APPENDIX A:
INDUSTRIAL SECTOR: FUEL AND END-USE ELECTRICITY CONSUMPTION

	Coal			***Natural Gas***			***Asphalt & Road Oil***			***Distillate Fuel***			***Kerosene***	
Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2 (7% sequest.)	Year	Trillion BTUs	Metric Tons CO_2 (100% sequest.)	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2
1985	5.388	512537	1985	22.051	1E+06	1985	5.4877	0	1985	2.4944	182633	1985	0	0
1986	5.1	485145	1986	21.2	1E+06	1986	4	0	1986	2.4	175720	1986	0	0
1987	5.4873	521990	1987	18.158	898695	1987	3.7912	0	1987	2.4942	182619	1987	0.0998	7220.6
1988	6.1139	581590	1988	15.134	749041	1988	2.7061	0	1988	2.6059	190796	1988	0.1002	7253.7
1989	5.1942	494110	1989	15.383	761348	1989	3.4961	0	1989	2.5971	190152	1989	0	0
1990	5.2947	503666	1990	17.283	855371	1990	3.5964	0	1990	2.4975	182858	1990	0	0
1991	5.2	494657	1991	16.5	816633	1991	0.9	0	1991	2.6	190363	1991	0	0
1992	3.5965	342118	1992	18.682	924606	1992	0.4995	0	1992	1.998	146289	1992	0	0
1993	4.4041	418943	1993	20.119	995727	1993	0.7006	0	1993	2.1019	153897	1993	0.2002	14488
1994	4.8044	457024	1994	17.816	881779	1994	1.101	0	1994	2.0018	146567	1994	0.8007	57951
1995	4.9	466119	1995	20.1	994807	1995	1.2	0	1995	1.9	139111	1995	0	0
1996	4.3322	412108	1996	17.646	873370	1996	1.184	0	1996	1.9284	141192	1996	0.2852	20643
1997	4.1788	397518	1997	17.37	859698	1997	1.1711	0	1997	1.8454	135116	1997	0.3114	22538
1998	4.0591	386132	1998	17.229	852704	1998	1.1673	0	1998	1.7775	130145	1998	0.3396	24577
1999	3.9414	374935	1999	17.094	846016	1999	1.1639	0	1999	1.7106	125244	1999	0.3677	26611
2000	3.8256	363913	2000	16.964	839620	2000	1.1609	0	2000	1.6446	120409	2000	0.3957	28641
2001	3.7114	353052	2001	16.841	833499	2001	1.1582	0	2001	1.5793	115632	2001	0.4238	30670
2002	3.5988	342337	2002	16.722	827641	2002	1.1558	0	2002	1.5148	110909	2002	0.4518	32699
2003	3.4875	331757	2003	16.609	822033	2003	1.1538	0	2003	1.451	106234	2003	0.4799	34729
2004	3.3776	321300	2004	16.501	816661	2004	1.1521	0	2004	1.3877	101603	2004	0.508	36762
2005	3.2689	310955	2005	16.397	811516	2005	1.1506	0	2005	1.325	97010	2005	0.5361	38798
2006	3.1612	300710	2006	16.297	806585	2006	1.1495	0	2006	1.2627	92452	2006	0.5643	40840
2007	3.0544	290556	2007	16.202	801860	2007	1.1487	0	2007	1.2009	87925	2007	0.5926	42889
2008	2.9485	280484	2008	16.11	797330	2008	1.1481	0	2008	1.1394	83423	2008	0.621	44945
2009	2.8434	270484	2009	16.022	792987	2009	1.1478	0	2009	1.0782	78945	2009	0.6496	47010
2010	2.739	260547	2010	15.938	788823	2010	1.1478	0	2010	1.0173	74485	2010	0.6782	49084
2011		0	2011		0	2011		0	2011		0	2011		0
2012		0	2012		0	2012		0	2012		0	2012		0

	LPG			Motor Gas			Residual			Other			Lubricants		
Year	Trillion BTUs	Metric Tons CO_2 (80% sequest.)	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2 (80% sequest.)	Year	Trillion BTUs	Metric Tons CO_2 (50% sequest.)	
1985	1.0975	13687	1985	0.2993	21323	1985	4.0909	322639	1985	17.461	164672	1985	0.3991	14823	
1986	1.3	16212	1986	0.3	21370	1986	4.4	347021	1986	17.3	163154	1986	0.4	14856	
1987	1.5963	19907	1987	0.2993	21321	1987	5.8864	464251	1987	18.058	170305	1987	0.4988	18527	
1988	1.303	16249	1988	0.3007	21419	1988	7.0159	553333	1988	20.747	195663	1988	0.4009	14890	
1989	1.0988	13703	1989	0.2997	21347	1989	6.0933	480564	1989	20.677	195003	1989	0.4994	18550	
1990	1.2987	16196	1990	0.2997	21349	1990	4.6953	370310	1990	21.479	202561	1990	0.4995	18552	
1991	1.3	16212	1991	0.3	21370	1991	6	473210	1991	22.3	210308	1991	0.4	14856	
1992	0.6993	8720.9	1992	0.2997	21349	1992	7.7923	614567	1992	25.375	239308	1992	0.3996	14842	
1993	0.8007	9985.7	1993	0.3003	21390	1993	11.01	868353	1993	24.523	231270	1993	0.4004	14870	
1994	1.6015	19971	1994	0.3003	21390	1994	11.41	899920	1994	25.323	238819	1994	0.5005	18587	
1995	1.3	16212	1995	0.3	21370	1995	10	788683	1995	24.4	230113	1995	0.4	14856	
1996	1.1373	14183	1996	0.296	21085	1996	11.031	869961	1996	26.524	250147	1996	0.4305	15990	
1997	1.1144	13897	1997	0.2928	20856	1997	11.57	912532	1997	27.095	255530	1997	0.4259	15817	
1998	1.1001	13719	1998	0.2918	20789	1998	12.19	961389	1998	27.862	262764	1998	0.4245	15766	
1999	1.0863	13547	1999	0.291	20728	1999	12.809	1E+06	1999	28.633	270036	1999	0.4232	15719	
2000	1.0729	13380	2000	0.2902	20673	2000	13.429	1E+06	2000	29.409	277348	2000	0.4221	15678	
2001	1.0599	13218	2001	0.2895	20625	2001	14.05	1E+06	2001	30.189	284705	2001	0.4212	15642	
2002	1.0472	13060	2002	0.289	20583	2002	14.672	1E+06	2002	30.974	292111	2002	0.4203	15610	
2003	1.0349	12906	2003	0.2884	20547	2003	15.295	1E+06	2003	31.765	299568	2003	0.4196	15582	
2004	1.0229	12756	2004	0.288	20517	2004	15.921	1E+06	2004	32.561	307081	2004	0.4189	15559	
2005	1.0112	12610	2005	0.2877	20491	2005	16.549	1E+06	2005	33.364	314653	2005	0.4184	15540	
2006	0.9997	12467	2006	0.2874	20471	2006	17.18	1E+06	2006	34.174	322288	2006	0.418	15525	
2007	0.9886	12328	2007	0.2872	20456	2007	17.814	1E+06	2007	34.99	329988	2007	0.4177	15514	
2008	0.9776	12192	2008	0.287	20446	2008	18.451	1E+06	2008	35.814	337756	2008	0.4175	15506	
2009	0.9669	12058	2009	0.2869	20441	2009	19.093	2E+06	2009	36.645	345597	2009	0.4174	15502	
2010	0.9565	11928	2010	0.2869	20440	2010	19.738	2E+06	2010	37.485	353512	2010	0.4174	15501	
2011		0	2011		0	2011		0	2011		0	2011		0	
2012		0	2012		0	2012		0	2012		0	2012		0	

	Biofuels			***Electricity***				***Total***			
Year	Trillion BTUs	Metric Tons CO_2 (No Net Emissions)		Year	Trillion BTUs	Metric Tons CO_2		Year	Trillion BTUs	Million Metric Tons CO_2	
1985	0	0		1985	9.1795	815435		1985	67.948	3.1391	
1986	0	0		1986	9.7	873977		1986	66.1	3.1467	
1987	0	0		1987	9.1788	813166		1987	65.549	3.118	
1988	0	0		1988	9.722	867118		1988	66.15	3.1974	
1989	0	0		1989	10.788	935722		1989	66.127	3.1105	
1990	7.3926	0		1990	11.189	982447		1990	75.524	3.1533	
1991	7.1	0		1991	11.10	950961		1991	73.7	3.1886	
1992	7.2928	0		1992	11.089	973986		1992	77.723	3.2858	
1993	7.4068	0		1993	11.711	1E+06		1993	83.677	3.7464	
1994	7.5069	0		1994	11.811	982515		1994	84.978	3.7245	
1995	7.8	0		1995	12	953721		1995	84.3	3.625	
1996	7.6431	0		1996	12.315	1E+06		1996	84.753	3.6215	
1997	7.6524	0		1997	12.474	1E+06		1997	85.502	3.6462	
1998	7.7192	0		1998	12.726	1E+06		1998	86.886	3.69	
1999	7.7881	0		1999	12.979	1E+06		1999	88.288	3.734	
2000	7.8589	0		2000	13.236	1E+06		2000	89.709	3.7781	
2001	7.9316	0		2001	13.494	1E+06		2001	91.148	3.8224	
2002	8.0063	0		2002	13.756	1E+06		2002	92.608	3.8667	
2003	8.0828	0		2003	14.02	1E+06		2003	94.087	3.9112	
2004	8.1613	0		2004	14.287	1E+06		2004	95.587	3.9556	
2005	8.2417	0		2005	14.557	1E+06		2005	97.107	4.0002	
2006	8.3239	0		2006	14.83	1E+06		2006	98.648	4.0447	
2007	8.4081	0		2007	15.107	1E+06		2007	100.21	4.0893	
2008	8.4941	0		2008	15.386	1E+06		2008	101.79	4.1338	
2009	8.5821	0		2009	15.669	1E+06		2009	103.4	4.1782	
2010	8.6719	0		2010	15.955	1E+06		2010	105.03	4.2226	
2011		0		2011				2011	0	0	
2012		0		2012				2012	0	0	

APPENDIX B:
INDUSTRIAL SECTOR: METHODOLOGY AND DATA SELECTION

SOURCES EXAMINED

- Motor and Steam Challenge Program Material
- Interlaboratory Working Group Study (1997)
- USDOE Industrial Assessment Database (IAD)
- ACEEE 1997 Energy Efficiency and Economic Development in NY, NJ, and PA
- Delaware Census Data

DATA SELECTION PROCESS

- Downloaded IAD, including Assessments Table and Recommendation Table
  - Assessment Table included 8,193 entries on industries surveyed
  - Recommendation Table included 57,769 entries on industrial productivity and energy efficiency enhancements
- Limited size of IAD so that Access query was manageable
  - Assessment Table Limited by:
    - Two-digit SIC codes represented in Delaware.
      - Selected two-digit SICs with 1,000 or more employees in Delaware (Except for Petroleum Refining and Stone, Glass and Clay, both of which were included — even though number of employees is < 1,000 — due to high energy consumption per worker. Both of these SICs are targeted by Interlaboratory study.)
- Recommendation Table limited to energy efficiency measures
  - Combustion Systems
    - Furnaces, Ovens, and directly fired operations; Boilers; and Fuel Switching
  - Thermal Systems
    - Steam; Heat Recovery; Heat Containment; and Cooling
  - Electrical Power
    - Demand Management and Co-generation
  - Motor Systems
    - Motors; Air Compressors; and Other Equipment
  - Buildings and Grounds
    - Lighting and Space Conditioning
- Selected energy efficiency measures for SIC codes within selected states
  - Query Criteria
    - ID/SUPER ID
    - SIC Code – limited to manufacturing codes that are represented in Delaware
    - STATE (PA, DE, MD, VA, and NJ)
    - ARC (Assessment Recommendation Code)
    - Description of Recommendation
    - Implementation Cost for Recommendation

