

Appendix B: Complete Well-to-Tank Results

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These tables show energy use in Btu and emissions in grams per million Btu available in vehicle tanks under different probabilities

The Crystal Ball software that we used to conduct Monte Carlo simulations in this study generates the probability distribution for each output parameter from the lowest value to the highest value. For energy use and GHG emissions, this means that the move from 0% to 100% probability represents the move from the best case to the worst case. In contrast, for efficiencies, the move in probability represents the move from the best case to the worst case.

Table B1. Conventional Gasoline						Table B2. 150 ppm S FRFG with MTBE					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs		Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	193,815	77.6%	190,851	92,429	17,619	0%	189,698	75.2%	186,864	68,639	17,404
10%	223,832	79.5%	220,224	103,149	19,694	10%	236,436	77.8%	232,974	89,280	20,873
20%	229,375	79.9%	225,620	105,260	20,056	20%	244,350	78.3%	240,657	92,705	21,445
30%	233,399	80.2%	229,463	106,674	20,330	30%	250,171	78.7%	246,317	95,085	21,854
40%	237,192	80.4%	233,207	107,896	20,581	40%	255,151	79.1%	251,179	97,285	22,221
50%	240,554	80.6%	236,418	109,064	20,806	50%	259,915	79.4%	255,879	99,234	22,561
60%	243,995	80.8%	239,757	110,265	21,033	60%	264,670	79.7%	260,512	101,231	22,919
70%	247,616	81.1%	243,217	111,538	21,283	70%	270,264	80.0%	265,973	103,507	23,303
80%	252,055	81.3%	247,522	112,998	21,574	80%	276,514	80.4%	272,087	106,199	23,748
90%	258,630	81.7%	253,834	115,045	22,004	90%	285,741	80.9%	281,067	109,964	24,408
100%	288,925	83.8%	283,314	126,682	24,047	100%	329,863	84.1%	324,173	132,842	27,515

Table B3. 5–30 ppm S FRFG with MTBE					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	175,304	73.0%	172,872	57,374	16,377
10%	234,009	76.9%	230,462	87,789	20,682
20%	245,236	77.6%	241,577	92,676	21,500
30%	253,090	78.1%	249,274	96,458	22,082
40%	259,898	78.6%	255,897	99,598	22,574
50%	266,255	79.0%	262,089	102,379	23,024
60%	272,898	79.4%	268,668	105,262	23,518
70%	280,222	79.8%	275,916	108,654	24,030
80%	288,493	80.3%	283,962	112,490	24,652
90%	300,605	81.0%	295,851	117,927	25,516
100%	370,130	85.1%	363,875	152,992	30,485

Table B4. 5–30 ppm S FRFG with EtOH					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	151,100	73.7%	148,809	63,938	15,113
10%	209,979	76.9%	206,654	90,057	19,347
20%	218,883	77.5%	215,441	94,072	19,996
30%	225,297	77.9%	221,784	97,214	20,495
40%	230,738	78.3%	227,068	99,611	20,868
50%	235,102	78.6%	231,398	101,712	21,191
60%	239,191	78.8%	235,349	103,738	21,473
70%	242,771	79.1%	238,922	105,447	21,771
80%	246,579	79.3%	242,624	106,980	22,026
90%	250,046	79.6%	246,056	108,623	22,280
100%	253,544	79.8%	249,471	110,276	22,539

Table B5. 5–30 ppm S RFG with No Oxygenate					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	148,557	72.8%	145,611	68,412	14,019
10%	214,444	77.5%	210,698	100,814	18,903
20%	226,726	78.3%	222,739	106,530	19,803
30%	236,281	78.9%	232,239	110,748	20,513
40%	243,943	79.4%	239,719	114,517	21,061
50%	251,533	79.9%	247,116	117,919	21,619
60%	258,876	80.4%	254,415	121,406	22,149
70%	267,185	80.9%	262,593	125,413	22,744
80%	276,992	81.5%	272,233	129,882	23,453
90%	290,862	82.3%	285,796	136,058	24,443
100%	373,644	87.1%	367,400	175,706	30,425

Table B6. Conventional Diesel					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	116,441	79.1%	114,474	58,058	11,732
10%	162,394	82.5%	159,426	76,044	15,049
20%	170,271	83.2%	167,113	79,434	15,627
30%	176,450	83.6%	173,148	82,095	16,062
40%	181,760	83.9%	178,337	84,402	16,447
50%	186,379	84.3%	182,908	86,596	16,788
60%	191,391	84.6%	187,749	88,682	17,150
70%	196,301	85.0%	192,575	90,828	17,499
80%	202,528	85.4%	198,597	93,433	17,943
90%	211,392	86.0%	207,344	97,201	18,576
100%	264,752	89.6%	259,767	122,350	22,478

Table B7. Low-Sulfur Diesel					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	99,234	74.0%	96,980	43,817	10,324
10%	170,427	79.2%	167,250	79,032	15,623
20%	184,946	80.3%	181,487	86,336	16,687
30%	196,360	81.0%	192,669	91,400	17,511
40%	206,289	81.7%	202,532	96,248	18,254
50%	215,048	82.3%	211,177	100,612	18,906
60%	224,419	82.9%	220,438	105,066	19,572
70%	234,505	83.6%	230,376	109,711	20,316
80%	245,973	84.4%	241,529	115,202	21,146
90%	262,610	85.4%	258,015	123,225	22,354
100%	351,228	91.0%	344,939	165,905	28,702

Table B8. 1 ppm S Crude Naphtha					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	23,697	76.5%	22,778	11,907	4,698
10%	121,098	83.0%	118,514	56,381	11,977
20%	134,765	84.0%	132,091	62,938	13,010
30%	145,026	84.8%	142,124	67,767	13,755
40%	153,478	85.5%	150,486	71,807	14,383
50%	161,557	86.1%	158,480	75,670	14,975
60%	169,544	86.7%	166,305	79,524	15,554
70%	178,746	87.3%	175,345	83,723	16,227
80%	189,903	88.1%	186,217	88,882	17,044
90%	204,511	89.2%	200,771	96,118	18,116
100%	307,259	97.7%	302,120	146,864	25,565

Table B9. CNG: NA NG					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	106,209	81.6%	100,902	2,454	12,844
10%	138,417	84.7%	130,291	3,883	15,202
20%	145,677	85.3%	137,245	4,354	15,719
30%	150,773	85.6%	141,901	4,705	16,098
40%	154,978	86.0%	146,012	5,006	16,410
50%	159,045	86.3%	149,846	5,279	16,710
60%	163,272	86.6%	153,769	5,559	17,015
70%	167,648	86.9%	157,990	5,866	17,332
80%	172,992	87.3%	162,983	6,232	17,722
90%	180,559	87.8%	170,224	6,716	18,283
100%	225,899	90.4%	213,119	8,274	21,570

