

DOCKETED

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Project Title:	Enterprise Emergency Peaker Project - Compliance
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Appendix C

GHG Emissions Calculations

Enterprise BESS Data Response

Energy Loss from Transmission and Charging/Discharging Cycles

19 Initial 52 MW

5 Future Batteries (year 20)

Annual Energy Production Total System		Annual Average Solar Radiation Hours/Day/Year
Grid Size (MW)	52	4.77
Total hrs/year	8,760	
% Operational time ¹	20%	
Operational hours/year	1,741	
KWh produced per year	90,534,600	
Assumed Heat Rate (Btu/KWh)	10,000	
Annual Fuel Equivalent (MMBtu) ²	905,346	

Annual Energy Production Per Battery		Annual Average Solar Radiation Hours/Day/Year
Grid Size (MW)	2.74	4.77
Total hrs/year	8,760	
% Operational time ¹	20%	
Operational hours/year	1,741	
KWh produced per year	4,764,979	
Assumed Heat Rate (Btu/KWh)	10,000	
Annual Fuel Equivalent (MMBtu) ²	47,650	

3.99% Loss associated with Transmission and Distribution of electricity (CA %2023)²

Charging/Discharging cycles Losses per unit³

20% 80% Year 1

31% 69% Year 20

1.30% loss per year - self discharge³

Emissions Losses

Year 1	Year 20
3,615,935	3,615,935 KWh/year loss from Transmission & Distribution
952,996	1,477,143 KWh/year Charging/Discharging Losses per unit
18,106,920	35,451,443 KWh/year Charging/Discharging Losses year Total
61,945	61,945 KWh/year Self Discharge Loss (per unit)
1,176,950	1,486,673 KWh/year Self Discharge Loss (Total)
3,616	3,616 MWh/year loss from Transmission & Distribution
18,107	35,451 MWh/year Charging/Discharging Losses year Total
1,177	1,487 MWh/year Self Discharge Loss (Total)
22,900	40,554 Total Loss per year

San Diego Gas & Electric Pollutant Intensity Factors

45.099 CO2	lbs/MWhr	CalEEMod 2026 forecasted
0.033 CH4	lbs/MWhr	
0.004 N2O	lbs/MWhr	

Year 1	Year 20	1 CO2 GWP
1,032,758	1,828,947 lbs CO2	25 CH4 GWP
756	1,338 lbs CH4	298 NO2 GWP
92	162 lbs N2O	From CalEEMod (uses IPCC's 4th Assessment Report)

Year 1	Year 20	
1,032,758	1,828,947 lbs CO2	
18,892	33,457 lbs CH4 (CO2e)	
27,297	48,340 lbs N2O (CO2e)	
1,078,947	1,910,745 lbs CO2e	
0.00045359	Metric Tons/lb	
489	867 Metric Tons/year	2026 50% Renewable

GHG Emissions with increased Renewables reaching 100% by 2045

823	2027	517	2034	212	2041
779	2028	474	2035	168	2042
736	2029	430	2036	124	2043
692	2030	386	2037	81	2044
648	2031	343	2038	37	2045
605	2032	299	2039		
561	2033	255	2040		

Sources:

- 1 1. Operational time is based on annual average solar radiation hours per day per year (4.77 La Jolla) for the project area. Source: solardirect.com
- 2 <https://data.ca.gov/dataset/california-electric-transmission-lines>
- 3 https://climate-transparency-platform.org/sites/default/files/knowledge_centre_files/Greenhouse%20Gas%20Emissions%20Acc

Enterprise BESS Data Response

GHG Emissions from Auxillary Loads

Chiller Electrical Usage (Chiller Manual- BTMS950-ESA10 Energy Storage Liquid Cooling Unit)

55 kW Chiller power usage
 1,320 kWh/day/unit
 481,800 kWh/year/unit
 19 initial units
 9,154,200 kWh/year
 9,154 MW/year - Initial
 24 Units (year 20)
 11,563,200 kWh/year
 11,563 MW/year - Initial

