Forecast	5,000		Line 11 + Line 14 and WP 4-5, Line 93

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Expense Walk by Major Work Category OM
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	57		WP 4-5, Line 103
2		Escalation	1	Includes labor and non-labor escalation	Line 1 x WP 4-21, Line 3
3		Adjustment	115	Misc Adj	Remaining adjustments
4		Total Net Change	115		Lines 2 + 3
5					
6	2025	Forecast	172		Line 1 + Line 4 and WP 4-5, Line 103
7		Escalation	3	Includes labor and non-labor escalation	Line 6 x WP 4-21, Line 3
8		Adjustment	3	Misc Adj	Remaining adjustments
9		Total Net Change	6		Line 7 + 8
10					
11	2026	Forecast	178		Line 6 + Line 9 and WP 4-5, Line 103
12		Escalation	4	Includes labor and non-labor escalation	Line 11 x WP 4-21, Line 3
13		Adjustment	3	Misc Adj	Remaining adjustments
14		Total Net Change	7		Line 12 + 13
15					
16	2027	Forecast	185		Line 11 + Line 14 and WP 4-5, Line 103

Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Expense Walk by Major Work Category OS
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	-119		WP 4-6, Line 112
2		Escalation	1	Includes labor and non-labor escalation	Line 1 x WP 4-21, Line 3
3		Adjustment	-184	Misc Adj	Remaining adjustments
4		Total Net Change	-183		Line 2 + 3
5					
6	2025	Forecast	-302		Line 1 + Line 4 and WP 4-6, Line 112
7		Escalation	6	Includes labor and non-labor escalation	Line 6 x WP 4-21, Line 3
8		Adjustment	-16	Misc Adj	Remaining adjustments
9		Total Net Change	-11		Line 7 + 8
10					
11	2026	Forecast	-313		Line 6 + Line 9 and WP 4-6, Line 112
12		Escalation	7	Includes labor and non-labor escalation	Line 11 x WP 4-21, Line 3
13		Adjustment	-19	Misc Adj	Remaining adjustments
14		Total Net Change	-12		Line 12 + 13
15					
16	2027	Forecast	-325		Line 11 + Line 14 and WP 4-6, Line 112

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Year-Over-Year Recorded Expense Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2020 Recorded	2021 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	4	AK	Manage Environmental Oper	2,410	2,360	(50)	no	-2%	no	no	no	
2	5	4	KK	Operate Fossil Generation	12,986	14,580	1,594	yes	12%	yes	yes	yes	Higher standard cost variance for Colusa in 2021.
3	5	4	KL	Maint Fossil Generating Equip	28,420	32,180	3,760	yes	13%	yes	yes	yes	Higher Colusa and Gateway maintenance costs in 2021.
4	5	4	KM	Maint Fossil Bldg, Grnd, Infrast	2,238	2,303	65	no	3%	no	no	no	
5	5	4	KQ	Operate Alternative Gen	1,080	882	(198)	no	-18%	yes	yes	yes	Routine O&M cost category always fluctuates year to year.
6	5	4	KR	Maint AltGen Generating Equip	1,608	807	(800)	no	-50%	yes	yes	yes	Lower Stroud maintenance costs in 2021.
7	5	4	KS	Maint AltGen Bldg, Grnd, Infrast	430	657	227	no	53%	yes	yes	yes	Routine O&M cost category always fluctuates year to year.
8	5	4	OM	Operational Management	137	324	187	no	137%	yes	yes	yes	Changes in Overhead cost allocations
9	5	4	OS	Operational Support	21	37	16	no	76%	yes	yes	yes	Changes in Overhead cost allocations

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Year-Over-Year Recorded Expense Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2021 Recorded	2022 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	4	AK	Manage Environmental Oper	2,360	2,286	(74)	no	-3%	no	no	no	
2	5	4	KK	Operate Fossil Generation	14,580	15,369	789	no	5%	yes	no	yes	Higher operating costs for Colusa in 2022.
3	5	4	KL	Maint Fossil Generating Equip	32,180	29,565	(2,615)	yes	-8%	yes	no	no	
4	5	4	KM	Maint Fossil Bldg, Grnd, Infrast	2,303	2,948	645	no	28%	yes	yes	yes	Routine O&M cost category always fluctuates year to year.
5	5	4	KQ	Operate Alternative Gen	882	2,433	1,550	yes	176%	yes	yes	yes	Elkhorn BESS began commercial operations in 2022.
6	5	4	KR	Maint AltGen Generating Equip	807	4,312	3,505	yes	434%	yes	yes	yes	Elkhorn BESS began commercial operations in 2022.
7	5	4	KS	Maint AltGen Bldg, Grnd, Infrast	657	338	(319)	no	-49%	yes	yes	yes	Routine O&M cost category always fluctuates year to year.
8	5	4	OM	Operational Management	324	(10)	(334)	no	-103%	yes	yes	yes	Changes in Overhead cost allocations
9	5	4	OS	Operational Support	37	(137)	(174)	no	-471%	yes	yes	yes	Changes in Overhead cost allocations

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Year-Over-Year Recorded Expense Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2022 Recorded	2023 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	4	AK	Manage Environmental Oper	2,286	2,128	(158)	no	-7%	yes	no	yes	Routine O&M cost category always fluctuates year to year.
2	5	4	KK	Operate Fossil Generation	15,369	14,805	(564)	no	-4%	no	no	no	
3	5	4	KL	Maint Fossil Generating Equip	29,565	32,899	3,333	yes	11%	yes	yes	yes	Higher maintenance costs for Humboldt and Gateway in 2023.
4	5	4	KM	Maint Fossil Bldg, Grnd, Infrast	2,948	2,934	(14)	no	0%	no	no	no	
5	5	4	KQ	Operate Alternative Gen	2,433	3,407	974	no	40%	yes	yes	yes	First full year of operations for Elkhorn BESS.
6	5	4	KR	Maint AltGen Generating Equip	4,312	3,906	(406)	no	-9%	yes	no	yes	Routine O&M cost category always fluctuates year to year.
7	5	4	KS	Maint AltGen Bldg, Grnd, Infrast	338	911	573	no	169%	yes	yes	yes	Higher maintenance costs at Guemsey in 2023.
8	5	4	OM	Operational Management	(10)	16	27	no	-258%	yes	yes	yes	Changes in Overhead cost allocations
9	5	4	OS	Operational Support	(137)	(55)	81	no	-60%	yes	yes	yes	Changes in Overhead cost allocations

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Year-Over-Year Recorded Expense Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2023 Recorded	2024 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	4	AK	Manage Environmental Oper	2,128	1,759	(369)	no	-17%	yes	yes	yes	Routine O&M cost category always fluctuates year to year.
2	5	4	KK	Operate Fossil Generation	14,805	15,828	1,023	yes	7%	yes	no	no	
3	5	4	KL	Maint Fossil Generating Equip	32,899	33,727	828	no	3%	no	no	no	
4	5	4	KM	Maint Fossil Bldg, Grnd, Infrast	2,934	2,906	(28)	no	-1%	no	no	no	
5	5	4	KQ	Operate Alternative Gen	3,407	2,972	(435)	no	-13%	yes	yes	yes	Lower operating costs at Elkhorn BESS in 2024.
6	5	4	KR	Maint AltGen Generating Equip	3,906	6,745	2,840	yes	73%	yes	yes	yes	Increase in Elhorn BESS maintenance costs in 2024.
7	5	4	KS	Maint AltGen Bldg, Grnd, Infrast	911	465	(446)	no	-49%	yes	yes	yes	Higher maintenance costs at Guernsey in 2023 back to normal in 2024.
8	5	4	MA	PG Energy Storage	346	941	594	no	-100%	yes	yes	yes	Ramping up Energy Storage Development in 2024.
9	5	4	OM	Operational Management	16	57	40	no	246%	yes	yes	yes	Changes in Overhead cost allocations
10	5	4	OS	Operational Support	(55)	(119)	(64)	no	116%	yes	yes	no	

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Escalation Rates and Factors

Line No.		Blended Escalation Rate							Blended Escalation Factors						
		2024	2025	2026	2027	2028	2029	2030	2024	2025	2026	2027	2028	2029	2030
1															
2															
3	Exhibit (Energy Supply - Fossil Gen)	2.24%	1.01%	1.84%	2.29%	2.35%	2.44%	2.49%	1.000	1.010	1.029	1.052	1.077	1.103	1.131
4	Exhibit (Energy Supply - Hydro Gen)	2.29%	1.53%	2.35%	2.79%	2.76%	2.77%	2.90%	1.000	1.015	1.039	1.068	1.098	1.128	1.161
5	Exhibit (Energy Supply - Energy Procurement)	3.46%	3.15%	3.07%	3.30%	3.33%	3.33%	3.34%	1.000	1.032	1.063	1.098	1.135	1.173	1.212
6															
7															
8	Source: Exhibit 10, Chapter 15 Workpapers.														

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
O&M Expense Forecast Drivers
(Thousands of Dollars)

Line No.		Amount	Reference
1	2024 Recorded	65,279	WP 4-6, Line 114
2	Escalation	3,121	WP 4-7 Lines 2 + 7 + 12, WP 4-8 Lines 2 + 7 + 12, WP 4-9 Lines 2 + 7 + 12, WP 4-10 Lines 2 + 7 + 12, WP 4-11 Lines 2 + 7 + 12, WP 4-12 Lines 2 + 7 + 12, WP 4-13 Lines 2 + 7 + 12, WP 4-14 Lines 2 + 7 + 12, WP 4-15 Lines 2 + 7 + 12, WP 4-16 Lines 2 + 7 + 12
3	Misc O&M	464	WP 4-7 Lines 3 + 8 + 13, 4-8 Lines 3 + 8 + 13, 4-9 Lines 3 + 8 + 13, 4-10 Lines 3 + 8 + 13, 4-11 Lines 3 + 8 + 13, 4-12 Lines 3 + 8 + 13, 4-13 Lines 3 + 8 + 13, 4-14 Lines 3 + 8 + 13, 4-15 Lines 3 + 8 + 13, 4-16 Lines 3 + 8 + 13
4	Aging Equipment and Infrastructure	2,234	WP 4-9 Line 4 + 11 + 18
5	LTSA	2,093	WP 4-9 Line 3 + 10 + 17
6	Elkhorn Operations ¹	(1,309)	WP 4-11 Line 3
7	Electric Gen & Storage Development	3,625	WP 4-14 Line 13
8	2027 Forecast	75,507	Lines 1-7

1. Reduction due to staffing change from 7X24 schedule to 5X8

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Risk Mapping - Expense
(Thousands of Nominal Dollars)

Line No.	Planning Order	Planning Order Description	Mitigation or Control Name	MWC	2027 Forecast (\$000)
1	Extended Unplanned Shutdown of a Critical Power Generation Asset				
2	5015792	GGs Manage Environmental Operations	C6 - Operating the Facility Within Requirements	AK	642
3	5016229	CGS Manage Environmental Operations	C6 - Operating the Facility Within Requirements	AK	346
4	5016233	HBGS Manage Environmental Operations	C6 - Operating the Facility Within Requirements	AK	863
5	5015794	GGs Maint Fossil Generating Equip	C5 - Maintaining the Systems	KL	4,570
6	5016230	CGS Maint Fossil Generating Equip	C5 - Maintaining the Systems	KL	5,405
7	5016234	HBGS Maint Fossil Generating Equip	C5 - Maintaining the Systems	KL	5,172
8	5236248	HBGS Annual Engine Outages	M3 - Component Replacement or Repair Mechanical	KL	3,316
9	5247633	GGs Spring Outages	M3 - Component Replacement or Repair Mechanical	KL	3,568
10	5247923	CGS Spring Outages	M3 - Component Replacement or Repair Mechanical	KL	4,586
11	5015796	GGs Maint Fossil Bldg, Grnd, Infrast.	C5 - Maintaining the Systems	KM	292
12	5016232	CGS Maint Fossil Bldg, Grnd, Infrast.	C5 - Maintaining the Systems	KM	2,597
13	5016236	HBGS Maint Fossil Bldg, Grnd, Infrast.	C5 - Maintaining the Systems	KM	168
14	5063469	Elkhorn BESS - Operate GRC	C6 - Operating the Facility Within Requirements	KQ	916
15	5063470	Elkhorn BESS - Maintain GRC	C5 - Maintaining the Systems	KR	5,492
16	5063471	Elkhorn BESS- Mnt Blds, Grnd & Infra GRC	C5 - Maintaining the Systems	KS	39
17					
18					
Total					37,972

Confidential LTSA Workpapers

Pages WP 4-24 to WP 4-46

Confidential in its Entirety

Table 4-1
Pacific Gas and Electric Company
2027 GRC
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Capital Expenditures by Major Work Category
(Thousands of Nominal Dollars)

		Capital Expenditures												
No.	MWC	MWC Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast	2030 Forecast	Reference
1	5	Tools & Equipment	153	327	142	243	489	414	328	410	404	473	440	WP 4-51, Line 5
2	2R	Instl/Rpl for Fossil Safety&Reg	454	18	-	-	119	-	-	-	-	-	-	WP 4-51, Line 9
3	2S	Instal/Repl Fossil Generating Eqp	12,521	13,578	8,828	14,735	17,887	18,061	14,533	19,873	17,915	22,098	22,023	WP 4-52, Line 54
4	2T	Instl/Repl Fossil BldgGrndInfrst	2,290	957	642	1,149	1,251	495	2,388	152	150	175	163	WP 4-52, Line 68
5	3A	Instl/Rpl for AltGen Safety&Reg	-	-	-	-	-	7	5	7	7	8	7	WP 4-52, Line 71
6	3B	Instal/Repl AltGen GeneratingEqp	557	28	733	2,065	5,308	2,537	1,999	2,594	1,176	1,376	1,280	WP 4-52, Line 77
7	3C	Instl/Rpl AltGn BldgGrndInfrst	-	-	-	-	-	666	529	661	-	-	-	WP 4-52, Line 80
8	3R	Energy Storage Capital	85,383	95,350	47,125	21,958	(2,440)	-	-	-	-	-	-	WP 4-52, Line 84
9	Grand Total		101,358	110,257	57,471	40,150	22,614	22,179	19,782	23,698	19,652	24,130	23,914	Sum Lines 1 - 8

Table 4-2
Pacific Gas and Electric Company
2027 GRC
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Forecast Capital Expenditures Summary
(Thousands of Nominal Dollars)

Line No.	Description	Capital Expenditures							Reference
		2024 CWIP	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast	2030 Forecast	
1	Projects > \$3 Million*	3,576	11,814	12,100	15,511	17,141	21,421	19,927	WP 4-49, Line 9
2	Other Work	2,055	10,365	7,682	8,187	2,511	2,709	3,987	WP 4-50, Line 10
3	Total	5,631	22,179	19,782	23,698	19,652	24,130	23,914	Line 1 + Line 2

4 * Planning orders where Construction Work in Progress (CWIP) Balance as of December 31, 2024 plus six years (2025-2030) of forecast.

Table 4-3
Pacific Gas and Electric Company
2027 GRC
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Recorded CWIP and Forecast Capital Expenditures Details - Projects Over \$3 Million*
(Thousands of Nominal Dollars)

Line	Planning					Capital Expenditures								
No.	Order	Description	MWC	Operative	Date	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast	2030 Forecast	Subtotal	Reference
MWC - 2S Instal/Repl Fossil Gneratng Eqp														
1	5760804	HBGS Annual Engine Emissions Module Repl	2S	Dec-2025		-	1,967	2,003	2,049	2,097	2,148	2,202	12,467	WP 4-138
2	5767987	Fossil Emergent Capital Work	2S	Sep-2026		-	-	483	3,197	4,703	8,416	6,798	23,598	WP 4-140
3	5789622	HBGS Annual Critical Spares Repl Program	2S	Dec-2025		-	641	510	640	632	740	688	3,851	WP 4-142
4	5793161	HBGS UNIC Upgrade 2023-25	2S	Dec-2030		3,575	-	-	-	-	-	-	3,575	
5	5806380	HBGS Annual Outage Capital Program	2S	Dec-2024		1	8,002	8,150	8,336	8,532	8,740	8,958	50,720	WP 4-144
6	Total					3,576	10,610	11,145	14,222	15,965	20,045	18,646	94,210	
MWC - 3B Instal/Repl AltGen GneratngEqp														
7	5524100	PV Cap Replace - Inverters & Panels	3B			-	1,204	955	1,289	1,176	1,376	1,280	7,280	WP 4-136
8	Total					-	1,204	955	1,289	1,176	1,376	1,280	7,280	
9	Grand Total					3,576	11,814	12,100	15,511	17,141	21,421	19,927	101,491	

10 * Planning orders where Construction Work in Progress (CWIP) Balance as of December 31, 2024 plus six years (2025-2030) of forecast.

Table 4-4
Pacific Gas and Electric Company
2027 GRC
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Recorded and Forecast Capital Expenditures Details - Other Work*
(Thousands of Nominal Dollars)

Line		Capital Expenditures												
No.	MWC	MWC Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast	2030 Forecast	Reference
1	5	Tools & Equipment	153	327	142	243	489	414	328	410	404	473	440	
2	20	DCPP Capital	-	-	-	-	-	-	-	-	-	-	-	
3	2R	Instl/Rpl for Fossil Safety&Reg	454	18	-	-	119	-	-	-	-	-	-	
4	2S	Instal/Repl Fossil Gneratng Eqp	10,595	9,798	5,392	8,509	8,526	7,451	3,387	5,651	1,951	2,053	3,377	
5	2T	Instl/Repl Fossil BldgGrndInfstr	2,290	957	642	1,149	1,251	495	2,388	152	150	175	163	
6	3A	Instl/Rpl for AltGen Sfty&Reg	-	-	-	-	-	7	5	7	7	8	7	
7	3B	Instal/Repl AltGen GneratngEqp	-	-	-	-	-	1,333	1,044	1,305	-	-	-	
8	3C	Instl/Rpl AltGn BldgGrndInfstr	-	-	-	-	-	666	529	661	-	-	-	
9	3R	Energy Storage Capital	85,383	95,350	47,125	21,958	(2,440)	-	-	-	-	-	-	
10	Grand Total		98,875	106,449	53,301	31,859	7,945	10,365	7,682	8,187	2,511	2,709	3,987	

11 * Excludes projects greater than \$3M

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit 5, Chapter 4
Natural Gas and Solar Generation Operations
Recorded and Forecast Capital Expenditures by Planning Order
(Thousands of Dollars)

Line No.	MWC	Planning Order	Description	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast	2030 Forecast	Reference
1	05	5508459	GGs Purchase Capital Tools	62	139	110	137	135	158	147	
2	05	5509639	HBGS Capital Tools	346	128	102	127	125	147	136	
3	05	5509719	CGS Capital Tools	81	138	109	137	135	158	147	
4	05	5514039	Solar PV Purchase Capital Tools	0	9	7	9	9	10	10	
5	05	05 Total		489	414	328	410	404	473	440	Lines 1-4
6											
7	2R	5778021	HBGS Rupture Disc Access Platforms	0	0	0	0	0	0	0	
8	2R	5808419	CGS Fireworks Workstation	119	0	0	0	0	0	0	
9	2R	2R Total		119	0	0	0	0	0	0	Lines 7-8
10											
11	2S	5760761	CGS Replace Unit 2 Catalyst	0	0	0	0	0	798	1,476	
12	2S	5760762	CGS Replace Unit 1 Catalyst	0	0	0	0	0	798	1,476	
13	2S	5760788	CGS Replace CT UA Catalyst	0	0	1,619	0	0	0	0	
14	2S	5760790	CGS Replace UB Catalyst	0	0	0	2,187	0	0	0	
15	2S	5760804	HBGS Annual Engine Emissions Module Repl	1,259	1,967	2,003	2,049	2,097	2,148	2,202	
16	2S	5767987	Fossil Emergent Capital Work	0	0	483	3,197	4,703	8,416	6,798	
17	2S	5789622	HBGS Annual Critical Spares Repl Program	923	641	510	640	632	740	688	
18	2S	5790983	HBGS Annual SCR Insulation	522	500	317	397	391	458	425	
19	2S	5793161	HBGS UNIC Upgrade 2023-25	2,247	0	0	0	0	0	0	
20	2S	5796439	HBGS Exciter Upgrade	24	0	0	0	0	0	0	
21	2S	5797378	GGs Excitation and Static Start Upgrade	340	1,677	0	0	0	0	0	
22	2S	5797379	CGS Excitation and Static Start Upgrade	432	1,238	0	0	0	0	0	
23	2S	5798338	GGs Switchyard Batteries	148	0	0	0	0	0	0	
24	2S	5798460	GGs Alt Design Steam Attenuator	1,046	0	0	0	0	0	0	
25	2S	5799869	GGs Flex Seal Replacement	769	0	0	0	0	0	0	
26	2S	5801620	GGs Main Steam Stop/Control Vlv Body Rep	1,896	0	0	0	0	0	0	
27	2S	5801621	GGs Piping Moisture Drain System	441	0	0	0	0	0	0	
28	2S	5801624	GGs Non Optical Flame Scanners	0	0	0	0	459	0	0	
29	2S	5801625	GGs CT Gas Valve and IGV Upgrades	0	0	0	1,284	0	0	0	
30	2S	5804486	CGS Auxiliary Steam Line Replacement	273	0	0	0	0	0	0	
31	2S	5804487	CGS DCS Ovation Control Upgrade	287	1,335	0	0	0	0	0	
32	2S	5806380	HBGS Annual Outage Capital Program	4,933	8,002	8,150	8,336	8,532	8,740	8,958	
33	2S	5806390	GGs DCS Replacement	256	0	0	0	0	0	0	
34	2S	5806394	CGS 230kV SF6 Breaker	2	0	0	619	0	0	0	
35	2S	5806480	GGs HP/IP Check Valve Replacement	-2	0	0	0	0	0	0	
36	2S	5806562	HBGS SCR Temp Sensors	56	0	0	0	0	0	0	
37	2S	5807238	CGS Valve Replacements	82	0	0	0	0	0	0	
38	2S	5808420	CGS Pin Seal Replacement	0	500	0	0	0	0	0	
39	2S	5808421	GGs Replace Obsolete ACC Relays	177	0	0	0	0	0	0	
40	2S	5809131	GGs WetSac Replacement	0	0	0	285	1,101	0	0	
41	2S	5809774	GGs HRSG A-B Bypass Attenuator Repl	0	1,850	0	0	0	0	0	
42	2S	5809798	GGs Replace BFP Motor and Vacuum Pump	230	0	0	0	0	0	0	
43	2S	5810023	HBGS sWOIS Network Segmentation	533	0	0	0	0	0	0	
44	2S	5810460	CGS Injection Pump Skid	0	100	0	0	0	0	0	
45	2S	5810499	CGS Water Hammer Repair	791	0	0	0	0	0	0	
46	2S	5810603	CGS Brush Holders-Shaft Grounding Upgrd	0	0	233	0	0	0	0	
47	2S	5810763	CGS Replace CEMS Analyzers	0	0	272	0	0	0	0	
48	2S	5810951	GGs CRH and LP Condensate Detection	0	0	505	0	0	0	0	
49	2S	5810952	GGs SCR Project Year 1	0	0	272	0	0	0	0	
50	2S	5810953	GGs SCR Project Year 2	0	0	0	666	0	0	0	

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit 5, Chapter 4
Natural Gas and Solar Generation Operations
Recorded and Forecast Capital Expenditures by Planning Order
(Thousands of Dollars)

Line No.	MWC	Planning Order	Description	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast	2030 Forecast	Reference
51	2S	5810982	GGG Replace ACC Gearboxes	0	0	171	213	0	0	0	
52	2S	5811021	CGS CRH/NRV Drip Leg Mod	0	250	0	0	0	0	0	
53	2S	5812398	GGG Replace ACC Motors	221	0	0	0	0	0	0	
54	2S Total			17,887	18,061	14,533	19,873	17,915	22,098	22,023	Lines 11-53
55											
56	2T	5776433	CGS HRSG Roof Access	27	0	0	0	0	0	0	
57	2T	5782180	HBGS Engine Hall Natural Gas Detector	-15	0	0	0	0	0	0	
58	2T	5785701	HBGS Shop Crane	50	0	0	0	0	0	0	
59	2T	5790984	HBGS Units 5 to 6 Platform Extension	0	0	253	0	0	0	0	
60	2T	5801260	CGS Heat Trace System	392	0	0	0	0	0	0	
61	2T	5801332	CGS 2023-24 Paving	36	0	0	0	0	0	0	
62	2T	5801358	CGS Bat Screen Installation	204	0	1,352	0	0	0	0	
63	2T	5801359	CGS HVAC Replacement	3	0	0	0	0	0	0	
64	2T	5801623	CGS Install Platforms, Ladders, Hoists	227	0	0	0	0	0	0	
65	2T	5801626	GGG HVAC Replacements	80	0	116	0	0	0	0	
66	2T	5808475	Elkhorn Capital Projects	246	153	121	152	150	175	163	
67	2T	5810509	CGS Sampling Shack	0	342	545	0	0	0	0	
68	2T Total			1,251	495	2,388	152	150	175	163	Lines 56-67
69											
70	3A	5511230	Vaca-Dixon Safety & Regulatory	0	7	5	7	7	8	7	
71	3A Total			0	7	5	7	7	8	7	Line 70
72											
73	3B	5524100	PV Cap Replace - Inverters & Panels	5,308	1,204	955	1,289	1,176	1,376	1,280	
74	3B	5810918	Solar Control and Communication Upgrades	0	533	423	529	0	0	0	
75	3B	5810919	Solar Panel Connectors	0	500	397	496	0	0	0	
76	3B	5810920	Solar Cathodic Protection	0	300	224	281	0	0	0	
77	3B Total			5,308	2,537	1,999	2,594	1,176	1,376	1,280	Line 63-76
78											
79	3C	5810857	Solar Civil Repairs	0	666	529	661	0	0	0	
80	3C Total			0	666	529	661	0	0	0	Line 79
81											
82	3R	5811338	MWC 3R Prospect Base	0	0	0	0	0	0	0	
83	3R	5811339	MWC 3R Elkhorn Base	-2,440	0	0	0	0	0	0	Line 82-83
84	3R Total			-2,440	0	0	0	0	0	0	
85											
86											
87	Total			22,614	22,179	19,782	23,698	19,652	24,130	23,914	Lines 5,9,54,68,71,77,80,84

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Capital Walk by Major Work Category 05
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	489		WP 4-51, Line 5
2		Adjustment	-76	Misc variance in year to year purchases	WP 4-51, Lines 1-4
3		Total Net Change	-76		Line 2
4					
5	2025	Forecast	414		Line 1 + Line 3 and WP 4-51, Line 5
6		Adjustment	-86	Misc variance in year to year purchases	WP 4-51, Lines 1-4
7		Total Net Change	-86		Line 6
8					
9	2026	Forecast	328		Line 5 + Line 7 and WP 4-51, Line 5
10		Adjustment	82	Misc variance in year to year purchases	WP 4-51, Lines 1-4
11		Total Net Change	82		Line 10
12					
13	2027	Forecast	410		Line 9 + Line 11 and WP 4-51, Line 5
14		Adjustment	-6	Misc variance in year to year purchases	WP 4-51, Lines 1-4
15		Total Net Change	-6		Line 14
16					
17	2028	Forecast	404		Line 13 + Line 15 and WP 4-51, Line 5
18		Adjustment	69	Misc variance in year to year purchases	
19		Total Net Change	69		Line 18
20					
21	2029	Forecast	473		Line 17 + Line 19 and WP 4-51, Line 5
22		Adjustment	-33	Misc variance in year to year purchases	
23		Total Net Change	-33		Line 22
24					
25	2030	Forecast	440		Line 21 + Line 23 and WP 4-51, Line 5

