



**APPENDIX C**

**ORVR WIDESPREAD USE ANALYSIS  
FOR  
CALIFORNIA, DELAWARE, GEORGIA, & PENNSYLVANIA  
(2007 ANALYSIS)**

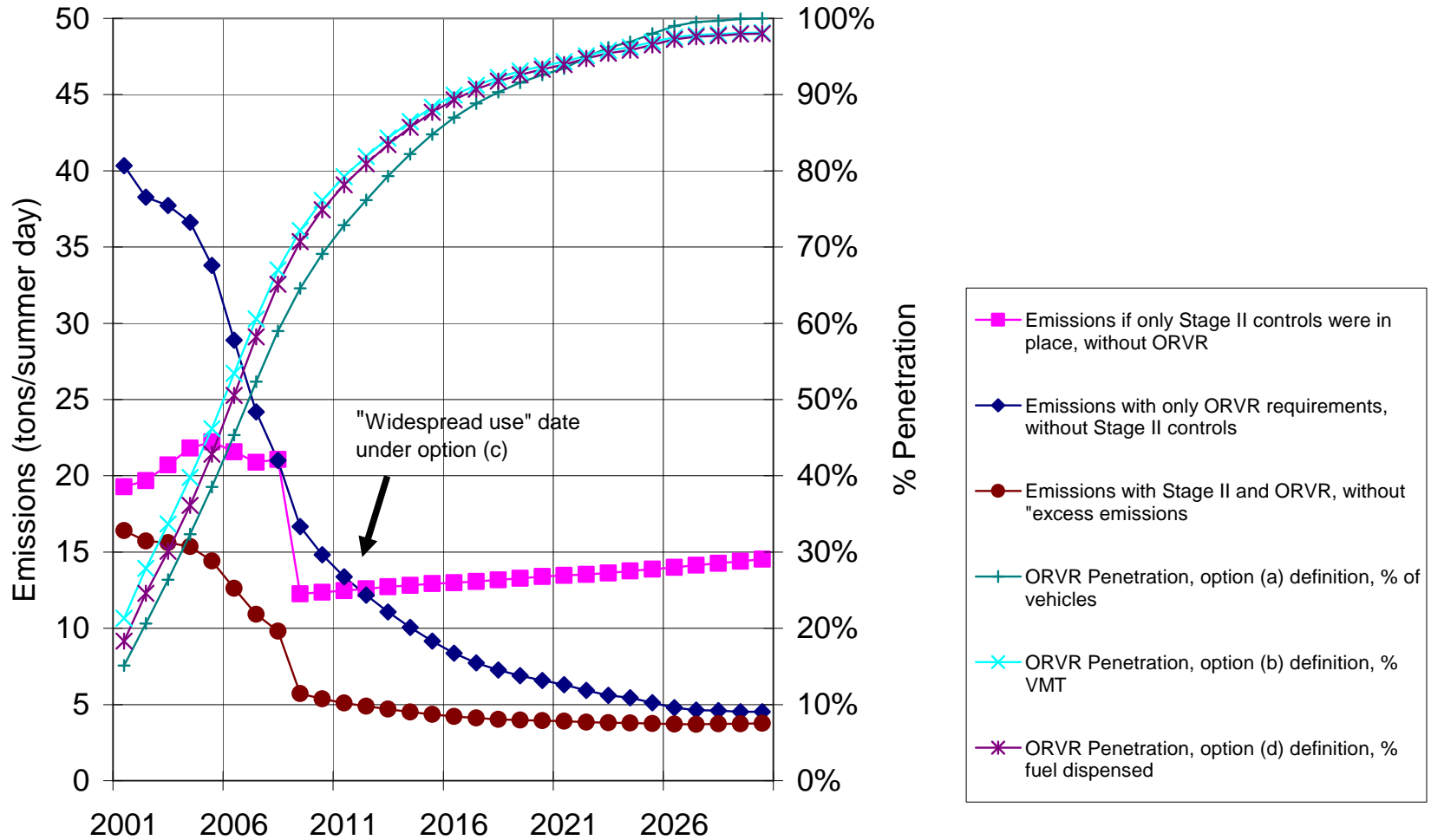
### Data Summary for 4 States

Requested Data	Provided Data Or MOBILE6 Defaults Used			
	CA	DE	GA	PA
Stage II VRS In-Use Effectiveness	CE: 95% (given) RE: 87.5% RP: 81.6% In-use: 67.8% <sup>a</sup>	CE: 95% (given) RE: 90.5% RP: 98.7% In-use: 85%	CE: 95% (given) RE: 95% RP: 90% In-use: 81%	CE: 95% (given) RE: 80% RP: 96% In-use: 73%
Ambient Temperature Data	Used 24 hrly avg T data	Min: 69.25°F Max: 87.35°F	Used 24 hrly avg T data; 2 sets	Min: 70.2°F Max: 87.5°F
In-use RVP of the gasoline used during the summer ozone season, and indicate if the gasoline is RFG	6.8 psia; Yes	6.81 psia 6.57 psia; Yes	7.0 psia; No	6.81 psia; Yes
Total gasoline usage, gallons/yr for the most recent available CYs and for those years that the states have projected data	✓	✓	✓	✓
Percentage of GDFs equipped with balance Stage II VRS	90%	18%	6.7%	20%
Percentage of GDFs equipped with vacuum assist Stage II VRS	10%	82%	93.3%	80%
With Stage I but no Stage II VRS, With Stage I but no P/V valve, With Stage I and with P/V valve	0% 0% 100%	0% 0% 100%	16.5% 0% 83.5%	0% 1% 99%
Balance Stage II VRS but no Stage I, Balance Stage II VRS and Stage I but no P/V valve, Balance Stage II VRS and Stage I with P/V valves	0% 0% 100%	0% 0% 100%	0% 0% 100%	0% 2% 98%