        - Energy Cost Total
        - Energy Usage by Fuel Type
            - Electricity, Natural Gas, LPG, Fuel Oil #1, Fuel Oil #2, Fuel Oil #4, Fuel Oil #6, Coal, Wood, Paper, Other Gas, Other (to calculate Total Energy Usage by establishment)
        - Energy Savings by Primary Resource
            - Fuel Type
            - Energy Conserved
            - Dollar Value Saved
        - Energy Savings by Secondary Resource
            - Fuel Type
            - Energy Conserved
            - Dollar Value Saved
    - Notable Data Excluded:
        - Tertiary Resource
            - (Source, Energy Conserved, Dollar Value Saved)
        - Quaternary Resource
            - (Source, Energy Conserved, Dollar Value Saved)
    - Query resulted in 1,358 entries
- Selection of Non-Duplicate Measures by Size of Energy Savings (to eliminate duplicate cases of the same measure; and to eliminate measures with small savings which typically result in high overhead requirements)
    - SIC codes often had duplicate measures. A typical case was picked based on energy savings and payback period.
    - Energy savings were ranked regardless of SIC and top 75^{th} percentile were selected (eliminating small savings cases)
    - 1,358 entries reduced to 171 entries
- Used national energy-employment ratio (energy consumption per worker) to determine energy consumption by SIC in Delaware
    - Extracted energy-employment ratios by two-digit SICs relevant to Delaware from ACE^3 database
    - Using Delaware Census data, determined the number of employees for selected Delaware four-digit SICs
    - Multiplied number of employees for each Delaware four-digit SIC by national energy-employment ratio for corresponding two-digit SIC
        - In effect, assumed that each chemical industry SIC used the same amount of energy on average per employee
    - Provides energy consumption for selected four-digit SICs in Delaware
- Calculated the energy savings in Delaware for each efficiency measure
    - Calculated the percentage of primary and secondary energy conserved for each efficiency measure by dividing the sum of primary and secondary energy savings by the particular facility's energy consumption
    - The energy consumption totals by four-digit SIC for Delaware were multiplied by the energy savings percentages for each measure (calculated as described above) to determine energy savings by efficiency measure by four-digit SIC

- Calculated the CO_2 emission reductions for Delaware
  - To scale the emission reductions derived from the database, a scaling factor was used. The energy consumption in the database was divided by the projected industrial energy consumption in 2010. This yielded a factor of 27%.
  - Next, each measure's primary and secondary energy savings (in BTUs) were multiplied by a conversion factor based on fuel type to determine metric tons of reduced CO_2 emissions
    - Conversion factors

- Electricity	0.088*		
- Natural Gas	117.080	x	2200**
- Fuel Oil #2	161.386	x	2200**
- Fuel Oil #4	161.386	x	2200**

    * electricity conversion factor was based on a 1990-1995 average fuel mix coefficient from the EIA's *State Energy Data Report*

    ** natural gas and fuel oil conversion factors were based on EIA's *Voluntary Reporting of Greenhouse Gases: Appendix B. Fuel and Energy Source Codes and Emission coefficients* (1997)

  - The estimate of CO_2 emission reduction derived in this manner was divided by the scaling factor of 27% to derive an estimate of CO_2 emission reduction for the Delaware industrial sector in 2010.
  - To determine the percent reduction, the above estimate of sectoral emission reductions was divided by the total projected sectoral emissions in 2010.
- Alternative scenarios were developed by multiplying the potential emission reduction by 65% and 35%
  - These alternative scenarios were based on implementation levels suggested in the Interlaboratory Working Group Study (1997).

APPENDIX C:
INDUSTRIAL SECTOR: ENERGY EFFICIENCY MEASURES

	STATE	SIC	ARC	DESCRIPTION	Implementation Cost per Establishment	Energy Usage by SIC	% Conserved Energy	Payback Period (years)	Annual Energy Savings by Establishment
1	DE	2015	2436	Install Desuperheater Water Heat Exchanger on Ice Maker System	$26,618	3,360,352	2.71%	2.1	$12,618
2	DE	2015	2626	Install Demand Defrost Controls on Freezer Coils	$33,000	3,360,352	0.95%	1.1	$29,378
3	DE	2015	4111	Replace V-Belts with Energy Efficient Belts	$2,803	3,360,352	0.17%	0.5	$5,159
4	DE	2015	4133	Install High Efficiency Motors	$45,837	3,360,352	1.24%	1.2	$38,274
5	DE	2015	4141	Install Variable Frequency Drives on Evaporative Condensor Fan	$66,206	3,360,352	0.85%	2.5	$26,349
6	DE	2015	7142	Install High Efficiency Lighting	$48,924	3,360,352	0.59%	2.7	$18,336
7	VA	2653	1212	Adjust Boiler Air-Fuel Ratio	$1,495	626,140	1.22%	1.0	$1,495
8	PA	2653	1213	Duct warm air to boiler air intake	$2,090	626,140	5.67%	0.3	$6,565
9	PA	2653	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$500	626,140	5.08%	0.1	$3,797
10	NJ	2653	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$0	626,140	2.18%	0.0	$2,812
11	PA	2653	2131	Insulate pipes	$317	626,140	0.98%	0.3	$1,201
12	NJ	2653	2133	Repair Leaks in Steam Lines and Valves	$1,455	626,140	12.35%	0.1	$11,639
13	PA	2653	2411	Use Waste Heat from Hot Flue Gases to Preheat Combustion Air	$6,800	626,140	13.03%	0.7	$9,848
14	PA	2653	7222	Air Condition Only Space in Use	$6,100	626,140	4.60%	1.8	$3,475
15	DE	2653	7243	Improve Interior Circulation with Destratification Fans, etc.	$4,320	626,140	2.11%	1.3	$3,434
16	NJ	2655	7233	Use Properly Designed and Sized HVAC Equipment	$7,010	626,140	18.91%	1.3	$5,240
17	NJ	2656	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$537	1,341,728	0.99%	0.2	$2,651
18	NJ	2656	7226	Use Computer Programs to Optimize HVAC Performance	$20,000	1,341,728	13.65%	0.1	$139,451
19	DE	2657	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$500	626,140	2.23%	0.1	$3,536
20	NJ	2657	2131	Insulate steam pipes	$2,420	626,140	3.11%	0.5	$4,874
21	NJ	2657	2411	Install heat exchangers	$5,550	626,140	11.53%	0.3	$18,070
22	DE	2657	4236	Eliminate Leaks in Inert Gas and Compressed Air Lines	$0	626,140	2.21%	0.0	$11,757
23	DE	2657	7243	Improve Interior Circulation with Destratification Fans, etc.	$4,140	626,140	2.37%	1.2	$3,548
24	DE	2657	7261	Install Timers and/or Thermostats	$2,151	626,140	2.34%	0.6	$3,707
25	VA	2671	1233	Adjust Steam Boiler Air-Fuel Ratio	$400	1,341,728	0.47%	0.2	$1,807
26	DE	2671	2428	Use Hot Flue Gases in Radiant Heaters for Space Heating, Etc.	$66,700	1,341,728	12.87%	0.8	$80,513
27	DE	2671	4115	Recover and Reuse Cooling Water	$0	1,341,728	0.92%	0.0	$18,842
28	DE	2671	4231	Reduce the Pressure of Compressed Air to Minimum	$3,200	1,341,728	0.40%	0.4	$8,150
29	VA	2671	7143	Install Energy-Efficient Lighting	$25,510	1,341,728	1.21%	1.8	$14,327

Primary Source Code	Primary % Conserved	Primary Energy Saved	Cost of Energy	Primary CO_2 saved [t]	Second. Source Code	Secondary % Conserved	Secondary Energy Saved	Cost of Energy	Secondary CO_2 Saved [t]	
# 2 Fuel Oil	2.71%	91,107	$4.91	6,683.34						1
Electricity	0.95%	31,861	$13.82	2,803.75						2
Electricity	0.17%	5,590	$13.82	491.94						3
Electricity	1.24%	41,520	$13.82	3,653.75						4
Electricity	0.85%	28,570	$13.82	2,514.19						5
Electricity	0.59%	19,902	$13.82	1,751.37						6
Natural Gas	1.22%	7,609	$2.84	404.92						7
Natural Gas	5.67%	35,500	$2.84	1,889.25						8
Natural Gas	5.08%	31,793	$2.84	1,691.97						9
# 4 Fuel Oil	2.18%	13,638	$4.91	1,000.45						10
Natural Gas	0.98%	6,157	$2.84	327.65						11
Natural Gas	9.81%	61,440	$2.84	3,269.74	# 2 Fuel Oil	2.54%	15,888	$4.91	1,165.49	12
Natural Gas	13.03%	81,591	$2.84	4,342.11						13
Natural Gas	4.60%	28,797	$2.84	1,532.51						14
Natural Gas	2.15%	13,444	$2.84	715.46	Electricity	-0.04%	(254)	$13.82	(22.35)	15
# 2 Fuel Oil	31.27%	195,797	$4.91	14,363.14	Natural Gas	-12.36%	(77,422)	$2.84	(4,120.25)	16
Natural Gas	0.99%	13,347	$2.84	710.32						17
Electricity	10.88%	145,915	$13.82	12,840.51	Natural Gas	2.78%	37,297	$2.84	1,984.85	18
Natural Gas	2.23%	13,986	$2.84	744.32						19
Natural Gas	3.11%	19,464	$2.84	1,035.85						20
Natural Gas	11.53%	72,205	$2.84	3,842.61						21
Electricity	2.21%	13,863	$13.82	1,219.93						22
Natural Gas	2.42%	15,149	$2.84	806.19	Electricity	-0.05%	(335)	$13.82	(29.45)	23
Natural Gas	2.34%	14,673	$2.84	780.88						24
Natural Gas	0.47%	6,367	$2.84	338.83						25
# 2 Fuel Oil	12.87%	172,695	$4.91	12,668.45						26
Electricity	0.92%	12,288	$13.82	1,081.31						27
Electricity	0.40%	5,318	$13.82	467.95						28
Electricity	1.21%	16,264	$13.82	1,431.26						29

	STATE	SIC	ARC	DESCRIPTION	Implementation Cost per Establishment	Energy Usage by SIC	% Conserved Energy	Payback Period (years)	Annual Energy Savings by Establishment
30	DE	2671	7243	Improve Interior Circulation with Destratification Fans, etc.	$5,220	1,341,728	0.88%	1.0	$5,303
31	DE	2672	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$2,000	626,140	9.42%	0.1	$19,516
32	DE	2672	4111	Utilize Energy Efficient Belts and Other Improved Mechanisms	$0	626,140	0.75%	0.0	$7,753
33	NJ	2672	7243	Improve Interior Circulation with Destratification Fans, etc.	$6,660	626,140	9.20%	1.5	$4,528
34	NJ	2741	4236	Eliminate Leaks in Inert Gas and Compressed Air Lines	$56	7,644	3.46%	0.0	$7,750
35	NJ	2752	2432	Recover Heat from Oven Exhaust/Kilns	$23,000	42,626	4.08%	4.0	$5,783
36	NJ	2752	2441	Preheat Boiler Makeup Water with Waste Process Heat	$9,500	42,626	5.79%	1.1	$8,856
37	VA	2752	2442	Install Combustion Pre-Heater	$5,634	42,626	18.46%	0.5	$11,625
38	MD	2752	4132	Install High Efficiency Motors	$21,621	42,626	3.73%	1.4	$15,720
39	MD	2752	7143	Install High Efficiency Lighting	$14,284	42,626	5.80%	0.6	$23,794
40	NJ	2819	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$500	2,051,483	6.96%	0.2	$3,169
41	VA	2819	2131	Insulate presently uninsulated steam mains and condensate line	$2,700	2,051,483	1.19%	0.5	$5,639
42	NJ	2819	2411	Use Waste Heat from Hot Flue Gases to Preheat Combustion Air	$6,800	2,051,483	8.16%	1.8	$3,748
43	NJ	2819	2443	Reuse/Recycle Hot or Cold Process Exhaust Air	$11,000	2,051,483	6.70%	4.1	$2,714
44	VA	2819	2511	Insulate exterior surface of heat exchangers	$790	2,051,483	0.79%	0.2	$3,753
45	VA	2819	4115	Recover and Reuse Cooling Water	$10,940	2,051,483	0.61%	0.3	$37,721
46	VA	2819	4133	Install High Efficiency Motors	$6,838	2,051,483	0.07%	1.5	$4,599
47	VA	2819	4236	Repair Leaks in Compressed Air Lines	$1,600	2,051,483	11.46%	0.2	$8,052
48	PA	2821	1213	Preheat boiler intake air using hot flue gas	$11,600	700,712	0.32%	2.5	$4,636
49	NJ	2821	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$750	700,712	7.35%	0.0	$48,442
50	NJ	2821	2113	Repair or Replace Steam Traps	$30,000	700,712	14.69%	0.3	$94,269
51	NJ	2821	2411	Use Waste Heat from Hot Flue Gases to Preheat Combustion Air	$7,500	700,712	0.58%	1.1	$6,895
52	NJ	2833	2411	Install stack heatexchanger to preheat combustion air	$11,610	168,846	9.50%	1.1	$10,486
53	NJ	2833	7142	Install high efficiency lighting	$81,329	168,846	4.59%	2.3	$34,962
54	NJ	2834	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$537	1,055,290	3.41%	0.0	$11,719
55	NJ	2834	2133	Repair Leaks in Steam Lines and Valves	$500	1,055,290	9.06%	0.0	$31,090
56	NJ	2834	7226	Use Computer Programs to Optimize HVAC Performance	$12,000	1,055,290	2.47%	0.6	$20,807
57	NJ	2844	1232	Clean/Adjust boiler	$220	1,055,290	3.24%	0.0	$5,227
58	NJ	2865	2131	Insulate Steam/Hot Water Lines	$8,786	2,110,580	1.21%	2.0	$4,470
59	NJ	2865	2133	Repair Leaks in Steam Lines and Valves	$160	2,110,580	6.47%	0.0	$23,820
60	NJ	2869	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$537	492,469	2.79%	0.2	$2,411
61	NJ	2891	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$500	28,141	3.56%	0.3	$1,646
62	VA	2951	2511	Insulate the Rotating Kiln	$5,655	715,227	2.87%	0.8	$7,287
63	VA	2951	4131	Install High Efficiency Motors	$45,026	715,227	0.63%	3.6	$12,439