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Capital Walk by Major Work Category 2S
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount		Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	17,887			WP 4-52, Line 54
2		Adjustment	708		HBGS Annual Engine Emissions Module Repl	WP 4-51, Line 15
3		Adjustment	3,070		HBGS Annual Outage Capital Program	WP 4-51, Line 32
4		Adjustment	-11,696		2024 other completed work	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
5		Adjustment	8,092		2025 other planned work	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
6		Total Net Change	174			Lines 2 - 5
7						
8	2025	Forecast	18,061			Line 1 + Line 6 and WP 4-52, Line 54
9		Adjustment	483		Fossil Emergent Work	WP 4-51, Line 16
10		Adjustment	36		HBGS Annual Engine Emissions Module Repl	WP 4-51, Line 15
11		Adjustment	147		HBGS Annual Outage Capital Program	WP 4-51, Line 32
12		Adjustment	-8,092		Other work planned to be complete 2025	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
13		Adjustment	3,897		2026 other planned work	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
14		Total Net Change	-3,529			Lines 9 - 13
15						
16	2026	Forecast	14,533			Line 8 + Line 14 and WP 4-52, Line 54
17		Adjustment	2,714		Fossil Emergent Work	WP 4-51, Line 16
18		Adjustment	46		HBGS Annual Engine Emissions Module Repl	WP 4-51, Line 15
19		Adjustment	187		HBGS Annual Outage Capital Program	WP 4-51, Line 32
20		Adjustment	-3,897		Other work planned to be complete 2026	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
21		Adjustment	6,291		2027 other planned work	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
22		Total Net Change	5,341			Lines 17 - 21
23						
24	2027	Forecast	19,873			Line 16 + Line 22 and WP 4-52, Line 54
25		Adjustment	1,506		Fossil Emergent Work	WP 4-51, Line 16
26		Adjustment	48		HBGS Annual Engine Emissions Module Repl	WP 4-51, Line 15
27		Adjustment	196		HBGS Annual Outage Capital Program	WP 4-51, Line 32
28		Adjustment	-6,291		Other work planned to be complete 2027	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
29		Adjustment	2,583		2028 other planned work	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
30		Total Net Change	-1,958			Lines 25 - 29
31						
32	2028	Forecast	17,915			Line 24 + Line 30 and WP 4-52, Line 54
33		Adjustment	3,713		Fossil Emergent Work	WP 4-51, Line 16
34		Adjustment	51		HBGS Annual Engine Emissions Module Repl	WP 4-51, Line 15
35		Adjustment	208		HBGS Annual Outage Capital Program	WP 4-51, Line 32
36		Adjustment	-2,583		Other work planned to be complete 2028	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
37		Adjustment	2,793		2029 other planned work	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
38		Total Net Change	4,183			Lines 33 - 37
39						
40	2029	Forecast	22,098			Line 32 + Line 38 and WP 4-52, Line 54
41		Adjustment	-1,618		Fossil Emergent Work	WP 4-51, Line 16
42		Adjustment	53		HBGS Annual Engine Emissions Module Repl	WP 4-51, Line 15
43		Adjustment	218		HBGS Annual Outage Capital Program	WP 4-51, Line 32
44		Adjustment	-2,793		Other work planned to be complete 2029	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
45		Adjustment	4,065		2030 other planned work	WP 4-51, Lines 11-50, WP 4-52, Lines 51-53
46		Total Net Change	-75			Lines 41 - 45
47						
48	2030	Forecast	22,023			Line 40 + Line 46 and WP 4-52, Line 54

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Capital Walk by Major Work Category 2T
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount		Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	1,251			WP 4-52, Line 68
2		Adjustment	-1,251		2024 completed work	WP 4-52, Lines 56-67
3		Adjustment	495		2025 planned work	WP 4-52, Lines 56-67
4		Total Net Change	-757			Lines 2 + 3
5						
6	2025	Forecast	495			Line 1 + Line 4 and WP 4-52, Line 68
7		Adjustment	-495		Work planned to be complete 2025	WP 4-52, Lines 56-67
8		Adjustment	2,388		2026 planned work	WP 4-52, Lines 56-67
9		Total Net Change	1,894			Lines 7 + 8
10						
11	2026	Forecast	2,388			Line 6 + Line 9 and WP 4-52, Line 68
12		Adjustment	-2,388		Work planned to be complete 2026	WP 4-52, Lines 56-67
13		Adjustment	152		2027 planned work	WP 4-52, Lines 56-67
14		Total Net Change	-2,236			Lines 12 + 13
15						
16	2027	Forecast	152			Line 11 + Line 14 and WP 4-52, Line 68
17		Adjustment	-152		Work planned to be complete 2027	WP 4-52, Lines 56-67
18		Adjustment	150		2028 planned work	WP 4-52, Lines 56-67
19		Total Net Change	-3			Lines 17 + 18
20						
21	2028	Forecast	150			Line 16 + Line 19 and WP 4-52, Line 68
22		Adjustment	-150		Work planned to be complete 2028	WP 4-52, Lines 56-67
23		Adjustment	175		2029 planned work	WP 4-52, Lines 56-67
24		Total Net Change	25			Lines 22 + 23
25						
26	2029	Forecast	175			Line 21 + Line 24 and WP 4-52, Line 68
27		Adjustment	-175		Work planned to be complete 2029	WP 4-52, Lines 56-67
28		Adjustment	163		2030 planned work	WP 4-52, Lines 56-67
29		Total Net Change	-12			Lines 27 + 28
30						
31	2030	Forecast	163			Line 26 + Line 29 and WP 4-52, Line 68

**Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Capital Walk by Major Work Category 3A
(Thousands of Dollars)**

Ln. No.	Year	Program/Activity	Amount		Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	0			WP 4-52, Line 71
2		Adjustment	0		2024 completed work	WP 4-52, Line 70
3		Adjustment	7		2025 planned work	WP 4-52, Line 70
4		Total Net Change	7			Lines 2 + 3
5						
6	2025	Forecast	7			Line 1 + Line 4 and WP 4-52, Line 71
7		Adjustment	-7		Work planned to be complete 2025	WP 4-52, Line 70
8		Adjustment	5		2026 planned work	WP 4-52, Line 70
9		Total Net Change	-1			Lines 7 + 8
10						
11	2026	Forecast	5			Line 6 + Line 9 and WP 4-52, Line 71
12		Adjustment	-5		Work planned to be complete 2026	WP 4-52, Line 70
13		Adjustment	7		2027 planned work	WP 4-52, Line 70
14		Total Net Change	1			Lines 12 + 13
15						
16	2027	Forecast	7			Line 11 + Line 14 and WP 4-52, Line 71
17		Adjustment	-7		Work planned to be complete 2027	WP 4-52, Line 70
18		Adjustment	7		2028 planned work	WP 4-52, Line 70
19		Total Net Change	0			Lines 17 + 18
20						
21	2028	Forecast	7			Line 16 + Line 19 and WP 4-52, Line 71
22		Adjustment	-7		Work planned to be complete 2028	WP 4-52, Line 70
23		Adjustment	8		2029 planned work	WP 4-52, Line 70
24		Total Net Change	1			Lines 22 + 23
25						
26	2029	Forecast	8			Line 21 + Line 24 and WP 4-52, Line 71
27		Adjustment	-8		Work planned to be complete 2029	WP 4-52, Line 70
28		Adjustment	7		2030 planned work	WP 4-52, Line 70
29		Total Net Change	-1			Lines 27 + 28
30						
31	2030	Forecast	7			Line 26 + Line 29 and WP 4-52, Line 71

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Capital Walk by Major Work Category 3B
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount		Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	5,308			WP 4-52, Line 77
2		Adjustment	-4,104		PV Cap Replace - Inverters & Panels	WP 4-52, Line 73
3		Adjustment	533		Solar Control and Communication Upgrades	WP 4-52, Line 74
4		Adjustment	0		2024 other completed work	WP 4-52, Lines 73-76
5		Adjustment	800		2025 other planned work	WP 4-52, Lines 73-76
6		Total Net Change	-2,771			Lines 2 - 5
7						
8	2025	Forecast	2,537			Line 1 + Line 6 and WP 4-52, Line 77
9		Adjustment	-249		PV Cap Replace - Inverters & Panels	WP 4-52, Line 73
10		Adjustment	-110		Solar Control and Communication Upgrades	WP 4-52, Line 74
11		Adjustment	-800		Other work planned to be complete 2025	WP 4-52, Lines 73-76
12		Adjustment	621		2026 other planned work	WP 4-52, Lines 73-76
13		Total Net Change	-538			Lines 9 - 12
14						
15	2026	Forecast	1,999			Line 8 + Line 13 and WP 4-52, Line 77
16		Adjustment	334		PV Cap Replace - Inverters & Panels	WP 4-52, Line 73
17		Adjustment	106		Solar Control and Communication Upgrades	WP 4-52, Line 74
18		Adjustment	-621		Other work planned to be complete 2026	WP 4-52, Lines 73-76
19		Adjustment	776		2027 other planned work	WP 4-52, Lines 73-76
20		Total Net Change	595			Lines 16 - 19
21						
22	2027	Forecast	2,594			Line 15 + Line 20 and WP 4-52, Line 77
23		Adjustment	-113		PV Cap Replace - Inverters & Panels	WP 4-52, Line 73
24		Adjustment	-529		Solar Control and Communication Upgrades	WP 4-52, Line 74
25		Adjustment	-776		Other work planned to be complete 2027	WP 4-52, Lines 73-76
26		Adjustment	0		2028 other planned work	WP 4-52, Lines 73-76
27		Total Net Change	-1,418			Lines 23 - 26
28						
29	2028	Forecast	1,176			Line 22 + Line 27 and WP 4-52, Line 73
30		Adjustment	200		PV Cap Replace - Inverters & Panels	WP 4-52, Line 73
31		Adjustment	0		Other work planned to be complete 2028	WP 4-52, Lines 73-76
32		Adjustment	0		2029 other planned work	WP 4-52, Lines 73-76
33		Total Net Change	200			Lines 30 - 32
34						
35	2029	Forecast	1,376			Line 29 + Line 33 and WP 4-52, Line 77
36		Adjustment	-96		PV Cap Replace - Inverters & Panels	WP 4-52, Line 73
37		Adjustment	0		Other work planned to be complete 2029	WP 4-52, Lines 73-76
38		Adjustment	0		2030 other planned work	WP 4-52, Lines 73-76
39		Total Net Change	-96			Lines 36 - 38
40						
41	2030	Forecast	1,280			Line 35 + Line 39 and WP 4-52, Line 77

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Capital Walk by Major Work Category 3C
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	0		WP 4-52, Line 80
2		Adjustment	666	Solar Civil Repairs	WP 4-52, Line 79
3		Total Net Change	666		Line 2
4					
5	2025	Forecast	666		Line 1 + Line 3 and WP 4-52, Line 80
6		Adjustment	-137	Solar Civil Repairs	WP 4-52, Line 79
7		Total Net Change	-137		Line 6
8					
9	2026	Forecast	529		Line 5 + Line 7 and WP 4-52, Line 80
10		Adjustment	132	Solar Civil Repairs	WP 4-52, Line 79
11		Total Net Change	132		Line 10
12					
13	2027	Forecast	661		Line 9 + Line 11 and WP 4-52, Line 80
14		Adjustment	-661	Solar Civil Repairs	WP 4-52, Line 79
15		Total Net Change	-661		Line 14
16					
17	2028	Forecast	0		Line 13 + Line 15 and WP 4-52, Line 80
18		Adjustment	0	Solar Civil Repairs	WP 4-52, Line 79
19		Total Net Change	0		Line 18
20					
21	2029	Forecast	0		Line 17 + Line 19 and WP 4-52, Line 80
22		Adjustment	0	Solar Civil Repairs	WP 4-52, Line 79
23		Total Net Change	0		Line 22
24					
25	2030	Forecast	0		Line 21 + Line 23 and WP 4-52, Line 80

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Capital Walk by Major Work Category 3R
(Thousands of Dollars)

Ln. No.	Year	Program/Activity	Amount	Detailed Description/Assumptions	Reference From
1	2024	Recorded Adjusted	-2,440		WP 4-52, Line 84
2		Adjustment	2,440	MWC 3R Elkhorn Base	4-52, Line 83
3		Total Net Change	2,440		Line 2
4					
5	2025	Forecast	0		Line 1 + Line 3 and WP 4-52, Line 84
6		Adjustment	0	MWC 3R Elkhorn Base	4-52, Line 83
7		Total Net Change	0		Line 6
8					
9	2026	Forecast	0		Line 5 + Line 7 and WP 4-52, Line 84
10		Adjustment	0	MWC 3R Elkhorn Base	4-52, Line 83
11		Total Net Change	0		Line 10
12					
13	2027	Forecast	0		Line 9 + Line 11 and WP 4-52, Line 84
14		Adjustment	0	MWC 3R Elkhorn Base	4-52, Line 83
15		Total Net Change	0		Line 14
16					
17	2028	Forecast	0		Line 13 + Line 15 and WP 4-52, Line 84
18		Adjustment	0	MWC 3R Elkhorn Base	4-52, Line 83
19		Total Net Change	0		Line 18
20					
21	2029	Forecast	0		Line 17 + Line 19 and WP 4-52, Line 84
22		Adjustment	0	MWC 3R Elkhorn Base	4-52, Line 83
23		Total Net Change	0		Line 22
24					
25	2030	Forecast	0		Line 21 + Line 23 and WP 4-52, Line 84

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Year-Over-Year Recorded Capital Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2020 Recorded	2021 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	4	05	Tools & Equipment	153	327	174	no	114%	yes	yes	yes	Routine capital MWC normal fluctuations year to year.
2	5	4	2R	Instl/Rpl for Fossil Safety&Reg	454	18	(436)	no	-96%	yes	yes	yes	Humboldt project was completed in 2021.
3	5	4	2S	Instal/Repl Fossil Gneratng Eqp	12,521	13,578	1,057	yes	8%	yes	no	no	
4	5	4	2T	Instl/Repl Fosl BldgGrndInfrst	2,290	957	(1,333)	yes	-58%	yes	yes	yes	Completion of certain Colusa and Humboldt projects in 2020.
5	5	4	3A	Instl/Rpl for AltGen	-	-	0	no	0%	no	no	no	
6	5	4	3B	Instal/Repl AltGen GneratngEqp	557	28	(529)	no	-95%	yes	yes	yes	Normal variation in PV Cap Replace - Inverters & Panels spending.
7	5	4	3C	Instl/Rpl AltGn BldgGrndInfrst	-	-	0	no	0%	no	no	no	
8	5	4	3R	Instl/Rpl AltGn BldgGrndInfrst	85,383	95,350	9,967	yes	12%	yes	yes	yes	Elkhorn BESS construction cost.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Year-Over-Year Recorded Capital Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2021 Recorded	2022 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	4	05	Tools & Equipment	327	142	(185)	no	-57%	yes	yes	yes	Routine capital MWC normal fluctuations year to year.
2	5	4	2R	Instl/Rpl for Fossil Safety&Reg	18	-	(18)	no	-100%	yes	yes	yes	No projects in this MWC in 2022.
3	5	4	2S	Instal/Repl Fossil Gneratng Eqp	13,578	8,828	(4,750)	yes	-35%	yes	yes	yes	Several Gateway, Colusa and Humboldt projects were completed in 2021.
4	5	4	2T	Instl/Repl Fosl BldgGmndInfrst	957	642	(315)	no	-33%	yes	yes	yes	Routine capital MWC normal fluctuations year to year.
5	5	4	3A	Instl/Rpl for AltGen	-	-	0	no	0%	no	no	no	
6	5	4	3B	Instal/Repl AltGen GneratngEqp	28	733	705	no	2519%	yes	yes	yes	Normal variation in PV Cap Replace - Inverters & Panels spending.
7	5	4	3C	Instl/Rpl AltGn BldgGmndInfrst	-	-	0	no	0%	no	no	no	
8	5	4	3R	Instl/Rpl AltGn BldgGmndInfrst	95,350	47,125	(48,225)	yes	-51%	yes	yes	yes	Elkhorn BESS construction cost.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Year-Over-Year Recorded Capital Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2022 Recorded	2023 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	4	05	Tools & Equipment	142	243	101	no	71%	yes	yes	yes	Routine capital MWC normal fluctuations year to year.
2	5	4	2R	Instl/Rpl for Fossil Safety&Reg	-	-	0	no	0%	no	no	no	
3	5	4	2S	Instal/Repl Fossil Gneratng Eqp	8,828	14,735	5,906	yes	67%	yes	yes	yes	Emergent Gateway Main Steam Stop/Control Valve Body Replacement project was required in 2023.
4	5	4	2T	Instl/Repl Fosl BldgGrndInfst	642	1,149	507	no	79%	yes	yes	yes	Several Colusa capital projets were initiated in 2023.
5	5	4	3A	Instl/Rpl for AltGen	-	-	0	no	0%	no	no	no	
6	5	4	3B	Instal/Repl AltGen GneratngEqp	733	2,065	1,331	yes	182%	yes	yes	yes	Required ramp-up in PV Cap Replace - Inverters & Panels spending.
7	5	4	3C	Instl/Rpl AltGn BldgGrndInfst	-	-	0	no	0%	no	no	no	
8	5	4	3R	Instl/Rpl AltGn BldgGrndInfst	47,125	21,958	(25,167)	yes	-53%	yes	yes	yes	Elkhorn BESS construction cost.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Year-Over-Year Recorded Capital Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2023 Recorded	2024 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	4	05	Tools & Equipment	243	489	247	no	102%	yes	yes	yes	Routine capital MWC normal fluctuations year to year.
2	5	4	2R	Instl/Rpl for Fossil Safety&Reg	-	119	119	no	0%	no	no	no	
3	5	4	2S	Instal/Repl Fossil Gnerating Eqp	14,735	17,887	3,152	yes	21%	yes	yes	yes	Humboldt Annual Outage Capital Program required beginning in 2024 due to growth in engine hours.
4	5	4	2T	Instl/Repl Fosl BldgGrndInfrst	1,149	1,251	102	no	9%	yes	no	yes	Routine capital MWC normal fluctuations year to year.
5	5	4	3A	Instl/Rpl for AltGen	-	-	0	no	0%	no	no	no	
6	5	4	3B	Instal/Repl AltGen GneratingEqp	2,065	5,308	3,243	yes	157%	yes	yes	yes	Required ramp-up in PV Cap Replace - Inverters & Panels spending.
7	5	4	3C	Instl/Rpl AltGn BldgGrndInfrst	-	-	0	no	0%	no	no	no	
8	5	4	3R	Instl/Rpl AltGn BldgGrndInfrst	21,958	(2,440)	(24,398)	yes	-111%	yes	yes	yes	Elkhorn BESS construction cost.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Risk Mapping - Capital
(Thousands of Nominal Dollars)

Line No.	Planning Order	Planning Order Description	Mitigation or Control Name	MWC	2027 Forecast (\$000)	2028 Forecast (\$000)	2029 Forecast (\$000)	2030 Forecast (\$000)	2027 - 2030 Forecast (\$000)
1	Extended Unplanned Shutdown of a Critical Power Generation Asset								
2	5508459	GGs Purchase Capital Tools	M3 - Component Replacement or Repair Mechanical	05	137	135	158	147	579
3	5509639	HBGS Capital Tools	M3 - Component Replacement or Repair Mechanical	05	127	125	147	136	535
4	5509719	CGS Capital Tools	M3 - Component Replacement or Repair Mechanical	05	137	135	158	147	576
5	5760761	CGS Replace Unit 2 Catalyst	M3 - Component Replacement or Repair Mechanical	2S			798	1,476	2,273
6	5760762	CGS Replace Unit 1 Catalyst	M3 - Component Replacement or Repair Mechanical	2S			798	1,476	2,273
7	5760790	GGs Replace UB Catalyst	M3 - Component Replacement or Repair Mechanical	2S	2,187				2,187
8	5760804	HBGS Annual Engine Emissions Module Repl	M3 - Component Replacement or Repair Mechanical	2S	2,049	2,097	2,148	2,202	8,497
9	5767987	Fossil Emergent Capital Work	M3 - Component Replacement or Repair Mechanical	2S	3,197	4,703	8,416	6,798	23,115
10	5789622	HBGS Annual Critical Spares Repl Program	M3 - Component Replacement or Repair Mechanical	2S	640	632	740	688	2,700
11	5790983	HBGS Annual SCR Insulation	M3 - Component Replacement or Repair Mechanical	2S	397	391	458	425	1,671
12	5801624	GGs Non Optical Flame Scanners	M3 - Component Replacement or Repair Mechanical	2S		459			459
13	5801625	GGs CT Gas Valve and IGV Upgrades	M3 - Component Replacement or Repair Mechanical	2S	1,284				1,284
14	5806380	HBGS Annual Outage Capital Program	M3 - Component Replacement or Repair Mechanical	2S	8,336	8,532	8,740	8,958	34,566
15	5806394	CGS 230kV SF6 Breaker	M2 - Component Replacement or Repair Electrical	2S	619				619
16	5809131	GGs WetSac Replacement	M2 - Component Replacement or Repair Electrical	2S	285	1,101			1,386
17	5810953	GGs SCR Project Year 2	M2 - Component Replacement or Repair Electrical	2S	666				666
18	5810982	GGs Replace ACC Gearboxes	M2 - Component Replacement or Repair Electrical	2S	213				213
19	5808475	Elkhorn Capital Projects	M2 - Component Replacement or Repair Electrical	2T	152	150	175	163	640
Total					20,427	18,460	22,736	22,617	84,239

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Deferred Work Analysis Summary

The Natural Gas, Solar, and Energy Storage deferred work analysis follows the principles for determining if work was deferred set forth in PG&E's 2023 GRC Decision (D.23-11-069). Each MAT or MWC in this chapter was checked against those principles by following the checks listed below.

Check 1: The work was requested and authorized based on representations that it was needed to provide safe and reliable service.

Check 2: PG&E did not perform all of the authorized and funded work, as measured by authorized (explicit or imputed) units of work;

Check 2a: *The work is measured by units of work.*

Check 2b: *PG&E expects to perform fewer of such units during the 2023-2026 period.*

Check 3: PG&E continues to represent that the curtailed work is necessary to provide safe and reliable service

Line	2027 GRC Chapter	Type	MWC	MAT CODE	Description	Check 2			Deferred Work (Yes or No)	Explanation	Units Comparison			Dollar Comparison (\$000s)		
						Check 1 (See Note 1)	Check 2a	Check 2b	Check 3		2023 to 2024 Rec. Adj. + 2025 to 2026 Forecast (A)	2023 to 2026 Imputed (B)	Difference	2023 to 2024 Rec. Adj. + 2025 to 2026 Forecast Forecast (A)	2023 to 2026 Imputed (B)	Difference
1	4	Capital	5	N/A	Tools & Equipment	No	No	N/A	N/A	This MWC is not related to safety, reliability, and/or maintenance.	N/A	N/A	N/A	1,474	1,798	\$ (324)
2	4	Capital	2R	N/A	Instl/Rpl for Fossil Safety&Reg	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	119	0	\$ 119
3	4	Capital	2S	N/A	Instal/Repl Fossil Gnerating Equip	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	65,216	16,414	\$ 48,802
4	4	Capital	2T	N/A	Instl/Repl Fosl BldgGrndInfrest	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	5,283	1,697	\$ 3,586
5	4	Capital	3A	N/A	Instl/Rpl for AltGen Safty&Reg	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	12	27	\$ (15)
6	4	Capital	3B	N/A	Instal/Repl AltGen GneratngEqp	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	11,908	2,942	\$ 8,967
7	4	Capital	3C	N/A	Instl/Rpl AltGn BldgGrndInfrest	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	1,195	0	\$ 1,195
8	4	Capital	3R	N/A	Energy Storage Capital	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	19,518	0	\$ 19,518
9	4	Expense	AK	N/A	Manage Environmental Oper	No	No	N/A	N/A	This MWC is not related to safety, reliability, and/or maintenance.	N/A	N/A	N/A	7,473	12,203	\$ (4,730)
10	4	Expense	KK	N/A	Operate Fossil Generation	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	62,579	61,663	\$ 916
11	4	Expense	KL	N/A	Maint Fossil Generating Equip	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	140,143	129,529	\$ 10,614
12	4	Expense	KM	N/A	Maint Fossil Bldg	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	11,762	13,404	\$ (1,642)
13	4	Expense	KQ	N/A	Operate Alternative Gen	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	9,800	2,005	\$ 7,795
14	4	Expense	KR	N/A	Maint AltGen Generating Equip	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	23,870	5,519	\$ 18,351
15	4	Expense	KS	N/A	Maint AltGen Bldg	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	2,325	2,291	\$ 34
16	4	Expense	MA	N/A	Energy Storage Expense	No	No	N/A	N/A	Work not unitized.	N/A	N/A	N/A	3,951	0	\$ 3,951
17	4	Expense	OM	N/A	Operational Management	No	No	N/A	N/A	This MWC is not related to safety, reliability, and/or maintenance.	N/A	N/A	N/A	401	1,238	\$ (837)
18	4	Expense	OS	N/A	Operational Support	No	No	N/A	N/A	This MWC is not related to safety, reliability, and/or maintenance.	N/A	N/A	N/A	(1,418)	0	\$ (1,418)
19													Capital Total	104,725	22,878	\$ 81,847

Notes:

1. Although the Spending Accountability Report may include variance explanations for certain MWCs (rather than the more detailed MAT code level) since they include some safety and reliability-related work, in PG&E's 2023 GRC, not all work in those MWCs were requested and authorized based on representations that it was needed to provide safe and reliable service.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Power Generation Headcount Forecast

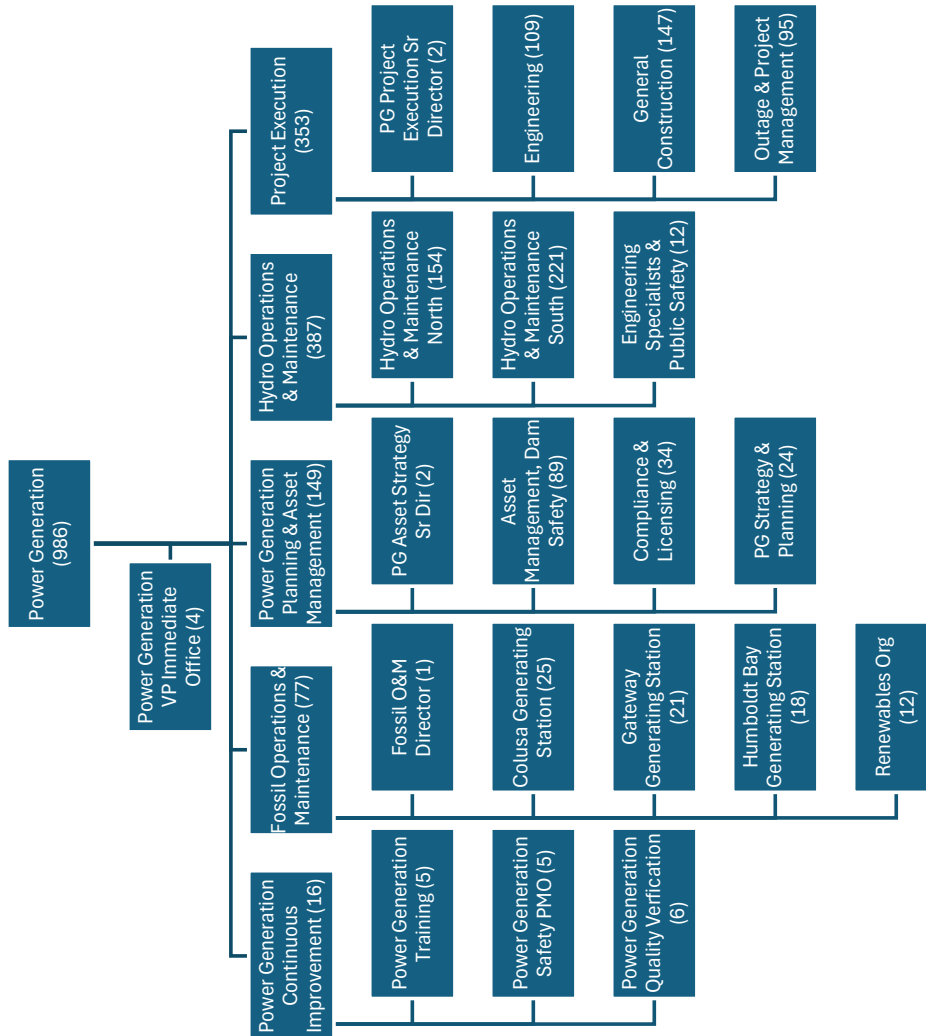
Line No.	Power Generation Continuous Improvement	Fossil Operations & Maintenance	Power Generation Planning & Asset Management	Hydro Operations & Maintenance	Project Execution	Power Generation VP Immediate Office	Total Headcount
1 2024 Actual Headcount (as of December 31, 2024)	16	77	149	387	353	4	986
2 2027 Proposed Organization Forecast Headcount	24	77	179	517	479	4	1,280