VA Stage II VRS but no Stage I, VA Stage II VRS and Stage I but no P/V valve, VA Stage II VRS and Stage I with P/V valves	0% 0% 100%	0% 0% 100%	0% 0% 100%	0% 1% 99%
Vehicle registration data (defn a)	✓ Gasoline only	✓ Gasoline only	✓ Fuel-independent	✓ Fuel-independent
Vehicle distribution data by vehicle type and age	✓ Gasoline only	✓ Gasoline only	✓ Fuel-independent; Default for HDV8a class	✓ Fuel-independent
Vehicle mileage accumulation data, AMAR	✓ Gasoline only	Default	Default	Default
Vehicle miles traveled (VMT) for the most recent calendar year and any years where projected data are available	✓ Gasoline only	✓ Fuel-independent	✓ Fuel-independent	✓ Fuel-independent
VMT fractional mix (represents the fraction of total highway VMT accumulated by each vehicle type)	Estimate from VMT info by vehicle type above	✓ Fuel-independent	✓ Fuel-independent	Estimate from VMT info by vehicle type above
Diesel sales fraction data	Not needed, as VMT is Gasoline only	Default	Default	Default
Vehicle fuel economy data	✓	Default	Default	Default
Anti-Tampering Program data	✓	✓	✓	✓

✓ Denotes that State-provided data were used for this parameter in the analysis, but the data set is too large to adequately describe here.

a In CA SCAQMD, beginning in 2009, the CE: 95% (given); RE: 87.5%; RP: 94.7%; and In-use: 78.7%.