Table B10. CNG: NNA NG					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	212,271	71.7%	205,348	9,124	22,026
10%	269,906	75.0%	260,633	11,149	26,017
20%	280,017	75.6%	270,435	11,737	26,706
30%	287,534	76.1%	277,727	12,185	27,232
40%	294,014	76.5%	284,012	12,563	27,683
50%	300,578	76.9%	290,567	12,922	28,134
60%	306,966	77.3%	296,756	13,333	28,600
70%	314,513	77.7%	304,129	13,751	29,099
80%	322,768	78.1%	312,109	14,260	29,662
90%	333,456	78.7%	322,597	15,010	30,409
100%	394,700	82.5%	381,589	31,081	34,863

Table B11. CNG: NNA FG					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	-918,879	500.0%	-925,906	9,041	-40,884
10%	-885,015	642.4%	-894,241	11,167	-38,396
20%	-878,438	672.9%	-887,899	11,742	-37,893
30%	-873,373	697.3%	-883,194	12,217	-37,536
40%	-869,227	719.9%	-879,205	12,599	-37,222
50%	-865,148	741.5%	-875,214	12,984	-36,942
60%	-861,112	764.6%	-871,266	13,363	-36,641
70%	-856,583	789.7%	-867,054	13,810	-36,304
80%	-851,396	822.6%	-861,999	14,333	-35,917
90%	-844,336	869.6%	-855,327	15,031	-35,388
100%	-800,017	1232.7%	-813,876	29,813	-31,700

Table B12. Methanol: NA NG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	470,252	59.5%	469,690	19,954	19,528
10%	536,415	61.7%	535,601	21,634	22,865
20%	550,905	62.2%	550,017	22,281	23,651
30%	561,500	62.6%	560,583	22,794	24,252
40%	570,973	63.0%	570,024	23,217	24,776
50%	579,381	63.3%	578,429	23,604	25,233
60%	588,308	63.7%	587,395	23,997	25,709
70%	597,312	64.0%	596,360	24,434	26,192
80%	607,157	64.5%	606,143	24,927	26,734
90%	621,265	65.1%	620,221	25,590	27,488
100%	679,891	68.0%	678,609	27,573	30,394

Table B13. Methanol: NA NG, Steam Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	479,776	60.3%	479,018	19,957	19,278
10%	535,108	62.3%	534,200	21,673	22,149
20%	546,846	62.8%	545,898	22,315	22,780
30%	555,062	63.1%	554,117	22,814	23,223
40%	562,526	63.4%	561,592	23,217	23,610
50%	569,396	63.7%	568,405	23,605	23,967
60%	576,695	64.0%	575,648	23,972	24,338
70%	584,310	64.3%	583,262	24,409	24,752
80%	593,018	64.6%	591,991	24,917	25,218
90%	605,198	65.1%	604,122	25,581	25,856
100%	657,561	67.6%	656,367	27,512	28,576

Table B14. Methanol: NA NG, Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	542,017	58.0%	541,289	20,099	23,435
10%	593,490	60.2%	592,573	21,806	25,985
20%	604,219	60.6%	603,300	22,479	26,540
30%	613,273	60.9%	612,336	22,965	27,008
40%	620,522	61.2%	619,540	23,393	27,382
50%	627,105	61.5%	626,107	23,800	27,747
60%	634,343	61.7%	633,297	24,200	28,109
70%	641,890	62.0%	640,851	24,645	28,501
80%	650,387	62.3%	649,301	25,175	28,955
90%	661,992	62.8%	660,888	25,895	29,541
100%	723,810	64.9%	722,481	27,970	32,518

Table B15. Methanol: NNA NG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	497,835	59.3%	497,105	30,578	21,176
10%	548,965	61.3%	548,101	33,001	23,912
20%	563,761	61.7%	562,856	33,695	24,743
30%	575,013	62.1%	574,131	34,224	25,349
40%	583,837	62.5%	582,918	34,668	25,849
50%	592,529	62.8%	591,564	35,076	26,316
60%	600,898	63.1%	599,935	35,483	26,775
70%	609,369	63.5%	608,351	35,939	27,233
80%	619,616	63.9%	618,607	36,474	27,773
90%	632,257	64.6%	631,199	37,198	28,438
100%	687,692	66.8%	686,418	40,406	31,164

Table B16. Methanol: NNA NG, Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	553,026	57.8%	552,344	30,507	24,608
10%	604,354	59.7%	603,406	33,159	26,952
20%	615,864	60.2%	614,900	33,839	27,531
30%	624,100	60.5%	623,151	34,358	27,978
40%	631,966	60.8%	630,968	34,802	28,379
50%	638,829	61.0%	637,816	35,236	28,743
60%	645,632	61.3%	644,616	35,672	29,107
70%	653,510	61.6%	652,434	36,144	29,512
80%	662,260	61.9%	661,131	36,698	29,967
90%	674,139	62.3%	672,995	37,413	30,595
100%	729,558	64.4%	728,169	40,649	33,076

Table B17. Methanol: NNA FG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	-930,081	593.6%	-930,746	30,747	-66,551
10%	-902,883	724.7%	-903,689	33,047	-65,349
20%	-896,350	763.7%	-897,211	33,691	-65,060
30%	-891,315	795.9%	-892,213	34,222	-64,842
40%	-887,187	824.9%	-888,117	34,651	-64,655
50%	-882,945	854.3%	-883,899	35,067	-64,486
60%	-878,772	886.4%	-879,752	35,515	-64,300
70%	-874,351	920.1%	-875,361	35,981	-64,105
80%	-869,073	964.8%	-870,100	36,526	-63,879
90%	-862,026	1029.6%	-863,121	37,256	-63,570
100%	-831,524	1430.2%	-832,829	39,988	-62,320

Table B18. FT Naphtha: NA NG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	451,909	49.1%	451,499	8,097	19,740
10%	603,317	56.4%	602,839	9,937	23,458
20%	630,066	57.5%	629,501	10,633	24,422
30%	650,227	58.2%	649,619	11,171	25,142
40%	667,340	58.8%	666,748	11,615	25,739
50%	684,102	59.4%	683,510	12,032	26,350
60%	700,680	60.0%	700,061	12,432	26,908
70%	718,373	60.6%	717,785	12,913	27,548
80%	739,829	61.3%	739,126	13,479	28,300
90%	772,881	62.4%	772,225	14,212	29,249
100%	1,035,390	68.9%	1,034,555	17,102	33,880

Table B19. FT Naphtha: NA NG, Steam Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	392,447	47.4%	392,073	8,132	3,128
10%	558,967	56.2%	558,357	9,894	8,897
20%	593,529	57.5%	592,984	10,568	10,050
30%	620,729	58.5%	620,247	11,090	10,871
40%	642,624	59.3%	642,059	11,551	11,660
50%	663,891	60.1%	663,304	11,953	12,348
60%	685,949	60.9%	685,419	12,366	13,066
70%	709,961	61.7%	709,263	12,829	13,803
80%	737,729	62.8%	737,002	13,382	14,708
90%	779,459	64.1%	778,818	14,089	15,889
100%	1,110,083	71.8%	1,109,261	16,604	22,210