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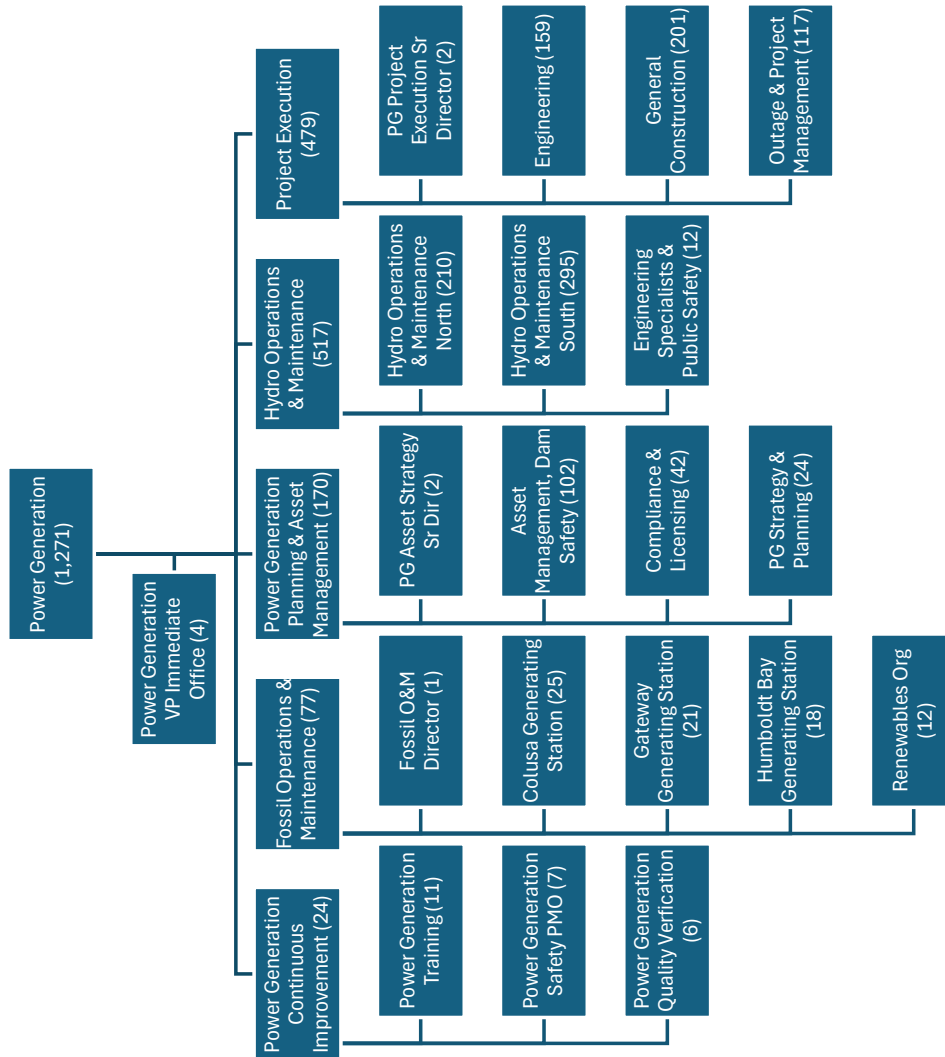
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Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Power Generation Organizational
Chart for 2024



WP 4-70

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Power Generation
Organizational Chart for 2027



WP 4-71

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit 5, Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Decommissioning Forecast (MWC 55)
Thousands of Dollars

Line No.		thru 2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
1	HBPP	32,572	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
2	Kern	9,310	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	HPPP	169,818	110	110	130	110	110	110	110	130	110	110	110	110	130	110	110	110	110
4	Gateway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24,632	0
5	Colusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22,155
6	Humboldt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12,657
7	Solar	0	0	0	0	0	0	0	0	0	0	0	1,602	40,051	40,051	40,532	0	0	0
8	Fuel Cell	1,035	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Elkhorn BES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Total	212,734	135	135	155	135	135	135	135	155	135	135	1,737	40,186	40,206	40,667	135	24,767	34,947
11																			
12																			
13																			
14	HBPP	32,572	25	26	26	26	26	27	27	27	28	28	29	29	30	30	31	32	32
15	Kern Demo	9,310	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	HPPP	169,818	112	113	134	115	116	117	119	143	123	125	127	129	156	134	137	139	142
17	Gateway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31,134	0
18	Colusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28,505
19	Humboldt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16,285
20	Solar	0	0	0	0	0	0	0	0	0	0	0	1,897	48,056	48,685	49,914	0	0	0
21	Fuel Cell	1,035	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Elkhorn BES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	Total	212,734	137	138	160	141	142	144	146	170	151	153	2,054	48,214	48,870	50,078	168	31,304	44,964
24																			
25																			

	Total Cost	Total Spent Thru 2024	2025	2026	Remaining Liability at 1/1/2027	Reference
HBPP	33,486	(32,572)	(25)	(26)	863	Line 14
Kern	9,310	(9,310)	0	0	0	Line 15
HPPP	173,993	(169,818)	(112)	(113)	3,951	Line 16
Gateway	31,134	0	0	0	31,134	Line 17
Colusa	28,505	0	0	0	28,505	Line 18
Humboldt	16,285	0	0	0	16,285	Line 19
Solar	148,551	0	0	0	148,551	Line 20
Fuel Cell	1,035	(1,035)	0	0	0	Line 21
Elkhorn BESS	14,030	0	0	0	14,030	Line 22
Total	466,328	(212,734)	(137)	(138)	243,319	Lines 27 - 35

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit 5, Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Decommissioning Forecast (MWC 55)
Thousands of Dollars

Line No.		2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	Total	Reference From
1	HBPP	25	25	25	25	25	25	25	25	25	25	25	25	33,297	WP 4-74, Line 6
2	Kern	0	0	0	0	0	0	0	0	0	0	0	0	9,310	WP 4-74, Line 9
3	HPPP	130	110	110	110	110	130	110	110	110	110	130	110	173,128	WP 4-74, Line 3
4	Gateway	0	0	0	0	0	0	0	0	0	0	0	0	24,632	WP 4-75, Line 51
5	Colusa	0	0	0	0	0	0	0	0	0	0	0	0	22,155	WP 4-78, Line 41
6	Humboldt	0	0	0	0	0	0	0	0	0	0	0	0	12,657	WP 4-76, Line 43
7	Solar	0	0	0	0	0	0	0	0	0	0	0	0	122,236	WP 4-79, Lines 55 - 64
8	Fuel Cell	0	0	0	0	0	0	0	0	0	0	0	0	1,035	WP 4-80, Line 3
9	Elkhorn BES	10,815	0	0	0	0	0	0	0	0	0	0	0	10,815	WP 4-81, Line 39
10	Total	10,970	135	135	135	135	155	135	135	135	135	155	135	409,264	Lines 1-9
11															
12															
13															
14	HBPP	33	33	34	35	35	36	36	37	38	38	39	40	33,486	Line 1 x WP 4-83, Lines 17 - 45
15	Kern Demo	0	0	0	0	0	0	0	0	0	0	0	0	9,310	Line 2 x WP 4-83, Lines 17 - 45
16	HPPP	170	147	149	152	155	186	160	163	166	169	203	175	173,993	Line 3 x WP 4-83, Lines 17 - 45
17	Gateway	0	0	0	0	0	0	0	0	0	0	0	0	31,134	Line 4 x WP 4-83, Lines 17 - 45
18	Colusa	0	0	0	0	0	0	0	0	0	0	0	0	28,505	Line 5 x WP 4-83, Lines 17 - 45
19	Humboldt	0	0	0	0	0	0	0	0	0	0	0	0	16,285	Line 6 x WP 4-83, Lines 17 - 45
20	Solar	0	0	0	0	0	0	0	0	0	0	0	0	148,551	Line 7 x WP 4-85, Lines 20 - 23
21	Fuel Cell	0	0	0	0	0	0	0	0	0	0	0	0	1,035	Line 8
22	Elkhorn BES	14,030	0	0	0	0	0	0	0	0	0	0	0	14,030	Line 9 x WP 4-85, Line 27
23	Total	14,233	180	183	186	190	222	197	200	204	207	242	215	456,328	Lines 14-22
24															

Remediation – Environmental Remediation of chemical impacts to the environment that are associated with the historic operation of the Power Plant

Decommissioning – Dismantling of the former power plant to remove above ground and below ground structures associated with the Power Plant

Note: This word/paper is from Exhibit 7, Chapter X

Line 3 + 6 + 9

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Gateway Generating Station Dismantling Cost Estimate (initially presented in 2014 GRC) with Updates to Scrap Prices

Cost Estimate Developed by TLG Services

Incorporates average scrap prices over a 5-year period from 2019 to 2024

Line No.	Activities (Costs in 2008 dollars unless otherwise stated)	Unit 1	Unit 2	Unit 3	Common	Station	Station Total
1	Gateway Unit Rating (MWe)	180	180	250	610		
2	Plant / Unit used as a Cost Basis (adjusted for rating)	not used	not used	not used	not used		
3	Station "Basis" Unit Rating	180	180	250	610		
4							
5	Characterization / Temporary Services	76,000	76,000	88,000	0	75,000	315,000
6							
7	Scaffolding / Worker Access	0	0	0	0		0
8							
9	Asbestos Remediation	0	0	0	0		0
10							
11	Equipment Removal	1,213,121	1,213,121	841,058	1,409,401		4,676,701
12							
13	Boiler(s)	0	0	0	0		0
14							
15	Structures Demolition	576,317	576,317	1,008,054	1,649,361		3,810,049
16							
17	Backfill / Grade / Landscaping	191,318	191,318	214,307	429,457	-	1,026,400
18							
19	Activities currently under contract					0	0
20							
21	Ongoing environmental monitoring (quarterly for 5 years)					123,000	123,000
22							
23	Utility Management / Oversight					598,639	598,639
24							
25	Demolition Contractor Management / Supervisory / Safety Staff					908,494	908,494
26							
27	Security					278,206	278,206
28							
29	Property Taxes	-	-	-	-	-	0
30							
31	Project Expenses						
32	Shared Heavy Equipment / Operating Engineers					747,807	747,807
33	Small Tool Allowance	23,344	23,344	24,419	39,591	n/a	110,698
34	Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					21,934	21,934
35	Permits					117,401	117,401
36	Demolition Contractors Insurance					343,274	343,274
37	Demolition Contractors Fee					1,396,158	1,396,158
38							
39	Sub-Total						14,473,760
40							
41	Contingency						2,171,064
42							
43	Project Total (before scrap credit)						16,644,824
44							
45	Scrap Credit (Average 2019-2024 Scrap Prices in 2024 \$s)	(1,461,680)	(1,461,680)	(1,460,892)	(1,112,733)	-	(5,496,985)
46							
47	Project Total (before scrap credit) (2024 \$s)						30,128,690
48							
49	Scrap Credit (Average 2019-2024 Scrap Prices in 2024 \$s)						(5,496,985)
50							
51	Project Total (2024 \$s)						24,631,705

Reference

Lines 1 - 37

Line 39 x 0.15

Line 39 + 41

Line 43 x WP 4-83, Line 16

Line 45

Line 47 + 49

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Colusa Generating Station Dismantling Cost Estimate (initially presented in 2014 GRC) with Updates to Scrap Prices

Cost Estimate Developed by TLG Services Incorporates average scrap prices over a 5-year period from 2019 to 2024

Line No.	Activities (Costs in 2012 dollars unless otherwise stated)	Unit 1	Unit 2	Unit 3	Common	Station	Station Total	Reference
1	Colusa Unit Rating (MWe)					657		
2								
3	Characterization / Temporary Services	82,000	82,000	96,000	0	75,000	335,000	
4								
5	Equipment Removal	1,320,480	1,320,480	909,900	1,261,757		4,812,618	
6								
7	Structures Demolition	610,582	610,582	1,075,659	1,521,620		3,818,443	
8								
9	Backfill / Grade / Landscaping	225,937	225,937	247,544	550,983	-	1,250,402	
10								
11	Ongoing environmental monitoring (quarterly for 5 years)					156,000	156,000	
12								
13	Utility Management / Oversight					620,925	620,925	
14								
15	Demolition Contractor Management / Supervisory / Safety Staff					938,336	938,336	
16								
17	Security					287,598	287,598	
18								
19	Property Taxes	-	-	-	-	-	0	
20								
21	Project Expenses							
22	Shared Heavy Equipment / Operating Engineers					734,781	734,781	
23	Small Tool Allowance	25,413	25,413	26,435	37,845	n/a	115,106	
24	Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					21,264	21,264	
25	Permits					121,819	121,819	
26	Demolition Contractors Insurance					356,194	356,194	
27	Demolition Contractors Fee					1,445,703	1,445,703	
28								Lines 1 - 27
29	Sub-Total						15,014,189	
30								Line 29 x 0.15
31	Contingency						2,252,128	
32								Line 29 + 31
33	Project Total (before scrap credit)							
34								
35	Scrap Credit (Average 2019-2024 Scrap Prices in 2024 \$s)	(1,611,359)	(1,611,359)	(1,549,283)	(1,188,863)	-	(5,960,863)	
36								
37	Project Total (before scrap credit) (2024 \$s)						28,115,982	Line 33 x WP 4-83, Line 16
38								
39	Scrap Credit (Average 2019-2024 Scrap Prices in 2024 \$s)						(5,960,863)	Line 35
40								
41	Project Total (2024 \$s)						22,155,119	Line 37 + 39

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Colusa Generating Station Dismantling Updates to Scrap Prices

Line No.

1 Basis for Scrap Metal Value (Based on TLG estimate for Gateway in 2024 \$\$)

	Material Type	Scrap Category	Market Value	Units	Transport Cost	Scrap Metal Credit (per ton)	Reference
2	Carbon Steel	Cast iron	206.77	Per Ton	42.79	163.98	WP 4-127
3		No. 1	258.46	Per Ton	42.79	215.67	WP 4-127
4		Mixed Scrap	206.77	Per Ton	42.79	163.98	WP 4-127
5		Galvanized	56.86	Per Ton	42.79	14.07	WP 4-127
6	Stainless Steel	SS-1	1.03	Per Pound	0.02	2,013.83	WP 4-127
7	Copper	Insulated Cable	1.81	Per Pound	0.02	5,736.21	WP 4-127
8		No. 2 Copper	2.89	Per Pound	0.02	824.05	WP 4-127
9		Large Motor	0.43	Per Pound	0.02	10,160.44	WP 4-127
10							
11							
12							

13 Quantity of Scrap Metals (pounds)¹

	Material Type	Scrap Category	Unit 1	Unit 2	Unit 3	Common	Station Total
14	Carbon Steel	No. 1	1,386,536	1,386,536	1,756,397	2,887,676	7,417,145
15		Mixed Scrap	6,855,557	6,855,557	3,659,155	3,423,965	20,794,234
16		Galvanized	49,932	49,932	56,487	198,170	354,521
17	Stainless Steel	SS-1	46,351	46,351	48,563	323,691	464,956
18	Copper	Insulated Cable	31,950	31,950	44,412	44,663	152,975
19		No. 2 Copper	212,807	212,807	216,258	20,261	662,133
20		Large Motor	86,621	86,621	540,463	134,660	848,365
21							
22							
23							

24 Scrap Metal Credits

	Material Type	Scrap Category	Unit 1	Unit 2	Unit 3	Common	Station Total	
25	Carbon Steel	No. 1	(143,347)	(143,347)	(181,585)	(298,542)	(766,822)	Line 3 x Line 15
26		Mixed Scrap	(708,762)	(708,762)	(378,302)	(353,987)	(2,149,812)	Line 5 x Line 16
27		Galvanized	(1,420)	(1,420)	(1,606)	(5,634)	(10,079)	Line 6 x Line 17
28	Stainless Steel	SS-1	(47,742)	(47,742)	(50,020)	(333,402)	(478,905)	Line 7 x Line 18
29	Copper	Insulated Cable	(57,830)	(57,830)	(80,386)	(80,840)	(276,885)	Line 8 x Line 19
30		No. 2 Copper	(615,012)	(615,012)	(624,986)	(58,554)	(1,913,564)	Line 9 x Line 20
31		Large Motor	(37,247)	(37,247)	(232,399)	(57,904)	(364,797)	line 10 x Line 21
32	Total		(1,611,359)	(1,611,359)	(1,549,283)	(1,188,863)	(5,960,863)	Total Lines 26-32
33								
34								

Notes:

1. Based on 2012 Study by TLG Services.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Humboldt Bay Generating Station Dismantling Cost Estimate (initially presented in 2014 GRC) with Updates to Scrap Prices

Cost Estimate Developed by TLG Services

Incorporates average scrap prices over a 5-year period from 2019 to 2024

Line No.	Activities (Costs in 2008 dollars unless otherwise stated)	Unit, each (typ. of 10)	Common	Station	Station Total
1	PG&E - Humboldt Unit Rating (MWe)	16	160		
2	Plant / Unit used as a Cost Basis (adjusted for rating)	not used	not used		
3	Station "Basis" Unit Rating	160	160		
4					
5	Characterization / Temporary Services	13,000	0	50,000	180,000
6					
7	Equipment Removal	152,193	131,083		1,653,017
8					
9	Structures Demolition	189,212	85,157		1,977,274
10					
11	Backfill / Grade / Landscaping	14,353	261,313	-	404,846
12					
13	Ongoing environmental monitoring (quarterly for 5 years)			121,000	121,000
14					
15	Utility Management / Oversight			401,933	401,933
16					
17	Demolition Contractor Management / Supervisory / Safety Staff			852,479	852,479
18					
19	Security			225,790	225,790
20					
21	Property Taxes	-	-	-	0
22					
23	Project Expenses				
24	Shared Heavy Equipment / Operating Engineers			643,425	643,425
25	Small Tool Allowance	4,185	5,420	n/a	47,274
26	Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)			17,801	17,801
27	Permits			58,971	58,971
28	Demolition Contractors Insurance			172,429	172,429
29	Demolition Contractors Fee			644,380	644,380
30					
31	Sub-Total				7,400,620
32					
33	Contingency				1,110,093
34					
35	Project Total (before scrap credit)				8,510,713
36					
37	Scrap Credit (Average 2019-2024 Scrap Prices in 2024 \$s)	(266,949)	(78,775)	-	(2,748,265)
38					
39	Project Total (before scrap credit) (2024 \$s)				15,405,187
40					
41	Scrap Credit (Average 2019-2024 Scrap Prices in 2024 \$s)				(2,748,265)
42					
43	Project Total (2024 \$s)				12,656,922

Reference

Lines 1 - 29

Line 31 x 0.15

Line 31 + 33

Line 35 x WP 4-83, Line 16

Line 37

Line 39 + 41

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Solar Demolition Summary

Line No.											Reference
1	Guernsey Decommissioning Study (in 2015 \$s unless otherwise stated)										
2	84,000 Panels										
3	12.5% for Overhead and Profit										
4								Total		Per MW	
5	Mobilization, (Characterization/Temporary Services)							\$	140,000	\$ 7,000	
6	Electrical Distribution, (Inverters, Transformers and Switchgear)							\$	136,014	\$ 6,801	
7	Photovoltaic Array Removal,										
8	(Panels, Support Structures, Tracking Motors, Controller Boxes, Combiner Boxes and Associated Wiring)							\$	4,024,902	\$ 201,245	
9	Excavation of Buried Cables							\$	812,884	\$ 40,644	
10	Structures Demolition, (Buildings and Foundations)							\$	66,936	\$ 3,347	
11	Backfill/Grade/Landscaping							\$	507,228	\$ 25,361	
12	Utility Management Oversight, (PG&E)							\$	167,672	\$ 8,384	
13	Demolition Contractor Management/Supervision/Safety Staff							\$	359,203	\$ 17,960	
14	Security							\$	148,036	\$ 7,402	
15	Heavy Equipment/Operating Engineers							\$	348,998	\$ 17,450	
16	Small Tool Allowance, (2% of Craft Labor)							\$	111,759	\$ 5,588	
17	Utilities Allowances							\$	29,309	\$ 1,465	
18	Permits							\$	81,715	\$ 4,086	
19	Demolition Contractors Insurance							\$	192,280	\$ 9,614	
20	Demolition Contractors Fee							\$	806,503	\$ 40,325	
21								Sub Total	\$ 7,933,440	\$ 396,672	Lines 5-20
22	Contingency, (15%)								1,203,617	\$ 60,181	
23								Total Before Scrap Credit	\$ 9,137,057	\$ 456,853	Line 21 + Line 22
24	Scrap Credit (in 2024 \$s)								(621,939)	\$ (31,097)	WP 4-125
25								Total	\$ 8,515,118	\$ 425,756	Line 23 + Line 24
26											
27	Huron Decommissioning Study. Used for all Stations Except Guernsey (in 2015 \$s unless otherwise stated)										
28	90,500 Panels										
29	12.5% for Overhead and Profit										
30								Total		Per MW	
31	Mobilization, (Characterization/Temporary Services)							\$	140,000	\$ 7,000	
32	Electrical Distribution, (Inverters, Transformers and Switchgear)							\$	136,014	\$ 6,801	
33	Photovoltaic Array Removal,										
34	(Panels, Support Structures, Tracking Motors, Combiner Boxes and Associated Wiring)							\$	4,010,076	\$ 200,504	
35	Excavation of Buried Cables							\$	878,448	\$ 43,922	
36	Structures Demolition, (Buildings and Foundations)							\$	66,936	\$ 3,347	
37	Backfill/Grade/Landscaping							\$	541,774	\$ 27,089	
38	Utility Management Oversight, (PG&E)							\$	167,672	\$ 8,384	
39	Demolition Contractor Management/Supervision/Safety Staff,							\$	359,203	\$ 17,960	
40	Security							\$	148,036	\$ 7,402	
41	Heavy Equipment/Operating Engineers							\$	348,998	\$ 17,450	
42	Small Tool Allowance, (2% of Craft Labor)							\$	113,465	\$ 5,673	
43	Utilities Allowances							\$	29,309	\$ 1,465	
44	Permits							\$	82,803	\$ 4,140	
45	Demolition Contractors Insurance							\$	194,839	\$ 9,742	
46	Demolition Contractors Fee							\$	817,833	\$ 40,892	
47								Sub Total	\$ 8,035,405	\$ 401,770	Lines 31-46
48	Contingency, (15%)								1,218,912	\$ 60,946	
49								Total Before Scrap Credit	\$ 9,254,317	\$ 462,716	Line 47 + Line 48
50	Scrap Credit (in 2024 \$s)								(1,322,190)	\$ (66,110)	WP 4-126
51								Total	\$ 7,932,127	\$ 396,606	Line 49 + Line 50
52											
53	Calculation of the Solar Demo Cost										
				Decommissioning Cost Before Scrap Credit by MW (2015 \$s)	Decommissioning Cost Before Scrap Credit (2015 \$s)	Decommissioning Cost Before Scrap Credit (2024 \$s)	Scrap Credit by MW (2024 \$s)	Scrap Credit (2024 \$s)	Total Decommissioning Cost (2024 \$s)	Year for Decom	Total Decommissioning Cost (Nominal \$s)
54	Station	MW's									
55	Guernsey	20	\$	456,853	\$9,137,057	\$17,122,924	\$ (31,097)	(\$621,939)	\$16,500,985	2038	\$20,320,528
56	Cantua	20	\$	462,716	\$9,254,317	\$17,342,671	\$ (66,110)	(\$1,322,190)	\$16,020,481	2037	\$19,473,860
57	Five Points	15	\$	462,716	\$6,940,738	\$13,007,003	\$ (66,110)	(\$991,643)	\$12,015,361	2036	\$14,416,662
58	Giffen	10	\$	462,716	\$4,627,159	\$8,671,335	\$ (66,110)	(\$661,095)	\$8,010,240	2037	\$9,736,930
59	Huron	20	\$	462,716	\$9,254,317	\$17,342,671	\$ (66,110)	(\$1,322,190)	\$16,020,481	2037	\$19,473,860
60	Gates	20	\$	462,716	\$9,254,317	\$17,342,671	\$ (66,110)	(\$1,322,190)	\$16,020,481	2038	\$19,728,800
61	Stroud	20	\$	462,716	\$9,254,317	\$17,342,671	\$ (66,110)	(\$1,322,190)	\$16,020,481	2036	\$19,222,216
62	Vaca Dixon	2	\$	462,716	\$925,432	\$1,734,267	\$ (66,110)	(\$132,219)	\$1,602,048	2035	\$1,897,382
63	West Gates	10	\$	462,716	\$4,627,159	\$8,671,335	\$ (66,110)	(\$661,095)	\$8,010,240	2038	\$9,864,400
64	Westside	15	\$	462,716	\$6,940,738	\$13,007,003	\$ (66,110)	(\$991,643)	\$12,015,361	2036	\$14,416,662
65	Total	152			\$70,215,549	\$131,584,550	(\$626,082)	(\$9,348,393)	\$122,236,157		\$148,551,299

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Recorded Fuel Cell Decommissioning Costs

Planning Order		Dollars					
Line No.	Planning Order	2020	2021	2022	2023	2024	Total
1	5906821 SF State Fuel Cell Decommissioning	-	156,716	622,409	-	-	779,125
2	5906822 CSU East Bay Fuel Cell Decommissioning	-	49,874	205,566	-	-	255,440
3	Total	-	206,590	827,975	-	-	1,034,565

- 4 Notes:
- 5 1. The CSU East Bay Fuel Cell was retired on July 6, 2021.
- 6 2. The Fuel Cell Energy Fuel Cell located at SF State was retired on July 6, 2021.
3. The Bloom Energy Fuel Cell located at SF State was retired on July 8, 2021.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Elkhorn Battery Energy Storage Demolition Summary

Line No.	Activities (Costs in 2024 dollars unless otherwise stated)	Total
1	Characterization / Temporary Services	\$231,127
2		
3	Equipment Removal	\$2,066,705
4		
5		
6	Structures Demolition	\$578,942
7		
8	Backfill / Grade / Landscaping	\$576,948
9		
10	Transportation Allowance	\$3,782,011
11		
12	Utility Management / Oversight	\$449,203
13		
14	Dismantling Contractor Mgmt. / Super. / Safety Staff	\$677,371
15		
16	Property Taxes	\$0
17		
18	Project Expenses	
19	Shared Heavy Equipment / Operating Engineers	\$874,915
20		
21	Small Tool Allowance	\$41,632
22		
23	Utilities Allowance	\$30,402
24		
25	Permits	\$110,751
26		
27	Demolition Contractor's Insurance	\$274,955
28		
29	Demolition Contractor's Fee	\$1,071,049
30		
31	Subtotal	\$10,766,010
32		
33	Contingency	\$1,614,902
34		
35	Project Total (before scrap credit)	\$12,380,912
36		
37	Scrap Credit	(\$1,565,775)
38		
39	Project Total	\$10,815,137

Reference: Dismantling Cost Study for the Elkhorn Energy Storage Facility at WP 4-112.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas, Solar, and Energy Storage Operations Costs
Decommissioning Escalation Indices

<u>Line No.</u>		TREND	Total Hydraulic Prod. Plant: JUEPPH@PCF	Total Steam Production Plant: JUEPPF@PCF	Total Other Production Plant: JUEPPO@PCF	Notes
1	2008	LH File		571.3		
2	2009	LH File		568.0		
3	2010	LH File		592.8		
4	2011	LH File		614.5		
5	2012	LH File		635.0		
6	2013	144		643.8		
7	2014	154		653.0		
8	2015	164	519.8	682.8	803.5	
9	2016	174	533.0	704.3	834.3	
10	2017	184	541.5	707.0	870.3	
11	2018	194	559.0	730.8	912.5	
12	2019	204	577.5	748.3	947.3	
13	2020	214	607.5	773.0	998.5	
14	2021	224	685.5	867.0	1069.8	
15	2022	234	763.0	955.0	1216.8	
16	2023	241	783.9	1009.3	1387.1	Trend 241 (Q1 2024) consistent with 2027 GRC Prep, April 2024
17	2024	"	788.2	1034.0	1505.8	
18	2025	"	781.1	1049.1	1609.6	
19	2026	"	787.8	1058.9	1671.6	
20	2027	"	796.0	1068.7	1704.2	
21	2028	"	804.9	1076.5	1699.7	
22	2029	"	815.2	1086.5	1689.5	
23	2030	"	830.9	1100.0	1689.3	
24	2031	"	847.8	1117.0	1699.8	
25	2032	"	865.2	1135.2	1717.2	
26	2033	"	882.9	1154.1	1737.6	
27	2034	"	899.2	1174.8	1760.3	

Notes: 1. Total Steam Production Plant: JUEPPF@PCF is used for Natural Gas Generation Facilities.
2. Total Other Production Plant: JUEPPO@PCF is used for Solar.

**Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 3
Natural Gas, Solar, and Energy Storage Operations Costs
Natural Gas Decommissioning Escalation Factors**

[illegible]

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 3
Natural Gas, Solar, and Energy Storage Operations Costs
Natural Gas Decommissioning Escalation Factors

[illegible]

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 3
Natural Gas, Solar, and Energy Storage Operations Costs
Solar Decommissioning Escalation Factors

[illegible]

DISMANTLING COST STUDY
for the
Elkhorn Energy Storage Facility



prepared for
Pacific Gas and Electric Company

prepared by
TLG Services, LLC
Bridgewater, CT

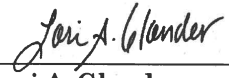
December 2024

*Pacific Gas and Electric Company
Dismantling Cost Study*

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APPROVALS

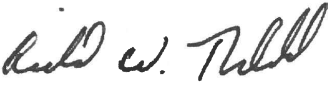
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REVISION LOG

Rev. No.	Date	Item Revised	Reason for Revision
0	12/17/2024		Final Issue

ACRONYMS / DEFINITIONS

BESS	Battery Energy Storage System
EES	Elkhorn Energy Storage
kW	Kilowatt
kW-hr	Kilowatt-hour
Megapack	Tesla battery module trade name [Open]
Mw	Megawatt
MWe	Megawatt (electric)
NESP	National Environmental Studies Project
OSHA	Occupational Safety & Health Administration
PG&E	Pacific Gas and Electric Company
TLG	TLG Services, LLC

EXECUTIVE SUMMARY

This report, prepared by TLG Services, LLC (TLG), provides estimated costs for the complete dismantling of the Elkhorn Energy Storage facility (EES), consisting of 256 Tesla Megapack battery modules and associated transformers, switchgear, cabling, and support structures; collectively referred to as Elkhorn Energy Storage. It is owned and operated by Pacific Gas and Electric Company. It is located on the south side of the Elkhorn Slough, on the northwest corner of the former Moss Landing power station site. The facility became operational in 2022.

The dismantling estimate includes the cost of removing the battery modules, support equipment, and buried cabling and cable vaults. The switchgear buildings, their contents, and the high-voltage equipment upstream to the Moss Landing substation are not included in this estimate. The scope of the dismantling estimate includes the following significant work activities and their associated labor, equipment, material, and waste disposal cost elements:

- Preparation of the facility for safe dismantling
- Removal and disposition of all installed equipment downstream from the switchgear
- Dismantling contractor's on-site management, engineering, safety, and administrative staff
- Dismantling contractor's expenses, including profit, insurance, permits, and fees.
- Cost contingency
- A cost credit associated with the disposition of scrap metals
- Note that PG&E's on-site management, oversight, and safety staff are not included within this estimate.

The general approach in assembling the estimate was to develop an inventory of equipment and structures designated to be removed. These inventories were established using site drawings and other data provided by PG&E (including discussions with the PG&E staff).

The dismantling and removal activity costs are estimated by applying unit factors (developed for each inventory item) against the inventory. Costs for project management, shared equipment and consumables, and similar types of costs are estimated on a period-dependent basis (i.e., the magnitude of the expense depends, in part, on the duration of the project and the types of activities taking place). The

manufacturer-supplied battery storage modules are assumed to be returned to the respective manufacturer. The potential value of scrap from materials generated in dismantling the remainder of the EES is included as a credit in the dismantling cost estimate. Contingency is provided within this estimate to account for unpredictable project events.

OSHA states that demolition involves additional hazards due to unknown factors which make demolition work particularly dangerous. OSHA states that the hazards of demolition work can be controlled and eliminated with the proper planning, the right personal protective equipment, necessary training, and compliance with OSHA standards. This cost estimate is intended to provide sufficient monies to allow PG&E management to perform the project using these principles and standards.

The dismantling costs for EES is estimated to be \$10,815,137 in 2024 dollars. This includes the credit for scrap metal generated during the dismantling process.

1. INTRODUCTION

1.1 OBJECTIVE OF STUDY

The objective of this dismantling cost study prepared by TLG Services is to present an estimate of the costs to dismantle the Elkhorn Energy Storage (EES) facility. This study is not intended to be a dismantling plan for the facility, but a cost estimate prepared to support current financial planning for future dismantling.

1.2 FACILITY DESCRIPTION

The EES is a set of 256 Tesla Megapack battery modules receiving its power input from the grid. Each module is assembled off-site by Tesla and trucked to ESS. Each module is the size of a standard cargo trailer and weighs approximately 56,000 pounds.

The combined capacity of the 256 modules is 730 MW-hr, with a power output of up to 182.5 MW, available for up to four hours.

The outputs of the battery modules are connected to 64 step-up transformers, 505 volts to 21 kV. The outputs of these transformers are collected and fed into the switchgear building.

This estimate does not include certain elements of the EES, since it is assumed that following the Tesla Megapacks reaching their end of service life, the remainder of the site will be repowered. Therefore, this dismantling estimate does not include the following items:

- Switchgear structures 1, 2 and 3
- The 115 kV Control Room
- Battery Energy Storage System (BESS) and Battery Room
- Metering Enclosure
- Transformer Banks 1, 2 and 3 and associated Neutral Grounding Reactors
- Pull Boxes 1 through 6, and 50 through 52.
- High voltage circuit breakers 112, 122 and 132
- All medium and high voltage leads and bus support structures upstream from the Switchgear structures out to the Moss Landing substation.

- SPCC Pond D, Oil Retention Pond A, and paved swale
- Security surveillance equipment and the security wall surrounding EES.

The scope of this estimate is shown in Figure 1.1. The dismantling estimate includes those site features shown within the yellow demarcation.

1.3 SCOPE

The scope of the dismantling estimate includes the following significant cost elements:

- Preparation for safe dismantling
 - Hazardous materials characterization
 - Isolation of the facility (e.g. electrical, gas, water)
- Labor, equipment, and material costs associated with the removal and disposition of all installed equipment.
- Dismantling contractor's on-site management
- Dismantling contractor's expenses, including insurance, permits, and fees.
- Owner's on-site management, oversight, and safety staff
- Cost contingency
- A cost credit associated with the disposition of scrap metals.

Costs are provided for the generating unit, identified by significant cost element. Costs are provided in 2024 dollars.

1.4 GENERAL APPROACH

The general approach in assembling the estimate was to develop an inventory of equipment and structures designated to be removed from the EES. These inventories were established using PG&E-provided drawings and the Combined Development Permit from Monterey County for the EES [Reference 1].

The removal, dismantling and restoration activity costs are estimated by applying unit factors (developed for each inventory item) against the inventory. Costs for project management, shared equipment and consumables, and similar types of costs are estimated on a period-dependent basis (i.e., the magnitude of the expense depends, in part, on the duration of the project and the types of activities taking place). The potential value of scrap from materials generated in dismantling the EES components and structural steel is included as a credit in

the dismantling cost estimate. Contingency is provided within this estimate to account for unpredictable project events.

OSHA states that dismantling involves additional hazards due to unknown factors which make dismantling work particularly dangerous. OSHA states that the hazards of dismantling work can be controlled and eliminated with the proper planning, the right personal protective equipment, necessary training, and compliance with OSHA standards. The cost estimate is intended to provide sufficient monies to allow PG&E management to perform the project using these principles and standards [Reference 2].

Section 2 of this report identifies the activities and sequence of activities necessary to dismantle the EES. Section 3 provides the specific bases for the estimate. Section 4 discusses scrap metal and associated credits to the dismantling costs. The results of the cost study are provided in Section 5. Appendices A and B contain detailed information used to develop this analysis.

**FIGURE 1.1
ELKHORN ENERGY STORAGE
BOUNDARY OF INCLUDED COMPONENTS**



2. DISMANTLING OPERATIONS

The estimate for dismantling the EES is based on the complete removal of the battery storage equipment. The following sections describe the project organization and basic activities necessary for accomplishing the dismantling project.

The actual dismantling program begins once PG&E has decided to dismantle the site. The dismantling program has been organized into three distinct periods: Period 1 – Engineering and Planning; Period 2 - Dismantling Operations; and Period 3 - Site Restoration. This section summarizes the activities performed under each Period of the program.

For the purposes of this estimate it is assumed that once the decision to dismantle has been made and a project start date established, the work in each of these periods will be completed successively (no delay between periods). This report does not attempt to describe all the activities necessary to dismantle the Facility but identifies representative activities appropriate to this type of project.

2.1 PRE-SHUTDOWN ACTIVITIES

PG&E pre-dismantling responsibility is to put the EES in a safe condition so that the dismantling contractor can begin the removal process.

- Through normal operations, PG&E will force a discharge of each Tesla Megapack module to below 10% charge level.

2.2 POST-SHUTDOWN FACILITY STAFF TRANSITION ACTIVITIES

The estimate is based on the facility being shut down and placed into a post-shutdown configuration by PG&E. The length of time that the facility is in this configuration is indeterminate and the costs for maintaining the Facility in this configuration is not included within the scope of this dismantling effort.

2.3 DISMANTLING ENGINEERING / PLANNING

When the decision is made to begin physical dismantling of the Facility, PG&E will begin field dismantling activities, beginning with engineering and planning, and removal of any hazardous materials, if any determined during scoping (none accounted for in this estimate).

2.3.1 Engineering and Planning

A preliminary planning phase of the program begins once it has been determined that the Facility will be dismantled, and the project has been authorized to proceed. During this phase, the owner assembles its dismantling management organization, makes appropriate decisions regarding the extent of dismantling and the approach to managing the activities, and accomplishes those site preparation activities necessary to transition from a facility shutdown configuration to site dismantling. Costs incurred during this preliminary phase of the program are included in the dismantling costs presented in this study.

PG&E prepares the facility for dismantling by performing the following activities:

- Prepare specifications that identify and describe the objectives and major work activities to be accomplished (establishing the final site configuration)
- Assemble Facility documentation that may be relevant to dismantling (drawings, hazardous material reports, environmental studies, etc.)
- Select a Dismantling Contractor
- Assemble and mobilize the management and oversight team responsible for the project.

2.3.2 Hazardous Material Abatement (as applicable)

The hazardous material abatement contractor prepares for this work by thoroughly understanding the scope of the remediation work and obtaining the permits necessary to initiate the work. Abatement of hazardous material is considered an important prerequisite to dismantling the facility. The method by which hazardous material is abated is strictly controlled by federal and/or state regulations.

At this time, there are no known hazardous materials on site at ESS, but regulations may change in the future. This estimate does not include any costs for future hypothetical hazardous materials removal.

2.3.3 Dismantling Preparations

The dismantling contractor prepares the Facility for dismantling by performing the following activities:

- Installing environmental barriers and monitoring equipment
- Reviewing Facility drawings and specifications that may be useful for the dismantling project
- Identifying the processes to achieve the final desired configuration
- Identifying the major work sequence
- Preparing dismantling activity specifications and work orders/forms
- Preparing detailed dismantling procedures
- Preparing a dismantling plan
- Preparing permit application(s) for Facility dismantling
- Mobilizing site staff
- Configuring temporary services/facilities to support dismantling operations
- Arranging for lifting and dismantling equipment, rigging, and tooling
- Hiring and training the labor force

2.4 DISMANTLING OPERATIONS

Dismantling activities are initiated after completing the engineering and planning process, and after hazardous material abatement and removal is complete.

The sequence of removal activities for the EES facility is as follows:

- All power connections in the Switchgear Enclosures between the electrical switchgear and the battery modules will be disconnected at the switchgear terminals.
- All instrumentation connections in the Switchgear Enclosures between monitoring and control equipment and the battery modules will be disconnected.
- Disconnect all medium and low voltage power cables from the 500 V to 21 kV pad mounted transformers (64 total).
- Disconnect all connections in all pull boxes and junction boxes for both power cabling and instrumentation and control cabling.
- Rig and remove all Megapack battery modules. This estimate includes transportation costs from the site back to the Tesla Gigafactory in Nevada. No other recovery costs for ultimate disposal or reuse of the Megapacks are included in this estimate.

- Rig and remove all pad-mounted transformers. All electrical equipment downstream from the Switchgear enclosures will be shipped offsite for scrap.
- Pull all power cabling from all conduits up to the switchgear in the three Switchgear enclosures. Ship cabling offsite for scrap recovery.
- Pull all instrumentation and control cabling from all conduits up to the Switchgear enclosures. Ship cabling offsite for scrap recovery.
- Remove all remaining electrical enclosures in the battery yard and ship for scrap recovery.
- Remove yard lighting and fire/flame detection equipment and ship for scrap recovery.

2.5 SITE RESTORATION

The sequence of site restoration activities for the EES facility is as follows:

- Remove the 32 poured concrete pads using demolition hammers to rubbleize the concrete. Concrete rubble will be trucked to a construction debris disposal site.
- Remove pull boxes using demolition hammers. Concrete rubble created will be trucked to a construction debris disposal site.
- Excavate above all buried conduits; remove conduits.
- Grade site to final contours. Plant native vegetation to control soil erosion.

Site restoration activities are limited to the restoration of the facility north of the Switchgear Structures to the property fence.

3. COST ESTIMATE

The basis, methodology, and assumptions for the site-specific cost estimate are described in the following paragraphs.

3.1 BASIS OF ESTIMATE

Inventory of Materials to be removed

The inventory is an essential element of the estimate, since dismantling costs are determined by applying unit cost factors against the corresponding inventory quantities. A site-specific inventory of materials to be removed was developed using a combination of methods. The inventory used in developing the estimate is provided in Appendix A.

The site-specific inventory was developed “from scratch”, by reviewing the Bill of Materials for the facility, discussions with PG&E staff, and extracting data from facility-specific drawings, photos and videos.

Economic Cost Drivers

In developing an estimate, the cost of labor, equipment and material, credit for scrap, and similar costs will influence the results of the estimate. The bases for the significant cost drivers are as follows:

1. Craft labor rates are based on the 2024 version 82nd edition of the Gordian Building Construction Costs with RSMeans data [Reference 3].
2. Utility rates were supplied by PG&E (escalated to 2024) [Reference 4].
3. Material and equipment costs for conventional dismantling and/or construction activities, Contractors Insurance, Small Tools Allowance, Permit / Fees, and Contractor’s Fee are based on RSMeans Construction Cost Data.
4. Scrap metal prices are based on published indices [Reference 5].
5. Contingency, contractor fee, contractor insurance, environmental sampling, and permits & fees are based upon RSMeans Construction Cost Data.
6. Costs in this estimate are in 2024 dollars.
7. Property taxes (or payments in lieu of taxes) are not included within the estimate.

Project Organization

For the purposes of this study, the dismantling project is assumed to be managed by a PG&E Project Engineer, who would have the primary responsibility for oversight of the dismantling of the Facility. These owner's representatives would maintain and/or provide the engineering, safety, and environmental compliance oversight necessary to support dismantling operations.

A Dismantling Contractor, experienced in dismantling similar facilities, would be hired as the prime contractor for the removal of facility components. The Dismantling Contractor's work superintendent would report to the PG&E Site supervisor. The Dismantling Contractor would manage and supervise the dismantling activities of the facility and be responsible for completing the work in an expeditious and safe manner. Contractor personnel would manage and direct the labor force in accordance with approved procedures and in accordance with a health and safety program.

Project Schedule

For the purposes of this study, the dismantling project schedule is assumed to be controlled by the removal and shipping operations of the Megapack battery modules. At an assumed three modules per workday, the 256 modules will require 86 days, or four months, to transfer the modules back to Tesla.

Concurrent with the battery module removal, the other features in the EES to be removed will be removed. This includes the pad-mounted transformers, pull boxes, control boxes, yard lighting and fire prevention equipment. These items will be removed in the same time frame as the battery modules.

Following the clearance of all above grade components, the poured concrete pads, pull boxes, and all buried conduits will be removed. Following this, the site will be graded, and native vegetation planted for soil erosion control. These activities are expected to require an additional month to complete.

The total duration of field activities is expected to be approximately 10 months.

3.2 METHODOLOGY

The methodology used to develop the cost estimate follows the basic approach presented in the AIF/NESP-036, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates" [Reference 6] and the US DOE "Decommissioning Handbook" [Reference 7]. These publications utilize a unit

factor method for estimating decommissioning activity costs to simplify the estimating calculations. Unit cost factors for concrete removal (\$/cubic yard), steel removal (\$/ton), and cutting costs (\$/in) are developed from the labor cost information from RSMeans. The activity-dependent costs are estimated using item quantities (cubic yards, tons, inches, etc.) developed from Plant drawings and inventory documents. The unit factors used in this study reflect the latest available information on worker productivity in Plant dismantling. A sample unit cost factor is provided in Appendix B.

An activity duration critical path is developed to determine the total dismantling program schedule. This program schedule is then used to determine the period-dependent costs for program management, administration, field engineering, equipment rental, quality assurance, and security. TLG estimated typical salary and hourly rates for personnel associated with period-dependent costs. The costs for conventional dismantling of structures, materials, backfill, landscaping, and equipment rental are obtained from RSMeans. Examples of such unit factor development are presented in AIF/NESP-036.

The unit cost factor method provides a demonstrable basis for establishing reliable cost estimates. The details of activities for labor costs, equipment and consumables costs provide assurance that cost elements have not been omitted. Detailed unit cost factors, coupled with the site-specific inventory of piping, components and structures provide confidence in the cost estimates.

The activity-dependent and period-dependent costs are combined with applicable collateral costs to yield the direct decommissioning cost. A contingency is then applied. "Contingencies" are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook" [Reference 8] as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The cost elements in this estimate are based on ideal conditions; therefore, a contingency factor has been applied.

Examples of items that could occur but have not otherwise been accounted for in this estimate include: labor work stoppages, bad weather delays, equipment/tool breakage, changes in the anticipated Plant shutdown conditions, etc. These types of unforeseeable events are discussed in the AIF/NESP-036 study. Guidelines are also provided for applying contingency.

3.3 ASSUMPTIONS

The following assumptions were used in developing the dismantling estimate.

Pre-requisite Activities

1. The arrangements of the units as they exist in 2024 based upon drawings provided by owner.
2. The dismantling process will be an engineered process with substantial consideration for occupational (worker) safety.
3. The dismantling will be performed by a Dismantling Contractor who is responsible for providing adequate staff and equipment to complete the dismantling in a safe manner.
4. The estimates are based on industrial safety and environmental regulations effective in 2024.
5. Prior to final shutdown of the EES, PG&E operations will ensure that each of the 256 Megapacks are discharged to less than 10% of their storage capacity, as required by shipping regulations.
6. All power to the site will be disconnected prior to beginning removal activities. The Decommissioning Contractor will provide temporary power as needed to support dismantling activities.
7. Prior to initiating dismantling, essentially all live circuits will have been de-energized (to preclude creating an industrial hazard). If required, temporary services systems (air, water, electrical, fire water, etc.) will be used to support dismantling operations and will remain in service throughout the project until no longer required.

Economic Assumptions

8. Post-shutdown “dormancy” costs (i.e., security and maintenance) are not included in the study.
9. Escalation/inflation of the costs over the remaining operating life is not included.
10. An allowance of 2% of craft labor costs is used for small tools.
11. A 12.5% fee is added to the Dismantling Contractor’s cost to account for its overhead and profit.
12. A 15% contingency is applied to all dismantling-related costs.

13. The Tesla Megapack battery modules are assumed to be returned to Tesla's Reno NV facility for ultimate disposal. Shipping of these modules to Tesla is included in this estimate.
14. Credit for scrap metal cost recovery is included in the estimates. Retired Facility equipment is assumed to have no value as salvage (sold for re-use).

Scheduling Assumptions

15. All work is performed during an eight-hour workday, five days per week, with no overtime.
16. Scheduling was calculated without constraints on availability of labor, equipment, or materials.
17. Handling of the Tesla Megapack battery modules is assumed to be the critical path activity for the dismantling operation. TLG assumed that three modules could be removed and shipped from the site per workday.
18. Proceeding in parallel with the battery module disposition, the pad-mounted transformers, control boxes and all cabling will be removed.
19. Following the removal of all components from the battery yard, removal of the buried conduits, pull boxes, and concrete support pads will be performed. This is estimated to require one month of effort.

Environmental Remediation Assumptions

20. The EES facility was surveyed for environmental hazards at the time of construction. The demolition of the facility will not introduce any additional environmental hazards requiring remediation.
21. All project activities and materials resulting from the dismantling effort of the EES are categorized as less than significant impact.
22. Any remediation necessary due to a fire, spill or other event in the future operations of EES is assumed to be done at the time of the incident. Therefore, the dismantling operation will not need to perform any further remediation.

4. SCRAP METAL CREDITS

The dismantling of a typical power plant occurs after a lengthy operating life. The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. PG&E will make economically reasonable efforts to salvage equipment following final facility shutdown. Since placing a salvage value on this equipment would be speculative, this analysis does not attempt to quantify the value that an owner may realize based upon those efforts.

The materials used in the equipment and buildings are suitable for recycling as scrap metals. As such, an estimated value of the scrap metal credit has been developed and applied to the units' cost estimate. The value of scrap was estimated using market values extracted from published sources and applying this value to the estimated quantities of materials generated from the dismantling project. There were three basic types of metals used in the scrap estimates: carbon steel, copper, and aluminum. The scrap credit, in addition to considering the quantity and types of materials, also considered the cost of handling and transporting these materials to a major scrap processing location in the San Francisco area where scrap is used or sold. The value of the scrap is reduced by the transportation costs.

The basis for scrap metal value is summarized in Table 4.1. A summary of the basis for the scrap credit is provided in Tables 4.2 which details the scrap quantities by material type.

TABLE 4.1
BASIS FOR SCRAP METAL VALUE
(2024 dollars)

Type of Material	Scrap Category ¹	Market Value ²	Units	Transport Cost ³	Scrap Metal Credit ⁴ (per ton)
Carbon Steel	Cast Iron	206.77	Per Ton	57.22	149.55
	No. 1	258.46	Per Ton	57.22	201.24
	Mixed Scrap	206.77	Per Ton	57.22	149.55
	Galvanized ⁵	56.86	Per Ton	57.22	0.00
Stainless Steel	SS-1	1.03	Per Pound	0.03	1,999.40
Aluminum	Insulated Cable	0.59	Per Pound	0.03	1,116.33
Copper	Insulated Cable	1.81	Per Pound	0.03	3,554.24
	No. 2 Copper	2.89	Per Pound	0.03	5,721.78

Note 1: Scrap categories are consistent with information provided in Recycler's World.

Note 2: The market value for scrap metal used in this estimate is based on Recycler's World U.S. Scrap Metal Index Spot Market Prices. Values shown represent the average over a 5-year period from 2019 to 2024.

Note 3: The estimated cost for handling and transporting the materials to a major scrap processing center in the San Francisco area is 57.22/ ton or \$0.03 / pound.

Note 4: The scrap metal credit reflects the market value of scrap adjusted for handling and transport cost to local scrap metal recycler.

Note 5: Transportation costs for galvanized steel exceed scrap market value.

TABLE 4.2
SCRAP METAL QUANTITIES AND CREDITS
(2024 dollars)

Type	Category	Scrap Weight (lbs)	Scrap Metal Pricing (per ton)	Credit
Carbon Steel	No. 1	884,633	\$201.24	\$89,012
	Mixed Scrap	731,250	\$149.55	\$54,679
	Galvanized ^[1]	24,026	\$0	\$0
Stainless Steel	SS-1	5,992	\$1,999.40	\$5,990
Copper	Insul Cable	390,970	\$3,554.24	\$694,801
	No. 2 Cu	244,064	\$5,721.78	\$698,240
Aluminum	Insul Cable	41,300	\$1,116.33	\$23,052
Total		2,322,235		\$1,565,775

^[1] – Galvanized scrap has no recycling value, therefore zero pricing shown

5. RESULTS

An estimate for dismantling the EES Facility was developed by applying the system inventories against the associated unit cost factors and accounting for program support costs. A summary of major cost categories is presented in Table 5.1. Note that columns may not total due to rounding.

The following is an explanation of the contents of each line item in these tables:

Plant Unit Rating (MWe) – This is the nominal electrical rating.

Electrical Capacity Rating (MW-hr) – This is the power that the Facility can produce over a nominal four-hour period.

Characterization / Temporary Services – The cost associated with performing a hazardous materials survey of the Facility prior to beginning field activities. Includes costs associated with de-energizing systems and isolation of the electrical systems in the buildings scheduled for dismantling. Costs for installing temporary services to support the dismantling are also included.

Equipment Removal – The cost associated with removing the battery modules and support equipment.

Transportation Allowance – The cost associated with transporting equipment back to the battery module manufacturer.

Utility Management / Oversight – The staff directly assigned to manage the dismantling project, including planning, execution, oversight, and restoration.

Dismantling Contractor Mgmt. / Super. / Safety Staff – The contractor's staff are assigned to manage, engineer, and supervise the dismantling project, including site safety personnel.

Property Taxes – Not included in this estimate.

The following six items, grouped as Project Expenses:

Shared Heavy Equipment / Operating Engineers – The cost for renting / operating equipment in general use throughout the dismantling project (cranes, trucks, forklifts, etc.).

Small Tool Allowance – The cost for procuring small tools; this is consistent with RSMeans 2024 Item 01 54 39.70-0100.

Utilities Allowance (Office Equip & Supplies / Telephone, Electric etc.) – The cost for procuring utility services and office supplies in support of the field office for the utility management and dismantling contractor staffs.

Permits – The cost of obtaining permits; this is consistent with RSMeans 2024 Item 01 41 26.50.

Dismantling Contractors Insurance – The cost of the dismantling contractor's insurance; the value is consistent with the RSMeans 2024 Item 01 31 13.30, lines 0020, 0200, and 0600.

Dismantling Contractors Fee – A fee applied to contractor activities; this represents the Contractors overhead and profit payment for the project and is consistent with RSMeans 2024 Item 01 31 13.80 lines 0350, 0400 and 0450.

Contingency – The cost to cover expenses for unforeseen events that are likely to occur. The estimate assumes 15% for all project activities, consistent with the RSMeans 2024 Item 01 21 16.50 lines 0050 and 0100.

Scrap Credit – A credit to the project for the recovery of scrap metals. This corresponds to the value shown in Table 4.2.

This study provides an estimate for dismantling under current requirements, based on present-day costs and available technology. As inputs to the cost model change over time, such as labor rates, equipment costs, scrap metal value, etc., this cost estimate should be reviewed and updated to reflect these changes.

TABLE 5.1
SUMMARY OF DISMANTLING COSTS
(2024 Dollars)

Activities (Costs)	Value
Power Rating (MWe)	182.5
Electrical Capacity Rating (MW-hr, 4-hour limit)	730.0
Characterization / Temporary Services	\$231,127
Equipment Removal	\$2,066,705
Structures Demolition	\$578,942
Backfill / Grade / Landscaping	\$576,948
Transportation Allowance	\$3,782,011
Utility Management / Oversight	\$449,203
Dismantling Contractor Mgmt. / Super. / Safety Staff	\$677,371
Property Taxes	\$0
Project Expenses	
Shared Heavy Equipment / Operating Engineers	\$874,915
Small Tool Allowance	\$41,632
Utilities Allowance	\$30,402
Permits	\$110,751
Demolition Contractor's Insurance	\$274,955
Demolition Contractor's Fee	\$1,071,049
Subtotal	\$10,766,010
Contingency	\$1,614,902
Project Total (before scrap credit)	\$12,380,912
Scrap Credit	(\$1,565,775)
Project Total	\$10,815,137

6. REFERENCES

1. "Pacific Gas & Electric Co (Elkhorn Battery Energy Storage Facility)" Combined Development Permit, File Number PLN180371, County of Monterey, State of California. 2019. [\[Open\]](#)
2. 29 CFR Part 1926, Subpart T - Demolition, United States Department of Labor, 2024 [\[Open\]](#)
3. "Building Construction Cost Data 2024," RSMeans Company, Inc., Greenville, SC. [\[Open\]](#)
4. E-mail dated March 3, 2018, from Aaron Adams of PG&E to Ben Stochmal at TLG Services; subject "Fuel Cell Decommissioning Study".
5. Recycler's World, Iron and Steel Recycling Section and Scrap Copper Recycling Section, U.S. Scrap Metal Index, 2019 to 2024. [\[Open\]](#)
6. T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986. [\[Open\]](#)
7. W.J. Manion and T.S. LaGuardia, "Decommissioning Handbook," U.S. Department of Energy, DOE/EV/10128-1, November 1980. [\[Open\]](#)
8. AACE International, Skills and Knowledge of Cost Engineering, 4th Edition, 1999. [\[Open\]](#)

APPENDIX A

SUMMARY OF FACILITY INVENTORIES

UCF	Description	Total
54	Removal of electrical equipment, <300 pound	107
57	Removal of electrical equipment, >10,000 pound	256
59	Removal of electrical transformers < 30 tons	65
65	Removal of incandescent light fixture	69
67	Removal of electrical conduit, linear foot	70,606
202	Removal of grade slab concrete, cubic yard	4,845
229	Backfill of below grade voids, cubic yard	3,526
230	Excavation of clean material, cubic yard	13,443
260	Removal of structural steel, pound	24,026
271	Landscaping w/o topsoil, acre	5
274	Removal of asphalt pavement, square foot	970

APPENDIX B
UNIT COST FACTOR DEVELOPMENT

APPENDIX B

UNIT COST FACTOR DEVELOPMENT

Example: Unit Factor for Removal of Electrical Transformers < 30 tons

1. SCOPE

Transformers up to 30 tons will be disconnected, removed and sent to the waste processing area.