Primary Source Code	Primary % Conserved	Primary Energy Saved	Cost of Energy	Primary CO_2 saved [t]	Second. Source Code	Secondary % Conserved	Secondary Energy Saved	Cost of Energy	Secondary CO_2 Saved [t]	
Natural Gas	0.89%	11,962	$2.84	636.62	Electricity	-0.02%	(211)	$13.82	(18.56)	30
Natural Gas	9.42%	58,955	$2.84	3,137.47						31
Electricity	0.75%	4,682	$13.82	411.99						32
Natural Gas	9.47%	59,275	$2.84	3,154.53	Electricity	-0.27%	(1,667)	$13.82	(146.71)	33
Electricity	3.46%	264	$13.82	23.26						34
Natural Gas	4.08%	1,741	$2.84	92.64						35
Natural Gas	5.79%	2,468	$2.84	131.35						36
Natural Gas	18.46%	7,870	$2.84	418.85						37
Elect. Consumpt.	3.73%	1,590	$13.82	139.93	Elect. Demand	0.00%	0	$0.00	-	38
Electr. Consump.	5.80%	2,474	$13.82	217.74	Electr. Demand	0.00%	0	$0.00	-	39
# 2 Fuel Oil	6.96%	142,704	$4.91	10,468.41						40
# 2 Fuel Oil	1.19%	24,327	$4.91	1,784.57						41
# 2 Fuel Oil	8.16%	167,338	$4.91	12,275.46						42
# 2 Fuel Oil	6.70%	137,355	$4.91	10,076.01						43
# 2 Fuel Oil	0.79%	16,191	$4.91	1,187.73						44
Electr. Consump.	0.61%	12,578	$13.82	1,106.85	Electr. Demand	0.00%	0	$0.00	-	45
Elect. Consumpt.	0.07%	1,534	$13.82	134.97	Elect. Demand	0.00%	0	$0.00	-	46
Elect. Consump.	11.46%	235,189	$13.82	20,696.60	Elect. Demand	0.00%	0	$0.00	-	47
Natural Gas	0.32%	2,240	$2.84	119.22						48
Natural Gas	7.21%	50,509	$2.84	2,688.01	# 6 Fuel Oil	0.15%	1,016	$2.62	80.35	49
Natural Gas	12.31%	86,262	$2.84	4,590.70	# 6 Fuel Oil	2.38%	16,678	$2.62	1,318.33	50
Natural Gas	0.58%	4,048	$2.84	215.45						51
Natural Gas	9.50%	16,043	$2.84	853.76						52
Electr. Consump.	4.59%	7,756	$13.82	682.56	Electr. Demand	0.00%	0	$0.00	-	53
# 4 Fuel Oil	3.41%	36,012	$4.91	2,641.71						54
# 4 Fuel Oil	9.06%	95,570	$4.91	7,010.75						55
Electricity	2.47%	26,026	$13.82	2,290.27						56
Natural Gas	3.24%	34,229	$2.84	1,821.63						57
Natural Gas	1.06%	22,391	$2.84	1,191.63	# 4 Fuel Oil	0.15%	3,232	$4.91	237.12	58
Natural Gas	5.65%	119,333	$2.84	6,350.68	# 4 Fuel Oil	0.82%	17,220	$4.91	1,263.19	59
Natural Gas	2.79%	13,736	$2.84	731.03						60
Natural Gas	3.56%	1,001	$2.84	53.25						61
Natural Gas	2.87%	20,492	$2.84	1,090.54						62
Electricity	0.63%	4,478	$13.82	394.04						63

	STATE	SIC	ARC	DESCRIPTION	Implementation Cost per Establishment	Energy Usage by SIC	% Conserved Energy	Payback Period (years)	Annual Energy Savings by Establishment
64	PA	2952	2411	Install recuperators on asphalt heaters	$8,140	1,129,306	3.63%	0.3	$23,449
65	PA	2952	4221	Use outside air for compressor intakes	$400	1,129,306	0.23%	0.1	$5,530
66	PA	2952	7111	Reduce light level in warehouse	$500	1,129,306	0.77%	0.0	$18,420
67	PA	2952	7143	Install high pressure sodium fixtures	$26,726	1,129,306	1.14%	1.0	$26,996
68	VA	3052	4231	Reduce Compresspor Air Pressure	$100	16,428	2.69%	0.0	$3,644
69	VA	3052	7111	Reduce Lighting Usage	$6,120	16,428	5.18%	0.9	$7,021
70	VA	3052	7241	Add Economizers on Air Handling Units	$6,985	16,428	7.14%	0.7	$9,680
71	NJ	3061	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$500	102,677	7.50%	0.0	$10,885
72	PA	3069	1222	Install turbulators in boiler tubes	$1,040	55,857	0.37%	0.8	$1,291
73	NJ	3069	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$537	55,857	6.68%	0.0	$15,337
74	PA	3069	2131	Insulate Steam Pipes	$8,003	55,857	2.84%	0.8	$9,848
75	NJ	3069	2133	Repair Leaks in Steam Lines and Valves	$100	55,857	3.34%	0.0	$7,660
76	NJ	3069	2411	Use Waste Heat from Hot Flue Gases to Preheat Combustion Air	$7,500	55,857	9.96%	0.6	$11,747
77	NJ	3069	2412	Use Flue Gas to Preheat Boiler Feedwater	$3,000	55,857	3.58%	0.4	$8,211
78	PA	3069	2511	Insulate Hot Sufaces of the Presses	$6,986	55,857	2.52%	0.8	$8,274
79	NJ	3069	4231	Reduce the Pressure of Compressed Air to Minimum	$0	55,857	0.75%	0.0	$9,625
80	PA	3069	7243	Install Destratification Fans	$7,200	55,857	2.79%	1.7	$4,267
81	NJ	3069	7261	Install Timers and/or Thermostats	$675	55,857	5.18%	0.1	$11,903
82	NJ	3081	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$2,500	167,843	1.06%	0.9	$2,825
83	PA	3081	2133	Repair Leaks in Steam Lines and Valves	$430	167,843	0.29%	0.2	$1,725
84	NJ	3081	2411	Use Waste Heat from Hot Flue Gases to Preheat Combustion Air	$25,000	167,843	13.17%	0.7	$35,120
85	NJ	3087	4221	Install Compressor Intakes in Coolest Locations	$700	101,856	2.38%	0.0	$14,131
86	PA	3089	1213	Duct Warm air to Boiler Air intakes	$2,330	248,890	14.01%	0.2	$12,196
87	NJ	3089	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$500	248,890	5.44%	0.2	$3,179
88	NJ	3089	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$269	248,890	2.83%	0.0	$5,698
89	NJ	3089	2133	Repair Leaks in Steam Lines and Valves	$325	248,890	10.77%	0.1	$6,284
90	VA	3089	2163	Use Minimum Steam Operating Pressure	$0	248,890	2.40%	0.0	$2,783
91	VA	3089	2437	Install Heat Reovery System on Extruder	$5,691	248,890	2.47%	0.5	$12,028
92	PA	3089	2492	Recover boiler room waste heat	$1,360	248,890	6.40%	0.1	$11,475
93	NJ	3089	2614	Use Cooling Tower/Economizer Cooling to Replace Chiller	$11,500	248,890	2.76%	0.7	$16,605
94	PA	3089	3291	Install energy managers	$5,000	248,890	1.39%	0.2	$23,639
95	MD	3089	4111	Replace Drive Belts with HTD Belts	$6,600	248,890	5.62%	1.6	$4,204
96	VA	3089	4133	Install High Efficiency Motors	$8,261	248,890	1.59%	1.7	$4,776
97	MD	3089	4231	Reduce Compressor Air Pressure	$15	248,890	0.28%	0.0	$2,247

Primary Source Code	Primary % Conserved	Primary Energy Saved	Cost of Energy	Primary CO_2 saved [t]	Second. Source Code	Secondary % Conserved	Secondary Energy Saved	Cost of Energy	Secondary CO_2 Saved [t]	
Natural Gas	3.63%	40,987	$2.84	2,181.27						64
Elect. Consump.	0.23%	2,627	$13.82	231.20	Elect. Demand	0.00%	0	$0.00	-	65
Electr. Consump.	0.77%	8,752	$13.82	770.17	Electr. Demand	0.00%	0	$0.00	-	66
Electr. Consump.	1.14%	12,846	$13.82	1,130.48	Electr. Demand	0.00%	0	$0.00	-	67
Electricity	2.69%	442	$13.82	38.86						68
Electricity	5.18%	851	$13.82	74.90						69
Electricity	7.14%	1,173	$13.82	103.18						70
# 2 Fuel Oil	7.50%	7,701	$4.91	564.92						71
Natural Gas	0.37%	208	$2.84	11.05						72
# 2 Fuel Oil	6.68%	3,730	$4.91	273.65						73
Natural Gas	2.84%	1,584	$2.84	84.30						74
# 2 Fuel Oil	3.34%	1,866	$4.91	136.88						75
Natural Gas	8.77%	4,899	$2.84	260.71	# 2 Fuel Oil	1.19%	663	$4.91	48.65	76
# 2 Fuel Oil	3.58%	1,997	$4.91	146.51						77
Electricity	2.52%	1,406	$13.82	123.72						78
Electricity	0.75%	421	$13.82	37.03						79
Natural Gas	2.79%	1,558	$2.84	82.89						80
# 2 Fuel Oil	5.18%	2,895	$4.91	212.37						81
# 2 Fuel Oil	1.06%	1,779	$4.91	130.51						82
Natural Gas	0.29%	483	$2.84	25.72						83
# 2 Fuel Oil	13.17%	22,103	$4.91	1,621.44						84
Electricity	2.38%	2,424	$13.82	213.29						85
Natural Gas	14.01%	34,882	$2.84	1,856.35						86
# 4 Fuel Oil	5.44%	13,549	$4.91	993.89						87
# 2 Fuel Oil	2.83%	7,044	$4.91	516.71						88
# 4 Fuel Oil	10.77%	26,803	$4.91	1,966.22						89
Natural Gas	2.40%	5,983	$2.84	318.41						90
Electr. Consump.	2.47%	6,142	$13.82	540.52	Electr. Demand	0.00%	0	$0.00	-	91
Natural Gas	6.40%	15,920	$2.84	847.26						92
Electricity	2.76%	6,865	$13.82	604.09						93
Electr. Consump.	1.39%	3,452	$13.82	303.80						94
Electricity	5.62%	13,984	$13.82	1,230.63						95
Electricity	1.59%	3,957	$13.82	348.21						96
Electricity	0.28%	704	$13.82	61.94						97