Table B20. FT Naphtha: NA NG, Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	564,623	45.1%	564,209	8,273	14,598
10%	710,795	51.8%	710,328	10,224	18,786
20%	745,193	53.0%	744,560	10,958	19,864
30%	770,440	53.8%	769,724	11,529	20,682
40%	792,632	54.5%	792,057	12,014	21,396
50%	814,512	55.1%	813,921	12,461	22,054
60%	835,973	55.8%	835,282	12,922	22,711
70%	859,392	56.5%	858,769	13,428	23,437
80%	887,548	57.3%	886,825	14,040	24,308
90%	929,275	58.5%	928,621	14,863	25,501
100%	1,218,874	63.9%	1,218,091	17,591	31,046

Table B21. FT Naphtha: NNA NG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	481,146	50.2%	480,536	17,738	20,752
10%	615,125	56.1%	614,534	20,021	24,392
20%	641,764	57.1%	641,147	20,719	25,327
30%	660,948	57.8%	660,313	21,261	26,034
40%	678,003	58.5%	677,295	21,723	26,675
50%	694,436	59.0%	693,792	22,180	27,260
60%	710,124	59.6%	709,470	22,620	27,825
70%	729,039	60.2%	728,341	23,103	28,424
80%	750,595	60.9%	749,886	23,676	29,126
90%	783,982	61.9%	783,186	24,432	30,096
100%	993,486	67.5%	992,526	27,634	34,972

Table B22. FT Naphtha: NNA NG, Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	532,131	45.7%	531,524	17,845	14,708
10%	718,665	51.7%	718,079	20,354	19,568
20%	752,549	52.8%	751,945	21,085	20,624
30%	777,628	53.6%	777,051	21,655	21,453
40%	800,052	54.3%	799,398	22,144	22,160
50%	821,385	54.9%	820,736	22,616	22,835
60%	842,710	55.6%	841,906	23,077	23,505
70%	866,870	56.3%	866,201	23,583	24,239
80%	895,367	57.1%	894,663	24,189	25,133
90%	935,125	58.2%	934,371	25,022	26,259
100%	1,187,887	65.3%	1,186,892	28,133	31,707

Table B23. FT Naphtha: NNA FG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	-943,082	595.5%	-943,388	17,856	-83,828
10%	-913,364	761.7%	-913,861	20,002	-74,420
20%	-906,350	809.9%	-906,880	20,732	-72,722
30%	-900,849	850.3%	-901,394	21,260	-71,568
40%	-896,202	886.3%	-896,801	21,716	-70,591
50%	-891,833	924.5%	-892,461	22,165	-69,645
60%	-887,169	963.4%	-887,836	22,620	-68,749
70%	-882,399	1008.5%	-883,091	23,136	-67,844
80%	-876,527	1067.7%	-877,237	23,675	-66,698
90%	-868,727	1154.2%	-869,511	24,471	-65,200
100%	-832,071	1756.9%	-833,084	27,483	-57,318

Table B24. FT Diesel: NA NG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	468,351	50.9%	467,824	6,140	19,638
10%	603,189	56.4%	602,589	7,893	23,523
20%	630,878	57.4%	630,247	8,574	24,507
30%	650,661	58.2%	650,038	9,106	25,195
40%	667,650	58.8%	667,009	9,568	25,827
50%	684,505	59.4%	683,854	9,988	26,429
60%	700,744	60.0%	700,039	10,417	27,025
70%	718,974	60.6%	718,139	10,878	27,645
80%	740,620	61.3%	739,816	11,402	28,373
90%	771,959	62.4%	771,234	12,158	29,321
100%	966,182	68.1%	965,411	14,611	34,095

Table B25. FT Diesel: NA NG, Steam Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	373,756	49.2%	373,325	6,134	3,717
10%	559,337	56.1%	558,658	7,881	8,946
20%	595,618	57.5%	594,952	8,554	10,098
30%	621,323	58.4%	620,676	9,091	10,982
40%	643,064	59.3%	642,537	9,522	11,754
50%	664,876	60.1%	664,162	9,922	12,432
60%	686,250	60.9%	685,603	10,350	13,140
70%	711,463	61.7%	710,721	10,839	13,920
80%	739,644	62.7%	738,887	11,366	14,807
90%	783,456	64.1%	782,710	12,048	15,972
100%	1,034,105	72.8%	1,033,192	14,943	23,272

Table B26. FT Diesel: NA NG, Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	539,732	45.8%	539,134	6,225	14,437
10%	708,817	51.8%	707,991	8,206	18,696
20%	741,632	53.0%	740,910	8,947	19,781
30%	768,598	53.8%	767,876	9,515	20,594
40%	791,308	54.6%	790,582	9,999	21,301
50%	811,268	55.2%	810,529	10,453	21,986
60%	833,075	55.8%	832,353	10,923	22,630
70%	857,940	56.5%	857,116	11,407	23,361
80%	887,293	57.4%	886,517	12,003	24,241
90%	928,592	58.5%	927,866	12,818	25,415
100%	1,184,578	64.9%	1,183,632	15,466	30,088

Table B27. FT Diesel: NNA NG, No Steam or Electricity Cogeneration					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	464,639	51.6%	464,109	15,877	21,003
10%	615,919	56.0%	615,224	18,356	24,476
20%	642,629	57.0%	642,053	19,092	25,420
30%	661,725	57.8%	661,039	19,617	26,122
40%	679,310	58.4%	678,586	20,053	26,709
50%	695,549	59.0%	694,833	20,507	27,292
60%	711,780	59.5%	711,011	20,948	27,868
70%	730,202	60.2%	729,427	21,427	28,489
80%	753,000	60.9%	752,239	22,005	29,205
90%	783,930	61.9%	783,305	22,758	30,210
100%	938,395	68.3%	937,389	25,817	34,559

Table B28. FT Diesel: NNA NG, Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	540,053	45.0%	539,493	16,143	15,280
10%	720,329	51.6%	719,673	18,665	19,678
20%	754,076	52.7%	753,366	19,410	20,741
30%	779,582	53.6%	778,866	19,984	21,569
40%	801,508	54.3%	800,754	20,471	22,286
50%	821,673	54.9%	820,845	20,957	22,940
60%	843,267	55.5%	842,523	21,431	23,628
70%	867,169	56.2%	866,358	21,945	24,373
80%	897,007	57.0%	896,153	22,566	25,213
90%	938,742	58.1%	937,878	23,412	26,345
100%	1,221,394	64.9%	1,220,237	27,069	33,397

Table B29. FT Diesel: NNA FG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	-943,511	613.9%	-943,893	15,895	-85,630
10%	-914,875	769.1%	-915,450	18,370	-74,739
20%	-907,777	817.7%	-908,403	19,044	-73,047
30%	-902,492	861.2%	-903,180	19,616	-71,862
40%	-897,573	898.1%	-898,279	20,067	-70,843
50%	-893,232	936.6%	-893,973	20,514	-69,896
60%	-888,670	976.3%	-889,424	20,971	-68,968
70%	-883,879	1025.5%	-884,640	21,478	-68,011
80%	-877,722	1084.2%	-878,537	22,072	-66,906
90%	-869,978	1174.6%	-870,833	22,856	-65,454
100%	-837,095	1770.2%	-838,184	26,028	-57,029