# LOS ANGELES, CA Area - Emissions and ORVR Percentages for Merged Data 2001 through 2030



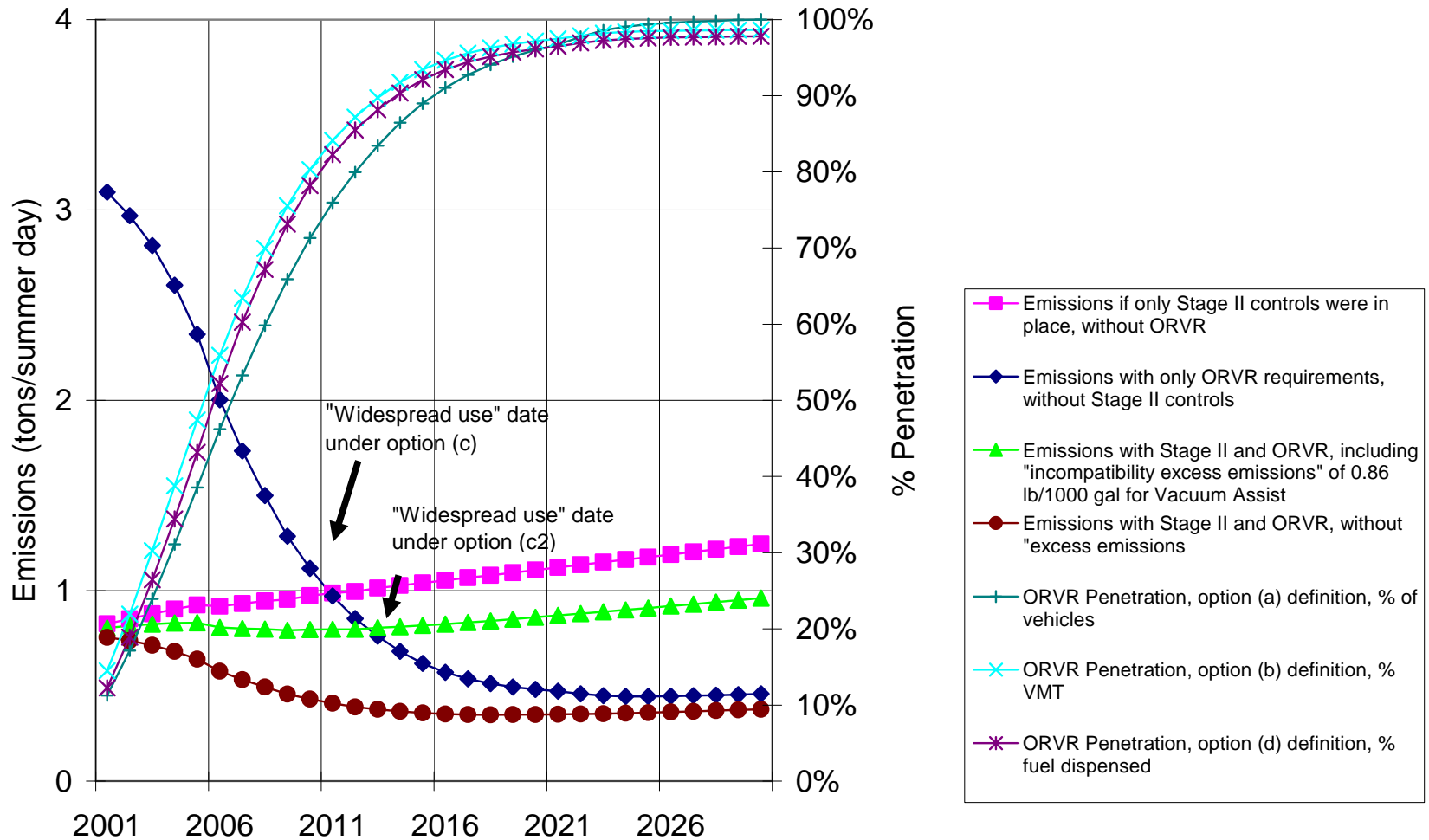
**TOTAL REFUELING EMISSIONS - California (Los Angeles Area)** (Calculations assume all VA have IEE of 0.86, uncorrected)

Calendar Year	Grams Emitted Per Gallon Gasoline				% Decrease from Uncontrolled
	Stage II Controls Only	ORVR Only	Stage II with ORVR, No IEE	Stage II with ORVR, IEE	
2001	1.114	2.330	0.947	0.948	66%
2002	1.114	2.166	0.890	0.892	68%
2003	1.129	2.055	0.850	0.853	70%
2004	1.128	1.894	0.794	0.798	72%
2005	1.128	1.716	0.732	0.737	74%
2006	1.128	1.511	0.661	0.666	77%
2007	1.128	1.307	0.589	0.594	79%
2008	1.128	1.124	0.526	0.532	81%
2009	0.651	0.885	0.303	0.311	89%
2010	0.651	0.781	0.283	0.291	90%
2011	0.651	0.699	0.267	0.276	90%
2012	0.651	0.630	0.253	0.263	91%
2013	0.651	0.567	0.241	0.251	91%
2014	0.651	0.511	0.229	0.241	92%
2015	0.651	0.461	0.220	0.232	92%
2016	0.651	0.420	0.212	0.224	92%
2017	0.651	0.385	0.205	0.218	92%
2018	0.651	0.359	0.200	0.213	93%
2019	0.651	0.338	0.195	0.209	93%
2020	0.651	0.320	0.192	0.206	93%
2021	0.651	0.305	0.189	0.204	93%
2022	0.651	0.285	0.185	0.200	93%
2023	0.651	0.268	0.182	0.197	93%
2024	0.651	0.257	0.180	0.196	93%
2025	0.651	0.240	0.176	0.193	93%
2026	0.651	0.223	0.173	0.190	93%
2027	0.651	0.214	0.171	0.188	93%
2028	0.651	0.210	0.170	0.188	93%
2029	0.651	0.205	0.169	0.188	93%
2030	0.651	0.203	0.169	0.188	93%