Container Electrical Usage

(estimated in CalEEMod based on refrigerated warehouse electrical usage)

128,851 kWh/year
 129 MW/year - Initial
 6.78 MWh/year/unit
 33.91 MWh/year = additional 5 units
 163 MWh/year total Year 20

Total Energy Consumption (MW)

9,283 Initial Year
 11,726 Year 20

San Diego Gas & Electric Pollutant Intensity Factors

45.099 CO2	lbs/MW/hr	CalEEMod	2026 forecasted
0.033 CH4	lbs/MW/hr		
0.004 N2O	lbs/MW/hr		

Year 1	Year 20		1 CO2 GWP
418,656	528,829 lbs CO2		25 CH4 GWP
306	387 lbs CH4		298 NO2 GWP
37	47 lbs N2O		From CalEEMod (uses IPCC's 4th Assessment Report)

Year 1	Year 20	
418,656	528,829 lbs CO2	
7,659	9,674 lbs CH4 (CO2e)	
11,065	13,977 lbs N2O (CO2e)	
437,380	552,480 lbs CO2e	
0.00045359	Metric Tons/lb	
198	251 Metric Tons/year	2026 50% Renewable

GHG Emissions with increased Renewables reaching 100% by 2045

188	2027	118	2034	48	2041
178	2028	108	2035	38	2042
168	2029	98	2036	28	2043
158	2030	88	2037	18	2044
148	2031	78	2038	11	2045
138	2032	68	2039		
128	2033	58	2040		

99 Average MT CO2e/year

Enterprise BESS Data Response
Annual GHG Emissions from Charging BESS from the Grid

If not provided b Units		
52 MW Storage		
4 hrs/day	Charging from Grid	
208 MWh/day		
365 days/year		
75920 MWh/year		
1000 kWh/MWh		
75,920,000 kWh/year		

San Diego Gas & Electric Pollutant Intensity Factors					
45.099 CO2	lbs/MWhr	CalEEMod	2026 forecasted		
0.033 CH4	lbs/MWhr				
0.004 N2O	lbs/MWhr				
3,423,916 lbs CO2					
2,505 lbs CH4					
304 lbs N2O					
1 CO2 GWP	From CalEEMod (uses IPCC's 4th Assessment Report)				
25 CH4 GWP					
298 NO2 GWP					
3,423,916 lbs CO2					
62,634 lbs CH4 (CO2e)					
90,497 lbs N2O (CO2e)					
3,577,047 lbs CO2e					
0.00045359 Metric Tons/lb					
1,623 Metric Tons/year		2026 50% Renewable			
1,541	2027	969	2034	396	2041
1,459	2028	887	2035	315	2042
1,377	2029	805	2036	233	2043
1,296	2030	723	2037	151	2044
1,214	2031	642	2038	69	2045
1,132	2032	560	2039		
1,050	2033	478	2040		
805 Average MT CO2e/year					

Enterprise BESS Data Response
Intensity Factor Reduction based on increased Renewables

Year	Renewable %	Change in %	reduction per year	Intensity Factor CO2	reduction per year
2019					
2024	45.00%				
2025	47.50%				
2026	50.00%			45.099	2.373631579
2027	52.50%			42.73	
2028	55.00%			40.35	
2029	57.50%			37.98	
2030	60%	15.0000%	0.025	35.60	
2031	66.00%			33.23	
2032	72.00%			30.86	
2033	78.00%			28.48	
2034	84.00%			26.11	
2035	90%	30%	0.06	23.74	
2036	91.00%			21.36	
2037	92.00%			18.99	
2038	93.00%			16.62	
2039	94.00%			14.24	
2040	95%	5%	0.01	11.87	
2041	96.00%			9.49	
2042	97.00%			7.12	
2043	98.00%			4.75	
2044	99.00%			2.37	
2045	100%	5%	0.01	0.00	