Table B30. Central G.H ₂ : NA NG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	433,782	44.5%	404,121	11,882	92,916
10%	599,831	54.4%	570,149	14,831	103,163
20%	635,534	55.7%	605,488	15,564	105,412
30%	664,509	56.7%	634,053	16,070	107,137
40%	689,208	57.6%	658,282	16,514	108,645
50%	712,528	58.4%	681,363	16,951	110,092
60%	737,580	59.2%	706,237	17,392	111,513
70%	764,395	60.1%	732,681	17,858	113,121
80%	795,887	61.1%	763,420	18,421	114,992
90%	839,869	62.5%	807,058	19,194	117,647
100%	1,248,653	69.7%	1,211,816	23,171	141,482

Table B31. Central G.H ₂ : NA NG, Steam Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	172,252	49.7%	142,275	11,939	77,076
10%	435,843	58.6%	406,378	14,527	92,615
20%	479,511	60.4%	449,155	15,176	95,196
30%	511,889	61.7%	480,833	15,651	97,145
40%	538,944	62.8%	508,719	16,084	98,780
50%	565,267	63.9%	534,609	16,474	100,368
60%	592,628	65.0%	560,847	16,883	102,070
70%	621,152	66.1%	589,298	17,316	103,822
80%	655,437	67.6%	623,459	17,809	105,854
90%	706,246	69.6%	673,254	18,521	108,827
100%	1,012,068	85.3%	971,474	22,371	126,555

Table B32. Central G.H ₂ : NA NG, Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	343,058	47.1%	318,006	11,993	86,957
10%	550,610	55.3%	521,405	14,778	100,009
20%	589,869	56.9%	559,448	15,449	102,418
30%	620,597	58.0%	589,486	15,952	104,320
40%	646,580	58.9%	616,055	16,408	105,851
50%	670,221	59.9%	638,766	16,829	107,321
60%	697,154	60.7%	665,823	17,273	108,794
70%	724,165	61.7%	692,182	17,744	110,477
80%	758,868	62.9%	727,113	18,291	112,533
90%	808,002	64.5%	775,040	19,041	115,423
100%	1,122,621	74.5%	1,087,974	23,142	134,963

Table B33. Central G.H ₂ : NNA NG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	565,367	41.8%	541,789	19,130	104,196
10%	737,205	50.4%	707,341	22,214	114,406
20%	775,532	51.6%	744,802	23,001	116,745
30%	805,289	52.5%	774,174	23,594	118,531
40%	829,425	53.2%	798,244	24,113	120,046
50%	854,880	53.9%	822,758	24,627	121,557
60%	879,006	54.7%	846,834	25,158	123,021
70%	905,667	55.4%	872,725	25,681	124,631
80%	938,316	56.3%	905,213	26,359	126,570
90%	984,359	57.6%	949,935	27,320	129,331
100%	1,390,256	63.9%	1,356,598	44,377	152,441

Table B34. Central G.H ₂ : NNA NG, Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	485,813	44.7%	461,572	18,969	98,899
10%	689,832	51.3%	659,734	22,123	111,214
20%	730,236	52.6%	699,428	22,911	113,750
30%	761,223	53.6%	729,861	23,506	115,617
40%	787,694	54.4%	755,919	24,003	117,224
50%	813,486	55.1%	781,619	24,500	118,803
60%	838,615	55.9%	806,467	25,024	120,393
70%	866,857	56.8%	834,330	25,572	122,042
80%	901,609	57.8%	868,558	26,251	124,097
90%	949,583	59.2%	916,358	27,166	127,120
100%	1,234,682	67.3%	1,202,496	44,960	142,806

Table B35. Central G.H ₂ : NNA FG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	-892,769	244.4%	-916,539	18,330	19,657
10%	-819,562	356.1%	-847,431	22,149	24,498
20%	-803,318	379.0%	-832,101	22,903	25,682
30%	-790,805	398.3%	-820,748	23,495	26,545
40%	-780,690	416.4%	-811,419	24,031	27,362
50%	-770,706	436.0%	-802,059	24,522	28,105
60%	-759,847	456.0%	-792,461	25,003	28,873
70%	-748,942	478.0%	-782,360	25,576	29,718
80%	-736,128	508.4%	-770,335	26,236	30,672
90%	-719,195	554.1%	-754,429	27,152	31,965
100%	-590,890	932.6%	-628,806	43,068	40,884

Table B36. Central L.H ₂ : NA NG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	882,755	34.9%	882,002	12,845	120,184
10%	1,167,098	39.6%	1,166,216	15,182	136,785
20%	1,223,423	40.6%	1,222,489	16,203	140,095
30%	1,263,807	41.4%	1,262,796	16,961	142,513
40%	1,301,481	42.1%	1,300,469	17,611	144,785
50%	1,337,879	42.8%	1,336,786	18,193	146,919
60%	1,375,625	43.4%	1,374,611	18,784	149,146
70%	1,415,284	44.2%	1,414,070	19,442	151,491
80%	1,460,414	45.0%	1,459,135	20,194	154,162
90%	1,524,551	46.1%	1,523,263	21,260	157,976
100%	1,869,210	53.1%	1,867,560	25,172	178,102

Table B37. Central L.H ₂ : NA NG, Steam Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	687,452	35.2%	686,629	12,492	107,188
10%	1,002,292	41.9%	1,001,318	14,904	125,853
20%	1,064,775	43.2%	1,063,852	15,851	129,528
30%	1,109,386	44.1%	1,108,339	16,514	132,237
40%	1,148,880	44.9%	1,147,833	17,151	134,518
50%	1,186,531	45.7%	1,185,395	17,698	136,781
60%	1,225,047	46.5%	1,223,985	18,262	139,145
70%	1,265,467	47.4%	1,264,241	18,899	141,537
80%	1,315,360	48.4%	1,314,208	19,624	144,491
90%	1,384,791	49.9%	1,383,623	20,611	148,597
100%	1,839,959	59.3%	1,838,302	24,783	175,563

Table B38. Central L.H ₂ : NA NG, Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	842,291	35.4%	841,667	12,578	117,364
10%	1,119,553	40.2%	1,118,646	15,160	133,587
20%	1,176,296	41.3%	1,175,346	16,140	136,965
30%	1,220,323	42.1%	1,219,092	16,872	139,572
40%	1,257,585	42.9%	1,256,591	17,486	141,793
50%	1,295,011	43.6%	1,293,897	18,085	143,968
60%	1,333,364	44.3%	1,332,221	18,668	146,208
70%	1,374,016	45.0%	1,372,816	19,329	148,705
80%	1,422,282	45.9%	1,421,030	20,109	151,546
90%	1,488,136	47.2%	1,486,822	21,200	155,451
100%	1,825,228	54.3%	1,823,514	25,441	174,643