2. CALCULATIONS

Act ID	Activity Description	Activity Duration	Critical Duration
a	Verify equipment is de-energized and disconnect	120	120
b	Unbolt transformer from mounts	60	(a)
c	Rig transformer for removal	60	60
d	Remove component and transfer to waste processing area	<u>120</u>	<u>120</u>
	Totals (Activity/Critical)	360	300

Duration adjustment(s):

Site-specific labor adjustment (0 % of critical duration)	0
+ Work break adjustment (8.33 % of productive duration)	<u>25</u>
Total work duration (minutes)	325

Total duration = 5.147 hours

3. LABOR REQUIRED

Crew	Number	Duration (hr)	Rate (\$/hr)	Cost (\$)
Laborers	2.00	5.417	74.73	809.62
Craftsmen	2.00	5.417	101.17	1,096.08
Foreman	1.00	5.417	103.17	558.87
General Foreman	0.25	5.417	104.17	<u>141.07</u>
Total labor cost				2,605.64

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs none

Total Cost Removal Electrical Transformers < 30 tons \$2,605.64

Total labor cost: \$2,605.64

Total equipment/material costs: 0.00

Total craft labor man-hours required per unit: 28.439

5. NOTES

- Durations are shown in minutes. The integrated duration accounts for those activities that can be performed in conjunction with other activities, indicated by the alpha designator of the concurrent activity. This results in an overall decrease in the sequenced duration.
- Work difficulty factors were developed in conjunction with the AIF program to standardize decommissioning cost studies and are delineated in the "Guidelines" study (Reference 6, Vol. 1, Chapter 5).

SCRAP METAL CREDIT VALUES
for the
Gateway
Humboldt
Guernsey
and
Huron
Power Stations

prepared for
Pacific Gas and Electric Company

prepared by

TLG Services, LLC

148 New Milford Road East
Bridgewater, CT

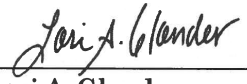
December 2024

Pacific Gas and Electric Company
Scrap Metal Credit Values

Document P01-1847-002, Rev. 0
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APPROVALS

Project Manager

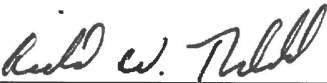


Lori A. Glander

12/17/2024

Date

Project Engineer



Richard W. Threlkeld

12/17/2024

Date

Technical Manager



Francis Seymore

12/17/24
Date

TLG Services, LLC

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REVISION LOG

No.	Date	Item Revised	Reason for Revision
0	12/17/2024		Final Issue

SCRAP METAL CREDITS

The dismantling of a typical power station occurs after a lengthy operating life. The existing station equipment is considered obsolete and suitable for scrap as deadweight quantities only. PG&E will make economically reasonable efforts to salvage equipment following final station shutdown. Since placing a salvage value on this equipment would be speculative, this analysis does not attempt to quantify the value that an owner may realize based upon those efforts.

The materials used in the equipment and buildings are suitable for recycle as scrap metals. As such, an estimated value of the scrap metal credit has been developed. The value of scrap is estimated using market values, extracted from published sources, and applying these values to the estimated quantities of materials generated from the dismantling project. The station inventories were developed in the 2008 analysis of the Gateway and Humboldt stations and in the 2015 analysis of the Guernsey and Huron stations.

There are three basic types of metals used in the scrap estimates; carbon steel (the most common material used at the station), copper, and aluminum. The scrap credit, in addition to considering the quantity and types of materials, also considers the cost of handling and transporting these materials to a local scrap metal recycler where scrap is used or sold. The value of the scrap is reduced by the transportation costs.

The basis for scrap metal value is summarized in Tables 1, 6, and 9. A summary of the basis for the scrap credit, which details the scrap quantities by material type from each station is provided in Tables 2, 4, 7, and 10. Tables 3, 5, 8, and 11 list the dollar value of these quantities.

TABLE 1
GUERNSEY AND HURON SOLAR STATIONS
BASIS FOR SCRAP METAL VALUE
(2024 dollars)

Type of Material	Scrap Category ¹	Market Value ²	Units	Transport Cost ³	Scrap Metal Credit ⁴ (per ton)
Carbon Steel	No. 1	258.46	Per Ton	57.22	201.24
	Mixed Scrap	206.77	Per Ton	57.22	149.55
	Galvanized	56.86	Per Ton	57.22	0
Copper	Insulated Cable	1.81	Per Pound	0.03	3,554.24
	No. 2 Copper	2.89	Per Pound	0.03	5,721.78
Aluminum	Cable	0.59	Per Pound		1,116.33
	Mixed Scrap	0.35	Per Pound	0.03	643.86

Note 1: Scrap categories are consistent with information provided in Recycler's World

Note 2: The market value for scrap metal used in this estimate is based on Recycler's World U.S. Scrap Metal Index Prices. Values shown represent the average over a 5-year period from 2019 to 2024.

Note 3: The estimated cost for handling and transporting the materials to a major scrap processing center is \$ 57.22 / ton or \$0.03 / pound.

Note 4: The scrap metal credit reflects the market value of scrap adjusted for handling and transport cost to local scrap metal recycler.

TABLE 2
GUERNSEY SOLAR STATION
QUANTITY OF SCRAP METALS
(weight in pounds)

Type of Material	Scrap Category	Station Total
Carbon Steel	No. 1	136,857
	Mixed Scrap	475,157
	Galvanized	6,873,718
Copper	Insulated Cable	160,954
	No. 2 Copper	88,776
Aluminum	Insulated Cable	58,451

TABLE 3
GUERNSEY SOLAR STATION
SCRAP METAL CREDITS
(2024 dollars)

Type of Material	Scrap Category	Station Total
Carbon Steel	No. 1	13,771
	Mixed Scrap	35,530
	Galvanized	0
Copper	Insulated Cable	286,035
	No. 2 Copper	253,979
Aluminum	Insulated Cable	32,625
Total		621,939

TABLE 4
HURON SOLAR STATION
QUANTITY OF SCRAP METALS
(weight in pounds)

Type of Material	Scrap Category	Station Total
Carbon Steel	No. 1	136,857
	Mixed Scrap	378,790
	Galvanized	1,154,521
Copper	Insulated Cable	173,409
	No. 2 Copper	85,716
Aluminum	Insulated Cable	58,451
	Mixed Scrap	2,155,989

TABLE 5
HURON SOLAR STATION
SCRAP METAL CREDITS
(2024 dollars)

Type of Material	Scrap Category	Station Total
Carbon Steel	No. 1	13,771
	Mixed Scrap	28,324
	Galvanized	0
Copper	Insulated Cable	308,169
	No. 2 Copper	245,224
Aluminum	Insulated Cable	32,625
	Mixed Scrap	694,077
Total		1,322,190

TABLE 6
GATEWAY GENERATING STATION
BASIS FOR SCRAP METAL VALUE
(2024 dollars)

Type of Material	Scrap Category ¹	Market Value ²	Units	Transport Cost ³	Scrap Metal Credit ⁴ (per ton)
Carbon Steel	Cast Iron	206.77	Per Ton	42.79	163.98
	No. 1	258.46	Per Ton	42.79	215.67
	Mixed Scrap	206.77	Per Ton	42.79	163.98
	Galvanized	56.86	Per Ton	42.79	14.07
Stainless Steel	SS-1	1.03	Per Pound	0.02	2,013.83
Copper	Insulated Cable	1.81	Per Pound	0.02	3,568.67
	No. 2 Copper	2.89	Per Pound	0.02	5,736.21
	Large Motor	0.43	Per Pound	0.02	824.05
	Copper-Nickel	5.10	Per Pound	0.02	10,160.44

Note 1: Scrap categories are consistent with information provided in Recycler's World

Note 2: The market value for scrap metal used in this estimate is based on Recycler's World U.S. Scrap Metal Index Prices. Values shown represent the average over a 5-year period from 2019 to 2024.

Note 3: The estimated cost for handling and transporting the materials to a major scrap processing center is \$ 42.79 / ton or \$0.02 / pound.

Note 4: The scrap metal credit reflects the market value of scrap adjusted for handling and transport cost to local scrap metal recycler.

TABLE 7
GATEWAY GENERATING STATION
QUANTITY OF SCRAP METALS
(weight in pounds)

Type of Material	Scrap Category	Unit 1	Unit 2	Unit 3	Common	Station Total
Carbon Steel	No. 1	1,386,536	1,386,536	1,756,397	2,887,676	7,417,144
	Mixed Scrap	6,855,557	6,855,557	3,659,155	3,423,965	20,794,233
Stainless Steel	SS-1	46,351	46,351	48,563	323,691	464,956
Galvanized	Steel	49,932	49,932	56,487	198,170	354,521
Copper	Insulated Cable	31,950	31,950	44,412	44,663	152,976
	No. 2 Copper	212,807	212,807	216,258	20,261	662,133
	Large Motor	86,621	86,621	540,463	134,660	848,364

TABLE 8
GATEWAY GENERATING STATION
SCRAP METAL CREDITS
(2024 dollars)

Type of Material	Scrap Category	Unit 1	Unit 2	Unit 3	Common	Station Total
Carbon Steel	No. 1	149,517	149,517	189,401	311,393	799,828
	Mixed Scrap	562,087	562,087	300,014	280,731	1,704,919
Stainless Steel	SS-1	46,672	46,672	48,899	325,929	468,171
Galvanized	Steel	351	351	397	1,394	2,494
Copper	Insulated Cable	57,010	57,010	79,247	79,693	272,960
	No. 2 Copper	610,353	610,353	620,249	58,111	1,899,066
	Large Motor	35,690	35,690	222,684	55,483	349,547
Total		1,461,680	1,461,680	1,460,892	1,112,733	5,496,985

TABLE 9
HUMBOLDT GENERATING STATION
BASIS FOR SCRAP METAL VALUE
(2024 dollars)

Type of Material	Scrap Category ¹	Market Value ²	Units	Transport Cost ³	Scrap Metal Credit ⁴ (per ton)
Carbon Steel	Cast Iron	206.77	Per Ton	79.83	126.94
	No. 1	258.46	Per Ton	79.83	178.63
	Mixed Scrap	206.77	Per Ton	79.83	126.94
	Galvanized	56.86	Per Ton	79.83	0
Stainless Steel	SS-1	1.03	Per Pound	0.04	1,976.79
Copper	Insulated Cable	1.81	Per Pound	0.04	3,531.63
	No. 2 Copper	2.89	Per Pound	0.04	5,699.17
	Large Motor	0.43	Per Pound	0.04	787.01
	Copper-Nickel	5.10	Per Pound	0.04	10,123.40

Note 1: Scrap categories are consistent with information provided in Recycler's World

Note 2: The market value for scrap metal used in this estimate is based on Recycler's World U.S. Scrap Metal Index Prices. Values shown represent the average over a 5-year period from 2019 to 2024.

Note 3: The estimated cost for handling and transporting the materials to a major scrap processing center is \$ 79.83 / ton or \$0.04 / pound.

Note 4: The scrap metal credit reflects the market value of scrap adjusted for handling and transport cost to San Francisco, CA.

TABLE 10
HUMBOLDT GENERATING STATION
QUANTITY OF SCRAP METALS
(weight in pounds)

Type of Material	Scrap Category	Unit 1-10	Common	Station Total
Carbon Steel	No. 1	3,314,266	118,481	3,432,747
	Mixed Scrap	11,228,646	151,792	11,380,438
Stainless Steel	SS-1	173,926	55,690	229,616
Galvanized	Steel	67,851	12,694	80,545
Copper	Insulated Cable	36,751	-	36,751
	No. 2 Copper	495,852	1,175	497,027
	Large Motor	8,224	-	8,224

TABLE 11
HUMBOLDT GENERATING STATION
SCRAP METAL CREDITS
(2024 dollars)

Type of Material	Scrap Category	Unit 1-10	Common	Station Total
Carbon Steel	No. 1	297,704	10,643	308,346
	Mixed Scrap	718,409	9,712	728,120
Stainless Steel	SS-1	171,996	55,072	227,068
Galvanized	Steel	-	-	-
Copper	Insulated Cable	64,915	-	64,915
	No. 2 Copper	1,413,225	3,349	1,416,574
	Large Motor	3,241	-	3,241
Total		2,669,489	78,775	2,748,265

REFERENCES

1. Recycler's World, Iron and Steel Recycling Section and Scrap Copper Recycling Section, U.S. Scrap Metal Index, October 1, 2019 to September 30, 2024
2. Dismantling Cost Study for the Guernsey and Huron Solar Power Stations, TLG Document P01-1717-001, Rev. 0, dated September 2015
3. Dismantling Cost Study for Gateway Generating Station Units 1, 2, and 3, TLG Document P01-1609-001, Rev. 0, dated September 2009
4. Dismantling Cost Study for Humboldt Bay Power Plant, TLG Document P01-1609-002, Rev. 0, dated September 2009

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 4
Natural Gas and Solar Generation Operations
Workpaper Supporting Solar PV Percent of Expected Generation

Line No.	Station	Net Generation (MWh)	Expected Net Generation (MWh)	Recorded - Expected Net Generation	Capacity	Capacity Factor (Actual)	Capacity Factor (Expected)	CAISO Curtailments (MWh)	Net Gen + CAISO Curtailments (MWh)	Stroud Transmission Event*	Net Gen + CAISO Curtailments + Stroud Transmission Event (MWh)
1	Cantua	31,214	41,326	-10,112	20						
2	Five Points	15,414	28,702	-13,289	15						
3	Gates	31,704	42,759	-11,056	20						
4	Giffen	13,555	20,662	-7,107	10						
5	Guernsey	22,738	49,322	-26,584	20						
6	Huron	28,770	41,616	-12,846	20						
7	Stroud	21,268	38,456	-17,188	20					37,379	
8	West Gates	19,249	21,042	-1,793	10						
9	Westside	13,870	28,839	-14,970	15						
10	Vaca Dixon	3,242	3,913	-671	2						
11	Total	201,023	316,638	-115,615	152	15.06%	23.72%	49,522	250,545	37,379	287,924
12	Percent of Expected Generation								79.1%		90.9%

*Stroud Solar Site Transmission induced outage event lasting from 10/15/2024 03:03 to 1/15/25 15:00 (approximately 37379 MWh of curtailment in 2024)

Pacific Gas and Electric Company
 2027 General Rate Case
 Exhibit (PG&E-5), Chapter 4
 Natural Gas and Solar Generation Operations
 2019-2023 NERC GADS Generating Unit Statistical Brochure
 Calculation of PG&E's Natural Gas Generation Reliability Metrics Industry Averages

Line	Equivalent Availability Factor	NERC GADS Data	2024 Capacity (MW)	Reference
1	Combined Cycle	84.0%	1,060.0	WP 4-135, Line 67
2	Recips	92.1%	163.0	WP 4-135, Line 74
3	Fossil Portfolio	85.0%	1,223.0	

	Forced Outage Factor	NERC GADS Data	2024 Capacity (MW)	
4	Combined Cycle	2.1%	1,060.0	WP 4-135, Line 67
5	Recips	2.7%	163.0	WP 4-135, Line 74
6	Fossil Portfolio	2.2%	1,223.0	

Project Title: Solar PV Replace Capital Equipment

Major Work Categories: 3B

Planning Order Numbers: 5524100

Project Start Date: Annual Project

Project Completion Date: N/A

Operative Date (only applies to Capital): Operative as installed

Project Description

This annual project replaces major prime mover components that fail over time at the solar stations. These components include solar panels, inverters and transformers that are needed to harvest, convert, condition, and deliver solar energy. Each have various life spans and failure rates. Replacement of failed components assures that the facilities stay at their designed production/efficiency ratings and serve their intended purpose. As an example, PG&E's experience has been that many of the component parts of the inverters have relatively short lives and must be replaced after just a few years of service.

Justification

PG&E's solar facilities have a minimum output requirement as specified in CPUC Decision 10-04-052. D.10-04-052 states that "Pacific Gas and Electric Company is authorized to recover its actual operations and maintenance costs in its General Rate Case subject to a reasonableness review. Should the average performance of Pacific Gas and Electric Company's Utility owned generation systems fall below 80% of expected output as provided in its compliance filings, it will weigh heavily in favor of disallowing or refunding some of the operations and maintenance costs to ratepayers." ¹

Failure of any of the major prime mover components reduces the total output of the stations and PG&E's ability to meet these CPUC requirements. Additionally, the need for customers to purchase replacement power because of increased forced outages is avoided.

Cost

The planned costs are based on original equipment manufacturer (OEM) data, failure experiences, and life cycle expectations.

¹ D.10-04-052, p. 80, OP 7.

Major Project Spending Estimates
(Thousands of Nominal Dollars)

CAPITAL

Planning Order	Description	Operative Date	CWIP 2024 Recorded	2025 Fore-cast	2026 Fore-cast	2027 Fore-cast	2028 Fore-cast	2029 Fore-cast	2030 Fore-cast	CWIP + 2025-2030 Forecast
5524100	Solar PV Replace Capital Equipment	As Installed	0	1,204	955	1,289	1,176	1,376	1,280	7,280

Benefits

- Replacement of failed components assures that the solar stations stay at or near their expected output ratings and helps assure that PG&E remains in compliance with D.10-04-052.
- Potential avoidance of future O&M expense cost increases associated with maintaining this aging equipment.
- A higher level of power generation reliability resulting from a reduction in forced outages and curtailments caused by this aging equipment. This results in a replacement power cost savings for customers.

Alternatives Considered

- *Do Nothing* – This alternative is not recommended. Running the equipment to failure and not replacing the failed components would result in a prolonged forced outage, replacement power costs for customers, and subsequent non-compliance with D.10-04-052.
- *Alternative 1: Identify specific equipment requiring placement* – This alternative is not recommended. The level of uncertainty and ability to predict the specific equipment/components that will need replacement in years 3-6 is high. This option would result in additional dollars being forecasted in years 3-6 since all potential equipment that could require replacement would need to be included.
- *Alternative 2: Programmatic Approach* – This is the recommend alternative because it provides the best value to the customer while maintaining compliance with D.10-04-052.

Project Title: HBGS Engine Emissions Module Replacements
Major Work Categories: 2S
Planning Order Numbers: 5760804
Project Start Date: Annual Project
Project Completion Date: N/A
Operative Date (only applies to Capital): Operative as installed

Project Description

This project replaces exhaust path catalysts (arranged in a modular fashion) used in the 10 engines at Humboldt Bay Generating Station (HBGS) to maintain emissions levels at or below those required by air quality regulations. Engine catalysts, reduce harmful emissions like NOx (nitrogen oxides) and CO (carbon monoxide) by converting them into less harmful substances like nitrogen, carbon dioxide, and water. The catalysts contain a honeycomb-like structure made up of layers of “bricks”, also known as substrates, which are porous structures designed to reduce harmful emissions from the engines. The scope of this project includes replacement of the catalyst housing and layers of bricks during engine maintenance overhauls that is determined through catalyst inspection and testing.

Justification

HBGS is required to meet the North Coast Air Quality Management District air quality standards. This project is required to comply with North Coast Air Quality Management District air quality standards.

Cost

The planned costs are based on the average annual amount spent and outage plans.

Major Project Spending Estimates

(Thousands of Nominal Dollars)

CAPITAL

Planning Order	Description	Operative Date	CWIP 2024 Recorded	2025 Fore-cast	2026 Fore-cast	2027 Fore-cast	2028 Fore-cast	2029 Fore-cast	2030 Fore-cast	CWIP + 2025-2030 Forecast
5760804	HBGS Engine Emissions Module Replacements	As Installed	0	1,967	2,003	2,049	2,097	2,148	2,202	12,467

Benefits

This is a regulatory requirement. These costs will ensure that HBGS will meet the air quality standards and maintain full availability.

Alternatives Considered

- *Do Nothing* - This alternative is not recommended. Running the engines until the engine emissions module(s) fail would result in an emissions exceedance and a forced outage resulting in higher replacement power cost for customers and fine(s) or other agency actions.
- *Alternative 1: HBGS Engine Emissions Module Replacements* – This is the recommend alternative. This alternative results in a higher level of power generation reliability resulting from a reduction in forced outages and curtailments caused by a failing engine emissions module. This results in a replacement power cost savings for customers. This alternative also results in compliance with the North Coast Air Quality Management District air quality standards.

Project Title: Fossil Emergent Capital Work

Major Work Categories: 2S

Planning Order Numbers: 5767987

Project Start Date: Annual Project

Project Completion Date: N/A

Operative Date (only applies to Capital): Sept 2026

Project Description

Fossil Emergent Capital Work forecasts the anticipated reliability expenditures that will be needed in future years to maintain reliable operations of Gateway, Colusa, and Humboldt Bay Generating Stations. These costs capture equipment replacement that will be needed outside of the equipment covered in the long-term service agreement (LTSA) for Gateway and Colusa. This includes heat recovery steam generator components, piping, station service, switchyard and ancillary system equipment which are necessary for the operations of the plants.

Justification

During PG&E's long-term planning and annual budget process, specific reliability projects are typically identified 1-3 years in advance based on condition assessments, monitoring, and inspections. This project assures that a reasonable forecast for expected reliability expenditures is reflected in the rate case for years 3-6 for which identifying the specific components/equipment that will likely fail becomes less predictable.

Similar to the combustion turbines and steam turbines covered under the LTSA, this plant equipment needs to be maintained to prevent premature failure and/or unplanned failure resulting in extended forced outages.

Cost

The planned costs are based on the average annual amount spent and takes into consideration the life cycle of the plants and specific equipment not covered under the LTSA. As individual projects are identified and entered into the long-term plan, the amount for this line item is adjusted accordingly during the long-term planning and annual budgeting process.

Major Project Spending Estimates

(Thousands of Nominal Dollars)

CAPITAL

Planning Order	Description	Operative Date	CWIP 2024 Recorded	2025 Fore-cast	2026 Fore-cast	2027 Fore-cast	2028 Fore-cast	2029 Fore-cast	2030 Fore-cast	CWIP + 2025-2030 Forecast
5767987	Fossil Emergent Capital Work	Sept 2026	0	0	483	3,197	4,703	8,416	6,798	23,598

Benefits

Reliability investments on heat recovery steam generator components, piping, ancillary/support systems, switchyard, and station service equipment are critical to ensure ongoing plant reliability and prevent forced outages that result in an increase in customer costs for replacement power. Replacing failed equipment on an expedited basis after it has caused a forced outage results in a higher capital cost due to the need to expedite the replacement equipment and contract labor. As Colusa, Gateway, and Humboldt Bay equipment continues to age it is reasonable to expect that equipment will reach end of life and require replacement. Additionally, given the level of cycling the plants are experiencing, the effects and impact to the rate of specific equipment failure is less predictable. This forecast will ensure PG&E has the appropriate level of reliability investment earmarked in the rate case to address equipment replacements prior to failing.

Alternatives Considered

- *Do Nothing* – Running the equipment to failure would result in a prolonged forced outage resulting in replacement power costs for customers and higher capital costs due to the need to expedite the replacement equipment and contract labor. Also, this approach would result in taking funding away from other projects that were specifically planned in the rate case.
- *Alternative 1: Identify specific equipment requiring placement* – The level of uncertainty to predict the specific equipment/components that will need replacement in years 3-6 is high, especially given the effect of plant cycling. This option would result in additional dollars being forecasted in years 3-6 since all potential equipment that could require replacement would need to be included.
- *Alternative 2: Programmatic Approach* – This is the recommend alternative because it provides the best value to the customer while maintaining reasonable levels of plant reliability.

Project Title: HBGS Annual Critical Capital Spares Replacement Program

Major Work Categories: 2S

Planning Order Numbers: 5789622

Project Start Date: Annual Project

Project Completion Date: N/A

Operative Date (only applies to Capital): December 2025

Project Description

This annual project replaces major prime mover components that fail over time at Humboldt Bay Generating Station (HBGS). These components include turbochargers, fuel pumps, bearings, couplings and many other critical components needed to keep the engines and generators operative. Each have various life spans and failure rates. Replacement of failed components assures that HBGS stays at its designed production/efficiency ratings and serves its intended purpose.

Justification

Failure of any of the major prime mover components reduces the total output of the station and PG&E's ability to meet its commitment to serve. HBGS serves several critical needs required by its location in an area that can be easily isolated from the grid and to the greater grid needs in PG&E's service territory. Additionally, the need to purchase replacement power because of increased forced outages is avoided.

Cost

The planned costs are based on original equipment manufacturer (OEM) data, failure experiences, and life cycle expectations.

Major Project Spending Estimates (Thousands of Nominal Dollars)

CAPITAL

Planning Order	Description	Operative Date	CWIP 2024 Recorded	2025 Fore-cast	2026 Fore-cast	2027 Fore-cast	2028 Fore-cast	2029 Fore-cast	2030 Fore-cast	CWIP + 2025-2030 Forecast
5789622	HBGS Annual Critical Capital Spares Repl Prog	December 2025	0	641	510	640	632	740	688	3,851

Benefits

Replacement of failed components in a timely fashion assures that the station stays at its designed production ratings and serves its intended purpose. Having these spare parts on hand reduces the length of scheduled

and forced outages resulting in future replacement power cost savings for customers and avoids the higher capital costs associated with the need to expedite replacement equipment/parts procurement.

Alternatives Considered

- *Do Nothing* – Running the equipment to failure and not replacing the failed equipment/part would result in prolonged forced outages resulting in replacement power costs for customers.
- *Alternative 1: Identify specific equipment requiring replacement* – The level of uncertainty and ability to predict the specific equipment/components that will need replacement is high, this option would result in additional dollars being forecast since all potential equipment that could require replacement would need to be included.
- *Alternative 2: Programmatic Approach* – This is the recommend alternative because it provides the best value to the customer while maintaining high levels of plant reliability.

Project Title: HBGS Annual Outage Capital Program

Major Work Categories: 2S

Planning Order Numbers: 5806380

Project Start Date: Annual Project

Project Completion Date: N/A

Operative Date (only applies to Capital): Operative as installed

Project Description

This project addresses the capital-related costs of the Humboldt Bay Generation Station (HBGS) hours-based engine outages specified by the original equipment manufacturer (OEM), Wartsila. Every 6,000 hours, and multiples thereof, each of the 10 engines undergo inspections and parts replacement based on the OEM maintenance guide and the as-found condition of the engine components. As the hours of use continue to increase, the engines require more and more component/parts replacement and the associated disassembly and reassembly to reach the components. Examples include the crankshaft and its bearings, fuel pumps, oil pumps, piston assemblies and array of gears and valves. Many of these parts are capital units of property and the work needed to reach them for replacement is also capital.

An example of hours-based maintenance is an automobile manufacturer's recommendation to change the engine oil or engine timing belt in your car. Not performing this mileage-based preventive maintenance will likely result in damage to the engine and higher repair/replacement costs to allow the car to serve its intended purpose again. You would also incur additional costs for a replacement car (rental) while your car is being repaired.

Justification

Failure of any of the major prime mover components reduces the total output of the station and PG&E's ability to meet its commitment to serve. HBGS serves several critical needs required by its location in an area that can be easily isolated from the grid. Additionally, the need to purchase replacement power because of increased forced outages is avoided.

Cost

The planned costs are based on OEM data, maintenance schedules, maintenance guides, and life cycle expectations.

Major Project Spending Estimates
(Thousands of Nominal Dollars)

CAPITAL

Planning Order	Description	Operative Date	CWIP 2024 Recorded	2025 Fore-cast	2026 Fore-cast	2027 Fore-cast	2028 Fore-cast	2029 Fore-cast	2030 Fore-cast	CWIP + 2025-2030 Forecast
5806380	HBGS Annual Outage Capital Program	As Installed	1	8,002	8,150	8,336	8,532	8,740	8,958	50,720

Benefits

Performing the hours-based maintenance per the OEM's schedules and guides assures that the station stays at its designed production ratings and serves its intended purpose. If PG&E does not perform the hours-based maintenance per the OEM's recommendation, the likely result will be many forced outages resulting in excessive replacement power costs to customers.