Table 10. Supply and disposition of electricity, 1990 through 2023

California

megawatthours

Category	Year 2023	Year 2022	Year 2021	Year 2020	Year 2019	Year 2018	Year 2017	Year 2016	Year 2015	Year 2014	Year 2013	Year 2012	Year 2011	Year 2010	Year 2009	Year 2008	Year 2007	Year 2006	Year 2005	Year 2004	Year 2003	Year 2002	Year 2001	Year 2000	Year 1999	Year 1998	Year 1997	Year 1996	Year 1995	Year 1994	Year 1993	Year 1992	Year 1991	Year 1990	
Supply																																			
Generation																																			
Electric utilities	77,632,620	65,372,954	62,190,174	67,891,454	82,939,810	75,238,779	90,422,390	81,155,619	71,150,169	71,037,135	78,407,643	82,486,064	105,360,204	96,939,535	85,123,706	83,346,844	87,348,589	100,338,454	89,348,213	75,177,122	81,728,209	74,588,271	70,132,656	85,856,285	87,874,809	114,926,213	112,183,063	114,706,047	121,881,402	126,749,186	125,782,063	119,306,725	104,967,938	114,528,000	
Independent power producers	113,254,234	110,744,114	106,631,213	96,891,648	89,217,606	88,971,634	83,476,287	82,582,662	90,907,434	89,576,573	86,201,998	80,574,100	58,255,052	69,294,065	80,796,990	85,067,386	82,940,841	76,508,931	68,720,587	75,927,726	65,429,324	63,545,451	88,665,145	78,995,767	57,911,793	31,928,915	18,598,854	19,079,663	18,956,807	18,752,093	20,462,154	17,919,147	17,428,214	15,407,379	
Combined heat and power, electric	11,550,177	12,249,285	12,496,170	12,081,197	13,237,744	14,910,074	15,865,433	16,664,260	17,246,706	20,207,580	16,905,498	18,163,487	18,656,710	19,582,003	21,008,878	21,534,860	22,341,666	21,399,211	23,458,694	24,566,735	25,458,401	26,975,628	21,304,838	23,410,478	22,963,928	23,266,896	21,931,565	21,512,982	21,690,967	21,641,993	21,598,133	21,148,684	19,021,491	17,547,076	
Electric power sector generation subtotal	202,437,031	188,366,353	181,317,557	176,864,299	185,395,189	179,120,487	189,764,110	180,402,541	179,304,309	180,821,288	181,515,139	181,223,651	182,271,967	185,615,603	186,899,673	189,949,090	192,181,096	198,246,596	181,627,493	175,671,583	172,615,934	165,109,350	180,102,640	188,262,531	168,750,531	170,122,024	152,701,482	155,298,692	162,529,176	167,143,271	167,842,349	158,377,557	141,417,643	147,482,454	
Combined heat and power, commercial	2,503,686	2,584,942	2,458,070	2,505,739	2,627,180	2,779,121	2,867,260	2,858,960	2,888,734	2,802,160	2,761,572	2,894,426	2,880,277	2,300,044	2,243,754	2,100,480	2,130,746	2,118,380	2,150,876	1,917,669	2,070,584	1,958,497	1,824,899	2,103,807	2,024,081	2,037,539	2,031,715	2,118,233	2,080,608	2,063,102	1,754,267	1,738,325	1,586,533	1,730,302	
Combined heat and power, industrial	11,688,077	12,432,562	13,389,479	13,713,500	13,761,865	13,566,030	13,515,150	13,701,715	14,510,816	15,184,174	15,800,404	15,400,490	15,652,598	16,009,948	15,632,805	15,934,693	16,535,739	16,433,712	16,614,449	17,191,102	18,102,025	17,142,183	16,668,548	17,716,145	17,544,608	17,441,143	18,064,398	17,846,277	16,853,559	16,985,617	17,394,028	17,039,576	15,943,468	16,572,153	