Table B39. Central L.H ₂ : NNA NG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	1,009,404	33.5%	1,008,769	21,136	130,266
10%	1,248,983	38.0%	1,248,038	24,119	144,301
20%	1,309,888	39.1%	1,308,689	25,153	147,870
30%	1,355,003	39.8%	1,353,913	25,926	150,612
40%	1,396,160	40.5%	1,395,027	26,611	152,999
50%	1,432,785	41.1%	1,431,610	27,230	155,151
60%	1,470,553	41.7%	1,469,358	27,832	157,417
70%	1,511,463	42.5%	1,510,220	28,513	159,858
80%	1,559,761	43.3%	1,558,525	29,314	162,759
90%	1,632,365	44.5%	1,631,097	30,455	167,094
100%	1,981,920	49.8%	1,980,461	35,053	187,393

Table B40. Central L.H ₂ : NNA NG, Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	937,221	33.7%	936,426	21,273	125,590
10%	1,206,907	38.7%	1,205,878	24,079	141,364
20%	1,268,338	39.7%	1,267,315	25,045	145,046
30%	1,312,000	40.5%	1,310,862	25,803	147,622
40%	1,350,619	41.2%	1,349,516	26,454	149,921
50%	1,387,132	41.9%	1,386,050	27,066	152,113
60%	1,426,509	42.5%	1,425,259	27,683	154,472
70%	1,470,291	43.3%	1,469,078	28,394	157,017
80%	1,518,719	44.1%	1,517,588	29,192	159,913
90%	1,585,462	45.3%	1,583,961	30,272	163,786
100%	1,970,064	51.6%	1,968,021	34,615	185,036

Table B41. Central L.H ₂ : NNA FG, No Steam or Electricity Co-Generation					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	-2,790	82.7%	-3,500	21,017	67,736
10%	64,736	88.0%	63,751	24,047	71,525
20%	76,311	89.0%	75,297	25,024	72,136
30%	85,118	89.7%	84,020	25,792	72,576
40%	92,514	90.4%	91,427	26,459	72,969
50%	99,378	91.0%	98,251	27,061	73,318
60%	106,326	91.5%	105,087	27,705	73,699
70%	114,684	92.2%	113,467	28,431	74,087
80%	123,766	92.9%	122,463	29,279	74,553
90%	136,264	93.9%	134,876	30,394	75,172
100%	208,542	100.3%	207,032	35,156	79,572

Table B42. Station G.H ₂ : NA NG					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	374,550	38.2%	355,733	6,249	90,845
10%	625,493	50.1%	606,324	7,459	105,176
20%	677,676	52.1%	658,357	7,730	108,134
30%	717,218	53.6%	697,854	7,921	110,373
40%	753,195	54.8%	733,905	8,101	112,443
50%	788,344	55.9%	769,055	8,274	114,395
60%	825,795	57.0%	806,282	8,443	116,479
70%	865,942	58.2%	846,201	8,625	118,807
80%	920,359	59.6%	900,127	8,810	121,834
90%	995,378	61.5%	975,427	9,108	126,137
100%	1,616,269	72.8%	1,595,803	10,398	159,222

Table B43. Station G.H ₂ : NNA NG					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	516,039	37.3%	496,656	6,898	102,307
10%	761,249	46.8%	741,817	8,208	116,327
20%	816,598	48.5%	796,282	8,481	119,385
30%	857,928	49.7%	837,656	8,683	121,697
40%	896,552	50.8%	876,024	8,873	123,935
50%	933,125	51.7%	912,466	9,040	125,959
60%	970,041	52.7%	949,808	9,210	128,122
70%	1,012,308	53.8%	991,945	9,397	130,507
80%	1,063,515	55.0%	1,042,980	9,610	133,390
90%	1,135,741	56.8%	1,115,276	9,919	137,458
100%	1,678,168	66.0%	1,656,163	12,345	167,233

Table B44. Station G.H ₂ : NNA FG					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	-831,976	293.1%	-849,849	55,007	24,393
10%	-786,677	360.5%	-806,026	65,559	27,042
20%	-776,651	376.6%	-796,389	67,913	27,649
30%	-768,741	388.6%	-788,767	69,619	28,131
40%	-762,212	399.1%	-782,365	71,028	28,502
50%	-755,991	409.8%	-776,224	72,370	28,876
60%	-749,417	420.5%	-770,036	73,735	29,255
70%	-742,695	432.4%	-763,562	75,222	29,653
80%	-734,492	447.7%	-755,588	76,943	30,114
90%	-722,609	468.8%	-744,150	79,403	30,792
100%	-658,834	595.2%	-682,359	96,535	34,560

Table B45. Station L.H ₂ : NA NG					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	768,767	19.3%	713,426	11,604	117,972
10%	1,459,075	28.4%	1,333,577	25,824	167,534
20%	1,604,844	30.3%	1,462,887	29,149	178,774
30%	1,716,934	31.8%	1,562,584	31,750	187,257
40%	1,821,540	33.0%	1,654,270	34,208	195,134
50%	1,923,441	34.2%	1,744,203	36,443	202,968
60%	2,030,800	35.4%	1,838,721	38,888	211,072
70%	2,144,997	36.8%	1,942,211	41,764	219,996
80%	2,299,272	38.4%	2,077,232	45,162	231,731
90%	2,524,846	40.7%	2,273,612	50,252	249,347
100%	4,183,731	56.5%	3,700,518	86,730	374,260

Table B46. Station L.H ₂ : NNA NG					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	949,471	17.8%	880,656	15,175	125,357
10%	1,650,319	26.6%	1,520,326	34,634	178,915
20%	1,812,183	28.3%	1,661,153	38,082	190,538
30%	1,931,423	29.6%	1,769,442	40,877	199,200
40%	2,040,496	30.7%	1,863,209	43,296	206,861
50%	2,142,119	31.8%	1,955,851	45,687	214,572
60%	2,253,310	32.9%	2,051,149	48,290	222,458
70%	2,378,006	34.1%	2,165,910	51,163	231,561
80%	2,529,049	35.6%	2,301,183	54,710	243,044
90%	2,755,498	37.7%	2,495,741	60,075	259,602
100%	4,618,404	51.3%	4,133,339	100,980	413,808

Table B47. Station L.H ₂ : NNA FG					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	-699,354	27.1%	-724,284	14,491	33,319
10%	25,961	48.8%	-101,093	34,624	84,425
20%	163,500	54.3%	18,964	37,893	95,199
30%	269,478	58.8%	111,782	40,618	103,122
40%	371,084	63.1%	199,133	43,059	110,759
50%	475,415	67.8%	289,883	45,509	118,965
60%	584,310	72.9%	382,951	48,244	126,965
70%	702,080	78.8%	486,320	51,194	136,166
80%	841,547	85.9%	606,995	54,634	146,590
90%	1,047,618	97.5%	783,852	59,773	162,565
100%	2,688,923	332.6%	2,200,320	98,139	289,363