Alternatives Considered

- *Do Nothing* – Running the engines past the scheduled service hours until failure would result in prolonged forced outages and replacement power costs to customers and higher costs to ultimately return the engine to service.
- *Alternative 1: Perform the Hours Based Maintenance on Schedule* – This is the recommend alternative because it provides the best value to the customer while maintaining reasonable levels of plant reliability.

Project Title: PG Energy Storage
Major Work Categories: MA
Planning Order Numbers: 5285372
Project Start Date: Expense – N/A
Project Completion Date: N/A
Operative Date (only applies to Capital): N/A

Project Description

This forecast is for the development of new electric generation projects in support of the Company's obligations to meet requirements for increased energy capacity and reliable operation of the electric grid.

Justification

Through the implementation of SB 100 and AB 1279, the State of California's transition to a clean energy future envisions dramatic acceleration of electrification, which will require increased efficiency in demand response and the rapid development of new energy infrastructure throughout the state. In support of the State's clean energy objectives, the Company will continue to evaluate whether and how best to strategically develop a long-range pipeline of new utility-owned GHG-free and ultra-low emissions electric generation facilities to meet state load growth projections, support deployment of behind the meter and grid-edge load management programs, support decarbonization of natural gas-fired generation facilities, and support the safe and reliable operation of the electric grid through the provision of ancillary functions such as inertia and black start.

This forecast will enable the Company to undertake long-term strategies and actions necessary to build a pipeline of new electric generation projects at the right places and the right times to achieve the State's clean energy goals. Strategies and actions that will be deployed include: partnerships with clean technology manufacturers and the related supply chain providers; monitoring and leveraging relevant state, federal, and industry research and development through participation in pilot projects for the evaluation and deployment of emerging carbon capture and load management technologies; supporting the evaluation and planning for optimal deployment of utility owned generation as part of the infrastructure necessary to meet electric grid requirements; and, completing feasibility studies and planning activities such as siting, interconnection, and preliminary engineering for new generation projects to enable rapid deployment as needs materialize.

Cost

The cost assumptions for this project are based on the professional judgment of the employees familiar with this type of work and historic PG&E cost data for similar work.

Major Project Spending Estimates
(Thousands of Nominal Dollars)

EXPENSE

Planning Order	Description	2025 Forecast	2026 Forecast	2027 Forecast	CWIP + 2025 - '27 Total
5285372	PG Energy Storage	1,320	1,344	5,000	\$ 7,664

Benefits

- Supports the State's clean energy objectives.
- Develops a long-range pipeline of new utility-owned GHG-free and ultra-low emissions electric generation facilities to meet state load growth projections, support deployment of behind the meter and grid-edge load management programs, support decarbonization of natural gas-fired generation facilities, and support the safe and reliable operation of the electric grid through the provision of ancillary functions such as inertia and black start.

Alternatives Considered

Status Quo (Do Nothing) - This alternative is not recommended. This alternative is not supportive of the State's clean energy objectives and does not help develop a long-range pipeline of new utility-owned GHG-free and ultra-low emissions electric generation facilities to meet state load growth projections, support deployment of behind the meter and grid-edge load management programs, support decarbonization of natural gas-fired generation facilities, and support the safe and reliable operation of the electric grid through the provision of ancillary functions such as inertia and black start.

Alternative 1: PG Energy Storage – This is the recommended alternative. This alternative supports the State's clean energy objectives. It develops a long-range pipeline of new utility-owned GHG-free and ultra-low emissions electric generation facilities to meet state load growth projections, support deployment of behind the meter and grid-edge load management programs, support decarbonization of natural gas-fired generation facilities, and support the safe and reliable operation of the electric grid through the provision of ancillary functions such as inertia and black start.

Alternative 2: Reschedule One Year – This alternative is not recommended. This alternative assumes the project is rescheduled by one year. This alternative ultimately has the same long-term benefits as the recommended alternative; however, in the short-term, this alternative is not recommended for the same reasons discussed in the status quo.

**PACIFIC GAS AND ELECTRIC COMPANY
2027 GENERAL RATE CASE
EXHIBIT (PG&E-5) ENERGY SUPPLY
WORKPAPERS SUPPORTING
CHAPTER 5, ENERGY POLICY AND PROCUREMENT ADMINISTRATION COSTS
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Table 5-1
Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 5
Energy Procurement & Administration
Expenses by Major Work Category
(Thousands of Nominal Dollars)

Line No.	MWC	Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	Reference (A)
1	AB	Misc Expense	678	441	648	281	762	945	949	1,018	
2	BI	Maint Buildings									
3	CT	Acq & Manage Elect Supply	26,975	27,554	26,679	30,352	31,087	31,396	31,391	34,126	
4	CV	Acq & Manage Gas Supply	2,151	2,520	2,222	2,482	2,551	2,534	2,536	2,732	
5	CY	Manage Electric Grid Ops	51	137	19						
6	Total		29,854	30,652	29,567	33,115	34,400	34,875	34,875	37,875	

Table 5-2
Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 5
Energy Procurement & Administration
Expenses by Major Work Category
(Thousands of Base Year Dollars)

Line No.	MWC	Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast
1	AB	Misc Expense	796	499	695	290	762	917	892	926
2	BI	Maint Buildings								
3	CT	Acq & Manage Elect Supply	30,900	30,626	28,637	31,472	31,087	30,475	29,513	31,043
4	CV	Acq & Manage Gas Supply	2,466	2,802	2,385	2,572	2,551	2,459	2,384	2,486
5	CY	Manage Electric Grid Ops	57	153	20					
6	Total		34,219	34,080	31,736	34,334	34,400	33,851	32,789	34,455

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-05) Chapter 5
2020-2021 Year-Over-Year Recorded Expense Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2020 Recorded	2021 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	5	AB	Misc Expense	678	441	(237)	No	-35%	Yes	Yes	Yes	Decrease in consulting costs and staffing turnover.
2	5	5	CT	Acq & Manage Elect Supply	26,975	27,554	579	No	2%	No	No	No	
3	5	5	CV	Acq & Manage Gas Supply	2,151	2,520	369	No	17%	Yes	Yes	Yes	Re-hires of attrited staff positions following end of the previous year's hiring freeze.
4	5	5	CY	Manage Electric Grid Ops	51	137	86	No	169%	Yes	Yes	Yes	Increase in labor charges associated with readiness and activation of the Emergency Operations Center. Active expenses associated with MWC CY have been mapped to Exhibit 4, Chapter 22 and Exhibit 9, Chapter 8.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-05) Chapter 5
2021-2022 Year-Over-Year Recorded Expense Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2021 Recorded	2022 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	5	AB	Misc Expense	441	648	207	No	47%	Yes	Yes	Yes	Increase in labor costs attributed to chief of staff position and increase in one-time consulting fees.
2	5	5	CT	Acq & Manage Elect Supply	27,554	26,679	(875)	No	-3%	No	No	No	
3	5	5	CV	Acq & Manage Gas Supply	2,520	2,222	(298)	No	-12%	Yes	Yes	Yes	Cost recovery of renewable natural gas (RNG) labor costs moved to a non-GRC balancing account.
4	5	5	CY	Manage Electric Grid Ops	137	19	(118)	No	-86%	Yes	Yes	Yes	Decrease in labor charges associated with the Emergency Operations Center. Active expenses associated with MWC CY have been mapped to Exhibit 4, Chapter 22 and Exhibit 9, Chapter 8.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-05) Chapter 5
2022-2023 Year-Over-Year Recorded Expense Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2022 Recorded	2023 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	5	AB	Misc Expense	648	281	(367)	No	-57%	Yes	Yes	Yes	Reclassification of the chief of staff position to MWC CT along with reduction in one-time consulting fees.
2	5	5	CT	Acq & Manage Elect Supply	26,679	30,352	3,673	Yes	14%	Yes	Yes	Yes	Reclassification of the Energy Policy and Design Group from MWC CY. MWC CY was part of EPP in the 2023 GRC, but has been reclassified to other groups in the Engineering, Planning, and Strategy Organization (e.g., Exhibit 4, Chapter 22 and Exhibit 9, Chapter 8). Variance is also attributed to the reclassification of the chief of staff position from MWC AB.
3	5	5	CV	Acq & Manage Gas Supply	2,222	2,482	260	No	12%	Yes	Yes	Yes	Additional fees for data subscriptions.
4	5	5	CY	Manage Electric Grid Ops	19	-	(19)	No	-100%	Yes	Yes	Yes	Decrease in labor charges associated with the Emergency Operations Center. Active expenses associated with MWC CY have been mapped to Exhibit 4, Chapter 22 and Exhibit 9, Chapter 8.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-05) Chapter 5
2023-2024 Year-Over-Year Recorded Expense Variance Summary in Dollars
(Thousands of Nominal Dollars)

Line No.	Exhibit	Chapter	MWC	MWC Description	2023 Recorded	2024 Recorded	Variance	Variance Greater Than \$1M?	Variance %	Variance Greater Than or Equal to 5%	Variance Greater Than or Equal to 10%	Variance Required Y/N	Variance Explanation
1	5	5	AB	Misc Expense	281	762	481	No	171%	Yes	Yes	Yes	Variance mainly driven by reclassification of officer labor costs to EPP's budget. In the 2023 GRC, officer base salaries were forecast in Exhibit 9, Chapter 3.
2	5	5	CT	Acq & Manage Elect Supply	30,352	31,087	735	No	2%	No	No	No	
3	5	5	CV	Acq & Manage Gas Supply	2,482	2,551	69	No	3%	No	No	No	
4	5	5	CY	Manage Electric Grid Ops	-	-	0	N/A	N/A	N/A	N/A	No	Active expenses associated with MWC CY have been mapped to Exhibit 4, Chapter 22 and Exhibit 9, Chapter 8.

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 5
Energy Procurement Administration Costs
2024-2027 Forecast Expense Walk
(Thousands of Nominal Dollars)

Line No.	Year	Amount	Detailed Description/Explanation	Reference
1	2024 Recorded	34,400		WP 5-1, line 6
2	Labor Escalation	1,255	Escalation	Assumes a 3.75% escalation rate for salary increases and a .74% promotion rate on 2024 Labor expenses.
3	Staffing Vacancies	(590)	Increased staffing vacancies	Assumes a 1.7% increase in employee vacancies (3.7 FTE). The impact of attrition to be offset through efficiency and waste elimination measures.
4	Non-Labor Costs	(190)	Reduction mainly attributed to decreased contract services.	
5	Total Net Change	475		Total of lines 2, 3, 4
6	2025 Forecast	34,875		Total of lines 1 & 5 and WP 5-1, line 6
7	Labor Escalation	1,195	Escalation	Assumes a 3.75% escalation rate for salary increases and a .74% promotion rate on 2025 Labor expenses.
8	Staffing Vacancies	(1,234)	Increased staffing vacancies	Assumes an additional 3.4% increase in the vacancy rate (7.6 FTE). The impact of attrition to be offset through efficiency and waste elimination measures.
9	Non-Labor Costs	39	Escalation	Assumes a 2% escalation rate on non-labor costs, such third party contract services and other employee expenses.
10	Total Net Change	0		Total of lines 7, 8, 9
11	2026 Forecast	34,875		Total of lines 6 & 10 and WP 5-1, line 6
12	Labor Escalation	1,237	Escalation	Assumes a 3.75% escalation rate for salary increases and a .74% promotion rate on 2026 Labor expenses.
13	Normalized Staffing Levels	1,721	Filling staffing vacancies	Re-hiring 10 FTE associated with staffing vacancies incurred in 2025 and 2026.
14	Non-Labor Costs	42	Escalation	Assumes a 2% escalation rate on non-labor costs, such as third party contract services and other employee expense.
15	Total Net Change	3,000		Total of lines 12, 13, 14
16	2027 Forecast	37,875		Total of lines 11 & 15 and WP 5-1, line 6
17	Total Labor Escalation	3,687		Total of lines 2, 7, 12
18	Total Staffing Vacancies	(102)		Total of lines 3, 8, 13
19	Total Non Labor Costs	(110)		Total of lines 4, 9, 14
20	Total Increase 2024 - 2027	3,475		Total of lines 17, 18, 19
21	Average Annual Increase	3.37%		

**PACIFIC GAS AND ELECTRIC COMPANY
2023 GENERAL RATE CASE**

**WORKPAPERS SUPPORTING
EXHIBIT (PG&E-5), ENERGY SUPPLY
CHAPTER 6, ENERGY SUPPLY TECHNOLOGY PROGRAM COSTS**

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Table 6-1
Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 6
Energy Supply Technology Programs
Expenses by Major Work Category
(Thousands of Nominal Dollars)

Line No.	MWC	Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	Reference (A)
1	JV	Maintain IT Apps & Infra	1,628	1,649	1,329	1,049	994	989	937	298	
2	TOTAL		1,628	1,649	1,329	1,049	994	989	937	298	

Table 6-2
Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 6
Energy Supply Technology Programs
Expenses by Major Work Category
(Thousands of Base Year Dollars)

Line No.	MWC	Description	2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast
1	JV	Maintain IT Apps & Infra	1,944	1,874	1,415	1,079	994	983	917	286
2	Total		1,944	1,874	1,415	1,079	994	983	917	286

Workpaper Table 6-3
 Pacific Gas and Electric Company
 2027 General Rate Case
 Workpapers Supporting Exhibit (PG&E-5), Chapter 6,
 Energy Supply Technology Programs
 Expense Historical Walk by MWC
 (Thousands of Nominal Dollars)

Line No.	Year	Program/Activity	Amount	Detailed Description/Explanation	Reference
1	2020	Recorded Adjusted	1,628		
2		All Programs			WP 6-1, Line 1
3		Net Change	21		
4					
5	2021	Recorded Adjusted	1,649		Line 1 + 3 and WP 6-1, Line 1
6		All Programs		Decrease is mainly due to the deployment and/ or ongoing support of Technology projects within System Planning and Asset Management and Minor Enhancements. This decrease is partially offset by completion and/or partial completion of Technology Projects within Energy Procurement and Demand Management such as Market Initiative Implementation and Energy Trade and Risk Management projects.	
7		Net Change	(320)		
8					
9	2022	Recorded Adjusted	1,329		Line 5 + 7 and WP 6-1, Line 1
10		All Programs		Decrease is mainly due to the deployment and/ or ongoing support of Technology projects within Energy Procurement and Demand Management, System Planning and Asset Management such as Civil Assets and Powerhouses, and Minor Enhancements. This decrease is partially offset by ongoing support of Technology projects within System Planning and Asset Management such as PowerGen GIS Foundational projects	
11		Net Change	(280)		
12					
13	2023	Recorded Adjusted	1,049		Line 9 + 11 and WP 6-1, Line 1
14		All Programs		Decrease is mainly due to the deployment and/ or ongoing support of Technology projects within Energy Procurement and Demand Management, and Minor Enhancements. This decrease is partially offset by completion and/or partial completion of Technology Projects within Energy Procurement and Demand Management such as Market Initiative Implementation, and System Planning and Asset Management such as Foundational PowerGen GIS Implementation.	
15		Net Change	(55)		
16					
17	2024	Recorded Adjusted	994		Line 13 + 15 and WP 6-1, Line 1

Worksheet Table 6-4
Pacific Gas and Electric Company
2027 General Rate Case
Workpapers Supporting Exhibit (PG&E-5), Chapter 6, Energy Supply and Technology Programs
Expense Forecast Walk by MWC
MWC JV - Maintain Applications and Infrastructure
(Thousands of Nominal Dollars)

Line No.	Year	Program/Activity Recorded Adjusted	Amount		Detailed Description/Explanation	Reference
1	2024		994	994		
2		All Programs			Decrease is mainly due to the deployment and/ or ongoing support of Technology projects within System Planning and Asset Management and Minor Enhancements.	WP 6-1, Line 1
3		Net Change	(5)			
4						
5	2025	Forecast	989	989		
6		All Programs			Decrease is mainly due to the deployment and/ or ongoing support of Technology projects within System Planning and Asset Management, and Minor Enhancements.	Line 1 + 3 and WP 6-1, Line 1
7		Net Change	(52)			
8						
9	2026	Forecast	937	937		
10		All Programs			Decrease is mainly due to the deployment and/ or ongoing support of Technology projects within System Planning and Asset Management, and Minor Enhancements.	Line 5 + 7 and WP 6-1, Line 1
11		Net Change	(639)			
12						
13	2027	Forecast	298	298	Cost decreases are due to proposed accounting policy changes for historically-expensed activities that directly support delivery of capital investments. See Exhibit (PG&E-7), Chapter 7 for further discussion.	Line 9 + 11 and WP 6-1, Line 1

Table 6-5
Pacific Gas and Electric Company
2027 GRC
Exhibit (PG&E-5), Chapter 6
Energy Supply Technology Programs
Capital Expenditures by Major Work Category
(Thousands of Nominal Dollars)

No.	MWC	MWC Description	Capital Expenditures											Reference
			2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast	2030 Forecast	
1	1	IT - Desktop Computers	7	-	-	-	-	-	-	-	-	-	-	-
2	2F	Build IT Apps & Infra	19,295	13,201	11,694	13,145	10,480	9,200	7,300	7,699	8,192	9,059	9,865	-
3		Grand Total	19,302	13,201	11,694	13,145	10,480	9,200	7,300	7,699	8,192	9,059	9,865	-

Table 6-6
Pacific Gas and Electric Company
2027 GRC
Exhibit (PG&E-5), Chapter 6
Energy Supply Technology Programs
Forecast Capital Expenditures Summary
(Thousands of Nominal Dollars)

Line No.	Description	Capital Expenditures							Reference
		2024 CWIP	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast	2030 Forecast	
1	Projects > \$3 Million*	-	9,200	7,300	7,699	8,192	9,059	9,865	
2	Other Work	1,069	-	-	-	-	-	-	
3	Total	1,069	9,200	7,300	7,699	8,192	9,059	9,865	

4 * Planning orders where Construction Work in Progress (CWIP) Balance as of December 31, 2024 plus six years (2025-2030) of forecast.

Table 6-7
Pacific Gas and Electric Company
2027 GRC
Exhibit (PG&E-5), Chapter 6
Energy Supply Technology Programs
Recorded CWIP and Forecast Capital Expenditures Details - Projects Over \$3 Million*
(Thousands of Nominal Dollars)

Line No.	Planning Order	Description	MWC	Operative Date	CWIP 2024 Recorded Adjusted	Capital Expenditures						Subtotal	Reference
						2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast	2030 Forecast		
1	MWC - 2F	Build IT Apps & Infra			-	9,200	7,300	7,699	8,192	9,059	9,865	51,315	WP 6-11
2	5812703	EnergyProcurement&DemandMgmt_ES_C	2F	Operative as Installed	-	9,200	7,300	7,699	8,192	9,059	9,865	51,315	
3		Grand Total			-	9,200	7,300	7,699	8,192	9,059	9,865	51,315	

* Planning orders where Construction Work in Progress (CWIP) Balance as of December 31, 2024 plus six years (2025-2030) of forecast.

Table 6-8
Pacific Gas and Electric Company
2027 GRC
Exhibit (PG&E-5), Chapter 6
Energy Supply Technology Programs
Recorded and Forecast Capital Expenditures Details - Other Work*
(Thousands of Nominal Dollars)

Line No.	MWC	MWC Description	Capital Expenditures										Reference	
			2020 Recorded Adjusted	2021 Recorded Adjusted	2022 Recorded Adjusted	2023 Recorded Adjusted	2024 Recorded Adjusted	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast		2030 Forecast
1	1	IT - Desktop Computers	7	-	-	-	-	-	-	-	-	-	-	-
2	2F	Build IT Apps & Infra	19,295	13,201	11,694	13,145	10,480	-	-	-	-	-	-	-
3		Grand Total	19,302	13,201	11,694	13,145	10,480	-	-	-	-	-	-	-

4 * Excludes projects greater than \$3M

Workpaper Table 6-9
Pacific Gas and Electric Company
2027 General Rate Case
Workpapers Supporting Exhibit (PG&E-5), Chapter 6 - Energy Supply Technology Programs
Capital Historical Walk by MWC
(Thousands of Nominal Dollars)

Line No.	Year	Amount	2F Build IT Applications and Infrastructure	01 IT - Desktop Computers	Variance %	Variance Required Y/N	Detailed Description/Explanation	Reference
1	2020	19,302	19,295	7				WP 6-5, Line 1 & 2
2			(6,094)		-32%	Yes	Decrease is mainly due to the deployment and/ or ongoing support of Technology projects within System Planning and Asset Management, Energy Procurement and Demand Management, and Minor Enhancements	
3				(7)	-100%	Yes	Decrease mainly due to the completion and/ or partial completion of deploying non-standard end user devices	
4	2021	13,201	13,201	0				Line 1 + 2 + 3 and WP 6-5, Line 1 & 2
5			(1,507)		-11%	Yes	Decrease is mainly due to the deployment and/ or ongoing support of Technology projects within Energy Procurement and Demand Management, System Planning and Asset Management, and Minor Enhancements	
6				0	0%	No	No recorded costs for MWC 01	
7	2022	11,694	11,694	0				Line 4 + 5 + 6 and WP 6-5, Line 1 & 2
8			1,411		12%	Yes	Increase is mainly due to the deployment and/ or ongoing support of Technology projects within Energy Procurement and Demand Management, System Planning and Asset Management, and Minor Enhancements	
9				0	0%	No	No recorded costs for MWC 01	
10	2023	13,105	13,105	0				Line 7 + 8 + 9 and WP 6-5, Line 1 & 2
11			(2,625)		-20%	Yes	Decrease is mainly due to the deployment and/ or ongoing support of Technology projects within Energy Procurement and Demand Management, System Planning and Asset Management, and Minor Enhancements	
12				0	0%	No	No recorded costs for MWC 01	
13	2024	10,480	10,480	0				Line 10 + 11 + 12 and WP 6-5, Line 1 & 2

Workpaper Table 6-10
Pacific Gas and Electric Company
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Workpapers Supporting Exhibit (PG&E-5), Chapter 6, Energy Supply Technology Programs
Capital Forecast Walk by MWC
MWC 2F - Build Applications and Infrastructure
(Thousands of Nominal Dollars)

Line No.	Year	Program/Activity	Amount	Detailed Description/Explanation	Reference
1	2024	Recorded Adjusted <i>All Programs</i>	10,480		WP 6-5, Line 2
2				Decrease is mainly due to the deployment and/ or ongoing support of Technology projects within Energy Procurement and Demand Management and moving Power Generation projects under Transformative Technology Programs.	
3		Net Change	(1,280)		
4					
5	2025	Forecast	9,200		Line 1 + 3 and WP 6-5, Line 2
6		<i>All Programs</i>		Decrease is mainly due to the deployment and/ or ongoing support of Technology projects within Energy Procurement and Demand Management	
7		Net Change	(1,900)		
8					
9	2026	Forecast	7,300		Line 5 + 7 and WP 6-5, Line 2
10		<i>All Programs</i>		Increase is mainly due to the deployment and/ or ongoing support of Technology projects within Energy Procurement and Demand Management	
11		Net Change	399		
12					
13	2027	Forecast	7,699		Line 9 + 11 and WP 6-5, Line 2
14		<i>All Programs</i>		Increase is mainly due to the deployment and/ or ongoing support of Technology projects within Energy Procurement and Demand Management	
15		Net Change	493		
16					
17	2028	Forecast	8,192		Line 13 + 15 and WP 6-5, Line 2
18		<i>All Programs</i>		Increase is mainly due to the deployment and/ or ongoing support of Technology projects within Energy Procurement and Demand Management	
19		Net Change	867		
20					
21	2029	Forecast	9,059		Line 17 + 19 and WP 6-5, Line 2
22		<i>All Programs</i>		Increase is mainly due to the deployment and/ or ongoing support of Technology projects within Energy Procurement and Demand Management	
23		Net Change	806		
24					
25	2030	Forecast	9,865		Line 21 + 23 and WP 6-5, Line 2

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Exhibit (PG&E-5), Chapter 6, Energy Supply Technology
Project Summary: Energy Procurement and Demand Management Value Stream**

Value Stream Program: Energy Procurement and Demand Management

Major Work Categories: 2F, JV

Planning Order Numbers: Capital 5812703; Expense 5071684

Project Start Date: 2025

Project Completion Date: 2030

Operative Date (only applies to Capital): Various

Value Stream Program Description:

The Energy Procurement and Demand Management value stream focuses on the technology solutions that directly enable analyzing & forecasting energy demand, trading & procuring energy and managing PG&E's energy portfolio.

The Value Stream program aims to enhance PG&E's Energy Supply capabilities in several business-critical areas:

- Compliance with Regulatory and Reliability Requirements: This ensures adherence to CAISO initiatives and FERC Order ER06-615-000, updating technology and systems for effective participation in the wholesale electric market.
- Energy Trading and Procuring Energy: This function manages the buying and selling of energy, including electric, natural gas, and GHG procurement. It supports trade capture, risk management, settlements, accounting, and compliance reporting to secure energy at the best prices.
- Managing PG&E's Energy Portfolio: This activity oversees the mix of renewable and non-renewable energy sources to ensure a balanced and sustainable supply.
- Analyzing and Forecasting Energy Demand: This responsibility uses advanced technology to predict future energy needs, aiding in planning and ensuring demand is met without overproduction or underproduction.
- Upgrading Technology Platforms and Risk Management: This operation upgrades technology platforms like the Endur application for better management of trade capture, scheduling, position management, risk management, compliance, reporting, settlement, and accounting. It also aims to optimize the portfolio and identify cost-saving opportunities while meeting regulatory compliance.
- Contract Management: This task handles all stages of energy bids and contracts, from solicitation to termination, including review, data validation, analysis, integration, and dispute resolution to enhance efficiency and reduce errors.

The work described in this value stream portfolio summary addresses the targeted needs of Energy Supply Technology Programs. The Energy Procurement and Demand Management value stream is dedicated to implementing technology solutions that are crucial for analyzing and forecasting energy demand, trading and procuring energy, and managing PG&E's energy portfolio. This value stream encompasses several key projects aimed at enhancing PG&E's operational efficiency, regulatory compliance, and customer satisfaction. Examples include:

- **CAISO Market Initiatives Implementation (MII) Program**

The Market Initiatives Implementation (MII) program is a mandatory initiative that ensures compliance with regulatory and reliability requirements in the electricity market, as mandated by FERC, CPUC, and CAISO. It aligns with FERC Order ER06-615-000, requiring market participants like PG&E to adapt to ongoing market design changes. CAISO annually publishes an Initiatives Catalog and Roadmap, detailing proposed market redesigns and enhancements to address regulatory mandates and market efficiency or reliability issues. The MII program synchronizes with CAISO's schedule to update PG&E's technology for effective participation in the wholesale electric market, assessing the potential impacts on technology and business processes based on CAISO's timelines.

Pacific Gas and Electric Company
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Exhibit (PG&E-5), Chapter 6, Energy Supply Technology
Project Summary: Energy Procurement and Demand Management Value Stream

- **Energy Trading Risk Management (ETRM) Compliance Program**

PG&E's Enterprise Trading and Risk Management (ETRM) platform is a comprehensive solution for managing electric, natural gas, and GHG procurement, encompassing trade capture, scheduling, risk management, compliance, reporting, settlement, and accounting. It is essential for demonstrating compliance with state and federal regulations and handling \$4 billion in transactions annually. The ETRM program project supports various products related to trade capture, risk management, settlements, accounting, and compliance reporting, addressing market, regulatory, and contract changes. The platform requires continuous updates due to changes from regulatory bodies and market dynamics. The program includes enhancements for power settlements and accounting to meet new contractual and financial requirements.

- **Endur Upgrade**

The Energy Trading and Risk Management and Risk Management platform, which includes the Endur application, is PG&E's enterprise trading and risk management platform for managing electric, natural gas, and GHG procurement. The ETRM Platform is a front-to-back-office solution including trade capture, scheduling, position management, risk management, compliance, reporting, settlement, and accounting and is the primary system the business relies on to demonstrate compliance with state and federal regulations to recover the cost of ~\$8B billion in transactions annually. The platform includes critical applications such as RDC, Cube, and MDS which support risk management functions (market and credit). To support the ETRM and Risk Management platform, it is necessary to upgrade PG&E's current implementation of OpenLink Endur, to the latest version supported by the vendor. The project includes testing and updating PG&E's extensive custom code and configuration to work in the latest version. Additionally, the infrastructure for Endur will need to be refreshed as the current set of servers were moved into production in 2023 and will need to be upgraded with the latest O/S and applications/Oracle DB.