Industrial and commercial generation subtotal	14,191,763	15,017,504	15,847,548	16,219,239	16,389,045	16,345,151	16,382,410	16,560,674	17,399,549	17,986,334	18,561,976	18,294,916	18,532,875	18,309,992	17,876,559	18,035,173	18,666,485	18,552,092	18,765,325	19,108,772	20,172,608	19,100,680	18,493,447	19,819,952	19,568,689	19,478,682	20,096,113	19,964,510	18,934,168	19,048,718	19,148,295	18,777,902	17,530,001	18,302,455	
Total net generation	216,628,794	203,383,857	197,165,106	193,083,537	201,784,204	195,465,638	206,146,520	196,963,215	196,703,858	198,807,622	200,077,115	199,518,567	200,804,842	204,125,596	204,776,132	207,984,263	210,847,581	216,798,688	200,292,818	194,789,355	192,788,542	184,210,030	198,596,086	208,082,483	188,319,220	189,600,707	172,797,595	175,263,202	181,463,344	186,191,990	186,990,645	177,155,458	158,947,644	165,784,910	
Total international imports	5,674,105	4,634,565	4,897,566	4,293,493	5,672,712	6,331,369	14,702,518	16,967,955	13,782,398	12,369,304	11,010,789	8,674,748	6,269,511	3,473,593	3,047,148	5,369,534	5,797,464	2,956,453	5,630,145	1,291,065	4,148,401	2,066,517	3,419,761	5,507,197	1,452,368	1,351,861	1,671,365	1,511,802	1,967,163	2,157,144	2,012,553	2,095,414	3,157,871	5,142,167	
Net interstate imports	43,244,434	71,503,454	72,740,877	79,969,661	71,031,536	86,652,863	65,460,858	73,378,629	79,443,241	79,716,562	80,363,665	80,660,537	83,293,067	79,646,642	81,178,433	89,521,954	77,964,366	73,427,499	77,562,381	86,931,066	73,900,695	76,698,186	72,558,322	62,164,770	75,539,862	75,113,861	81,296,046	68,517,774	56,119,146	51,419,244	48,214,715	60,974,474	71,767,013	66,087,034	
Total supply	265,547,333	279,521,876	274,803,549	277,346,691	279,488,452	288,449,890	286,309,896	287,309,799	289,929,497	290,893,488	291,451,569	289,053,852	290,367,420	287,245,821	289,001,713	302,875,751	294,609,411	293,162,640	283,485,344	283,002,426	270,837,638	262,974,733	274,574,169	275,754,450	265,311,450	266,066,429	255,767,005	245,292,778	239,549,653	239,768,378	237,217,913	240,228,346	233,872,528	237,014,131	
Disposition																																			
Sales to ultimate customers																																			
Full service providers	150,208,854	164,439,009	170,506,603	177,488,484	181,470,082	205,345,286	219,016,574	225,905,190	230,583,822	232,926,669	231,258,488	234,402,668	238,976,375	239,499,450	240,583,487	248,104,619	243,033,693	239,307,133	228,581,569	225,895,922	217,640,863	212,571,987	237,660,910	221,322,575	211,981,140	226,395,687	227,876,239	218,112,485	212,604,724	213,684,302	210,499,926	213,447,241	208,650,489	211,092,922	
Energy-only providers	87,269,085	85,259,226	74,616,540	70,724,016	66,918,218	47,954,696	36,314,488	29,284,561	28,822,648	26,993,982	25,552,182	24,193,157	22,120,408	17,576,741	16,923,930	18,661,682	19,618,460	21,223,282	23,406,325	24,625,312	23,896,284	22,641,345	10,097,868	22,734,627	22,849,739	10,038,283	3,887	0	0	0	0	0	0	0	
Facility direct sales	2,002,513	2,170,901	2,126,722	1,962,172	1,990,410	1,924,290	1,936,875	1,656,884	1,763,967	2,064,135	4,521,789	942,213	844,917	1,454,701	2,076,259	1,388,918	1,582,758	2,428,113	2,261,613	1,504,739	1,084,169	855,473	0	0	0	0	0	0	0	0	0	0	0	0	0