Tons Per Summer Day				
Stage II Controls Only	ORVR Only	Stage II with ORVR, No IEE	Stage II with ORVR, IEE	Excess Emissions
19.29	40.35	16.40	16.42	0.02
19.68	38.28	15.73	15.75	0.03
20.72	37.73	15.61	15.65	0.05
21.81	36.62	15.35	15.43	0.07
22.22	33.80	14.42	14.51	0.10
21.57	28.89	12.63	12.73	0.10
20.89	24.19	10.91	11.01	0.09
21.07	21.00	9.82	9.93	0.11
12.26	16.67	5.71	5.86	0.15
12.36	14.82	5.37	5.53	0.16
12.47	13.38	5.10	5.28	0.18
12.58	12.17	4.89	5.08	0.19
12.72	11.08	4.70	4.91	0.21
12.82	10.05	4.52	4.74	0.22
12.93	9.16	4.36	4.60	0.24
12.99	8.37	4.22	4.47	0.25
13.07	7.74	4.11	4.37	0.26
13.17	7.26	4.04	4.31	0.27
13.28	6.89	3.98	4.27	0.28
13.40	6.58	3.95	4.24	0.30
13.46	6.30	3.90	4.21	0.30
13.54	5.91	3.84	4.16	0.31
13.62	5.60	3.80	4.12	0.32
13.75	5.43	3.79	4.13	0.34
13.88	5.12	3.75	4.11	0.35
14.00	4.79	3.71	4.08	0.37
14.13	4.63	3.71	4.09	0.38
14.26	4.60	3.73	4.12	0.39
14.39	4.53	3.74	4.15	0.41
14.53	4.54	3.77	4.19	0.42

# DELAWARE - Emissions and ORVR Percentages

(IEE 0.86)