- **Centralized Electric Position Management**

EPP is increasing its electricity procurement through third-party power purchase agreements (PPAs) and open market transactions, aiming to add about 10,000 MW over the next decade due to regulatory mandates for green power. In 2024, EPP's Structured Energy Transaction (SET) team conducted around 25 procurement solicitations, resulting in an estimated 1,000 MW of new transactions. Key programs driving contract growth include:

- Central Procurement Entity (CPE)
- Voluntary Allocation and Market Offer (VAMO) sales
- Renewable Market Adjusting Tariff (ReMAT) and Bioenergy Market Adjusting Tariff (BioMAT)
- Ad hoc executions like Resource Adequacy (RA), Renewable Energy Credits (RECs), and Low Carbon Fuel Standard (LCFS)
- Upcoming Renewable Portfolio Standard (RPS) program Request for Offer (RFO)
- Natural Gas/Renewable Natural Gas (RNG)

- **Energy Contract Life Cycle Management System**

Contract management at EPP involves procuring and selling electricity through third-party power purchase agreements (PPAs), confirmations, and open market transactions. With regulatory mandates driving a significant increase in procurement volumes (around 10,000 MW over the next decade), EPP's Structured Energy Transaction (SET) team manages numerous procurement solicitations to meet these requirements. However, the current contract management system, which relies on outdated tools like MS Excel and MS Access, is inadequate for handling over 2,800 wholesale contracts efficiently. Timely and accurate contract information is crucial for decision-making, risk management, and compliance reporting. Additionally, the highly confidential nature of contract data necessitates robust security measures to prevent financial or reputational damage from data breaches.

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2023 General Rate Case
Exhibit (PG&E-5), Chapter 6, Energy Supply Technology
Project Summary: Energy Procurement and Demand Management Value Stream**

Program Justification:

PG&E needs to invest in technology platforms to comply with FERC and CAISO initiatives. Establishing an Endur Platform Program is crucial for meeting new regulatory requirements. The ETRM platform requires continuous maintenance and updates due to regulatory changes.

Effective position management and technology updates are necessary for managing the electric portfolio and identifying cost-saving opportunities.

Energy Policy and Procurement (EPP) plans to implement a contract management system to track, store, and administer energy bids and contracts. This system will manage the contract review process, ensure timely data validation, and enable analytics for dispute resolution. It will also reduce manual data input, eliminate data maintenance costs, and enhance data extraction for reporting. Automated workflows will streamline training and enforce standardized processes.

Streamlining processes includes automating competitive solicitations, ensuring stakeholder input during contract review, and allowing contract administrators to manage new contract types and common functions. Targeted outreach will be performed using database contacts and contract language attributes.

A more detailed justification of the planned projects for this GRC cycle are as follows:

- **CAISO Market Initiatives Implementation (MII) Program**

The California Independent System Operator's (CAISO) annual set of Market Improvement Initiatives (MII) play a major role in Energy Policy and Procurement's (EPP) technology requirements. MII is a mandatory program that implements regulatory and reliability requirement changes in the electricity wholesale market. The initiatives are initiated and/or mandated by FERC, CPUC, and/or CAISO. FERC Order ER06-615-000 mandates that market participants in the wholesale market (like PG&E) continue to evolve with future market design changes to align with CAISO's market design changes. MII needs to be sufficiently funded to cover the wide variety of initiatives slated for 2027 - 2030. EPP's CAISO MII Program will continue to develop technical solutions in response to CAISO's extensive catalog of proposed initiatives impacting market analysis, forecasting, bidding, scheduling, optimization, and settlement. Failure to meet the mandates may result in the inability of PG&E to participate in the electricity wholesale market or may result to fines and penalties.

- **Energy Trading Risk Management (ETRM) Compliance Program**

The ETRM program at PG&E includes a suite of applications that support various functions including procurement and scheduling, risk management, contract management, settlements and reporting, and accounting. To comply with market and regulatory changes, as well as procurement mandates from governing bodies like CPUC, NERC/FERC, and CAISO, updates and upgrades are needed for the different applications. The ETRM program also ensures the stability and capacity of infrastructure, maintains the necessary expertise for daily operations and controls, and addresses the complexities of a dynamic market.

- **Endur Upgrade**

The ETRM platform requires continuous maintenance of its hardware, OS Software versions, and Database Versions. The current annual funding cycle and off-cycle process does not adequately fund all the required work. The ETRM Platform continuously requires new or modified functionality due primarily to market and regulatory changes from the following sources: CPUC, State of California, NERC, FERC, CAISO, CCA Market Changes, PG&E's Energy Portfolio Strategy changes in response to market changes, and PG&E's Interfacing Applications (FBS, RDC, MDR, SAP, ICE, ODMS).

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Project Summary: Energy Procurement and Demand Management Value Stream

- **Centralized Electric Position Management**

To effectively manage the electric portfolio and associated risks, EPP relies heavily on technology for data management and decision-making. Effective position management is crucial due to the changing resource mix, procurement mandates, and regulatory changes. Current tools and processes are outdated and need updating to ensure effective management and compliance. Advancing technology can optimize the portfolio, identify cost-saving opportunities, and meet regulatory obligations.

- **Energy Contract Life Cycle Management System**

The project includes creating a secure and efficient solution to track, store, and manage energy bids and contracts throughout their lifecycle. This will enhance analysis, decision-making, and reporting. It aims to streamline the contract review process, ensure timely data validation, and support analytics for dispute resolution. The project will reduce manual data input, eliminate redundant systems, and improve data mining for regulatory reporting. It will also provide a self-serve model for data requests, reduce training time with automated workflows, and streamline competitive solicitations and contract reviews. Additionally, it will enable contract administrators to configure new contract types and perform targeted email outreach without heavy IT involvement.

Program Cost:

PG&E used the IT Project/Program Estimating Tool (PET), which is a customized Microsoft Excel template, to document estimate assumptions and generate labor and non-labor cost forecasts for this program. To calculate labor costs, users enter labor units by activity and resource type, and the PET multiplies that by standard labor, overhead, and escalation rates. To calculate non-labor costs, users enter unit quantity and unit price assumptions for contracts (such as software licenses or third-party services), materials, and other drivers. The PET then calculates overheads, such as materials burden, and escalation where appropriate. Finally, the tool calculates AFUDC using standard rates and user-provided operative date assumptions. If necessary, users can adjust the calculated output for rounding or other project- or program-specific considerations. Users enter assumptions in each row of the tool to explain their inputs. See Exhibit (PG&E-7), Chapter 7 for additional information regarding the PET. PG&E can provide the specific PET output produced for this program upon request.

Accounting assumptions in the tool are based on current guidance from PG&E's Capital Accounting department. In this GRC, PG&E has proposed a new accounting policy that would allow technology investment costs currently treated as expense to be capitalized beginning in 2027. To convert the forecast shown in the PET to the forecast proposed in the GRC (which reflects the new accounting policy), PG&E multiplied the expense estimates for 2027-3030 by a standard conversion factor and added the result to the capital forecast for each corresponding year. See Exhibit (PG&E-7), Chapter 7

Major Project Spending Expense Estimates
(Thousands of Nominal Dollars)

	Recorded					Forecast		
	2020	2021	2022	2023	2024	2025	2026	2027
EXPENSE								
Energy Procurement & Demand Management	392	589	186	77	103	400	350	-
MWC JV	392	589	186	77	103	400	350	-

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Project Summary: Energy Procurement and Demand Management Value Stream

Major Project Spending Capital Estimates
(Thousands of Nominal Dollars)

	Recorded					Forecast					
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
CAPITAL											
Energy Procurement & Demand Management	9,645	6,633	6,055	8,194	6,878	9,200	7,300	7,699	8,192	9,059	9,865
MWC 2F	9,645	6,633	6,055	8,194	6,878	9,200	7,300	7,699	8,192	9,059	9,865

Program Benefits:

The Value Stream program is essential for PG&E to maintain compliance with state and federal agencies, avoiding penalties and building trust with regulators and customers. Effective participation in CAISO's wholesale electric market guarantees a reliable electricity supply, better load management, and optimized operations, which are crucial for customer satisfaction and grid stability. Improved contract management enhances information control, preventing data breaches and addressing cybersecurity threats, system failures, and compliance violations. Enhanced data management improves processes, identifies cost-saving opportunities, and resolves billing disputes more effectively. Overall, the program ensures PG&E meets ongoing regulatory and contractual requirements. It also aims in keeping systems and business processes updated for compliance.

- **Compliance:** Compliance with state and federal agencies is crucial. The Value Stream program ensures PG&E remains compliant with market initiatives and tariff changes, avoiding penalties and maintaining trust with regulators and customers. It involves meticulous cost recovery management for electric, natural gas, and GHG procurement, with detailed reporting for over \$4 billion in annual transactions.
- **Reliability:** Effective participation in CAISO's wholesale electric market ensures a reliable electricity supply, better load management, response to market signals, and optimized operations. Reliable service is essential for customer satisfaction and grid stability, especially during peak demand or outages.
- **Risk Management:** Improved contract management enhances information control and workflow, preventing data breaches. Proactive measures address cybersecurity threats, system failures, data breaches, and compliance violations, minimizing their impact on operations, financial performance, and reputation.
- **Customer Satisfaction:** Enhanced data management improves RFO processes for counterparties and regulatory parties, identifies cost-saving opportunities, and resolves billing disputes more effectively.
- **Contractual Requirements:** The work allows PG&E to meet ongoing regulatory and contractual requirements, ensuring systems and business processes are updated to implement compliance requirements within the required period.

PG&E is undertaking several critical projects to enhance its operational efficiency, regulatory compliance, and customer satisfaction. Each project is designed to address specific needs such as ensuring compliance with regulatory requirements, improving the reliability of electricity supply, enhancing risk management, and optimizing data management processes. By investing in these initiatives, PG&E aims to maintain its reputation, meet regulatory obligations, and provide reliable and efficient service to its customers.

• **CAISO Market Initiatives Implementation (MII) Program**

- **Compliance:** The project ensures that PG&E remains in compliance with mandated market initiatives and tariff changes. This is crucial for avoiding penalties and ensuring that the company operates within the legal and regulatory frameworks set by governing bodies. Staying compliant also helps in maintaining the company's reputation and trust with regulators and customers.
- **Reliability:** By effectively participating in the CAISO's wholesale electric market, PG&E can ensure a reliable supply of electricity to its customers. This participation allows PG&E to better manage and balance its load, respond to market signals, and optimize its operations. Reliable service is essential for

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Project Summary: Energy Procurement and Demand Management Value Stream**

customer satisfaction and for the stability of the electric grid, especially during peak demand periods or unexpected outages.

- **Energy Trading Risk Management Compliance Program**
 - Compliance: PG&E meticulously manages the cost recovery for its electric, natural gas, and GHG procurement, involving detailed reports for over \$4 billion in annual transactions. Key CPUC cost recovery proceedings include the Core Procurement Incentive Mechanism, Quarterly Compliance Review, Mark-to-Market reporting, and the ERRA Annual Compliance Review. Additionally, Endur facilitates compliance reporting to major regulatory bodies, including the SEC, ARB, CEC, CFTC, CPUC, EIA, and FERC.
- **Endur Upgrade**
 - Compliance: This work will allow PG&E to meet ongoing regulatory and contractual requirements.
 - Risk Management: Proactively addresses potential issues like cybersecurity threats, system failures, data breaches, and compliance violations to minimize their impact on operations, financial performance, and reputation.
- **Centralized Electric Position Management**
 - Reliability: The planned solution will increase decision clarity, improve communications and transparency.
 - Compliance: Ensuring compliance with agencies like the SEC, ARB, CEC, CFTC, CPUC, EIA, and FERC is crucial. Key cost recovery and reporting processes, such as, but not limited to, the Core Procurement Incentive Mechanism, Quarterly Compliance Review, Mark-to-Market reporting, and ERRA Annual Compliance Review, are essential for meeting these regulatory requirements.
- **Energy Contract Life Cycle Management System**
 - Risk Management: Improved contract management will lead to better information control and workflow to prevent a data breach.
 - Customer Satisfaction: Enhanced data management will improve the RFO processes for counterparties and regulatory parties, help identify cost-saving opportunities and resolve billing disputes more effectively.
 - Compliance: Ensures PG&E systems and business processes are updated and able to implement compliance requirements within the required period.
 - Contractual Requirements: The work allows PG&E to meet ongoing regulatory and contractual requirements, ensuring systems and business processes are updated to implement compliance requirements within the required period.

Program Alternatives Considered:

When evaluating the best approach for EPP to manage its regulatory and operational requirements, several alternatives were considered. These alternatives range from maintaining the status quo to implementing advanced technology solutions. Each alternative was assessed for its ability to meet regulatory requirements, optimize operations, manage risks, and ensure customer satisfaction. Examples are as follows:

- **CAISO Market Initiatives Implementation (MII) Program**

The following alternative solutions were thoroughly evaluated to determine the most effective approach for implementing this program. The goal was to identify a solution that would provide the best balance of compliance, reliability, risk management, customer satisfaction, and cost-effectiveness.

 - Status Quo (Do Nothing) – This alternative is not recommended. This alternative results in PG&E not being in compliance with the CAISO. Staying compliant helps in maintaining the company's reputation and trust with regulators and customers.

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- Alternative 1: CAISO Market Initiatives Implementation (MII) Program - This is the recommended alternative. Delivering reliable service is vital for ensuring customer satisfaction and maintaining the stability of the electric grid, particularly during peak demand periods or unexpected outages. Compliance is key to upholding the company's reputation and fostering trust with both regulators and customers.
- **Energy Trading Risk Management Compliance Program**
The following alternative solutions were thoroughly evaluated to determine the most effective approach for implementing this program. The goal was to identify a solution that would provide the best balance of compliance, risk management, and cost-effectiveness.
 - Status Quo (Do Nothing) – This alternative is not recommended. This alternative is not an option for a regulatory and compliance mandated project, as this would subject PG&E to potential fines and risks.
 - Alternative 1: Continuous Updates and Upgrades for ETRM applications – This is the recommended alternative. This alternative supports the most efficient management for compliance and cost recovery efforts and proceedings, as mandated by major regulatory bodies.
 - Alternative 2: Manual Implementation – This alternative is not recommended. This option is not possible as numerous PG&E's systems are tightly integrated with CAISO systems and the regulatory rules that govern their functions. These systems must adapt as soon as CAISO systems and regulatory rules evolve and take effect.
- **Endur Upgrade**
The following alternative solutions were thoroughly evaluated to determine the most effective approach for implementing this program. The goal was to identify a solution that would provide the best balance of compliance and reliability.
 - Status Quo (Do Nothing) - This alternative is not recommended. The Endur application necessitates a smaller upgrade project addressing fewer changes between the PG&E implemented version of Endur and the most current version. Failure to address this application would result in a much larger project given the change in technology and would eventually result in significant risk as it would be unsupported either partially or wholly by the vendor. Failure to address would eventually leave PG&E with significant technological debt and risk adding to operational overheads and burden potentially resulting in the inability of the application to properly support business needs.
 - Alternative 1: Upgrading Endur Application – This alternative is the recommended alternative. Maintenance of Endur application to the latest version ensures PG&E meets regulatory and contractual requirements while proactively addressing cybersecurity threats, system failures, data breaches, and compliance violations to protect operations, financial performance, and reputation.
 - Alternative 2: Moving to Alternative Platforms - This alternative is not recommended. Alternative platforms were considered during the original Endur implementation. To date PG&E has invested more than \$60M in the platform to ensure reliable, consistent reporting to various regulators including the SEC, CFTC, FERC, ARB, and CPUC. Replacing Endur with another solution would require another \$60M+ project.
- **Centralized Electric Position Management**
The following alternative solutions were thoroughly evaluated to determine the most effective approach for implementing this program. The goal was to identify a solution that would provide the best balance of compliance, reliability, risk management, and cost-effectiveness.

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Project Summary: Energy Procurement and Demand Management Value Stream**

- Status Quo (Do Nothing) This alternative is not recommended. If EPP delays implementation to the following GRC cycle, regulatory fines, compliance violations, and inefficient procurement efforts may drive customer rates higher.
- Alternative 1: Centralized Electric Position Management Implementation - This alternative is the recommended alternative. Implementation of this Initiative will:
 - Leverage Technology - EPP relies on advanced technology for efficient data management and informed decision-making.
 - Update Outdated Tools - Current tools and processes are outdated and need modernization to ensure effective management and compliance.
 - Crucial Position Management - Effective management is essential due to evolving resource mixes, procurement mandates, and regulatory changes.
 - Optimize Portfolio - Advancing technology can optimize the portfolio, uncover cost-saving opportunities, and meet regulatory obligations.

- **Energy Contract Life Cycle Management System**

The following alternative solutions were thoroughly evaluated to determine the most effective approach for implementing this program. The goal was to identify a solution that would provide the best balance of compliance, reliability, risk management, customer satisfaction and cost-effectiveness.

- Status Quo (Do Nothing) This alternative is not recommended. This alternative results in the following:
 - Compliance and Data Security risks: Improper storage or security of contract data could leak proprietary information, harming PG&E's reputation and competitiveness
 - Increase in headcount to manage volume growth/ implementation of manual controls
 - Manual contract tracking may also lead to regulatory non-compliance
 - Delays and/or incorrect regulatory reporting due to less rigid business process workflows and controls
- Alternative 1: Energy Contract Life Cycle Management System - This alternative is the recommended alternative. Implementation of this Initiative provides:
 - Secure and Efficient Solution: Track, store, and manage energy bids and contracts throughout their lifecycle.
 - Enhanced Analysis and Reporting: Improve analysis, decision-making, and reporting capabilities.
 - Streamlined Contract Review: Simplify the contract review process and ensure timely data validation.
 - Support for Dispute Resolution: Provide analytics to aid in resolving disputes.
 - Reduced Manual Data Input: Minimize manual data entry and eliminate redundant systems.
 - Improved Data Mining: Enhance data mining for regulatory reporting.
 - Self-Serve Data Requests: Offer a self-serve model for data requests.
 - Automated Workflows: Reduce training time with automated workflows.
 - Streamlined Solicitations and Reviews: Simplify competitive solicitations and contract reviews.
 - Configurable Contract Types: Enable contract administrators to configure new contract types.
 - Targeted Email Outreach: Allow targeted email outreach without heavy IT involvement

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2027 GENERAL RATE CASE
EXHIBIT (PG&E-5), ENERGY SUPPLY**

**WORKPAPERS SUPPORTING
CHAPTER 7, ENERGY SUPPLY RATEMAKING**

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**Pacific Gas and Electric Company
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Exhibit (PG&E-5), Chapter 7
Energy Supply Ratemaking
Modification to Hydro Licensing Balancing Account**

Line No.

1 Annual Capital Costs Proposed to be Included in Hydro Licensing Balancing Account

2	RAMP Description	RAMP ID	Total Cost over GRC				
			Period	2027	2028	2029	2030
3	Internal Erosion Mitigation	LGUWR-M001	\$ 123,234,889.93	\$ 27,824,596.33	\$ 44,590,614.38	\$ 31,449,628.49	\$ 19,370,050.73
4	Spillway Remediation	LGUWR-M002	\$ 100,449,991.79	\$ 13,768,093.14	\$ 30,066,070.44	\$ 32,886,138.08	\$ 23,729,690.13
5	Seismic Retrofit	LGUWR-M003	\$ 24,621,764.66	\$ 9,774,493.40	\$ 1,079,165.06	\$ 2,756,507.05	\$ 11,011,599.15
6	LLO Refurbishment	LGUWR-M004	\$ 74,571,783.62	\$ 27,449,094.81	\$ 24,776,324.30	\$ 18,789,589.60	\$ 3,556,774.91
7	Physical Security	LGUWR-M005	\$ 2,966,023.00	\$ -	\$ -	\$ 1,560,287.00	\$ 1,405,736.00
8	TOTALS		\$ 325,844,453.00	\$ 78,816,277.68	\$ 100,512,174.18	\$ 87,442,150.22	\$ 59,073,850.92

9

10 Test Year Expense Costs Proposed to be Included in Hydro Licensing Balancing Account

11	RAMP Description	RAMP ID	2027
12	Internal Erosion Mitigation	LGUWR-M001	\$ -
13	Spillway Remediation	LGUWR-M002	\$ 156,000.00
14	Seismic Retrofit	LGUWR-M003	\$ -
15	LLO Refurbishment	LGUWR-M004	\$ -
16	Physical Security	LGUWR-M005	\$ -
17	TOTALS		\$ 156,000.00

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 7
Energy Supply Ratemaking
Modification to Hydro Licensing Balancing Account - Details

Line No.	Exhibit and Chapter	Ch. Name	Cost Type (Capital/Expense)	Planning Order	PO Desc.	MWC	MWC Desc	RAMP Description	2027	2028	2029	2030	Total
1	5.03X	Hydro Operations Costs	E	5260129	Pit 5 Spillway Apron/Tailrace Remove Block 1	AX	Maint Resv,Dams&Waterways	M002 - Spillway Remediation	\$ 156,000	\$ -	\$ -	\$ -	\$ 156,000
2	5.03X	Hydro Operations Costs	C	5745679	Fordyce Dam Leakage Reduction DOE	2L	Instl/Rpl for Hydro Safety&Reg	M001 - Internal Erosion Mitigation	\$ 11,138,143	\$ 15,441,493	\$ 10,849,941	\$ -	\$ 37,429,577
3	5.03X	Hydro Operations Costs	C	5783541	Lower Bucks Dam Resurface DS Face	2L	Instl/Rpl for Hydro Safety&Reg	M001 - Internal Erosion Mitigation	\$ 12,002,296	\$ 10,710,677	\$ 260,048	\$ -	\$ 22,973,020
4	5.03X	Hydro Operations Costs	C	5798438	Relief Dam Resurface Upstream Liner	2N	Instal/Repl Resv,Dams&Waterway	M001 - Internal Erosion Mitigation	\$ 3,780,407	\$ 18,071,454	\$ 18,098,027	\$ 19,210,734	\$ 59,160,622
5	5.03X	Hydro Operations Costs	C	5803993	Pit 6 Forebay Dam Restore Upstream Slope	2N	Instal/Repl Resv,Dams&Waterway	M001 - Internal Erosion Mitigation	\$ -	\$ -	\$ 681,325	\$ 135,888	\$ 817,213
6	5.03X	Hydro Operations Costs	C	5806395	Wise FB Install Rip Rap	2N	Instal/Repl Resv,Dams&Waterway	M001 - Internal Erosion Mitigation	\$ -	\$ 183,495	\$ 1,560,287	\$ 23,429	\$ 1,767,211
7	5.03X	Hydro Operations Costs	C	5806781	Relief Dam U/S Liner Patching 2024	2N	Instal/Repl Resv,Dams&Waterway	M001 - Internal Erosion Mitigation	\$ -	\$ -	\$ -	\$ -	\$ -
8	5.03X	Hydro Operations Costs	C	5809060	Courtlight - Dam Concrete Liner Repairs	2N	Instal/Repl Resv,Dams&Waterway	M001 - Internal Erosion Mitigation	\$ -	\$ -	\$ -	\$ -	\$ -
9	5.03X	Hydro Operations Costs	C	5809987	Strawberry LLO Replace Rockfall Netting	2N	Instal/Repl Resv,Dams&Waterway	M001 - Internal Erosion Mitigation	\$ 142,698	\$ 183,495	\$ -	\$ -	\$ 326,193
10	5.03X	Hydro Operations Costs	C	5810107	Fordyce Dam Install Plinth	2L	Instl/Rpl for Hydro Safety&Reg	M001 - Internal Erosion Mitigation	\$ -	\$ -	\$ -	\$ -	\$ -
11	5.03X	Hydro Operations Costs	C	5810108	Fordyce Dam Install Carpi Liner	2L	Instl/Rpl for Hydro Safety&Reg	M001 - Internal Erosion Mitigation	\$ -	\$ -	\$ -	\$ -	\$ -
12	5.03X	Hydro Operations Costs	C	5812098	Fordyce Dam U/S Liner Patching 2026	2N	Instal/Repl Resv,Dams&Waterway	M001 - Internal Erosion Mitigation	\$ -	\$ -	\$ -	\$ -	\$ -
13	5.03X	Hydro Operations Costs	C	5812099	Relief Dam U/S Liner Patching 2027	2N	Instal/Repl Resv,Dams&Waterway	M001 - Internal Erosion Mitigation	\$ 761,053	\$ -	\$ -	\$ -	\$ 761,053
14	5.03X	Hydro Operations Costs	C	5771199	Pit 7 Radial Gate1 Repl Arms & Trunnions	2L	Instl/Rpl for Hydro Safety&Reg	M002 - Spillway Remediation	\$ 2,828,555	\$ 12,320,389	\$ 101,939	\$ -	\$ 15,250,883
15	5.03X	Hydro Operations Costs	C	5771200	Pit 6 Radial Gate1 Repl Arms & Trunnions	2L	Instl/Rpl for Hydro Safety&Reg	M002 - Spillway Remediation	\$ 1,147,926	\$ 2,304,843	\$ 12,962,026	\$ 91,841	\$ 16,506,636
16	5.03X	Hydro Operations Costs	C	5776722	Pit 6 Radial Gate2 Repl Arms & Trunnions	2L	Instl/Rpl for Hydro Safety&Reg	M002 - Spillway Remediation	\$ -	\$ 316,529	\$ 1,607,720	\$ 2,811,472	\$ 4,735,721
17	5.03X	Hydro Operations Costs	C	5776723	Pit 7 Radial Gate2 Repl Arms & Trunnions	2L	Instl/Rpl for Hydro Safety&Reg	M002 - Spillway Remediation	\$ 273,979	\$ 1,181,709	\$ 2,600,478	\$ 11,916,894	\$ 15,973,060
18	5.03X	Hydro Operations Costs	C	5776899	Rock Cr Dam Drum Gate Repl Hose	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ -	\$ -
19	5.03X	Hydro Operations Costs	C	5779023	Spaulding Dam 1 Install Log Booms	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 1,440,570	\$ -	\$ -	\$ -	\$ 1,440,570
20	5.03X	Hydro Operations Costs	C	5784683	Rock Creek Cresta Coffe Dam DOE	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 74,538	\$ -	\$ -	\$ -	\$ 74,538
21	5.03X	Hydro Operations Costs	C	5787970	Salt Springs Log Boom DOE	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ -	\$ -
22	5.03X	Hydro Operations Costs	C	5792673	Rock Cr Dam Repl Radial BP Gate Hoist	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 104,645	\$ 252,306	\$ 1,716,316	\$ -	\$ 2,073,266
23	5.03X	Hydro Operations Costs	C	5792674	Cresta Dam Repl Radial BP Gate Hoist	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ -	\$ -
24	5.03X	Hydro Operations Costs	C	5793557	Tiger Creek Abay Spillway Gates Automati	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ -	\$ -
25	5.03X	Hydro Operations Costs	C	5793568	Spaulding 2 Dam Replace Apron	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ -	\$ -
26	5.03X	Hydro Operations Costs	C	5800748	Pit 3 Dam Repl Plunge Pool & Wing Wall	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 406,936	\$ 7,106,188	\$ 26,005	\$ -	\$ 7,539,129
27	5.03X	Hydro Operations Costs	C	5802602	Pit 7 Dam Radial Gate Chain Replacement	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 42,321	\$ 4,418	\$ 2,868	\$ -	\$ 49,607
28	5.03X	Hydro Operations Costs	C	5802603	Pit 6 Dam Radial Gate Chain Replacement	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 38,053	\$ -	\$ -	\$ -	\$ 38,053
29	5.03X	Hydro Operations Costs	C	5802899	Fordyce Dam Replace Radial Gate Actuator	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 161,835	\$ 1,578,562	\$ 75,850	\$ -	\$ 1,816,247
30	5.03X	Hydro Operations Costs	C	5804217	McClood Dam Replace Log Boom	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 951,317	\$ 91,748	\$ -	\$ -	\$ 1,043,064
31	5.03X	Hydro Operations Costs	C	5805443	Rock Creek Dam Upgr Drum Gate Indicators	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ -	\$ -
32	5.03X	Hydro Operations Costs	C	5805970	Pit 6 Dam Replace Debris Boom	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 47,566	\$ -	\$ -	\$ -	\$ 47,566
33	5.03X	Hydro Operations Costs	C	5805971	Pit 4 Dam Debris Boom Replacement	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 1,887,846	\$ 45,874	\$ -	\$ -	\$ 1,933,719
34	5.03X	Hydro Operations Costs	C	5806779	Relief Dam Install Log Boom	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 47,566	\$ 321,117	\$ -	\$ -	\$ 368,682
35	5.03X	Hydro Operations Costs	C	5806780	Relief Spillway Impr Lower Training Wall	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 285,395	\$ 688,107	\$ 2,600,478	\$ 2,342,894	\$ 5,916,874
36	5.03X	Hydro Operations Costs	C	5806782	Lower Bear Dam 1 Erosion Protection	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ 183,495	\$ 676,124	\$ -	\$ 859,620
37	5.03X	Hydro Operations Costs	C	5806819	Rock Creek Dam Replace Gate Control RTUs	2M	Instal/Repl Hydro Generating Eqp	M002 - Spillway Remediation	\$ 547,007	\$ -	\$ -	\$ -	\$ 547,007
38	5.03X	Hydro Operations Costs	C	5806841	Cresta Dam Replace Gate Control RTUs	2M	Instal/Repl Hydro Generating Eqp	M002 - Spillway Remediation	\$ 551,764	\$ -	\$ -	\$ -	\$ 551,764
39	5.03X	Hydro Operations Costs	C	5806844	PV Scott Dam Inst New Log Boom Anchors	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ -	\$ -
40	5.03X	Hydro Operations Costs	C	5808116	Rock Creek Dam Recoat Radial BP Gate GIR	2L	Instl/Rpl for Hydro Safety&Reg	M002 - Spillway Remediation	\$ -	\$ -	\$ 104,019	\$ 843,442	\$ 947,461
41	5.03X	Hydro Operations Costs	C	5808117	Lower Bear Dam Recoat Radial Gate GIR	2L	Instl/Rpl for Hydro Safety&Reg	M002 - Spillway Remediation	\$ -	\$ -	\$ 520,096	\$ -	\$ 520,096
42	5.03X	Hydro Operations Costs	C	5808199	Cresta Dam BP Gate Repl Seals Recoat GIR	2L	Instl/Rpl for Hydro Safety&Reg	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ -	\$ -
43	5.03X	Hydro Operations Costs	C	5808200	Belden Dam Recoat Radial Gates GIR	2L	Instl/Rpl for Hydro Safety&Reg	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ 187,431	\$ 187,431
44	5.03X	Hydro Operations Costs	C	5808202	Rock Creek Dam Recoat Drum Gate 2	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ -	\$ -
45	5.03X	Hydro Operations Costs	C	5808204	Pit 1 Dam Recoat Radial Gate 5 GIR	2N	Instl/Rpl for Hydro Safety&Reg	M002 - Spillway Remediation	\$ 190,263	\$ 275,243	\$ 1,664,306	\$ 18,743	\$ 2,148,555
46	5.03X	Hydro Operations Costs	C	5808205	Pit 6 Dam Recoat Radial Gate GIR	2L	Instl/Rpl for Hydro Safety&Reg	M002 - Spillway Remediation	\$ -	\$ 137,621	\$ 988,182	\$ 890,300	\$ 2,016,103
47	5.03X	Hydro Operations Costs	C	5808206	Pit 7 Dam Recoat Radial Gates GIR	2L	Instl/Rpl for Hydro Safety&Reg	M002 - Spillway Remediation	\$ -	\$ -	\$ 104,019	\$ 278,263	\$ 382,282
48	5.03X	Hydro Operations Costs	C	5808207	Cresta Dam Recoat Drum Gate 1	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 23,783	\$ -	\$ -	\$ -	\$ 23,783
49	5.03X	Hydro Operations Costs	C	5808620	Blue Lake Dam Install Log Boom	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 237,829	\$ 229,369	\$ 10,402	\$ -	\$ 477,600
50	5.03X	Hydro Operations Costs	C	5808621	Kidd Lake Dam Install Log Boom	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 621,938	\$ 5,470	\$ -	\$ -	\$ 627,408
51	5.03X	Hydro Operations Costs	C	5808703	Pit 6 Fbay Dam Rep Gates 4 & 5 Chains	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 76,105	\$ 137,621	\$ 624,115	\$ -	\$ 837,842
52	5.03X	Hydro Operations Costs	C	5808805	Wishon Dam Recoat Radial Gates GIR	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 71,349	\$ -	\$ -	\$ -	\$ 71,349
53	5.03X	Hydro Operations Costs	C	5809663	Lyons Dam Restore Toe Void	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ 710,127	\$ 18,350	\$ -	\$ -	\$ 728,476
54	5.03X	Hydro Operations Costs	C	5812074	Spaulding Dam 2 Rplc Gate Hoist 8 -10	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ 780,144	\$ 1,405,736	\$ 2,185,880
55	5.03X	Hydro Operations Costs	C	5812076	Upper Peak Dam Install Log Boom	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ -	\$ 46,858
56	5.03X	Hydro Operations Costs	C	5812077	Rucker Lake Dam Install Log Boom	2N	Instal/Repl Resv,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ -	\$ 70,287	\$ 70,287