	STATE	SIC	ARC	DESCRIPTION	Implementation Cost per Establishment	Energy Usage by SIC	% Conserved Energy	Payback Period (years)	Annual Energy Savings by Establishment
98	VA	3089	4233	Replace Compressed-Air Wipers with Sponge Rollers	$3,000	248,890	1.81%	0.6	$5,441
99	VA	3089	4237	Replace Compressed Air Cooling with Water or Air Cooling	$13,460	248,890	5.33%	0.5	$24,816
100	MD	3089	7111	Reduce Lighting	$9,819	248,890	2.73%	0.5	$21,730
101	NJ	3089	7221	Maintain Lower Temp. in Winter & Higher in Summer	$0	248,890	43.88%	0.0	$8,044
102	MD	3089	7224	Set Back Space Heaters During Heating Season	$900	248,890	3.13%	0.1	$8,812
103	PA	3089	7226	Use Computer Programs to Optimize HVAC Performance	$0	248,890	7.30%	0.0	$31,161
104	PA	3089	7261	Install Timers and/or Thermostats	$2,800	248,890	11.97%	0.5	$5,664
105	PA	3229	2131	Insulate Steam Pipes	$2,745	33,442	0.61%	0.4	$6,143
106	PA	3229	2422	Preheat Lehr Intake Air using the surface heat near burners	$677	33,442	0.76%	0.2	$3,479
107	PA	3229	2437	Recover furnace waste heat	$3,690	33,442	1.48%	0.2	$14,990
108	PA	3229	2443	Install a Stack Heat Exchanger	$3,500	33,442	2.37%	0.5	$6,502
109	PA	3229	2511	Insulation of Day tanks	$910	33,442	1.21%	0.2	$5,488
110	PA	3229	2514	Use Doors on 16 pot furnace openings to reduce heat loss	$522	33,442	1.21%	0.1	$6,458
111	PA	3229	4231	Reduce compressor air pressure	$35	33,442	0.17%	0.0	$4,577
112	PA	3295	1213	Preheat Intake air using hot surface	$4,500	87,240	0.52%	3.3	$1,367
113	PA	3296	2411	Preheat Boiler Intake air using hot fuel gas	$3,700	254,451	0.78%	0.4	$9,068
114	PA	3296	2437	Use Process heat to preheat water	$7,710	254,451	0.54%	1.2	$6,325
115	PA	3296	2511	Insulate Intake pipe to waste heat boiler	$288	254,451	0.36%	0.1	$4,143
116	VA	3297	2511	Insulate the Rotating Kiln	$16,700	14,540	7.16%	0.8	$21,127
117	VA	3297	4236	Repair Leaks in Compressed Air Lines	$1,200	14,540	1.04%	0.2	$6,452
118	PA	3312	4226	Install Small Compressor	$36,000	1,185,121	1.25%	0.9	$38,326
119	PA	3312	7291	Eliminate Heaters in the Compressor Room	$19	1,185,121	0.47%	0.0	$4,127
120	NJ	3315	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$537	553,057	0.49%	0.3	$1,936
121	MD	3315	4111	Utilize Energy Efficient Belts and Other Improved Mechanisms	$21,400	553,057	1.98%	1.3	$16,798
122	MD	3315	4133	Use Most Efficient Type of Electric Motors	$44,360	553,057	4.20%	1.2	$35,736
123	PA	3321	7233	Use Properly Designed and Sized HVAC Equipment	$8,240	1,185,121	4.58%	1.8	$4,470
124	NJ	3429	7243	Improve Interior Circulation with Destratification Fans, etc.	$5,040	13,392	1.91%	1.3	$3,847
125	NJ	3442	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$500	39,059	3.37%	0.2	$2,009
126	NJ	3442	2437	Recover Waste Heat from Equipment	$500	39,059	2.96%	0.1	$4,934
127	NJ	3442	4236	Eliminate Leaks in Inert Gas and Compressed Air Lines	$200	39,059	2.77%	0.0	$20,305
128	NJ	3442	7231	Install Infrared heaters	$6,000	39,059	5.85%	0.9	$6,903
129	PA	3442	7243	Install destratification fans	$10,400	39,059	5.72%	3.8	$2,763
130	NJ	3442	7261	Install secure thermostats	$5,000	39,059	9.46%	0.4	$11,162
131	PA	3444	7221	Maintain Lower Temp. in Winter & Higher in Summer	$0	134,587	30.48%	0.0	$4,207

Primary Source Code	Primary % Conserved	Primary Energy Saved	Cost of Energy	Primary CO_2 saved [t]	Second. Source Code	Secondary % Conserved	Secondary Energy Saved	Cost of Energy	Secondary CO_2 Saved [t]	
Electricity	1.81%	4,502	$13.82	396.17						98
Electricity	5.33%	13,276	$13.82	1,168.25						99
Electricity	2.73%	6,807	$13.82	598.98						100
Natural Gas	43.88%	109,219	$2.84	5,812.42						101
Natural Gas	3.13%	7,791	$2.84	414.60						102
Electricity	7.30%	18,181	$13.82	1,599.89						103
Natural Gas	11.97%	29,791	$2.84	1,585.40						104
Natural Gas	0.61%	202	$2.84	10.77						105
Natural Gas	0.76%	256	$2.84	13.61						106
Natural Gas	1.48%	494	$2.84	26.29						107
Natural Gas	2.37%	793	$2.84	42.18						108
Natural Gas	1.21%	403	$2.84	21.45						109
Natural Gas	1.21%	404	$2.84	21.49						110
Electricity	0.17%	58	$13.82	5.10						111
Natural Gas	0.52%	454	$2.84	24.15						112
Natural Gas	0.78%	1,978	$2.84	105.25						113
Natural Gas	0.54%	1,379	$2.84	73.39						114
Natural Gas	0.36%	903	$2.84	48.08						115
Natural Gas	7.16%	1,040	$2.84	55.37						116
Elect. Consumpt.	1.04%	151	$13.82	13.32						117
Electricity	1.25%	14,822	$13.82	1,304.31						118
Natural Gas	0.47%	5,578	$2.84	296.84						119
# 4 Fuel Oil	0.49%	2,722	$4.91	199.70						120
Electricity	1.98%	10,930	$13.82	961.81						121
Electricity	4.20%	23,247	$13.82	2,045.75						122
# 2 Fuel Oil	4.58%	54,236	$4.91	3,978.57						123
Natural Gas	1.97%	264	$2.84	14.03	Electricity	-0.06%	(7)	$13.82	(0.66)	124
Natural Gas	3.37%	1,318	$2.84	70.13						125
Natural Gas	2.96%	1,156	$2.84	61.54						126
Electricity	2.77%	1,081	$13.82	95.11						127
Natural Gas	5.85%	2,286	$2.84	121.68						128
Natural Gas	5.79%	2,260	$2.84	120.30	Electr. Consump.	-0.06%	(24)	$13.82	(2.15)	129
Natural Gas	9.46%	3,696	$2.84	196.69						130
Natural Gas	30.48%	41,022	$2.84	2,183.10						131

	STATE	SIC	ARC	DESCRIPTION	Implementation Cost per Establishment	Energy Usage by SIC	% Conserved Energy	Payback Period (years)	Annual Energy Savings by Establishment
132	VA	3471	1233	Adjust Boiler Air-Fuel Ratio	$1,495	13,392	3.03%	0.3	$4,337
133	PA	3471	2133	Repair Leaks in Steam Lines and Valves	$0	13,392	1.42%	0.0	$6,034
134	PA	3479	1213	Use Hot Flue Gas to Preheat Intake Combustion Air	$7,445	2,232	6.04%	1.7	$4,294
135	PA	3479	1233	Adjust Boiler/Oven Air-Fuel Ratio	$5,000	2,232	14.19%	0.5	$10,127
136	NJ	3479	2153	Close Off Unneeded Steam Lines	$1,880	2,232	1.65%	1.1	$1,773
137	PA	3479	2422	Use Waste heat from Hot Flue Gases to Generate Steam	$15,000	2,232	18.00%	0.3	$52,380
138	PA	3491	7241	Add economizers on air conditioning units	$11,628	2,232	8.90%	1.1	$11,051
139	NJ	3496	2422	Use Waste heat from Hot Flue Gases to Generate Steam	$11,500	2,232	5.02%	1.2	$9,901
140	DE	3496	2532	Use Only Amount of Air Necessary to Drive Off Combustible Solv	$10,000	2,232	8.03%	1.7	$5,773
141	NJ	3498	7224	Reduce/Eliminate Space Heating/Cooling During Non-Working Hour	$0	41,068	1.31%	0.0	$4,210
142	MD	3499	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$500	13,392	0.89%	0.2	$2,376
143	NJ	3499	2131	Insulate Steam/Hot Water Lines	$2,290	13,392	4.20%	1.1	$2,107
144	VA	3546	2525	Create an Indoor Recirc. Loop for Heat Treat Oil	$3,677	6,911	2.39%	0.2	$20,090
145	VA	3546	4141	Instal VSD on Cooling Tower Fans	$5,698	6,911	0.58%	1.2	$4,595
146	PA	3561	1233	Analyze Flue Gas for Proper Air/Fuel Ratio	$0	1,152	5.07%	0.0	$1,830
147	VA	3561	4236	Repair Leaks in Compressed Air Lines	$400	1,152	1.99%	0.2	$1,834
148	PA	3564	4236	Eliminate Leaks in Inert Gas and Compressed Air Lines	$0	6,911	1.60%	0.0	$9,599
149	MD	3585	1233	Adjust furnace air fuel ratio	$2,000	43,197	3.00%	0.7	$2,667
150	PA	3589	7261	Install Timers and/or Thermostats	$239	1,152	13.49%	0.1	$4,071
151	NJ	3613	7231	Use Radiant Heater for Spot Heating	$10,500	7,303	33.26%	1.2	$8,910
152	VA	3679	2411	Install a Heat Reclaim System in Ovens	$7,873	7,303	3.77%	0.9	$9,088
153	VA	3679	2612	Free Cooling from Chilled Water Heat Rejection Loop	$66,950	7,303	1.76%	2.7	$24,554
154	VA	3679	4131	Reduce Air Handler Air Flow	$1,296	7,303	1.19%	0.1	$8,786
155	VA	3679	4141	Install VFD on Cooling Tower Motor	$6,136	7,303	0.66%	0.7	$9,378
156	NJ	3679	7261	Install Timers and/or Thermostats	$2,800	7,303	10.66%	0.4	$6,567
157	PA	3711	7231	Change oil heaters to radiant heaters	$9,600	1,316,241	48.35%	3.0	$3,205
158	VA	3713	7261	Install Timers and/or Thermostats	$0	1,755	13.06%	0.0	$5,046
159	VA	3714	4111	Replace standard V-belts with cogged V-belts	$955	1,755	0.66%	0.2	$5,663
160	VA	3714	4221	Move compressor air intakes outdoors	$1,120	1,755	0.62%	0.2	$6,310
161	VA	3714	4236	Repair compressed air leaks	$5,000	1,755	0.68%	0.7	$6,880
162	PA	3823	2131	Insulate Pipes of the Boiler	$490	1,003	2.54%	0.4	$1,191
163	PA	3823	7224	Reduce/Eliminate Space Heating/Cooling During Non-Working Hour	$0	1,003	7.77%	0.0	$8,820
164	NJ	3842	2411	Install Stack Heat Exchanger	$1,110	6,021	5.73%	0.1	$16,870
165	PA	3842	2443	Use inside air for air makeup systems	$0	6,021	3.26%	0.0	$8,932
166	NJ	3842	7142	Install high efficiency lighting	$111,891	6,021	3.47%	2.6	$43,564