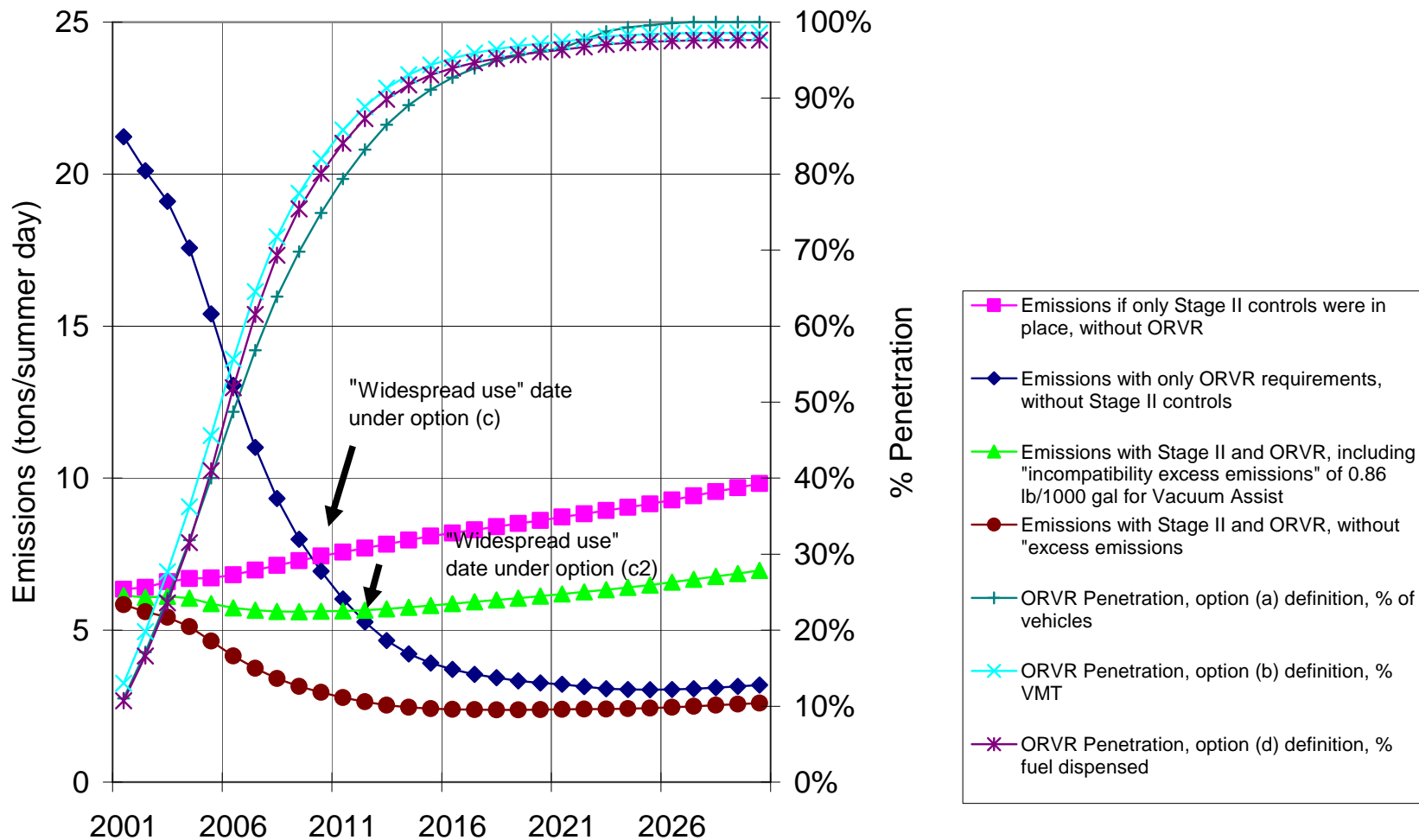
**TOTAL REFUELING EMISSIONS – Delaware** (Calculations assume all VA have IEE of 0.86, uncorrected)

Calendar Year	Grams Emitted Per Gallon Gasoline				% Decrease from Uncontrolled
	Stage II Controls Only	ORVR Only	Stage II with ORVR, No IEE	Stage II with ORVR, IEE	
2001	0.718	2.688	0.656	0.698	77%
2002	0.718	2.500	0.622	0.687	77%
2003	0.725	2.322	0.589	0.681	78%
2004	0.725	2.092	0.548	0.667	78%
2005	0.725	1.840	0.503	0.653	79%
2006	0.725	1.580	0.456	0.637	79%
2007	0.725	1.348	0.414	0.624	80%
2008	0.725	1.149	0.379	0.612	80%
2009	0.725	0.978	0.348	0.602	81%
2010	0.725	0.832	0.322	0.593	81%
2011	0.725	0.715	0.301	0.586	81%
2012	0.725	0.622	0.284	0.581	81%
2013	0.725	0.545	0.270	0.576	81%
2014	0.725	0.482	0.259	0.573	81%
2015	0.725	0.431	0.250	0.570	82%
2016	0.725	0.393	0.243	0.568	82%
2017	0.725	0.364	0.238	0.566	82%
2018	0.725	0.344	0.234	0.565	82%
2019	0.725	0.328	0.231	0.564	82%
2020	0.725	0.315	0.229	0.563	82%
2021	0.725	0.305	0.227	0.562	82%
2022	0.725	0.293	0.225	0.562	82%
2023	0.725	0.283	0.223	0.561	82%
2024	0.725	0.277	0.222	0.561	82%
2025	0.725	0.274	0.222	0.561	82%
2026	0.725	0.272	0.221	0.560	82%
2027	0.725	0.271	0.221	0.560	82%
2028	0.725	0.270	0.221	0.560	82%
2029	0.725	0.268	0.220	0.560	82%
2030	0.725	0.267	0.220	0.560	82%