Pacific Gas and Electric Company
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Energy Supply Rate-making
Modification to Hydro Licensing Balancing Account - Details

Line No.	Exhibit and Chapter	Ch. Name	Cost Type (Capital/Expense)	Planning Order	PO Desc.	MWC	MWC Desc	RAMP Description	2027	2028	2029	2030	Total
57	5. 03X	Hydro Operations Costs	C	5812082	Spaulding 3 Aux Spillway Intst Log Boom	2N	Instal/Repl Resy,Dams&Waterway	M002 - Spillway Remediation	\$ 142,698	\$ 22,937	\$ -	\$ -	\$ 165,634
58	5. 03X	Hydro Operations Costs	C	5812083	Spaulding 2 Dam Rock Anchorage	2N	Instal/Repl Resy,Dams&Waterway	M002 - Spillway Remediation	\$ 142,698	\$ 91,748	\$ 260,048	\$ 14,057	\$ 508,550
59	5. 03X	Hydro Operations Costs	C	5812113	Salt Springs Dam Rplc 12 Gate Hoist	2M	Instal/Repl Hydr Hydro Generating Eqp	M002 - Spillway Remediation	\$ 713,487	\$ 2,752,428	\$ 4,680,861	\$ -	\$ 8,146,776
60	5. 03X	Hydro Operations Costs	C	5812248	Belden Dam Repl Radial Gates Hoist	2M	Instal/Repl Resy,Dams&Waterway	M002 - Spillway Remediation	\$ -	\$ -	\$ 780,144	\$ -	\$ 3,591,616
61	5. 03X	Hydro Operations Costs	C	5774800	Crane Valley Dam Intake Twr Seismic Upgr	2L	Instl/Rpl for Hydro Safety&Reg	M003 - Seismic Retrofit	\$ 5,549,834	\$ 14,699	\$ -	\$ -	\$ 5,564,533
62	5. 03X	Hydro Operations Costs	C	5802821	Upper Peak Mitigate Seismic Deformation	2N	Instal/Repl Resy,Dams&Waterway	M003 - Seismic Retrofit	\$ 3,749,002	\$ 101,116	\$ -	\$ -	\$ 3,850,118
63	5. 03X	Hydro Operations Costs	C	5802878	Belden Intake Structure Seismic Improve	2N	Instal/Repl Resy,Dams&Waterway	M003 - Seismic Retrofit	\$ 237,829	\$ 275,243	\$ 312,057	\$ 4,685,787	\$ 5,510,916
64	5. 03X	Hydro Operations Costs	C	5812254	Bucks Storage Dam Intake Tower Retrofit	2M	Instal/Repl Hydr Hydro Generating Eqp	M003 - Seismic Retrofit	\$ -	\$ 458,738	\$ 780,144	\$ 1,405,736	\$ 2,644,618
65	5. 03X	Hydro Operations Costs	C	5812262	Butt Valley Privatize Intk Seismic Imprv	2P	Instl/Repl Hydr BldgGrndInfstr	M003 - Seismic Retrofit	\$ -	\$ -	\$ 104,019	\$ 234,289	\$ 338,308
66	5. 03X	Hydro Operations Costs	C	5812324	Lake Almanor Dam Intake Tower Retrofit	2N	Instal/Repl Resy,Dams&Waterway	M003 - Seismic Retrofit	\$ 237,829	\$ 229,369	\$ 1,560,287	\$ 4,217,208	\$ 6,244,693
67	5. 03X	Hydro Operations Costs	C	5812326	Lower Bucks Dam Abandon Intake Tower	2N	Instal/Repl Resy,Dams&Waterway	M003 - Seismic Retrofit	\$ -	\$ -	\$ -	\$ -	\$ 468,579
68	5. 03X	Hydro Operations Costs	C	5778440	Courtlight Dam Upgrade I/D Gate Control	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ -	\$ -	\$ -	\$ -	\$ -
69	5. 03X	Hydro Operations Costs	C	5779207	Helms Repl Courtlight LLO Bypass Vlv DOE	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ -	\$ -	\$ -	\$ -	\$ -
70	5. 03X	Hydro Operations Costs	C	5779638	Tiger Creek Regulator Dam LLO Automation	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ 772,676	\$ 6,619,476	\$ 1,080,332	\$ 300,153	\$ 8,772,637
71	5. 03X	Hydro Operations Costs	C	5780885	Forcyce Dam Replace LLO and Guard Valves	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ 70,223	\$ -	\$ -	\$ -	\$ 70,223
72	5. 03X	Hydro Operations Costs	C	5783130	Balch 2 Repl 22" Needle Vlv Actuat & Wir	2M	Instal/Repl Hydr Hydro Generating Eqp	M004 - LLO Refurbishment	\$ 28,540	\$ 3,119,418	\$ 3,120,574	\$ 93,716	\$ 6,362,247
73	5. 03X	Hydro Operations Costs	C	5785096	Pit 3 LLO Replace No.1,2,3 Actuator	2L	Instl/Rpl for Hydro Safety&Reg	M004 - LLO Refurbishment	\$ 5,650,943	\$ -	\$ -	\$ -	\$ 5,650,943
74	5. 03X	Hydro Operations Costs	C	5789325	CVD Repl Gates, Stems, Guides & Actuator	2L	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ 142,698	\$ 194,505	\$ 2,425,726	\$ 46,858	\$ 2,809,786
75	5. 03X	Hydro Operations Costs	C	5792573	McCloud Dam LLO Repl. 5x7 SG Actuator	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ 9,466	\$ -	\$ -	\$ -	\$ 9,466
76	5. 03X	Hydro Operations Costs	C	5798439	Manzanita Dam Refurbish LLO	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ -	\$ -	\$ -	\$ -	\$ -
77	5. 03X	Hydro Operations Costs	C	5802879	LA Canyon Dam LLO Replace Gate 1 Stem	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ -	\$ -	\$ -	\$ -	\$ -
78	5. 03X	Hydro Operations Costs	C	5805464	Crane Valley IFR LLO Rpl Pipe	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ 20,251,326	\$ 14,475,935	\$ 11,746,881	\$ 538,866	\$ 47,013,008
79	5. 03X	Hydro Operations Costs	C	5807220	Spaulding Dam 1 Replace LLO	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ 237,829	\$ -	\$ -	\$ -	\$ 237,829
80	5. 03X	Hydro Operations Costs	C	5809988	Strawberry Intake Tower Guide Valve Rplc	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ -	\$ -	\$ -	\$ -	\$ -
81	5. 03X	Hydro Operations Costs	C	5811070	Rock Creek Dam Repl IFR and Guard Valves	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ -	\$ -	\$ -	\$ -	\$ -
82	5. 03X	Hydro Operations Costs	C	5812101	Lower Bear Intake Gate motor replacement	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ -	\$ -	\$ -	\$ -	\$ -
83	5. 03X	Hydro Operations Costs	C	5812184	Crane Valley Dam Replace Needle Valve	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ -	\$ -	\$ -	\$ -	\$ -
84	5. 03X	Hydro Operations Costs	C	5812200	Helms - Wishon Dam Replace HB Valve	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ -	\$ -	\$ -	\$ -	\$ 702,868
85	5. 03X	Hydro Operations Costs	C	5812320	Grista Dam Restore LLO & Dredge	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ 142,698	\$ 183,495	\$ 208,038	\$ 468,579	\$ 1,002,810
86	5. 03X	Hydro Operations Costs	C	5812325	Lake Almanor LLO Retrofit Disc Structure	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ -	\$ -	\$ -	\$ -	\$ 234,289
87	5. 03X	Hydro Operations Costs	C	5812332	Rock Creek Dam Restore LLO & Dredge	2N	Instal/Repl Resy,Dams&Waterway	M004 - LLO Refurbishment	\$ 142,698	\$ 183,495	\$ 208,038	\$ 468,579	\$ 1,002,810
88	5. 03X	Hydro Operations Costs	C	5792753	Pit 3 Lk Britton Dam Intst Video Monitor	2L	Instl/Rpl for Hydro Safety&Reg	M005 - Physical Security	\$ -	\$ -	\$ -	\$ -	\$ -
89	5. 03X	Hydro Operations Costs	C	5812246	Dam Safety Camera (HAWC Cameras)	2P	Instl/Repl Hydr BldgGrndInfstr	M005 - Physical Security	\$ -	\$ -	\$ 1,560,287	\$ 1,405,736	\$ 2,966,023

Pacific Gas and Electric Company
2027 General Rate Case
Exhibit (PG&E-5), Chapter 7
Energy Supply Ratemaking
Conceptual Hydroelectric Decommissioning Forecasts

Line
No.

Annual Costs with Probabilities Applied (2024\$)

	PH Name	Prob. Of Decom.	Total Cost (2024 \$)	Probability (2024 \$)	Total Cost with Probability (2024 \$)	2025	2026	2027	2028	2029	2030	2031	2032
2	Battle Creek	100%	\$161,260,000	\$161,260,000	\$161,260,000	\$18,666,432	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3	Crane Valley	100%	\$116,410,000	\$116,410,000	\$116,410,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
4	Desabla - Centerville	100%	\$91,390,000	\$91,390,000	\$91,390,000	\$0	\$0	\$0	\$0	\$0	\$0	\$6,138,589	\$6,138,589
5	Hamilton Branch	100%	\$76,750,000	\$76,750,000	\$76,750,000	\$0	\$0	\$0	\$0	\$0	\$0	\$1,535,000	\$1,535,000
6	Hat Creek	100%	\$35,830,000	\$35,830,000	\$35,830,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
7	Kerckhoff 1	100%	\$37,530,000	\$37,530,000	\$37,530,000	\$0	\$0	\$0	\$1,468,706	\$0	\$0	\$683,254	\$7,075,608
8	Miocene - Coal Canyon/Lime Saddle	100%	\$86,530,000	\$86,530,000	\$86,530,000	\$151,349	\$500,236	\$495,069	\$489,569	\$483,441	\$488,529	\$13,986,968	\$13,986,968
9	Phoenix	10%	\$4,630,000	\$463,000	\$463,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
10	Porter Valley	100%	\$499,800,000	\$499,800,000	\$499,800,000	\$0	\$0	\$0	\$85,939,842	\$86,731,160	\$87,644,107	\$87,096,013	\$87,225,523
11	TOTALS		\$1,110,130,000	\$1,036,888,000									

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13 Annual Costs with Probabilities Applied (Nominal \$)

	PH Name	Prob. Of Decom.	Total Cost (Nominal \$)	Probability (Nominal \$)	Total Cost with Probability	2025	2026	2027	2028	2029	2030	2031	2032
14	Battle Creek	100%	\$198,188,563	\$198,188,563	\$198,188,563	\$18,500,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
15	Crane Valley	100%	\$193,558,922	\$193,558,922	\$193,558,922	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
16	Desabla - Centerville	100%	\$112,382,886	\$112,382,886	\$112,382,886	\$0	\$0	\$0	\$0	\$0	\$0	\$6,603,497	\$6,738,754
17	Hamilton Branch	100%	\$85,934,891	\$85,934,891	\$85,934,891	\$0	\$0	\$0	\$0	\$0	\$0	\$1,651,254	\$1,685,076
18	Hat Creek	100%	\$47,914,595	\$47,914,595	\$47,914,595	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
19	Kerckhoff 1	100%	\$42,634,077	\$42,634,077	\$42,634,077	\$0	\$0	\$0	\$1,500,000	\$0	\$0	\$735,000	\$7,767,384
20	Miocene - Coal Canyon/Lime Saddle	100%	\$97,571,633	\$97,571,633	\$97,571,633	\$150,000	\$500,000	\$500,000	\$500,000	\$500,000	\$515,000	\$15,046,276	\$15,354,462
21	Phoenix	10%	\$11,901,664	\$1,190,166	\$1,190,166	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
22	Porter Valley	100%	\$532,309,818	\$532,309,818	\$532,309,818	\$0	\$0	\$0	\$87,770,990	\$89,701,960	\$92,353,019	\$93,692,260	\$95,753,480
23	TOTALS		\$1,322,397,047	\$1,224,344,148									

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Conceptual Hydroelectric Decommissioning Forecasts

Line No.	PH Name	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
1													
2	Battle Creek	\$0	\$0	\$0	\$0	\$28,518,714	\$28,518,714	\$28,518,714	\$28,518,714	\$28,518,714	\$0	\$0	\$0
3	Crane Valley	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
4	Desalia - Centerville	\$6,138,589	\$6,138,589	\$6,138,589	\$0	\$0	\$12,139,411	\$12,139,411	\$12,139,411	\$12,139,411	\$12,139,411	\$0	\$0
5	Hamilton Branch	\$1,535,000	\$1,535,000	\$1,535,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
6	Hat Creek	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,166,000	\$7,166,000	\$7,166,000	\$0	\$0
7	Kerckhoff 1	\$7,075,608	\$7,075,608	\$7,075,608	\$7,075,608	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8	Miocene - Coal Canyon/Lime Saddle	\$13,986,968	\$13,986,968	\$13,986,968	\$13,986,968	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
9	Phoenix	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
10	Potter Valley	\$65,163,355	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
11	TOTALS												
12													
13													
14													
15	Battle Creek	\$0	\$0	\$0	\$0	\$34,528,666	\$35,219,239	\$35,923,624	\$36,642,096	\$37,374,938	\$0	\$0	\$0
16	Crane Valley	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
17	Desalia - Centerville	\$6,876,646	\$7,003,545	\$7,143,616	\$0	\$0	\$14,991,588	\$15,291,420	\$15,597,248	\$15,909,193	\$16,227,377	\$0	\$0
18	Hamilton Branch	\$1,719,557	\$1,751,289	\$1,786,314	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
19	Hat Creek	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
20	Kerckhoff 1	\$7,926,325	\$8,072,594	\$8,234,046	\$8,398,727	\$0	\$0	\$0	\$9,207,192	\$9,391,335	\$9,579,162	\$9,770,745	\$9,966,160
21	Miocene - Coal Canyon/Lime Saddle	\$15,668,654	\$15,957,797	\$16,276,953	\$16,602,492	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
22	Phoenix	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
23	Potter Valley	\$72,998,099	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24	TOTALS												

Pacific Gas and Electric Company
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Line No.	PH Name	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060
1																	
2	Battle Creek	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3	Crane Valley	\$0	\$0	\$0	\$0	\$0	\$0	\$23,282,000	\$23,282,000	\$23,282,000	\$23,282,000	\$23,282,000	\$0	\$0	\$0	\$0	\$0
4	Desabla - Centerville	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
5	Hamilton Branch	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
6	Hat Creek	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
7	Kerckhoff 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8	Miocene - Coal Canyon/Lime Saddle	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
9	Phoenix	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
10	Porter Valley	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
11	TOTALS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
12																	
13																	
14																	
15	Battle Creek	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
16	Crane Valley	\$0	\$0	\$0	\$0	\$0	\$0	\$37,193,972	\$37,937,851	\$38,696,608	\$39,470,540	\$40,259,951	\$0	\$0	\$0	\$0	\$0
17	Desabla - Centerville	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
18	Hamilton Branch	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
19	Hat Creek	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
20	Kerckhoff 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
21	Miocene - Coal Canyon/Lime Saddle	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
22	Phoenix	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
23	Porter Valley	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24	TOTALS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

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Conceptual Hydroelectric Decommissioning Forecasts

Line
No.

Annual Costs with Probabilities Applied (2024\$)

	PH Name	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077
1																		
2	Battle Creek	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3	Crane Valley	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
4	DeSalia - Centerville	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
5	Hamilton Branch	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
6	Hat Creek	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
7	Kerckhoff 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8	Miocene - Coal Canyon/Lime Saddle	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
9	Phoenix	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$92,600	\$92,600	\$92,600	\$92,600	\$92,600
10	Potter Valley	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
11	TOTALS																	

12

13 Annual Costs with Probabilities Applied (Nominal \$)

	PH Name	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077
14																		
15	Battle Creek	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
16	Crane Valley	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
17	DeSalia - Centerville	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
18	Hamilton Branch	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
19	Hat Creek	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
20	Kerckhoff 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
21	Miocene - Coal Canyon/Lime Saddle	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
22	Phoenix	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$228,700	\$233,274	\$237,940	\$242,699	\$247,553
23	Potter Valley	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24	TOTALS																	

Pacific Gas and Electric Company
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Conceptual Project-Specific Decommissioning Estimates for Hydroelectric Projects

Line No.			Reference From
1	Battle Creek Decommissioning Study		A. 18-12-009, WP 8-113, Exhibit (PG&E-5)
2	Asset Type	Total Cost	
3	Dams/Diversions	\$21,030,329	
4	Tunnel Bat Gates	\$1,640,732	
5	Canals/Ditches	\$29,148,729	
6	Feeders	\$382,221	
7	Penstocks	\$8,069,847	
8	Pipelines	\$866,388	
9	Siphons	\$1,374,597	
10	Flumes	\$3,450,992	
11	Dam Gate House	\$39,454	
12	Powerhouses	\$4,598,831	
13	Other Buildings	\$83,980	
14	Inskip Domestic Water Supply	\$50,000	
15	Recreation Sites	\$322,550	
16	Gaging Stations	\$419,798	
17	Construction Costs	\$71,478,448	Sum of Line 3-16
18	Engineering and Permitting - 30% of Construction	\$21,443,534	Line 17 multiplied by 0.3
19	Contingency - 25% of Construction	\$17,869,612	Line 17 multiplied by 0.25
20	Total Cost at time of Study (2017)	\$110,791,594	Sum of Line 17-19
21	Total Cost 2024 \$	\$161,260,000	
22			
23			
24			
25	Crane Valley Physical Decommissioning		
26	Asset Class	Total Cost	Cost Model
27	Conveyances	\$22,626,251	
28	Dams	\$9,717,352	
29	Other Structures	\$12,973,768	
30	Power Generation	\$5,617,642	
31	Excessive Sediment Removal - 25% of Dam	\$2,426,095	
32	Steepness of Terrain - 50% of Conveyances	\$11,313,126	
33	Construction Costs	\$64,674,233	Sum of Line 27-32
34	Engineering and Permitting - 30% of Construction	\$19,402,270	Line 33 multiplied by 0.3
35	Contingency - 30% of Construction	\$19,402,270	Line 33 multiplied by 0.3
36	Political - 20% of Construction	\$12,934,847	Line 33 multiplied by 0.2
37	Total Cost 2024 \$	\$116,410,000	Sum of Line 33-36

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Line No.			Reference From
38	DeSabra-Centerville Decommissioning Study		A. 18-12-009, WP 8-160, Exhibit (PG&E-5)
39	Project Component	Total Cost	
40	Centerville Development	\$13,391,636	
41	DeSabra Development	\$24,044,288	
42	Toadtown Development	\$2,438,437	
43	Construction Costs	\$39,874,361	Sum of Line 40-42
44	Engineering and Permitting - 30% of Construction	\$11,962,308	Line 43 multiplied by 0.3
45	Contingency - 25% of Construction	\$9,968,590	Line 43 multiplied by 0.25
46	Total Cost at time of Study (2016)	\$61,805,260	Sum of Line 43-45
47	Total Cost 2024 \$	\$91,390,000	
48			
49			
50	Hamilton Branch Physical Decommissioning		
51	Asset Class	Total Cost	Cost Model
52	Conveyances	\$11,618,009	
53	Dams	\$29,190,978	
54	Power Generation	\$6,188,487	
55	Other Structures	\$973,033	
56	Construction Costs	\$47,970,507	Sum of Line 52-55
57	Engineering and Permitting - 30% of Construction	\$14,391,152	Line 56 multiplied by 0.3
58	Contingency - 30% of Construction	\$14,391,152	Line 56 multiplied by 0.3
59	Total Cost 2024 \$	\$76,750,000	
60			
61			
62			
63			
64	Hat Creek Physical Decommissioning		
65	Asset Class	Total Cost	Cost Model
66	Conveyance	\$12,195,342	
67	Dams	\$2,854,229	
68	Power Generation	\$7,317,205	
69	Radial Gates - 1% of Dam	\$25,948	
70	Construction Costs	\$22,392,723	Sum of Line 66-69
71	Engineering and Permitting - 30% of Construction	\$6,717,817	Line 70 multiplied by 0.3
72	Contingency - 30% of Construction	\$6,717,817	Line 70 multiplied by 0.3
73	Total Cost 2024 \$	\$35,830,000	Sum of Line 70-72

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Conceptual Project-Specific Decommissioning Estimates for Hydroelectric Projects

Line No.

74 Kerckhoff 1 Physical Decommissioning

75 Asset Type	Total Cost	Project-specific estimate
76 Intake Structure	\$324,344	
77 Underground Tunnel	\$6,486,884	
78 Adit 1 and Adit 2	\$648,688	
79 Surge Chamber	\$648,688	
80 Headworks	\$6,486,884	
81 Penstocks	\$648,688	
82 Switchyards	\$648,688	
83 Powerhouse	\$12,973,768	
84 Construction Costs	\$28,866,634	Sum of Line 76-83
85 Engineering and Permitting - 10% of Construction	\$2,886,663	Line 84 multiplied by 0.1
86 Contingency - 20% of Construction	\$5,773,327	Line 84 multiplied by 0.2
87 Total Cost (2024 \$)	\$37,530,000	Sum of Line 84-86

88

89

90

91 Miocene Decommissioning Study

Reference From
A. 21-06-021, WP 8-10, Exhibit (PG&E-5)

92 Asset Type	Total Cost
93 Dams	\$21,108,625
94 Tunnels	\$672,674
95 Canals	\$10,077,600
96 Feeders/Culvert Crossings	\$352,829
97 Penstocks	\$3,264,247
98 Buried Conveyance Pipes/Siphons	\$299,037
99 Flumes	\$5,411,917
100 Switchyards	\$113,206
101 Powerhouses	\$1,662,768
102 Gauging Stations	\$67,352
103 Bridges (Transfer)	-
104	
105 Construction Costs	\$43,030,255
106 Engineering and Permitting - 30% of Construction	\$12,909,077
107 Contingency - 25% of Construction	\$10,757,564
108 Total Cost at time of Study (2020)	\$66,696,895
109 Total Cost 2024\$	\$86,530,000

Sum of Line 93-104

Line 105 multiplied by 0.3

Line 105 multiplied by 0.25

Sum of Line 105-107

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Line No.

110 Phoenix Physical Decommissioning

111 Asset Class	Total Cost	Cost Model
112 Other Structures	\$1,946,065	
113 Power Generation	\$947,085	
114 Construction Costs	\$2,893,150	Sum of Line 112-113
115 Engineering and Permitting - 30% of Construction	\$867,945	Line 114 multiplied by 0.3
116 Contingency - 30% of Construction	\$867,945	Line 114 multiplied by 0.3
117 Total Cost 2024 \$	\$4,630,000	Sum of Line 114-116

118

119

120

121

122 Potter Valley Decommissioning Study

Reference From
A. 18-12-009, WP 8-36, Exhibit (PG&E-5)

123 Asset Type	Total Cost
124 Scott Dam	\$78,000,000
125 Cape Horn Dam	\$27,000,000
126 Water Conveyances	\$0

127

128

129 Powerhouse	\$2,300,000	
130 Construction Costs	\$107,300,000	Sum of Line 124-129
131 Engineering and Permitting - 30% of Construction	\$32,190,000	Line 130 multiplied by 0.3
132 Political - 80% of Construction	\$85,840,000	Line 130 multiplied by 0.8
133 Environmental - 80% of Construction	\$85,840,000	Line 130 multiplied by 0.8
134 Contingency - 25% of Construction	\$26,825,000	Line 130 multiplied by 0.25
135 Total Costs at time of Study (2016)	\$337,995,000	Sum of Line 130-134
136 Total Cost 2024 \$	\$499,800,000	

WP 7-12

Confidential LTSA Workpapers

Pages WP 7-13 to WP 7-15

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