

APPENDIX P

DEDICATED ALTERNATIVE FUEL VEHICLE INFORMATION

DALLAS/FORT WORTH ATTAINMENT DEMONSTRATION

APRIL 2000 REVISION

DEDICATED ALTERNATIVE FUEL VEHICLES PROGRAM

TABLE 1

	90-96	96-99	99-02
Public Sector	133	2120^	349+
Private Sector		208*	175+
TOTAL	133	2328	524+

EMISSION REDUCTIONS OF 2985 DEDICATED ALTERNATIVE FUEL VEHICLES:

VOC Reduction (Tons/Day): 0.175336577

NOx Reduction (Tons/Day): 0.181062577

TABLE 2

	DART#	THE T	DFW	TOTAL
Buses	139	113	18	270
Light Duty Vehicles	355	39	35	429

^ See attached "AFVs in Public Fleets"

+See attached "AFVs Funded Under 1999 TIP Call for Projects"

* See attached "AFVs in Private Fleets"

Excludes DART Future Plans

AFVs in Public Fleets (Funded Through Fiscal Year 2000)

Agency	Vehicle Size	Fuel	Quantity	Incremental Cost	NOx lbs/yr	NOx tons/day	NOx cost/lbs/Yr	VOCs lbs/yr	VOCs tons/day	VOCs cost/lbs./Yr
City of Dallas	Light Duty	CNG	235	\$822,500.00	1548.72	0.002978308	\$23.53	2049.78	0.003941885	\$17.78
City of Denton	Light Duty	Electric	1	\$3,500.00	19.38	0.000037269	\$8.00	19.38	0.000037269	\$8.00
City of Plano	Light Duty	Propane	62	\$217,000.00	709.04	0.001363538	\$13.56	516.76	0.000993769	\$18.60
City of Plano	Mid Duty	Propane	4	\$14,000.00	75.37	0.000144942	\$8.23	54.93	0.000105635	\$11.29
City of Plano	Heavy Duty	Propane	6	\$240,000.00	169.20	0.000325385	\$17.06	123.32	0.000237154	\$23.40
U.S. Postal Service	Light Duty	CNG	143	\$500,500.00	942.41	0.001812327	\$23.53	1247.31	0.002398673	\$17.78
U.S. Postal Service	Light Duty	Propane	7	\$24,500.00	80.05	0.000153942	\$13.56	58.34	0.000112192	\$18.60
City of Fort Worth	Light Duty	Propane	136	\$476,000.00	1555.31	0.002990981	\$13.56	1133.53	0.002179865	\$18.60
City of Farmers Branch	Light Duty	Electric	1	\$3,500.00	19.38	0.000037269	\$8.00	19.38	0.000037269	\$8.00
City of Farmers Branch	Light Duty	CNG	1	\$3,500.00	6.59	0.000012673	\$23.53	8.72	0.000016769	\$17.78
Denton ISD	Heavy Duty*	Propane	92	\$3,680,000.00	9339.99	0.017961519	\$4.74	5382.36	0.010350692	\$8.22
Dallas County Schools	Heavy Duty*	Propane	236	\$9,440,000.00	23959.09	0.046075173	\$4.74	17461.71	0.033580212	\$6.50
Carrollton-Farmers Branch ISD	Heavy Duty*	Propane	13	\$520,000.00	1319.78	0.002538038	\$4.74	760.55	0.001462596	\$8.22
TX DOT-Ft. Worth	Light Duty	Propane	220	\$770,000.00	2515.95	0.004838365	\$13.56	1833.66	0.003526269	\$18.60
TX DOT-Ft. Worth	Light Duty	CNG	76	\$266,000.00	500.86	0.000963192	\$23.53	662.91	0.001274827	\$17.78
City of Mesquite	Light Duty	Propane	54	\$189,000.00	617.55	0.001187596	\$13.56	450.08	0.000865538	\$18.60
City of Mesquite	Mid Duty	Propane	100	\$350,000.00	1884.36	0.003623769	\$8.23	1373.35	0.002641058	\$11.29
City of Glenn Heights	Light Duty	Propane	1	\$3,500.00	11.44	0.000022000	\$13.55	8.33	0.000016019	\$18.61
U.S. General Services Administration	Mid-Duty	CNG	33	\$115,500.00	358.35	0.000689135	\$14.28	474.28	0.000912077	\$10.79
DART	Light Duty	LNG	355	\$1,242,500.00	2339.56	0.004499154	\$23.53	3096.48	0.005954769	\$17.78
DART	Heavy Duty*	LNG	139	\$5,560,000.00	8132.05	0.015638558	\$8.22	10763.01	0.020698096	\$6.21
FWTA - The "T"	Light Duty	CNG	39	\$136,500.00	257.02	0.000494269	\$23.53	340.18	0.000654192	\$17.77
FWTA - The "T"	Heavy Duty*	CNG	113	\$4,520,000.00	6610.95	0.012713365	\$8.22	8749.78	0.016826500	\$6.21
DFW International Airport	Light Duty	CNG	35	\$122,500.00	230.66	0.000443577	\$23.53	305.29	0.000587096	\$17.77
DFW International Airport	Heavy Duty*	CNG	18	\$720,000.00	1053.07	0.002025135	\$8.22	1393.77	0.002680327	\$6.21
			2120	\$29,118,000.00	64256.13	0.123569481	\$348.74	58287.19	0.112090750	\$350.39