Tons Per Summer Day				
Stage II Controls Only	ORVR Only	Stage II with ORVR, No IEE	Stage II with ORVR, IEE	Excess Emissions
0.83	3.09	0.75	0.80	0.05
0.85	2.97	0.74	0.82	0.08
0.88	2.81	0.71	0.82	0.11
0.90	2.61	0.68	0.83	0.15
0.93	2.35	0.64	0.83	0.19
0.92	2.00	0.58	0.81	0.23
0.93	1.73	0.53	0.80	0.27
0.95	1.50	0.49	0.80	0.30
0.95	1.29	0.46	0.79	0.33
0.97	1.12	0.43	0.80	0.36
0.99	0.97	0.41	0.80	0.39
1.00	0.85	0.39	0.80	0.41
1.01	0.76	0.38	0.81	0.43
1.03	0.68	0.37	0.81	0.44
1.04	0.62	0.36	0.82	0.46
1.05	0.57	0.35	0.83	0.47
1.07	0.54	0.35	0.83	0.48
1.08	0.51	0.35	0.84	0.49
1.10	0.49	0.35	0.85	0.50
1.11	0.48	0.35	0.86	0.51
1.12	0.47	0.35	0.87	0.52
1.14	0.46	0.35	0.88	0.53
1.15	0.45	0.35	0.89	0.54
1.16	0.44	0.36	0.90	0.54
1.18	0.44	0.36	0.91	0.55
1.19	0.45	0.36	0.92	0.56
1.20	0.45	0.37	0.93	0.56
1.22	0.45	0.37	0.94	0.57
1.23	0.45	0.37	0.95	0.58
1.24	0.46	0.38	0.96	0.58

# GEORGIA - Emissions and ORVR Percentages

(IEE 0.86)



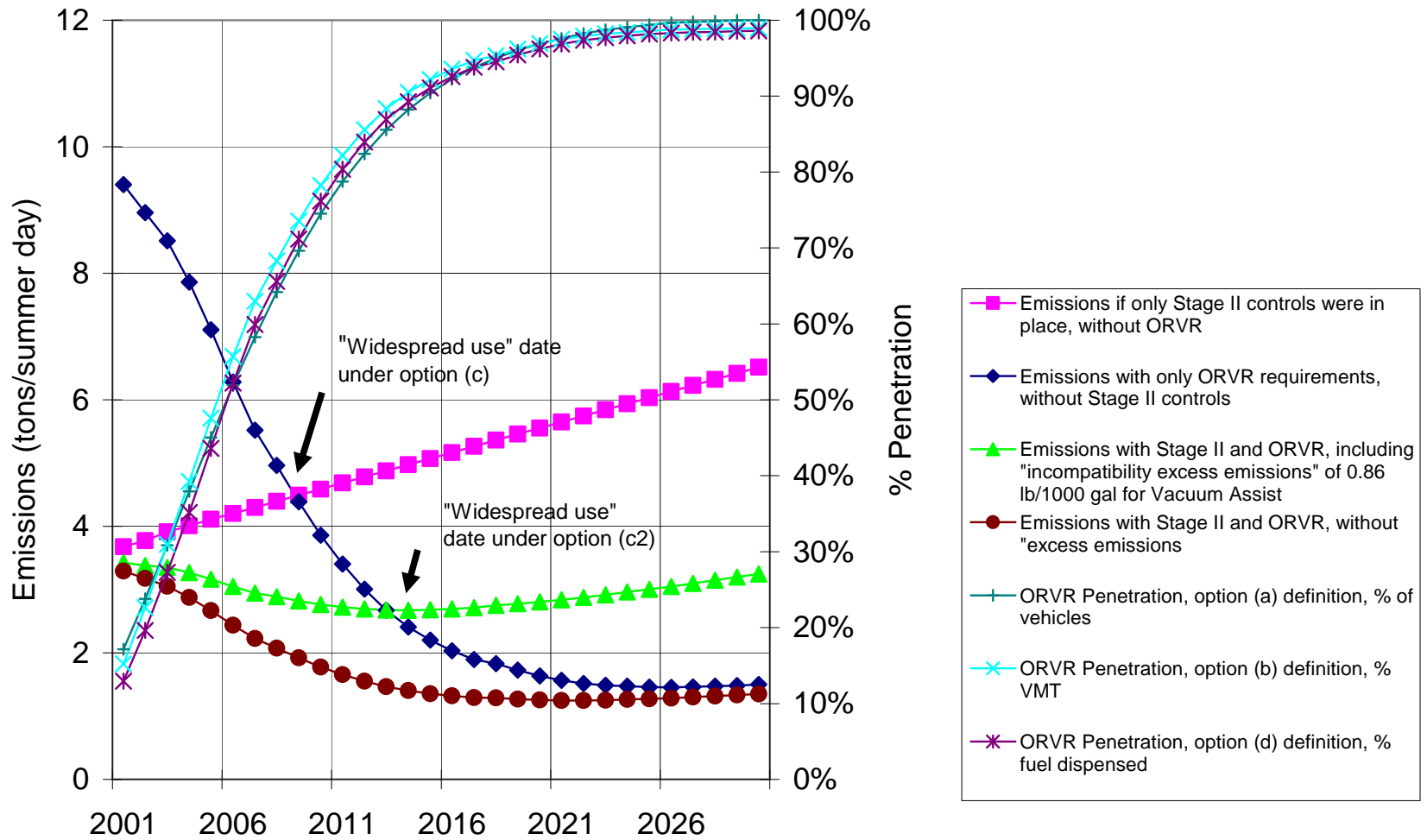
**TOTAL REFUELING EMISSIONS – Georgia** (Calculations assume all VA have IEE of 0.86, uncorrected)

