

10/8/2003

Matrix #4

Statewide TRU PM Emissions

Scenario #2: LETRU & ULETRU = Full Cryogenic Refrigeration to LETRU & ULETRU, 1200 Hr/Yr. Scenario (revised to equalize effectiveness against lower and upper emission benefit of reg; also changed to reflect non-use w/ TRU gen sets.)
(used to calculate Alternative 2 C/E)

Em = Em Rate*Pop*Activity*Avg HP*Load Fctr

<15 hp

Activity = 1038hr/yr, Avg HP = 10 hp, Load Fctr = 0.64
Em = Em Rate*Pop*1038*10*.64

Year	Population	Avg Em Fctr		Emissions (tpd)	
		New Std Only	New&In-Use Stds	New Stds Only	New&In-Use Stds
2000	4623	0.87	0.87	0.080	0.080
2001	4449	0.86	0.86	0.077	0.077
2002	4501	0.83	0.83	0.075	0.075
2003	4557	0.81	0.81	0.074	0.074
2004	4623	0.79	0.79	0.073	0.073
2005	4701	0.76	0.76	0.072	0.072
2006	4787	0.74	0.74	0.071	0.071
2007	4879	0.72	0.72	0.070	0.070
2008	4974	0.67	0.58	0.067	0.058
2009	5067	0.62	0.55	0.063	0.056
2010	5174	0.57	0.48	0.059	0.050
2011	5307	0.53	0.42	0.056	0.044
2012	5449	0.48	0.36	0.053	0.039
2013	5621	0.45	0.30	0.050	0.034
2014	5822	0.42	0.25	0.049	0.029
2015	6068	0.39	0.21	0.048	0.025
2016	6354	0.37	0.19	0.047	0.024
2017	6635	0.35	0.19	0.047	0.026
2018	6935	0.34	0.19	0.047	0.027
2019	7248	0.33	0.19	0.047	0.028
2020	7578	0.32	0.19	0.048	0.029

15-25 hp

Activity = 1038hr/yr, Avg HP = 17 hp, Load Fctr = 0.64
Em = Em Rate*Pop*1038*17*.64

Year	Population	Avg Em Fctr		Emissions (tpd)	
		New Std Only	New&In-Use Stds	New Stds Only	New&In-Use Stds
2000	1947	0.87	0.87	0.058	0.058
2001	1898	0.86	0.86	0.055	0.055
2002	1897	0.83	0.83	0.054	0.054
2003	1899	0.81	0.81	0.052	0.052
2004	1905	0.79	0.79	0.051	0.051
2005	1914	0.77	0.77	0.050	0.050
2006	1927	0.74	0.74	0.049	0.049
2007	1945	0.72	0.72	0.048	0.048
2008	1961	0.67	0.58	0.045	0.039
2009	1973	0.63	0.55	0.042	0.037
2010	1989	0.58	0.49	0.039	0.033
2011	2012	0.53	0.42	0.037	0.029
2012	2040	0.49	0.36	0.034	0.025
2013	2073	0.46	0.30	0.032	0.021
2014	2112	0.43	0.25	0.031	0.018
2015	2167	0.40	0.20	0.030	0.015
2016	2231	0.38	0.18	0.029	0.014
2017	2296	0.36	0.18	0.028	0.014
2018	2364	0.34	0.19	0.028	0.015
2019	2434	0.33	0.19	0.027	0.015
2020	2507	0.32	0.19	0.027	0.016

Relative Emission Reduction Effectiveness Compared to Limits of Reg

Year	Em. Red. Alt.2 (tpd)	Em. Red. Reg. (low end, tpd)	Em. Red. Reg. (high end, tpd)	% More Effect. Than Reg. (l)	% More Effect. Than Reg. (h)
2009	1.719	0.416	0.853	313	102
2010	1.571	0.237	0.733	563	114
2011	1.437	0.234	0.684	514	110
2012	1.314	0.474	0.681	177	93
2013	1.140	0.5	0.639	128	78
2014	0.990	0.538	0.618	84	60
2015	0.872	0.61	0.593	43	47
2016	0.768	0.599	0.549	28	40
2017	0.673	0.55	0.497	22	36
2018	0.588	0.513	0.458	15	28
2019	0.513	0.488	0.43	5	19
2020	0.448	0.474	0.348	-6	29
Total (tpd):	13.907				
Tot. PM Red.(lb	10152397				