*= heavy duty vehicles are buses

COST Per Ton Per Day NOx: \$0.00067
VOCS: \$0.00067

AFVs in Private Fleets

Owner	Vehicle Size	Fuel	Quantity	Incremental Cost	NOx lbs/yr	NOx tons/day	NOx Cost/lb./Yr	VOCs lbs/yr	VOCs lbs/day	VOCs Cost/lb./Yr
Super Shuttle	Light Duty	Propane	60	\$210,000.00	6861.67	0.013195519	\$1.36	5000.88	0.009617077	\$1.86
McShan Florist	Light Duty	CNG	8	\$28,000.00	105.44	0.000202769	\$11.76	139.56	0.000268385	\$8.89
TXU Gas & Electric	Light Duty	CNG	29	\$101,500.00	172.01	0.000330788	\$26.14	227.66	0.000437808	\$19.75
TXU Gas & Electric	Light Duty	Electric	2	\$7,000.00	34.89	0.000067096	\$8.89	34.89	0.000067096	\$8.89
Northwest Propane	Light Duty	Propane	38	\$133,000.00	434.57	0.000835712	\$13.56	316.72	0.000609077	\$18.60
TX New Mexico Power	Light Duty	Electric	3	\$10,500.00	52.33	0.000100635	\$8.89	52.33	0.000100635	\$8.89
TX New Mexico Power	Light Duty	CNG	1	\$3,500.00	5.93	0.000011404	\$26.15	7.85	0.000015096	\$19.75
TX New Mexico Power	Light Duty	LPG	2	\$7,000.00	20.59	0.000039596	\$15.06	15.00	0.000028846	\$20.67
Central & Southwest Inc.	Light Duty	Electric	3	\$10,500.00	52.33	0.000100635	\$8.89	52.33	0.000100635	\$8.89
Marquis Messengers	Light Duty	Propane	30	\$105,000.00	686.17	0.001319558	\$6.78	500.09	0.000961712	\$9.30
Alcon Laboratories	Light Duty	Natural Gas	6	\$21,000.00	35.59	0.000068442	\$26.14	47.10	0.000090577	\$19.75
Texas Instruments	Light Duty	Electric	5	\$17,500.00	87.22	0.000167731	\$8.89	87.22	0.000167731	\$8.89
Ford Motor Company	Light Duty	CNG	1	\$3,500.00	5.93	0.000011404	\$26.15	7.85	0.000015096	\$19.75
DaimlerChrysler	Light Duty	CNG	1	\$3,500.00	5.93	0.000011404	\$26.15	7.85	0.000015096	\$19.75
Huffhines Gas	Light Duty	Propane	18	\$63,000.00	507.61	0.000976173	\$5.50	369.95	0.000711442	\$7.54
Propane Systems of TX	Heavy Duty	Propane	1	\$40,000.00	28.20	0.000054231	\$17.06	20.55	0.000039519	\$23.41
TOTAL			208	\$764,500.00	9096.41	0.017493096	\$237.37	6887.83	0.013245827	\$224.58