Calendar Year	Grams Emitted Per Gallon Gasoline				% Decrease from Uncontrolled	Tons Per Summer Day				
	Stage II Controls Only	ORVR Only	Stage II with ORVR, No IEE	Stage II with ORVR, IEE		Stage II Controls Only	ORVR Only	Stage II with ORVR, No IEE	Stage II with ORVR, IEE	Excess Emissions
2001	0.854	2.856	0.785	0.825	74%	6.35	21.23	5.83	6.14	0.30
2002	0.854	2.681	0.747	0.810	75%	6.40	20.11	5.60	6.07	0.47
2003	0.854	2.474	0.702	0.792	75%	6.59	19.11	5.42	6.11	0.69
2004	0.854	2.239	0.651	0.771	76%	6.70	17.57	5.11	6.05	0.94
2005	0.854	1.958	0.590	0.746	77%	6.72	15.40	4.64	5.87	1.23
2006	0.854	1.634	0.520	0.718	77%	6.82	13.05	4.15	5.73	1.58
2007	0.854	1.348	0.458	0.693	78%	6.97	11.01	3.74	5.66	1.92
2008	0.854	1.118	0.408	0.673	79%	7.13	9.33	3.41	5.62	2.21
2009	0.854	0.937	0.369	0.657	79%	7.28	7.99	3.15	5.61	2.46
2010	0.854	0.797	0.339	0.645	80%	7.44	6.94	2.95	5.62	2.67
2011	0.854	0.680	0.313	0.636	80%	7.57	6.03	2.78	5.63	2.85
2012	0.854	0.584	0.293	0.627	80%	7.70	5.27	2.64	5.66	3.02
2013	0.854	0.508	0.276	0.621	80%	7.83	4.66	2.53	5.69	3.16
2014	0.854	0.452	0.264	0.617	81%	7.96	4.22	2.46	5.75	3.29
2015	0.854	0.413	0.256	0.614	81%	8.09	3.92	2.42	5.81	3.39
2016	0.854	0.386	0.250	0.611	81%	8.19	3.71	2.40	5.87	3.47
2017	0.854	0.365	0.245	0.610	81%	8.30	3.55	2.38	5.93	3.54
2018	0.854	0.349	0.242	0.609	81%	8.40	3.43	2.38	5.99	3.61
2019	0.854	0.334	0.239	0.608	81%	8.51	3.33	2.38	6.05	3.68
2020	0.854	0.324	0.236	0.607	81%	8.61	3.26	2.38	6.12	3.74
2021	0.854	0.315	0.234	0.607	81%	8.72	3.22	2.39	6.19	3.80
2022	0.854	0.304	0.232	0.606	81%	8.83	3.14	2.40	6.26	3.86
2023	0.854	0.294	0.230	0.605	81%	8.93	3.08	2.40	6.33	3.93
2024	0.854	0.288	0.228	0.605	81%	9.04	3.05	2.42	6.40	3.99
2025	0.854	0.284	0.228	0.605	81%	9.15	3.04	2.44	6.48	4.04
2026	0.854	0.280	0.227	0.605	81%	9.28	3.05	2.47	6.57	4.11
2027	0.854	0.278	0.226	0.605	81%	9.42	3.07	2.50	6.67	4.17
2028	0.854	0.278	0.226	0.605	81%	9.55	3.11	2.53	6.77	4.24
2029	0.854	0.278	0.226	0.605	81%	9.69	3.15	2.57	6.86	4.30
2030	0.854	0.278	0.226	0.605	81%	9.82	3.20	2.60	6.96	4.36