Total electric industry sales	239,480,452	251,869,136	247,249,865	250,174,672	250,378,710	255,224,272	257,267,937	256,846,635	261,170,437	262,584,786	261,332,459	259,538,038	261,941,700	258,530,892	269,583,676	268,155,219	264,234,911	262,958,528	254,249,507	252,025,973	243,221,316	236,068,805	247,758,778	244,057,202	234,830,879	236,433,970	227,880,126	218,112,485	212,604,724	213,684,302	210,499,926	213,447,241	208,650,489	211,092,922	
Direct use	13,048,166	13,052,857	13,108,353	12,558,137	12,951,845	12,859,245	12,794,860	12,289,369	11,510,704	11,180,448	12,077,629	10,750,313	10,195,768	10,073,764	10,035,114	13,462,354	9,146,403	14,030,060	11,672,828	15,199,327	15,183,496	14,993,111	14,674,123	14,598,510	16,951,018	13,870,511	12,576,708	12,033,448	10,615,263	10,369,644	10,771,434	10,049,616	10,339,906	9,655,985	
Total international exports	1,197,792	1,431,026	1,233,980	1,056,413	1,956,310	5,606,943	489,224	1,561,634	149,197	60,333	60,525	272,295	384,207	401,156	518,468	674,638	292,736	564,692	103,051	46,874	22,510	196,823	365,041	2,126,103	1,263,940	1,968,578	351,817	283,356	228,484	101,410	45,872	25,311	167,628	823,792	
Estimated losses	10,695,911	13,623,971	11,632,235	13,933,396	13,576,506	13,163,869	13,994,972	13,405,104	13,628,657	13,672,774	14,055,012	16,186,330	15,971,461	16,824,428	17,081,619	16,724,851	17,049,934	16,992,953	16,467,454	17,859,286	17,707,433	19,375,594	16,963,967	18,422,982	16,812,276	17,161,466	16,930,260	16,227,105	16,232,813	16,847,078	16,873,811	16,921,185	16,028,342		
Unaccounted	1,215,012	-455,114	1,575,115	-375,525	625,080	1,595,562	1,792,903	3,187,058	4,070,502	3,395,147	3,942,270	4,438,193	1,659,416	2,268,548	2,340,007	3,501,921	4,211,279	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Net interstate exports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total disposition	265,547,333	279,521,876	274,803,549	277,346,691	279,488,452	288,449,890	286,309,896	287,309,799	289,929,497	290,893,488	291,451,569	289,053,852	290,367,420	287,245,821	289,001,713	302,875,751	294,609,411	293,162,640	283,485,344	283,002,426	270,837,638	262,974,733	274,574,169	275,754,450	265,311,450	266,066,429	255,767,005	245,292,778	239,549,653	239,768,378	237,217,913	240,228,346	233,872,528	237,014,131	
Net interstate trade	-43,244,434	-71,503,454	-72,740,877	-79,969,661	-71,031,536	-86,652,863	-65,460,858	-73,378,629	-79,443,241	-79,716,562	-80,363,665	-80,660,537	-83,293,067	-79,646,642	-81,178,433	-89,521,954	-77,964,366	-73,427,499	-77,562,381	-86,931,066	-73,900,695	-76,698,186	-72,558,322	-62,164,770	-75,539,862	-75,113,861	-81,298,045	-68,517,774	-56,119,146	-51,419,244	-48,214,715	-60,974,474	-71,767,013	-66,087,034	
Net trade index (ratio)	0.8	0.7	0.7	0.7	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.7		

Priority direct sales are electricity sales from non utility power producers which reported electricity sales to an ultimate customer.

Net Interstate Trade = Total Supply - (Total Electric Industry Sales + Direct Use + Total International Exports (if applies) + Estimated Losses).

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