Primary Source Code	Primary % Conserved	Primary Energy Saved	Cost of Energy	Primary CO_2 saved [t]	Second. Source Code	Secondary % Conserved	Secondary Energy Saved	Cost of Energy	Secondary CO_2 Saved [t]	
Natural Gas	3.03%	406	$2.84	21.62						132
Natural Gas	1.42%	190	$2.84	10.13						133
Natural Gas	6.04%	135	$2.84	7.18						134
Natural Gas	14.19%	317	$2.84	16.85						135
Natural Gas	1.65%	37	$2.84	1.96						136
Natural Gas	18.00%	402	$2.84	21.38						137
Electr. Consump.	8.90%	199	$13.82	17.48						138
Natural Gas	5.02%	112	$2.84	5.97						139
Natural Gas	8.03%	179	$2.84	9.54						140
Natural Gas	1.31%	538	$2.84	28.62						141
Natural Gas	0.89%	119	$2.84	6.33						142
# 2 Fuel Oil	4.20%	562	$4.91	41.23						143
Electricity	2.39%	165	$13.82	14.51						144
Electricity	0.58%	40	$13.82	3.53						145
# 2 Fuel Oil	5.07%	58	$4.91	4.28						146
Elect. Consumpt.	1.99%	23	$13.82	2.02						147
Electricity	1.60%	111	$13.82	9.76						148
Natural Gas	3.00%	1,295	$2.84	68.93						149
Natural Gas	13.49%	155	$2.84	8.27						150
Natural Gas	33.26%	2,429	$2.84	129.27						151
Natural Gas	3.77%	275	$2.84	14.65						152
Electr. Consump.	1.76%	129	$13.82	11.31						153
Elect. Consumpt.	1.19%	87	$13.82	7.64	Elect. Demand	0.00%	0	$0.00	-	154
Elect. Consumpt.	0.66%	48	$13.82	4.26						155
Natural Gas	10.66%	778	$2.84	41.42						156
# 2 Fuel Oil	48.35%	636,339	$4.91	46,680.07						157
# 2 Fuel Oil	12.64%	222	$4.91	16.27	Electricity	0.42%	7	$13.82	0.65	158
Electricity	0.66%	12	$13.82	1.03						159
Elect. Consumpt.	0.62%	11	$13.82	0.95	Elect. Demand	0.00%	0	$0.00	-	160
Elect. Consumpt.	0.68%	12	$13.82	1.05	Elect. Demand	0.00%	0	$0.00	-	161
Natural Gas	2.54%	26	$2.84	1.36						162
Natural Gas	7.77%	78	$2.84	4.15						163
Natural Gas	5.73%	345	$2.84	18.36						164
Natural Gas	3.26%	196	$2.84	10.45						165
Electr. Consump.	3.47%	209	$13.82	18.41	Electr. Demand	0.00%	0	$0.00	-	166

	STATE	SIC	ARC	DESCRIPTION	Implementation Cost per Establishment	Energy Usage by SIC	% Conserved Energy	Payback Period (years)	Annual Energy Savings by Establishment
167	VA	3949	1233	Adjust Boiler Air-Fuel Ratio	$1,495	4,128	5.09%	0.3	$4,337
168	VA	3949	4236	Repair Leaks In Compressed Air Lines	$800	4,128	1.67%	0.2	$4,909
169	VA	3999	2411	Install Combustion Air Preheater	$5,800	688	9.06%	0.4	$16,369
170	VA	3999	7221	Reduce Setpoints on Unit Heaters in Warehouse B and C	$0	688	4.71%	0.0	$8,524

Primary Source Code	Primary % Conserved	Primary Energy Saved	Cost of Energy	Primary CO_2 saved [t]	Second. Source Code	Secondary % Conserved	Secondary Energy Saved	Cost of Energy	Secondary CO_2 Saved [t]	
Natural Gas	5.09%	210	$2.84	11.19						167
Elect. Consumpt.	1.67%	69	$13.82	6.07						168
Natural Gas	9.06%	62	$2.84	3.32						169
Natural Gas	4.71%	32	$2.84	1.72						170

	Energy usage (TBtu)	
Projected energy consumption in 2010	105.03	
Energy consumption in data set	25.12	
	CO_2 emissions	
2010 projected emissions	4,222,594	4,222,594
Datasheet's emission reductions	274,994	1,149,794
Emissions Reduction		27%
	Emission Reductions	
100% Scenario CO_2 Reduction (t)	1,140,100	27%
Remaining Emissions (t)	3,082,493	
65% Scenario CO_2 Reduction (t)	741,065	18%
Remaining Emissions (t)	3,481,528	
35% Scenario CO_2 Reduction (t)	399,035	9%
Remaining Emissions (t)	3,823,558	
Average Payback Period (yr)		0.68

APPENDIX D:

RESIDENTIAL SECTOR: FUEL AND END-USE ELECTRICITY CONSUMPTION

	Coal			***Natural Gas***			***Distillate Fuel***			***Kerosene***		
Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	
1985	0	0	1985	6.315	336075	1985	7.8186	572452	1985	3.7088	268417	
1986	0.1	9512.6	1986	7	372527	1986	6.2	453942	1986	1.8	130270	
1987	0.3007	28601	1987	7.1158	378689	1987	7.8173	572358	1987	1.9042	137813	
1988	0.1004	9552.5	1988	7.7323	411498	1988	8.134	595540	1988	1.7071	123549	
1989	0.2	19025	1989	7.7	409780	1989	7.7	563767	1989	1.5	108559	
1990	0.2	19025	1990	7.4	393815	1990	5.6	410012	1990	0.8	57898	
1991	0.2	19025	1991	7.4	393815	1991	5.9	431977	1991	0.9	65135	
1992	0	0	1992	8.5	452355	1992	6.1	446621	1992	0.8	57898	
1993	0.4008	38123	1993	8.6163	458543	1993	6.6125	484144	1993	0.6011	43506	
1994	0.2004	19061	1994	8.9166	474525	1994	6.9129	506136	1994	0.5009	36254	
1995	0	0	1995	8.8	468320	1995	6.3	461264	1995	0.7	50661	
1996	0.1766	16801	1996	8.9142	474395	1996	5.8762	430238	1996	0.68	49213	
1997	0.1776	16891	1997	8.9674	477230	1997	5.6413	413040	1997	0.6669	48269	
1998	0.1782	16950	1998	9.0042	479188	1998	5.4066	395853	1998	0.6533	47284	
1999	0.1788	17009	1999	9.0409	481140	1999	5.182	379410	1999	0.6404	46345	
2000	0.1798	17099	2000	9.0939	483962	2000	4.9759	364320	2000	0.6291	45532	
2001	0.181	17221	2001	9.1634	487660	2001	4.7865	350449	2001	0.6195	44837	
2002	0.1823	17343	2002	9.2329	491361	2002	4.6038	337074	2002	0.6104	44173	
2003	0.1836	17465	2003	9.3026	495066	2003	4.4275	324163	2003	0.6016	43538	
2004	0.1849	17588	2004	9.3723	498777	2004	4.2571	311687	2004	0.5932	42930	
2005	0.1862	17711	2005	9.4422	502495	2005	4.0922	299620	2005	0.5851	42349	
2006	0.1875	17835	2006	9.5122	506221	2006	3.9327	287936	2006	0.5775	41791	
2007	0.1888	17959	2007	9.5824	509956	2007	3.778	276613	2007	0.5701	41257	
2008	0.1901	18084	2008	9.6527	513700	2008	3.628	265629	2008	0.563	40745	
2009	0.1914	18209	2009	9.7233	517454	2009	3.4823	254965	2009	0.5562	40253	
2010	0.1927	18335	2010	9.794	521220	2010	3.3408	244603	2010	0.5497	39781	

	LPG			***Bio-Fuel***			***Electricity***			***Total***	
Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2 (No Net Emissions)	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Million Metric Tons CO_2
1985	2.105	131254	1985	0	0	1985	6.6158	587692	1985	26.563	1.8959
1986	1.5	93530	1986	0	0	1986	7.2	648725	1986	23.8	1.7085
1987	1.804	112485	1987	0	0	1987	7.9176	701430	1987	26.86	1.9314
1988	2.0084	125229	1988	0	0	1988	8.6361	770258	1988	28.318	2.0356
1989	2	124707	1989	0	0	1989	8.9	771959	1989	28	1.9978
1990	2.1	130942	1990	1.6	0	1990	9	790257	1990	26.7	1.8019
1991	2.3	143413	1991	1.7	0	1991	9.6	822452	1991	28	1.8758
1992	2.2	137177	1992	1.8	0	1992	9.5	834414	1992	28.9	1.9285
1993	2.4045	149931	1993	1.9036	0	1993	10.42	905319	1993	30.959	2.0796
1994	2.5047	156174	1994	1.9035	0	1994	10.62	883437	1994	31.559	2.0756
1995	3.1	193295	1995	2.1	0	1995	10.8	858349	1995	31.8	2.0319
1996	2.7288	170151	1996	2.0918	0	1996	11.115	901707	1996	31.583	2.0425
1997	2.7761	173097	1997	2.1388	0	1997	11.288	907972	1997	31.656	2.0365
1998	2.817	175649	1998	2.1805	0	1998	11.436	913432	1998	31.676	2.0284
1999	2.8567	178126	1999	2.2208	0	1999	11.58	918103	1999	31.7	2.0201
2000	2.9006	180861	2000	2.264	0	2000	11.741	922001	2000	31.785	2.0138
2001	2.9488	183867	2001	2.3104	0	2001	11.921	925135	2001	31.93	2.0092
2002	2.9963	186827	2002	2.3559	0	2002	12.098	927514	2002	32.079	2.0043
2003	3.043	189744	2003	2.4006	0	2003	12.272	929146	2003	32.231	1.9991
2004	3.0892	192621	2004	2.4446	0	2004	12.445	930031	2004	32.386	1.9936
2005	3.1347	195460	2005	2.4879	0	2005	12.615	930173	2005	32.543	1.9878
2006	3.1797	198266	2006	2.5306	0	2006	12.783	929570	2006	32.703	1.9816
2007	3.2242	201041	2007	2.5727	0	2007	12.95	928218	2007	32.866	1.975
2008	3.2683	203787	2008	2.6143	0	2008	13.115	926113	2008	33.032	1.9681
2009	3.3119	206506	2009	2.6553	0	2009	13.279	923248	2009	33.2	1.9606
2010	3.3551	209201	2010	2.696	0	2010	13.442	919612	2010	33.37	1.9528

APPENDIX E:

RESIDENTIAL SECTOR: PROJECTED ENERGY CONSUMPTION AND CO_2 EMISSIONS BY SELECTED END-USES

		BAU scenario								
		1996	1996		2000	2000		2010	2010	
Selected end use	**Life time**	**% of total EU**	**EU Trillion Btus**	**CO_2 emission Metric Tons**	**% of total**	**EU Trillion Btus**	**CO_2 emission Metric Tons**	**% of total**	**EU Trillion Btus**	**CO_2 emission Metric Tons**
Refrigerators (Elec.)	19	3.7%	1.16	95433	3.2%	1.01	79097	2.3%	0.76	52183
Freezers (Elec.)	19	1.2%	0.37	30259	1.0%	0.31	24168	0.7%	0.22	14909
Water Heating (Elec.)	10	3.2%	1.02	83795	3.2%	1.01	79097	3.1%	1.04	70819
Water Heating (All Fuel)	13.9	13.3%	4.20	234075	13.2%	4.20	228608	13.3%	4.44	230196
Clothes Dryers (Elec.)	17	1.7%	0.54	44225	1.8%	0.56	43943	1.8%	0.60	41001
Cooking (Gas)	19	1.7%	0.54	30050	1.8%	0.56	30481	1.4%	0.46	24008
Lighting (Elec.)	1	3.1%	0.96	79140	3.1%	0.98	76900	3.2%	1.06	72683
Space Heating (Elec.)	18	5.0%	1.57	128380	4.6%	1.46	114399	5.1%	1.70	116545
Space Heating (All Fuel)	20	43.0%	13.59	757335	41.7%	13.26	722299	38.8%	12.95	671473
Space Cooling (Elec.)	13	4.1%	1.31	107071	4.2%	1.34	105462	4.4%	1.47	100638
Miscellaneous (Elec.)	12	10.1%	3.18	260696	12.8%	4.06	318584	16.2%	5.39	369007
Miscellaneous (Gas)	12	0.9%	0.28	15816	0.9%	0.28	15241	0.9%	0.30	15535
Electricity		32.0%			33.7%			36.7%		
Other Fuel		58.9%			57.6%			54.4%		
Subtotal		90.9%	28.72	1866275	91.3%	29.01	1838279	91.1%	30.40	1778997
Total		100%	31.58	2042505	100%	31.78	2013775	100%	33.37	1952752
	Life time	**Total shells in 1996**	**Total shells in 2000**	**Total shells in 2010**	**Old shells in 2010**	**New shells in 2010**				
Household Envelope	50	270615	279364	311385	194843	116542				
					63%	37%				