Matrix #4

25-50 hp TRUs, reefer railcars, gen sets

Activity = 1465hr/yr, Avg HP = 34 hp, Load Fctr = 0.53

Em = Em Rate*Pop*1465*34*.53

Year	CA-Based	Out-of-State	Reefer Railcar	CA Gen Set	OOS Gen Set	Total 25-50 hp	Avg Em Fctr	Avg Em Fctr	Emissions (tpd)	
	Population	Population	Population	Population	Population	Population	New Stds Only	New&In-Use Stds	New Stds Only	New&In-Use Stds
2000	22772	7591	1678	0	0	32041	0.98	0.98	2.501	2.501
2001	22606	7535	1666	0	0	31807	0.92	0.92	2.332	2.332
2002	22778	7593	1678	0	0	32049	0.89	0.89	2.281	2.281
2003	22986	7662	1694	0	0	32341	0.87	0.87	2.231	2.231
2004	23230	7743	1712	0	0	32685	0.83	0.83	2.151	2.151
2005	23515	7838	1733	0	0	33086	0.79	0.79	2.073	2.073
2006	23814	7938	1755	0	0	33507	0.75	0.75	1.992	1.992
2007	24112	8037	1777	0	0	33926	0.71	0.71	1.909	1.909
2008	24409	8136	1799	0	0	34343	0.64	0.48	1.763	1.324
2009	24714	8238	1821	0	0	34774	0.58	0.45	1.614	1.248
2010	25109	8370	1850	0	0	35329	0.52	0.45	1.473	1.273
2011	25638	8546	1889	0	0	36073	0.47	0.40	1.344	1.152
2012	26266	8755	1935	0	0	36957	0.42	0.28	1.226	0.826
2013	27033	9011	1992	0	0	38035	0.35	0.21	1.057	0.641
2014	28006	9335	2064	0	0	39405	0.29	0.15	0.911	0.469
2015	29226	9742	2154	0	0	41122	0.24	0.09	0.794	0.296
2016	30650	10217	2259	0	0	43126	0.20	0.06	0.692	0.208
2017	32165	10722	2370	0	0	45257	0.17	0.04	0.598	0.157
2018	33785	11262	2489	0	0	47535	0.14	0.03	0.513	0.105
2019	35509	11836	2616	0	0	49961	0.11	0.01	0.438	0.052
2020	37344	12448	2752	0	0	52543	0.09	0.00	0.372	0.000

Operator Cost Range (2002 \$)

(basis for calculations below)

\$78,760 \$2,346,240

Composite PM Emissions of all TRU HP ranges

Year	Emissions (tpd)	Emission Red. From Reg. (low end of range)	Emission Benefit Adjustment Factor (low)	Emission Red. From Reg. (high end of range)	Emission Benefit Adjustment Factor (high)	Annual In-Use Cost	Ann. Op. Rep. Costs (low)	Ann. Op. Rep. Costs (high)	Total Ann. Oper. Cost (low)	Total Ann. Oper. Cost (high)	In-Use Only \$/lb. (low)	In-Use Only \$/lb. (high)
	2000	2.640					\$0	\$0	\$0	\$0	\$0	
2001	2.464					\$0	\$0	\$0	\$0	\$0		
2002	2.410					\$0	\$0	\$0	\$0	\$0		
2003	2.357					\$0	\$0	\$0	\$0	\$0		
2004	2.276					\$0	\$0	\$0	\$0	\$0		
2005	2.194					\$0	\$0	\$0	\$0	\$0		
2006	2.112					\$0	\$0	\$0	\$0	\$0		
2007	2.028					\$0	\$0	\$0	\$0	\$0		
2008	1.875	0.498	0.266	0.948	0.506	\$125,416,556	\$58,772	\$1,750,800	\$125,475,328	\$127,167,357	24.36	47.00
2009	1.719	0.416	0.242	0.853	0.496	\$134,970,188	\$55,973	\$1,667,429	\$135,026,162	\$136,637,617	26.04	54.04
2010	1.571	0.237	0.151	0.733	0.466	\$144,077,398	\$53,308	\$1,588,028	\$144,130,705	\$145,665,425	18.95	59.24
2011	1.437	0.234	0.163	0.684	0.476	\$152,752,378	\$50,769	\$1,512,407	\$152,803,147	\$154,264,785	23.73	70.02
2012	1.314	0.474	0.361	0.681	0.518	\$161,013,436	\$48,352	\$1,440,388	\$161,061,788	\$162,453,824	60.60	87.81
2013	1.140	0.5	0.439	0.639	0.561	\$168,876,647	\$46,049	\$1,371,798	\$168,922,696	\$170,248,445	89.03	114.67
2014	0.990	0.538	0.543	0.618	0.624	\$176,376,173	\$43,857	\$1,306,474	\$176,420,030	\$177,682,647	132.55	153.35
2015	0.872	0.61	0.700	0.593	0.680	\$183,516,912	\$41,768	\$1,244,261	\$183,558,680	\$184,761,173	201.92	197.58
2016	0.768	0.599	0.779	0.549	0.714	\$190,326,235	\$39,779	\$1,185,011	\$190,366,015	\$191,511,246	264.52	243.89
2017	0.673	0.55	0.817	0.497	0.738	\$196,809,793	\$37,885	\$1,128,582	\$196,847,678	\$197,938,375	327.01	297.14
2018	0.588	0.513	0.872	0.458	0.779	\$125,994,251	\$36,081	\$1,074,840	\$126,030,332	\$127,069,090	256.17	230.59
2019	0.513	0.488	0.952	0.43	0.839	\$126,014,435	\$34,363	\$1,023,657	\$126,048,797	\$127,038,091	320.80	284.89
2020	0.448	0.474	1.059	0.348	0.777	\$113,018,886	\$32,726	\$974,911	\$113,051,613	\$113,993,798	366.12	271.03
11821.700 Tons PM							\$579,682	\$17,268,585	\$1,999,742,971	\$2,016,431,873	Low = 24	H = 366

\$1,999,163,288 2008-2020 Total (in 2002 \$)