# PENNSYLVANIA - Emissions and ORVR Percentages

(IEE 0.86)



**TOTAL REFUELING EMISSIONS – Pennsylvania** (Calculations assume all VA have IEE of 0.86, uncorrected)

Calendar Year	Grams Emitted Per Gallon Gasoline				% Decrease from Uncontrolled	Tons Per Summer Day				
	Stage II Controls Only	ORVR Only	Stage II with ORVR, No IEE	Stage II with ORVR, IEE		Stage II Controls Only	ORVR Only	Stage II with ORVR, No IEE	Stage II with ORVR, IEE	Excess Emissions
2001	1.052	2.691	0.943	0.980	68%	3.68	9.40	3.29	3.43	0.13
2002	1.052	2.499	0.886	0.943	69%	3.77	8.96	3.18	3.38	0.21
2003	1.065	2.316	0.831	0.912	71%	3.91	8.51	3.06	3.35	0.29
2004	1.065	2.088	0.764	0.868	72%	4.01	7.86	2.88	3.27	0.39
2005	1.065	1.842	0.692	0.821	74%	4.11	7.11	2.67	3.17	0.50
2006	1.065	1.592	0.618	0.773	75%	4.20	6.28	2.44	3.05	0.61
2007	1.065	1.368	0.552	0.731	77%	4.30	5.52	2.23	2.95	0.72
2008	1.065	1.203	0.503	0.700	78%	4.40	4.96	2.08	2.89	0.81
2009	1.065	1.041	0.455	0.669	79%	4.49	4.39	1.92	2.82	0.90
2010	1.065	0.896	0.413	0.642	79%	4.59	3.86	1.78	2.77	0.99
2011	1.065	0.774	0.377	0.620	80%	4.69	3.40	1.66	2.73	1.07
2012	1.065	0.670	0.346	0.601	81%	4.78	3.01	1.55	2.70	1.14
2013	1.065	0.584	0.321	0.585	81%	4.88	2.67	1.47	2.68	1.21
2014	1.065	0.516	0.301	0.573	82%	4.97	2.41	1.40	2.67	1.27
2015	1.065	0.463	0.285	0.563	82%	5.07	2.20	1.36	2.68	1.32
2016	1.065	0.420	0.272	0.556	82%	5.17	2.03	1.32	2.70	1.38
2017	1.065	0.384	0.262	0.550	82%	5.26	1.90	1.29	2.72	1.42
2018	1.065	0.364	0.256	0.547	82%	5.36	1.83	1.29	2.75	1.46
2019	1.065	0.337	0.248	0.542	83%	5.46	1.73	1.27	2.78	1.51
2020	1.065	0.314	0.241	0.539	83%	5.55	1.64	1.26	2.81	1.55
2021	1.065	0.296	0.236	0.536	83%	5.65	1.57	1.25	2.84	1.59
2022	1.065	0.281	0.232	0.534	83%	5.75	1.52	1.25	2.88	1.63
2023	1.065	0.271	0.229	0.532	83%	5.84	1.49	1.25	2.92	1.66
2024	1.065	0.265	0.227	0.532	83%	5.94	1.47	1.26	2.96	1.70
2025	1.065	0.258	0.225	0.531	83%	6.03	1.46	1.27	3.01	1.73
2026	1.065	0.253	0.223	0.530	83%	6.13	1.46	1.28	3.05	1.77
2027	1.065	0.250	0.222	0.530	83%	6.23	1.46	1.30	3.10	1.80
2028	1.065	0.249	0.222	0.531	83%	6.32	1.48	1.32	3.15	1.83
2029	1.065	0.246	0.221	0.531	83%	6.42	1.48	1.33	3.20	1.86
2030	1.065	0.246	0.221	0.531	83%	6.52	1.50	1.35	3.25	1.90