	Fuel Switching			Savings Scenario							
	2010	2010		1996-2010		1996-2010		2000-2010		2000-2010	
Selected end use	**% of total**	**EU Trillion Btus**	**CO_2 Metric Tons**	**EU Trillion BTUs**	**CO_2 emission Metric Tons**	**Energy Savings Trillion Btus**	**CO_2 reduction Metric Tons**	**EU Trillion BTUs**	**CO_2 emission Metric Tons**	**Energy Savings Trillion Btus**	**CO_2 reduction Metric Tons**
Refrigerators (Elec.)	2.3%	0.76	52183	0.58	39703	0.18	12480	0.63	43268	0.13	8914
Freezers (Elec.)	0.7%	0.22	14909	0.17	11843	0.04	3066	0.19	12719	0.03	2190
Water Heating (Elec.)	1.4%	0.47	32009	0.34	23167	0.70	47652	0.34	23167	0.70	47652
Water Heating (All Fuel)	15.0%	5.01	259606	3.88	201042	0.56	29154	4.19	217473	0.25	12723
Clothes Dryers (Elec.)	1.8%	0.60	41001	0.59	40330	0.01	671	0.59	40521	0.01	479
Cooking (Gas)	1.4%	0.46	24008	0.39	20077	0.08	3931	0.41	21200	0.05	2808
Lighting (Elec.)	3.2%	1.06	72683	0.50	34161	0.56	38522	0.50	34161	0.56	38522
Space Heating (Elec.)	3.4%	1.14	77734	0.81	55126	0.90	61420	0.82	56315	0.88	60231
Space Heating (All Fuel)	40.5%	13.52	700883	11.86	614633	1.10	56840	11.97	620773	0.98	50700
Space Cooling (Elec.)	4.4%	1.47	100638	1.20	82276	0.27	18362	1.32	90267	0.15	10371
Miscellaneous (Elec.)	16.2%	5.39	369007	3.61	247234	1.78	121772	3.91	267530	1.48	101477
Miscellaneous (Gas)	0.9%	0.30	15535	0.27	13981	0.03	1553	0.27	14240	0.02	1295
Electricity				*Fuel Switch*	*-215367*		215367	*Fuel Switch*	*-215367*		215367
Other Fuel											
Subtotal	91.1%	30.40	1760195	24.19	1168205	6.21	610792	25.15	1226268	5.25	552729
Total	100%	33.37	1933950	27.16	1341960			28.12	1400023		
		100% case		81.4%	68.7%	18.6%	31.3%	84.3%	71.7%	15.7%	28.3%
		35% case				6.5%	10.9%			5.5%	9.9%
		65% case				12.1%	20.3%			10.2%	18.4%

APPENDIX F:
RESIDENTIAL SECTOR: IMPLEMENTATION SCENARIOS

	100% Implementation					65% Implementation		35% Implementation	
	EU Trillion BTUs	CO_2 emission Metric Tons	Energy Savings Trillion Btus	CO_2 reduction Metric Tons	Total Cost ($)	Energy Savings MMBtus	CO_2 reduction Metric Tons	Energy Savings MMBtus	CO_2 reduction Metric Tons
Refrigerators (Elec.)	0.632	43268	0.130	8914	1289960	84694	5794	45605	3120
Freezers (Elec.)	0.186	12719	0.032	2190	422595	20810	1424	11205	767
Water Heating (Elec.)	0.339	23167	0.697	47652	6554321	452743	30974	243785	16678
Water Heating (All Fuel)	4.195	217473	0.245	12723	527625	159515	8270	85892	4453
Clothes Dryers (Elec.)	0.592	40521	0.007	479	77790	4555	312	2453	168
Cooking (Gas)	0.409	21200	0.054	2808	129992	35206	1825	18957	983
Lighting (Elec.)	0.499	34161	0.563	38522	4673478	365995	25039	197074	13483
Space Heating (Elec.)	0.823	56315	0.880	60231	9411252	572246	39150	308133	21081
Space Heating (Gas)	11.974	620773	0.978	50700	5212483	635669	32955	342283	17745
Space Cooling (Elec.)	1.319	90267	0.152	10371	807995	98536	6741	53058	3630
Miscellaneous (Elec.)	3.910	267530	1.483	101477	14402530	964124	65960	519144	35517
Miscellaneous (Gas)	0.275	14240	0.025	1295	149825	16231	841	8740	453
Fuel Switching		-215367		215367			139989		75379
Subtotal	25.154	1226268	5.247	552729	43659846	3410324	359274	1836328	193455
% Savings			15.7%	28.3%		10.2%	18.4%	5.5%	9.9%

APPENDIX G:
COMMERCIAL SECTOR: FUEL AND END-USE ELECTRICITY CONSUMPTION

	Coal			***Natural Gas***			***Distillate Fuel***			***Kerosene***			***LPG***		
Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	
1985	0.1	9512.6	1985	3.5	186264	1985	1.9	139111	1985	0.3	21712	1985	0.4	24941	
1986	0.1	9512.6	1986	3.6	191585	1986	1.4	102503	1986	0.1	7237.2	1986	0.3	18706	
1987	0.6	57076	1987	3.8	202229	1987	2.1	153755	1987	0.1	7237.2	1987	0.3	18706	
1988	0.2991	28450	1988	4.0874	217525	1988	2.2929	167881	1988	0.1994	14430	1988	0.3988	24865	
1989	0.3	28538	1989	4.2	223516	1989	1.7	124468	1989	0	0	1989	0.4	24941	
1990	0.2991	28454	1990	4.0879	217551	1990	1.9941	146001	1990	0.0997	7215.9	1990	0.3988	24868	
1991	0.3	28538	1991	4.4	234160	1991	2.6	190363	1991	0.1	7237.2	1991	0.4	24941	
1992	0	0	1992	5.1	271413	1992	2	146433	1992	0	0	1992	0.4	24941	
1993	0.8	76101	1993	5.4	287378	1993	1.9	139111	1993	0	0	1993	0.4	24941	
1994	0.4021	38251	1994	5.7301	304944	1994	1.5079	110404	1994	0	0	1994	0.4021	25073	
1995	0	0	1995	5.93	315585	1995	1.6081	117743	1995	0	0	1995	0.5025	31335	
1996	0.3217	30603	1996	5.8868	313284	1996	1.7916	131177	1996	0	0	1996	0.4461	27818	
1997	0.3247	30888	1997	6.07	323037	1997	1.7617	128986	1997	0	0	1997	0.4523	28203	
1998	0.326	31007	1998	6.2174	330881	1998	1.7234	126182	1998	0	0	1998	0.456	28433	
1999	0.3291	31310	1999	6.3989	340538	1999	1.6964	124205	1999	0	0	1999	0.4623	28829	
2000	0.3357	31938	2000	6.646	353687	2000	1.6873	123540	2000	0	0	2000	0.4735	29523	
2001	0.3426	32593	2001	6.8992	367163	2001	1.6795	122966	2001	0	0	2001	0.485	30243	
2002	0.3498	33276	2002	7.1589	380982	2002	1.6728	122478	2002	0	0	2002	0.497	30990	
2003	0.3573	33986	2003	7.4253	395159	2003	1.6672	122070	2003	0	0	2003	0.5094	31762	
2004	0.365	34723	2004	7.6987	409710	2004	1.6627	121736	2004	0	0	2004	0.5222	32562	
2005	0.3731	35489	2005	7.9794	424650	2005	1.6591	121473	2005	0	0	2005	0.5355	33388	
2006	0.3814	36284	2006	8.2678	439997	2006	1.6564	121275	2006	0	0	2006	0.5492	34243	
2007	0.3901	37107	2007	8.5641	455765	2007	1.6545	121139	2007	0	0	2007	0.5634	35127	
2008	0.3991	37960	2008	8.8686	471970	2008	1.6535	121061	2008	0	0	2008	0.578	36040	
2009	0.4083	38843	2009	9.1816	488630	2009	1.6532	121039	2009	0	0	2009	0.5931	36983	
2010	0.4179	39757	2010	9.5035	505761	2010	1.6536	121069	2010	0	0	2010	0.6087	37957	

	Motor Gas			***Residual***			***Electricity***			***Total***		
Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Million Metric Tons CO_2	
1985	0.2	14247	1985	0.4	31547	1985	5.8	515227	1985	12.6	0.9426	
1986	0.2	14247	1986	1	78868	1986	6.4	576645	1986	13.1	0.9993	
1987	0.2	14247	1987	1	78868	1987	6.8	602424	1987	14.9	1.1345	
1988	0.1994	14203	1988	1.0966	86489	1988	7.3773	657988	1988	15.951	1.2118	
1989	0.2	14247	1989	1.5	118302	1989	7.8	676548	1989	16.1	1.2106	
1990	0.1994	14205	1990	1.0968	86499	1990	8.0761	709133	1990	16.252	1.2339	
1991	0.2	14247	1991	0.3	23660	1991	8.4	719646	1991	16.7	1.2428	
1992	0.2	14247	1992	0.6	47321	1992	8.5	746581	1992	16.8	1.2509	
1993	0	0	1993	1.4	110416	1993	9.1	790656	1993	19	1.4286	
1994	0	0	1994	1.0053	79284	1994	9.4496	786093	1994	18.497	1.3441	
1995	0	0	1995	0.8041	63416	1995	9.9504	790824	1995	18.795	1.3189	
1996	0	0	1996	0.9598	75698	1996	10.035	795871	1996	19.441	1.3745	
1997	0	0	1997	0.9592	75648	1997	10.308	816374	1997	19.876	1.4031	
1998	0	0	1998	0.9536	75208	1998	10.521	836818	1998	20.197	1.4285	
1999	0	0	1999	0.9539	75233	1999	10.792	857190	1999	20.633	1.4573	
2000	0	0	2000	0.9642	76043	2000	11.174	877474	2000	21.281	1.4922	
2001	0	0	2001	0.9752	76916	2001	11.567	897649	2001	21.948	1.5275	
2002	0	0	2002	0.9871	77849	2002	11.97	917693	2002	22.635	1.5633	
2003	0	0	2003	0.9997	78841	2003	12.384	937576	2003	23.342	1.5994	
2004	0	0	2004	1.013	79892	2004	12.809	957269	2004	24.071	1.6359	
2005	0	0	2005	1.0271	81002	2005	13.246	976736	2005	24.82	1.6727	
2006	0	0	2006	1.0419	82170	2006	13.696	995936	2006	25.593	1.7099	
2007	0	0	2007	1.0574	83396	2007	14.159	1014826	2007	26.388	1.7474	
2008	0	0	2008	1.0737	84679	2008	14.634	1033358	2008	27.207	1.7851	
2009	0	0	2009	1.0907	86021	2009	15.124	1051478	2009	28.051	1.823	
2010	0	0	2010	1.1084	87421	2010	15.627	1069127	2010	28.919	1.8611	