Table B48. Electricity: U.S. Mix					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	1,024,950	33.4%	830,787	21,888	156,260
10%	1,268,914	39.0%	1,074,627	29,089	180,907
20%	1,313,552	39.9%	1,119,192	30,434	185,482
30%	1,347,262	40.6%	1,152,953	31,509	188,915
40%	1,376,522	41.1%	1,182,163	32,464	191,939
50%	1,404,538	41.6%	1,210,174	33,371	194,803
60%	1,432,187	42.1%	1,237,761	34,317	197,681
70%	1,465,604	42.6%	1,271,170	35,399	201,129
80%	1,504,973	43.2%	1,310,562	36,771	205,350
90%	1,562,291	44.1%	1,367,761	38,800	211,308
100%	1,995,731	49.4%	1,800,928	55,601	258,744

Table B49. Electricity: CA Mix					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	848,537	44.1%	594,484	2,576	109,240
10%	959,492	47.7%	705,117	4,787	118,836
20%	981,422	48.3%	727,027	5,238	120,816
30%	996,710	48.7%	742,302	5,578	122,307
40%	1,011,081	49.1%	756,660	5,849	123,639
50%	1,023,474	49.4%	769,057	6,131	124,905
60%	1,036,973	49.7%	782,480	6,413	126,201
70%	1,052,119	50.1%	797,653	6,693	127,641
80%	1,070,440	50.5%	815,978	7,038	129,475
90%	1,096,913	51.0%	842,413	7,513	132,186
100%	1,266,348	54.1%	1,011,636	10,603	151,329

Table B50. Electricity: NE U.S. Mix					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	1,007,975	39.3%	780,029	30,763	132,032
10%	1,132,478	43.4%	904,298	43,870	144,167
20%	1,158,045	44.0%	929,871	46,840	146,743
30%	1,177,706	44.5%	949,516	49,259	148,657
40%	1,194,489	44.9%	966,305	51,385	150,303
50%	1,211,095	45.2%	982,928	53,525	151,926
60%	1,228,363	45.6%	1,000,206	55,802	153,705
70%	1,247,073	45.9%	1,018,906	58,331	155,659
80%	1,270,958	46.3%	1,042,665	61,401	158,020
90%	1,303,718	46.9%	1,075,460	65,818	161,336
100%	1,544,541	49.8%	1,316,017	109,375	184,995

Table B51. Electricity: NG CC Turbines					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	895,824	42.5%	896,302	0	124,362
10%	1,009,296	44.9%	1,009,350	1,712	131,702
20%	1,042,610	45.7%	1,042,597	2,545	133,880
30%	1,069,086	46.3%	1,069,249	3,214	135,616
40%	1,091,277	46.9%	1,091,317	3,796	137,070
50%	1,111,841	47.4%	1,111,847	4,295	138,429
60%	1,134,284	47.8%	1,134,301	4,816	139,885
70%	1,157,995	48.3%	1,157,954	5,383	141,437
80%	1,187,111	49.0%	1,187,149	6,095	143,344
90%	1,225,385	49.8%	1,225,371	7,063	145,862
100%	1,353,751	52.7%	1,353,516	9,916	154,224

Table B52. Station G.H ₂ : Electrolysis, U.S. Mix					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	1,612,608	20.0%	1,345,454	36,835	205,035
10%	2,172,087	25.2%	1,857,426	50,754	255,064
20%	2,286,910	26.3%	1,959,948	53,811	264,884
30%	2,376,232	27.1%	2,041,095	56,192	272,705
40%	2,453,787	27.7%	2,108,702	58,335	279,383
50%	2,531,530	28.3%	2,182,082	60,388	286,494
60%	2,610,915	29.0%	2,253,174	62,572	293,514
70%	2,693,799	29.6%	2,329,362	64,931	300,999
80%	2,807,271	30.4%	2,431,930	67,808	311,094
90%	2,964,251	31.5%	2,574,053	72,241	325,351
100%	3,991,377	38.3%	3,541,112	106,979	420,937

Table B53. Station G.H ₂ : Electrolysis, CA Mix					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	1,309,546	24.4%	965,053	5,759	139,002
10%	1,699,197	30.5%	1,269,116	9,359	165,441
20%	1,781,640	31.5%	1,334,503	10,144	171,019
30%	1,847,075	32.4%	1,385,946	10,724	175,419
40%	1,904,140	33.1%	1,429,940	11,257	179,159
50%	1,961,553	33.8%	1,475,087	11,749	183,161
60%	2,020,931	34.4%	1,521,248	12,278	187,146
70%	2,087,120	35.1%	1,574,268	12,839	191,493
80%	2,170,274	35.9%	1,637,939	13,526	196,952
90%	2,279,654	37.0%	1,726,465	14,504	204,663
100%	3,098,649	43.3%	2,384,395	22,964	263,811

Table B54. Station G.H ₂ : Electrolysis, NE U.S. Mix					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	1,500,295	22.1%	1,182,867	56,970	166,142
10%	1,944,586	27.8%	1,569,053	80,412	201,056
20%	2,040,623	28.9%	1,649,502	86,361	208,087
30%	2,112,237	29.7%	1,711,511	90,861	213,480
40%	2,178,199	30.3%	1,766,094	95,089	218,318
50%	2,238,785	30.9%	1,817,819	99,122	222,969
60%	2,302,215	31.5%	1,871,392	103,328	227,707
70%	2,371,525	32.1%	1,931,322	108,122	232,952
80%	2,465,962	32.9%	2,007,785	113,992	239,636
90%	2,591,947	34.0%	2,117,370	122,709	249,875
100%	3,531,938	40.0%	2,910,546	217,862	317,731

Table B55. Station G.H ₂ : Electrolysis, NG CC Turbines					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	1,337,589	23.3%	1,337,711	586	153,315
10%	1,795,807	29.0%	1,795,746	3,835	183,337
20%	1,895,449	30.1%	1,895,181	5,086	189,880
30%	1,969,177	30.9%	1,968,961	6,073	194,711
40%	2,037,020	31.6%	2,036,582	6,933	199,133
50%	2,096,867	32.3%	2,096,599	7,711	203,117
60%	2,160,621	32.9%	2,160,115	8,489	207,274
70%	2,232,164	33.7%	2,231,667	9,366	211,968
80%	2,318,855	34.5%	2,318,116	10,388	217,624
90%	2,449,640	35.8%	2,449,072	11,896	226,231
100%	3,299,021	42.8%	3,297,790	18,488	281,882

Table B56. Station G.H ₂ : Electrolysis, Nuclear Power					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	378,666	42.7%	36,487	0	9,949
10%	606,773	51.7%	56,762	0	11,943
20%	655,042	53.6%	61,585	0	12,406
30%	692,386	54.9%	65,279	0	12,771
40%	723,687	56.0%	68,796	0	13,106
50%	755,186	57.0%	71,857	60	13,404
60%	786,404	58.0%	75,226	157	13,740
70%	822,757	59.1%	78,863	265	14,091
80%	866,479	60.4%	83,003	403	14,523
90%	933,267	62.2%	89,910	617	15,184
100%	1,339,376	72.5%	147,292	2,095	20,903