COST Per Ton Per Day

NOx: \$0.00046

VOCS: \$0.00043

AFVs Requested Under 1999 TIP Call for Projects

Project Name	Number of Vehicles	Incremental Cost	NOx lbs./yr	NOx tons/day	NOx cost/lb./Year	VOCs lbs./yr	VOCs tons/day	VOCs cost/lb./Year
DFW Airport - Light Duty CNG	162	\$640,000.00	3061.20	0.00589	\$9.26	4051.59	0.007792	\$7.00
DFW Airport - Mid-Duty (Vans)	10	\$40,000.00	108.59	0.00021	\$16.32	143.72	0.000276	\$12.33
DFW Airport - Heavy Equipment	19	\$684,000.00	308.77	0.000594	\$26.64	408.67	0.000786	\$20.13
DFW Airport Private Sector Sponsorship - Buses	13	\$520,000.00	760.55	0.001463	\$8.22	1006.61	0.001936	\$6.21
FWTA - CNG Fueled Buses	68	\$9,350,000.00	3978.27	0.007651	\$28.26	5265.36	0.010126	\$21.36
FWTA - CNG Fuel Systems - Light Duty Truck	75	\$206,250.00	2355.07	0.004529	\$5.13	2355.07	0.004529	\$3.88
Plano - Alternative Fuel - Light Duty Truck	2	\$10,000.00	100.79	0.000194	\$4.39	100.79	0.000194	\$4.39
TXU - Coca Cola LNG Conversion - Heavy Duty Truck	175	\$3,500,000.00	11091.38	0.02133	\$3.79	14679.76	0.02823	\$2.87
Grand Total	524	\$14,950,250.00	21764.62	0.04	\$102.01	28011.57	0.05	\$78.17

COST Per Ton Per Day

NOx: \$0.00020

VOCS: \$0.00015

RELATED INFORMATION

Additional Public Sector Requests

Agency	Vehicle Size	Fuel	Quantity	Incremental Cost	NOx lbs/yr	NOx tons/day	NOx cost/lbs	VOCs lbs/yr	VOCs tons/day	VOCs cost/lbs.
City of Farmers Branch	Light Duty	CNG	5	\$17,500.00	32.95	0.000063365	\$23.53	43.61	0.000083865	\$17.78
Dallas County	Light Duty	CNG	14	\$49,000.00	92.26	0.000177423	\$23.53	122.11	0.000234827	\$17.78
			19	\$66,500.00	125.21	0.000240788	\$47.06	165.72	0.000318692	\$35.56

Other Alternative Fuel Equipment

Agency	Vehicle Size	Fuel	Quantity	Incremental Cost	NOx lbs/yr	NOx tons/day	NOx cost/lbs	VOCs lbs/yr	VOCs tons/day	VOCs cost/lbs.
Plano	Small Engines		19			0.000000000			0.000000000	
American Airlines	GSE		200			0.000000000			0.000000000	
			219		0	0.000000000		0	0.000000000	

ASSUMPTIONS

These emission reduction calculations are based on an assumed mileage of 36,000 miles per year for buses and 10,000 miles annually for other vehicles unless the city or company noted otherwise. The emission factors, from Transportation Control Measure Effectiveness Study by the North Central Texas Council of Governments, are .88 for light duty vehicles, 1.45 for mid-duty vehicles (vans), and 2.17 for buses and heavy-duty vehicles. The fuel factors (how much an alternative fuel reduces NOx or VOCs emissions from gasoline) were taken from the Chesapeake Bay Alternative Fuel Vehicle Source Book. Propane reduces NOx by 59% and VOCs by 43%; CNG reduces NOx by 34% and VOCs by 45%; and electricity is a 100% reduction of emissions from the vehicle tailpipe. Since these vehicles are dedicated, so they have a 100% usage rate.

METHODOLOGY

To Calculate the Tons Per Year:

1. Multiple the number of vehicles by the emission factor.
2. Multiple that rate by the emission factor appropriate for the vehicle type.
3. Take that number and multiple by the total reduction factor (this is the fuel factor multiplied by the usage rate and divided by 454 for the grams conversion) and you will get the pounds per year.
4. The pounds per year can be converted to tons per day by dividing it first by 260 and then by 2000.

To Calculate the Cost Per Pound Per Year :

1. Determine whether the project length is 5 years or 10 years.
2. Divide the project length into the incremental cost. For projects with an unspecified incremental cost, \$3,500 was used for light duty vehicles and \$40,000 for heavy-duty.
3. Multiply the result by a capital recovery factor of 0.12026 for 10 years and .22149 for 5 years as taken from the TIP "Factsheet".
4. The result is the annualized project cost which then can be divided by the pounds of NOx and VOCs per year to get the cost.
5. Once you have the cost per pound per year you can convert it to the cost per ton per day by dividing it first by 260 and then by 2000.