APPENDIX H

COMMERCIAL SECOR: PROJECTED ENERGY CONSUMPTION AND CO_2 EMISSIONS BY SELECTED END-USES

		BAU								
Year/Study period		**1996**	**1996**		**2000**	**2000**		**2010**	**2010**	
	Life time	% of total EU	EU Trillion Btus	CO_2 Metric Tons	% of total EU	EU Trillion Btus	CO_2 Metric Tons	% of total EU	EU Trillion Btus	CO_2 Metric Tons
Space Conditioning & Vent (Elec.)	18	11.3%	2.188	179468	11.1%	2.359	185223	10.3%	2.972	203349
Space Conditioning & Vent (Fuel)	18	20.2%	3.928	241630	19.3%	4.107	249829	18.3%	5.300	315779
Lighting (Elec.)	12	15.4%	2.993	245509	15.4%	3.274	257096	14.4%	4.170	285273
Refrigeration (Elec.)	15	1.9%	0.364	29888	1.9%	0.409	32137	1.9%	0.538	36809
Miscellaneous (Elec.)	12	14.5%	2.811	230565	15.8%	3.356	263523	19.2%	5.548	379597
Miscellaneous (Gas)	12	20.1%	3.904	240133	20.6%	4.393	267176	20.6%	5.952	354628
PV	25									
Elec. Use		43.0%			44.2%			45.7%		
Other Fuel Use		40.3%			39.9%			38.9%		
Subtotal		83.3%	16.188	1167194	84.1%	17.898	1254983	84.7%	24.481	1575435
Total		100%	19.441	1374452	100%	21.281	1492205	100%	28.919	1861091

	Fuel Switching + PV			Savings							
Year/Study period	**2010**			**1996-2010**		**1996-2010**		**2000-2010**		**2000-2010**	
	% of total EU	EU Trillion Btus	CO_2 Metric Tons	EU Trillion BTUs	CO_2 Emission Metric Tons	Energy Savings Trillion Btus	CO_2 Reduction Metric Tons	EU Trillion BTUs	CO_2 Emission Metric Tons	Energy Savings Trillion Btus	CO_2 Reduction Metric Tons
Space Conditioning & Vent (Elec.)	8.8%	2.539	173671	1.591	108834	1.382	94515	1.862	127359	1.111	75990
Space Conditioning & Vent (Fuel)	19.8%	5.734	341625	3.593	214085	1.707	101694	4.205	250525	1.095	65254
Lighting (Elec.)	14.4%	4.170	285273	3.127	213955	1.042	71318	3.301	225841	0.869	59432
Refrigeration (Elec.)	1.9%	0.538	36809	0.382	26159	0.156	10650	0.427	29202	0.111	7607
Miscellaneous (Elec.)	19.2%	5.548	379597	3.717	254330	1.831	125267	4.023	275208	1.526	104389
Miscellaneous (Gas)	20.6%	5.952	354628	5.357	319165	0.595	35463	5.456	325075	0.496	29552
PV	-1.0%	-0.289	-19785	-0.289	-75650	0.289	75650	-0.289	-75650	0.289	75650
Elec. Use				Fuel Switch loss emission	-85416		85416		-85416		85416
Other Fuel Use											
Subtotal			1571603	17.479	975462	7.002	599973	18.984	1072144	5.497	503291
Total		28.919		21.918	1261117			23.423	1357800		
			100% case	75.8%	67.8%	24.2%	32.2%	81.0%	73.0%	19.0%	27.0%
			35% case			8.5%	11.3%			6.7%	9.5%
			65% case			15.7%	21.0%			12.4%	17.6%

APPENDIX I
COMMERCIAL SECOR: IMPLEMENTATION SCENARIOS

	100% Implementation					65% Implementation		35% Implementation	
	EU Trillion Btus	CO_2 Emission Metric Tons	Energy Savings Trillion Btus	CO_2 Reduction Metric Tons	Total Cost ($)	Energy Savings mmBtus	CO_2 Reduction Metric Tons	Energy Savings mmBtus	CO_2 Reduction Metric Tons
Space Conditioning & Vent (Elec.)	1.862	127359	1.111	75990	4565099	721974	49393	388755	26596
Space Conditioning & Vent (Fuel)		250525	1.095	65254	4501348	711892	42415	383326	22839
Lighting (Elec.)	3.301	225841	0.869	59432	-8860783	564658	38631	304046	20801
Refrigeration (Elec.)	0.427	29202	0.111	7607	518165	72276	4945	38918	2663
Miscellaneous (Elec.)	4.023	275208	1.526	104389	15563536	991794	67853	534043	36536
Miscellaneous (Gas)	5.456	325075	0.496	29552	2976012	322401	19209	173601	10343
PV	-0.289	-75650	0.289	75650	6420116	187976	49172	101218	26477
Fuel Switching		-85416		85416			55521		29896
Subtotal (w/o PV)	15.068	1147794	5.208	427641	19263378	3384996	277967	1822690	149674
Subtotal (with PV)	14.779	1072144	5.497	503291	25683494	3572972	327139	1923908	176152
BAU	28.919	1861091							
% Savings (w/o PV)			18.0%	23.0%		11.7%	14.9%	6.3%	8.0%
% Savings (with PV)			19.0%	27.0%		12.4%	17.6%	6.7%	9.5%

APPENDIX J:
TRANSPORTATION SECTOR: FUEL AND END-USE ELECTRICITY CONSUMPTION

Aviation Fuel*			***Distillate***			***Jet Fuel****			***LPG***	
Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Million Metric Tons CO_2
1985	0.100	6925	1985	7.200	527159	1985	8.400	598063	1985	0	0
1986	0.100	6937	1986	8.614	630710	1986	7.212	513479	1986	0.200	12491
1987	0.100	6925	1987	9.100	666270	1987	6.900	491266	1987	0	0
1988	0.100	6936	1988	8.413	615977	1988	7.311	520555	1988	0	0
1989	0.100	6915	1989	10.884	796852	1989	6.790	483414	1989	0	0
1990	0.401	27745	1990	8.013	586663	1990	7.011	499178	1990	0	0
1991	0.100	6915	1991	8.188	599522	1991	12.882	917150	1991	0	0
1992	0.100	6925	1992	8.000	585732	1992	7.800	555344	1992	0	0
1993	0.300	20745	1993	9.486	694540	1993	7.689	547423	1993	0	0
1994	0.322	22269	1994	9.647	706310	1994	3.216	228946	1994	0	0
1995	0.336	23266	1995	10.191	746135	1995	0.448	31893	1995	0	0
1996	0.303	20999	1996	8.927	653622	1996	8.967	638437	1996	0	0
1997	0.322	22324	1997	8.949	655207	1997	9.083	646706	1997	0	0
1998	0.343	23739	1998	9.011	659722	1998	9.239	657815	1998	0	0
1999	0.363	25154	1999	9.073	664329	1999	9.396	668994	1999	0	0
2000	0.384	26568	2000	9.138	669027	2000	9.554	680245	2000	0	0
2001	0.404	27983	2001	9.203	673815	2001	9.713	691572	2001	0	0
2002	0.425	29399	2002	9.270	678693	2002	9.874	702976	2002	0	0
2003	0.445	30816	2003	9.338	683662	2003	10.035	714461	2003	0	0
2004	0.465	32235	2004	9.407	688720	2004	10.197	726029	2004	0	0
2005	0.486	33657	2005	9.477	693868	2005	10.361	737682	2005	0	0
2006	0.507	35081	2006	9.548	699106	2006	10.526	749423	2006	0	0
2007	0.527	36509	2007	9.621	704433	2007	10.692	761255	2007	0	0
2008	0.548	37942	2008	9.695	709849	2008	10.860	773180	2008	0	0
2009	0.569	39378	2009	9.770	715355	2009	11.028	785200	2009	0	0
2010	0.589	40819	2010	9.847	720950	2010	11.199	797317	2010	0	0

*=not included in consumption or emissions total

Motor Gas			Residual			Lubricants			Total		
Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Metric Tons CO_2	Year	Trillion BTUs	Million Metric Tons CO_2
1985	39.200	2792400	1985	1.500	118302	1985	0.400	14856	1985	48.300	3.453
1986	40.067	2854129	1986	3.706	292298	1986	0.300	11161	1986	52.888	3.801
1987	40.800	2906376	1987	7.600	599399	1987	0.400	14856	1987	57.900	4.187
1988	42.566	3032190	1988	5.509	434451	1988	0.401	14879	1988	56.888	4.097
1989	42.236	3008669	1989	5.592	440994	1989	0.399	14834	1989	59.110	4.261
1990	41.466	2953805	1990	5.709	450264	1990	0.401	14880	1990	55.588	4.006
1991	40.442	2880907	1991	8.288	653677	1991	0.399	14835	1991	57.318	4.149
1992	42.400	3020351	1992	6.500	512644	1992	0.400	14856	1992	57.300	4.134
1993	43.237	3079953	1993	7.189	567022	1993	0.399	14834	1993	60.312	4.356
1994	46.412	3306158	1994	8.575	676296	1994	0.429	15924	1994	65.063	4.705
1995	49.386	3518012	1995	7.391	582926	1995	0.448	16637	1995	67.416	4.864
1996	42.813	3049803	1996	7.653	603601	1996	0.400	14863	1996	59.794	4.322
1997	42.926	3057817	1997	7.855	619518	1997	0.401	14900	1997	60.131	4.347
1998	43.230	3079506	1998	8.091	638093	1998	0.404	15005	1998	60.736	4.392
1999	43.541	3101619	1999	8.327	656711	1999	0.407	15111	1999	61.348	4.438
2000	43.857	3124156	2000	8.563	675377	2000	0.410	15220	2000	61.968	4.484
2001	44.180	3147113	2001	8.801	694098	2001	0.413	15331	2001	62.596	4.530
2002	44.508	3170491	2002	9.039	712880	2002	0.416	15443	2002	63.232	4.578
2003	44.842	3194289	2003	9.278	731729	2003	0.419	15558	2003	63.876	4.625
2004	45.182	3218504	2004	9.518	750652	2004	0.422	15675	2004	64.528	4.674
2005	45.527	3243138	2005	9.759	769652	2005	0.425	15794	2005	65.188	4.722
2006	45.879	3268189	2006	10.001	788737	2006	0.429	15915	2006	65.857	4.772
2007	46.237	3293657	2007	10.244	807911	2007	0.432	16038	2007	66.534	4.822
2008	46.600	3319543	2008	10.488	827180	2008	0.435	16163	2008	67.219	4.873
2009	46.969	3345848	2009	10.734	846548	2009	0.439	16290	2009	67.912	4.924
2010	47.344	3372570	2010	10.981	866021	2010	0.442	16419	2010	68.614	4.976

APPENDIX K

TRANSPORTATION SECTOR: FUEL EFFICIENCY MEASURES

Baseline CO_2 Emissions for Highway Vehicles in 2010					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg. Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	47.50	4441.25	21.3	208509389.7	1861515.0
LDGT	45.70	4272.95	17.3	246991329.5	2205071.2
HDGV	3.60	336.60	6.3	53428571.4	476995.7
LDDV	0.25	23.38	21.3	1097417.8	11165.7
LDDT	0.15	14.03	17.3	810693.6	8248.4
HDDV	1.00	93.50	6.3	14841269.8	151003.2
MC	1.80	168.30	35.0	4808571.4	42929.6
LDV Subtotal		8919.90		462217402.1	4128930.0
HDV Subtotal		430.10		68269841.3	627998.9
TOTALS		**9350.00**		**530487243.3**	**4756928.9**

Modest Commitment Strategy -- Projected Delaware Roadway CO2 Emissions in 2010					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg. Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	47.50	4441.25	23.3	190611588.0	1701728.3
LDGT	45.70	4272.95	19.3	221396373.1	1976566.4
HDGV	3.60	336.60	6.3	53428571.4	543611.4
LDDV	0.25	23.38	23.3	1003218.9	8956.5
LDDT	0.15	14.03	19.3	726683.9	6487.6
HDDV	1.00	93.50	6.3	14841269.8	151003.2
MC	1.80	168.30	35.0	4808571.4	42929.6
LDV Subtotal		8919.90		418546435.3	3736668.4
HDV Subtotal		430.10		68269841.3	694614.6
TOTALS		**9350.00**		**486816276.6**	**4431283.0**
Total CO_2 Reduction from 2010 Baseline (Increased Trucks) in Metric Tons					**325645.8**