Table B57. Station G.H ₂ : Electrolysis, Hydroelectric Power					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	248,129	45.8%	0	0	0
10%	454,269	57.2%	0	0	0
20%	497,947	59.1%	0	0	0
30%	530,836	60.6%	0	0	0
40%	560,929	61.8%	0	0	0
50%	590,508	62.9%	0	0	0
60%	618,625	64.1%	0	0	0
70%	650,231	65.3%	0	0	0
80%	692,015	66.8%	0	0	0
90%	749,593	68.8%	0	0	0
100%	1,185,734	80.1%	0	0	0

Table B58. Station L.H ₂ : Electrolysis, U.S. Mix					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	2,307,303	16.6%	1,960,268	51,218	262,424
10%	2,951,444	20.6%	2,521,853	68,814	317,145
20%	3,085,159	21.4%	2,642,606	72,742	328,836
30%	3,189,856	21.9%	2,738,235	75,392	337,959
40%	3,276,985	22.4%	2,817,107	77,850	346,171
50%	3,370,909	22.9%	2,901,719	80,433	354,034
60%	3,461,069	23.4%	2,982,352	82,966	362,266
70%	3,558,525	23.9%	3,071,838	85,657	371,145
80%	3,681,168	24.5%	3,184,656	89,128	382,418
90%	3,858,465	25.3%	3,350,034	93,984	398,580
100%	5,033,128	30.2%	4,459,567	137,879	516,552

Table B59. Station L.H ₂ : Electrolysis, CA Mix					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	1,967,710	20.6%	1,443,761	8,173	178,373
10%	2,368,595	24.9%	1,767,603	13,123	206,382
20%	2,468,528	25.7%	1,845,107	14,022	212,731
30%	2,541,519	26.3%	1,903,326	14,723	217,816
40%	2,604,325	26.8%	1,952,265	15,352	222,171
50%	2,666,603	27.3%	2,003,518	15,939	226,616
60%	2,732,768	27.7%	2,054,059	16,561	231,056
70%	2,805,942	28.2%	2,113,844	17,232	235,935
80%	2,893,481	28.8%	2,185,139	18,036	242,128
90%	3,017,843	29.7%	2,283,585	19,179	250,703
100%	3,864,922	33.7%	2,993,093	28,796	316,935

Table B60. Station L.H ₂ : Electrolysis, NE U.S. Mix					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	2,172,651	19.1%	1,764,845	83,607	217,928
10%	2,675,408	22.7%	2,157,520	110,859	250,780
20%	2,785,429	23.4%	2,250,025	117,860	258,692
30%	2,870,191	24.0%	2,324,179	123,398	265,218
40%	2,941,903	24.5%	2,385,314	128,349	270,813
50%	3,013,692	24.9%	2,443,185	132,956	276,019
60%	3,083,446	25.4%	2,504,276	138,234	281,363
70%	3,163,524	25.8%	2,572,381	143,738	287,467
80%	3,265,213	26.4%	2,658,090	150,657	295,067
90%	3,405,145	27.2%	2,776,780	160,963	305,647
100%	4,233,574	31.5%	3,494,168	281,871	371,940

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	1,897,884	19.7%	1,894,780	1,381	189,874
10%	2,490,537	23.7%	2,486,790	5,489	228,666
20%	2,608,312	24.5%	2,604,687	7,030	236,432
30%	2,692,029	25.1%	2,688,428	8,239	241,969
40%	2,761,063	25.6%	2,757,261	9,285	246,435
50%	2,835,577	26.1%	2,831,846	10,239	251,341
60%	2,908,230	26.6%	2,904,667	11,225	256,094
70%	2,986,407	27.1%	2,982,403	12,277	261,201
80%	3,085,876	27.7%	3,082,297	13,568	267,737
90%	3,225,981	28.6%	3,222,025	15,381	276,890
100%	4,087,580	34.5%	4,082,529	22,723	333,238

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	723,271	35.6%	62,290	0	12,317
10%	1,008,889	42.2%	87,974	481	14,863
20%	1,061,664	43.6%	93,740	652	15,405
30%	1,103,823	44.5%	98,019	787	15,830
40%	1,141,075	45.3%	101,925	908	16,214
50%	1,174,780	46.0%	105,877	1,021	16,593
60%	1,209,671	46.7%	109,557	1,137	16,961
70%	1,249,543	47.5%	113,606	1,254	17,360
80%	1,295,825	48.5%	118,637	1,414	17,862
90%	1,367,239	49.8%	126,053	1,641	18,617
100%	1,810,933	58.0%	181,240	3,126	24,154

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	570,285	38.6%	0	0	0
10%	818,046	46.6%	0	0	0
20%	867,639	48.1%	0	0	0
30%	905,510	49.1%	0	0	0
40%	939,192	50.0%	0	0	0
50%	969,720	50.8%	0	0	0
60%	1,001,926	51.6%	0	0	0
70%	1,038,267	52.5%	0	0	0
80%	1,080,952	53.5%	0	0	0
90%	1,145,473	55.0%	0	0	0
100%	1,593,590	63.7%	0	0	0

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	429,786	57.3%	430,829	37,565	-33,680
10%	530,100	60.8%	530,981	57,295	-20,899
20%	549,517	61.6%	550,386	64,276	-18,682
30%	563,442	62.1%	564,271	69,881	-17,029
40%	575,777	62.6%	576,517	74,233	-15,691
50%	586,809	63.0%	587,510	78,264	-14,338
60%	598,667	63.5%	599,350	82,163	-13,062
70%	610,215	64.0%	610,843	86,781	-11,657
80%	623,816	64.5%	624,488	91,939	-10,036
90%	644,384	65.4%	644,991	98,855	-7,772
100%	746,271	69.9%	746,606	117,415	6,887

Table B65. Ethanol: Corn, Dry Mill, Market Value

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	405,090	60.6%	404,222	73,888	-36,104
10%	469,944	64.1%	469,027	92,727	-25,391
20%	485,132	64.8%	484,129	100,251	-23,516
30%	496,232	65.2%	495,229	105,988	-22,012
40%	505,405	65.6%	504,342	110,775	-20,743
50%	514,488	66.0%	513,361	115,335	-19,583
60%	523,417	66.4%	522,328	119,848	-18,351
70%	532,940	66.8%	531,732	124,707	-17,088
80%	543,868	67.3%	542,660	130,555	-15,537
90%	559,781	68.0%	558,508	137,591	-13,226
100%	650,628	71.2%	649,125	157,852	3,877

Table B66. Ethanol: Corn, Wet Mill, Displacement

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	397,246	54.5%	397,079	62,972	-35,375
10%	553,157	58.8%	552,755	81,471	-17,929
20%	577,976	59.7%	577,599	89,118	-15,445
30%	596,065	60.4%	595,645	94,775	-13,463
40%	610,930	61.0%	610,541	99,666	-11,801
50%	626,328	61.5%	625,914	103,769	-10,291
60%	640,644	62.1%	640,139	108,126	-8,730
70%	655,891	62.7%	655,487	112,862	-7,058
80%	674,487	63.4%	673,969	118,395	-5,172
90%	699,608	64.4%	699,064	126,018	-2,291
100%	833,770	71.6%	832,929	148,187	14,696

Table B67. Ethanol: Corn, Wet Mill, Market Value

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	331,164	60.1%	330,345	71,492	-41,343
10%	445,409	64.3%	444,487	89,493	-27,624
20%	464,042	65.0%	463,053	96,636	-25,455
30%	477,574	65.6%	476,567	102,086	-23,904
40%	489,293	66.2%	488,187	106,789	-22,534
50%	500,483	66.6%	499,445	111,130	-21,295
60%	511,666	67.1%	510,590	115,385	-19,945
70%	523,629	67.7%	522,500	120,113	-18,543
80%	537,477	68.3%	536,318	125,512	-16,931
90%	556,281	69.2%	555,131	132,795	-14,633
100%	663,933	75.1%	662,770	154,385	-1,834

Table B68. Ethanol: Woody Biomass

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	563,338	14.4%	-83,341	58,364	-128,164
10%	1,128,298	31.2%	-25,788	83,323	-99,002
20%	1,259,584	33.9%	-12,537	89,206	-95,386
30%	1,368,241	35.8%	-3,384	93,759	-92,784
40%	1,466,628	37.5%	5,225	97,824	-90,634
50%	1,563,679	39.0%	12,754	101,986	-88,717
60%	1,668,516	40.5%	21,109	106,465	-86,655
70%	1,792,134	42.2%	29,389	111,669	-84,570
80%	1,951,785	44.3%	40,062	118,164	-82,161
90%	2,207,583	47.0%	53,934	128,037	-78,955
100%	5,964,398	64.0%	186,119	262,162	-64,588

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	445,810	19.0%	-32,711	31,266	-82,728
10%	885,593	35.6%	9,855	59,485	-73,056
20%	1,003,934	38.6%	18,051	64,227	-71,138
30%	1,090,748	40.7%	24,357	67,943	-69,693
40%	1,177,848	42.4%	29,529	71,196	-68,455
50%	1,263,480	44.2%	34,573	74,620	-67,257
60%	1,357,187	45.9%	39,495	77,963	-66,105
70%	1,458,322	47.8%	44,866	81,974	-64,878
80%	1,590,834	49.9%	51,539	86,715	-63,225
90%	1,806,688	53.0%	60,891	93,520	-60,784
100%	4,264,709	69.2%	133,130	161,477	-43,313

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	374,485	61.6%	374,223	55,420	-20,691
10%	451,996	65.1%	451,284	73,078	-10,107
20%	466,497	65.7%	465,738	78,180	-8,525
30%	476,838	66.2%	476,020	82,236	-7,382
40%	485,700	66.6%	484,883	85,733	-6,390
50%	494,177	66.9%	493,277	88,755	-5,476
60%	502,545	67.3%	501,557	91,824	-4,562
70%	511,259	67.7%	510,241	95,229	-3,534
80%	522,092	68.2%	521,069	99,156	-2,299
90%	535,412	68.9%	534,241	104,308	-566
100%	622,236	72.8%	620,662	127,141	9,867

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	357,606	64.8%	355,504	80,723	-21,621
10%	407,102	67.7%	404,837	99,842	-13,606
20%	418,789	68.3%	416,407	105,169	-12,164
30%	427,079	68.7%	424,674	109,494	-11,108
40%	434,481	69.0%	432,108	112,971	-10,191
50%	441,662	69.4%	439,214	116,459	-9,339
60%	448,530	69.7%	446,046	119,792	-8,409
70%	455,720	70.1%	453,207	123,551	-7,459
80%	464,385	70.5%	461,772	127,918	-6,329
90%	476,318	71.1%	473,724	133,234	-4,590
100%	543,519	73.7%	540,969	153,606	6,584

	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	345,453	60.0%	344,168	70,916	-16,987
10%	469,282	63.4%	467,836	91,272	-8,011
20%	488,187	64.1%	486,748	96,750	-6,055
30%	501,224	64.7%	499,771	100,912	-4,672
40%	512,707	65.2%	511,196	104,401	-3,465
50%	523,216	65.6%	521,766	107,756	-2,334
60%	534,006	66.1%	532,469	111,192	-1,183
70%	545,752	66.6%	544,199	114,855	-5
80%	559,336	67.2%	557,817	118,805	1,474
90%	577,444	68.1%	575,746	124,317	3,388
100%	666,067	74.3%	664,269	144,923	18,492

Table B73. E85: Corn, Wet Mill, Market Value					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	309,190	64.2%	307,388	79,306	-24,861
10%	390,901	67.8%	389,086	96,718	-14,957
20%	404,984	68.5%	403,074	102,241	-13,398
30%	414,808	69.0%	412,892	106,289	-12,196
40%	423,756	69.4%	421,745	109,774	-11,245
50%	432,008	69.8%	430,064	113,011	-10,355
60%	440,418	70.2%	438,458	116,353	-9,332
70%	449,330	70.7%	447,326	119,885	-8,328
80%	459,430	71.2%	457,369	123,889	-7,147
90%	473,876	71.9%	471,775	129,462	-5,431
100%	558,452	76.4%	556,355	149,943	4,262

Table B74. E85: Woody Biomass					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	526,300	19.6%	3,485	72,296	-83,519
10%	885,681	37.5%	48,739	92,242	-66,250
20%	983,708	40.3%	58,257	97,048	-63,840
30%	1,061,085	42.2%	64,955	100,427	-61,961
40%	1,133,417	43.9%	71,340	103,576	-60,483
50%	1,202,608	45.4%	77,402	106,590	-59,000
60%	1,278,685	46.9%	83,362	109,716	-57,542
70%	1,368,084	48.5%	90,021	113,637	-56,018
80%	1,480,427	50.4%	98,055	118,318	-54,221
90%	1,663,898	53.0%	109,241	125,943	-51,837
100%	4,108,941	65.5%	239,755	232,717	-42,297

Table B75. E85: Herbaceous Biomass					
	Total Energy	Efficiency	Fossil Fuel	Petroleum	GHGs
0%	410,131	21.5%	39,080	53,031	-58,377
10%	723,286	41.8%	72,952	74,836	-47,814
20%	804,977	44.7%	79,855	78,749	-46,417
30%	872,960	46.9%	84,760	81,646	-45,378
40%	930,933	48.6%	89,246	84,167	-44,497
50%	992,711	50.2%	93,259	86,714	-43,602
60%	1,057,972	51.8%	97,281	89,218	-42,698
70%	1,132,120	53.4%	101,920	92,208	-41,725
80%	1,235,132	55.4%	107,343	96,029	-40,582
90%	1,392,296	58.0%	115,268	101,743	-38,854
100%	3,644,703	70.9%	231,191	192,909	-22,934