Major Commitment Strategy -- Projected Delaware Roadway CO_2 Emissions in 2010					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg. Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	47.50	4441.25	27.2	163281250.0	1457730.5
LDGT	45.70	4272.95	23.2	184178879.3	1644298.8
HDGV	3.60	336.60	6.3	53428571.4	476995.7
LDDV	0.25	23.38	27.2	859375.0	8743.8
LDDT	0.15	14.03	23.2	604525.9	6150.8
HDDV	1.00	93.50	6.3	14841269.8	151003.2
MC	1.80	168.30	35.0	4808571.4	42929.6
LDV Subtotal		8919.90		353732601.6	3159853.4
HDV Subtotal		430.10		68269841.3	627998.9
TOTALS		**9350.00**		**422002442.9**	**3787852.302**
Total CO_2 Reduction from 2010 Baseline (Increased Trucks) in Metric Tons					**969076.6**

Full Implementation Strategy Projected -- Delaware Roadway CO_2 Emissions in 2010					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg. Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	47.50	4441.25	29.0	153146551.7	1367250.6
LDGT	45.70	4272.95	25.0	170918000.0	1525909.3
HDGV	3.60	336.60	6.3	53428571.4	543611.4
LDDV	0.25	23.38	25.0	935000.0	8347.4
LDDT	0.15	14.03	29.0	483620.7	4317.6
HDDV	1.00	93.50	6.3	14841269.8	151003.2
MC	1.80	168.30	35.0	4808571.4	42929.6
LDV Subtotal		8919.90		330291743.8	2948754.6
HDV Subtotal		430.10		68269841.3	694614.6
TOTALS		**9350.00**		**398561585.1**	**3643369.2**
Total CO_2 Reduction from 2010 Baseline (Increased Trucks) in Metric Tons					**1113559.7**

APPENDIX L
TRANSPORTATION SECTOR: ALTERNATIVE FUEL VEHICLES

Modest Commitment Scenario -- CO_2 Emissions for Highway Vehicles in 2010 with 1.2% CNG fleet penetration					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg. Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	46.30	4329.05	21.3	203241784.0	1814487.2
LDGT	45.70	4272.95	17.3	246991329.5	2205071.2
HDGV	3.60	336.60	6.3	53428571.4	476995.7
LDDV	0.25	23.38	21.3	1097417.8	11165.7
LDDT	0.15	14.03	17.3	810693.6	8248.4
HDDV	1.00	93.50	6.3	14841269.8	151003.2
MC	1.80	168.30	35.0	4808571.4	42929.6
LDCNGV	1.20	112.20	21.3	n/a	35271.4
LDV Subtotal		8919.90		456949796.4	4081902.2
HDV Subtotal		430.10		68269841.3	627998.9
TOTALS		**9350.00**		**525219637.7**	**4745172.5**
TOTAL CO_2 REDUCTION FROM 2010 BASELINE					**11756.3**

Major Commitment Scenario -- CO_2 Emissions for Highway Vehicles in 2010 with 2.1% CNG fleet penetration					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg. Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	45.40	4244.90	21.3	199291079.8	1779216.4
LDGT	45.70	4272.95	17.3	246991329.5	2205071.2
HDGV	3.60	336.60	6.3	53428571.4	476995.7
LDDV	0.25	23.38	21.3	1097417.8	11165.7
LDDT	0.15	14.03	17.3	810693.6	8248.4
HDDV	1.00	93.50	6.3	14841269.8	151003.2
MC	1.80	168.30	35.0	4808571.4	42929.6
LDCNGV	2.10	196.35	21.3	n/a	61725.0
LDV Subtotal		8919.90		452999092.2	4046631.4
HDV Subtotal		430.10		68269841.3	627998.9
TOTALS		**9350.00**		**521268933.5**	**4736355.3**
TOTAL CO_2 REDUCTION FROM 2010 BASELINE					**20573.6**

Full Implementation Scenario -- CO_2 Emissions for Highway Vehicles in 2010 with 3.5% CNG and 1.75% Electric fleet penetration					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg. Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	42.25	3950.38	21.3	185463615.0	1655768.6
LDGT	45.70	4272.95	17.3	246991329.5	2205071.2
HDGV	3.60	336.60	6.3	53428571.4	476995.7
LDDV	0.25	23.38	21.3	1097417.8	11165.7
LDDT	0.15	14.03	17.3	810693.6	8248.4
HDDV	1.00	93.50	6.3	14841269.8	151003.2
MC	1.80	168.30	35.0	4808571.4	42929.6
LDCNGV	3.50	327.25	21.3	n/a	102874.9
LDHV	1.75	163.63	21.3	n/a	0.0
LDV Subtotal		8919.90		439171627.4	3923183.6
HDV Subtotal		430.10		68269841.3	627998.9
TOTALS		**9350.00**		**507441468.7**	**4654057.4**
TOTAL CO_2 REDUCTION FROM 2010 BASELINE					**102871.4**

APPENDIX M

TRANSPORTATION SECTOR: TRANSPORTATION CONTROL MEASURES (TCM'S)

Modest Commitment Scenario

TCM	VMT Reduction
Area-Wide Ridesharing	0.50%
Transit Improvements	0.50%
HOV lanes	0.30%
Compressed Work Week	0.60%
Telecommuting	1.00%
TOTAL	**2.90%**

Major Commitment Scenario

TCM	VMT Reduction
Area-Wide Ridesharing	1.00%
Transit Improvements	1.00%
HOV lanes	0.30%
Compressed Work Week	0.60%
Telecommuting	3.00%
Parking Pricing (work)	1.50%
Parking Pricing (non-work)	3.50%
Congestion Pricing	3.00%
Pay-as-you-drive Insurance	2.00%
TOTAL	**15.90%**

Full Implementation Scenario

TCM	VMT Reduction
Area-Wide Ridesharing	1.00%
Transit Improvements	1.00%
HOV lanes	0.30%
Compressed Work Week	0.60%
Telecommuting	5.00%
Parking Pricing (work)	3.00%
Parking Pricing (non-work)	3.50%
Congestion Pricing	4.00%
Pay-as-you-drive Insurance	2.00%
TOTAL	**20.40%**

Summary of TCM Scenarios

Scenario	Percentage Reduction	Reduction in LDV VMT's	CO_2 Reduction (metric tons)
Moderate	2.90%	258.6	323,824.7
Major	15.90%	1016.9	656,953.2
Full Implementation	20.40%	2087.3	1,127,198.4

Modest Commitment Scenario -- CO_2 Emissions for Highway Vehicles in 2010					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg. Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	70.60	6418.8	21.3	301352112.7	2690389.5
LDGT	22.47	2042.8	17.3	118080924.9	1054194.3
HDGV	3.70	336.6	6.3	53428571.4	476995.7
LDDV	0.25	22.7	21.3	1065727.7	10843.3
LDDT	0.15	13.6	17.3	786127.2	7998.5
HDDV	1.03	93.5	6.3	14841269.8	151003.2
MC	1.80	163.4	35.0	4668571.4	41679.7
LDV Subtotal	100.00	8661.3		425953463.8	3805105.3
HDV Subtotal		430.1		68269841.3	627998.9
TOTALS		**9091.4**		**494223305.1**	**4433104.2**

Major Commitment Scenario -- CO_2 Emissions for Highway Vehicles in 2010					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg. Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	70.28	5856.9	21.3	274969892.0	2454856.2
LDGT	22.37	1863.9	17.3	107741185.0	961883.9
HDGV	4.04	336.6	6.3	53428571.4	476995.7
LDDV	0.25	20.7	21.3	972314.6	9892.9
LDDT	0.15	12.4	17.3	718277.5	7308.1
HDDV	1.12	93.5	6.3	14841269.8	151003.2
MC	1.79	149.1	35.0	4260394.3	38035.6
LDV Subtotal		7903.0		388662063.3	3471976.8
HDV Subtotal		430.1		68269841.3	627998.9
TOTALS	**100.00**	**8333.1**		**456931904.6**	**4099975.7**

Full Implementation Scenario -- CO_2 Emissions for Highway Vehicles in 2010					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg. Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	69.72	5063.6	21.3	237727920.2	2122370.0
LDGT	22.19	1611.5	17.3	93148699.4	831606.2
HDGV	4.63	336.6	6.3	53428571.4	476995.7
LDDV	0.25	17.9	21.3	840624.4	8553.0
LDDT	0.15	10.7	17.3	620994.2	6318.3
HDDV	1.29	93.5	6.3	14841269.8	151003.2
MC	1.78	128.9	35.0	3683365.7	32884.1
LDV Subtotal		6832.6		336021604.0	3001731.6
HDV Subtotal		430.1		68269841.3	627998.9
TOTALS	**100.00**	**7262.7**		**404291445.2**	**3629730.5**

APPENDIX N

TRANSPORTATION SECTOR: COMBINED EMISSION REDUCTION SCENARIOS

Modest Commitment Strategy -- Modest Commitment Fuel Efficiency, AFV and TCM Scenarios Combined					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg.Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	46.30	4203.51	23.3	180408049.4	1610633.9
LDGT	45.70	4149.03	19.3	214975878.2	1919246.0
HDGV	3.60	336.60	6.3	53428571.4	476995.7
LDDV	0.25	22.70	23.3	974125.5	9911.3
LDDT	0.15	13.62	19.3	705610.1	7179.3
HDDV	1.00	93.50	6.3	14841269.8	151003.2
MC	1.80	163.42	35.0	4669122.9	41684.7
LDCNGV	1.20	108.95	23.3	N/A	31308.7
LDV Subtotal		8661.22		401732786.1	3619963.8
HDV Subtotal		430.10		68269841.3	627998.9
TOTALS		**9091.32**		**470002627.4**	**4247962.7**
Total CO_2 Reduction from 2010 Baseline (Increased Trucks) in Metric Tons					**508966.1**

Major Commitment Strategy -- Major Commitment Fuel Efficiency, AFV and TCM Scenarios Combined					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg.Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	45.40	3760.98	27.2	138271375.0	1234449.1
LDGT	45.70	3785.83	20.7	182890516.9	1632796.7
HDGV	3.60	336.60	6.3	53428571.4	476995.7
LDDV	0.25	20.71	27.2	761406.3	7747.1
LDDT	0.15	12.43	20.7	600297.1	6107.8
HDDV	1.00	93.50	6.3	14841269.8	151003.2
MC	1.80	149.11	35.0	4260394.3	38035.6
LDCNGV	2.10	173.97	27.2	N/A	42825.8
LDV Subtotal		7903.03		326783989.5	2961962.0
HDV Subtotal		430.10		68269841.3	627998.9
TOTALS		**8333.13**		**395053830.8**	**3589960.9**

Total CO_2 Reduction from 2010 Baseline (Increased Trucks) in Metric Tons	**1166968.0**

Full Implementation Strategy -- Full Implementation Fuel Efficiency, AFV and TCM Scenarios Combined					
Vehicle Type	*Percentage of VMT*	*Total VMT (millions)*	*Avg.Vehicle Fuel Efficiency (mpg)*	*Gas Consumption (gallons)*	*CO_2 (metric tons)*
LDGV	42.25	3144.50	29.0	108430982.8	968042.2
LDGT	45.70	3401.27	23.8	142910428.6	1275865.3
HDGV	3.60	336.60	6.3	53428571.4	476995.7
LDDV	0.25	18.61	25.0	744260.0	7572.6
LDDT	0.15	11.16	23.8	469071.4	4772.6
HDDV	1.00	93.50	6.3	14841269.8	151003.2
MC	1.80	133.97	35.0	3827622.9	34172.0
LDCNGV	3.50	260.49	29.0	N/A	60145.7
LDEV	1.75	130.25	29	N/A	0
LDV Subtotal		7100.24		256382365.6	2350570.4
HDV Subtotal		430.10		68269841.3	627998.9
TOTALS		**7530.34**		**324652206.9**	**2978569.3**
Total CO_2 Reduction from 2010 Baseline (Increased Trucks) in Metric Tons					**1778359.6**

APPENDIX O
WASTES SECTOR: METHODOLOGY FOR CALCULATING CO_2 EQUIVALENT EMISSIONS

Step 1: USEPA Landfill Gas Emissions Model Version 2.01:

This model was used to calculate both the CH_4 and CO_2 emissions from the four active landfills in Delaware (CIL, CSWMC, SSWMC, and PPLF) for the BAU and three alternative scenarios. The model calculated the historical CH_4 and CO_2 emissions for each of the landfills, beginning with the operation of each landfill. The model also projected future emissions until each landfill reached its capacity. Data provided by DSWA was utilized to generate emission rates. DSWA provided actual "refuse in place" data for each of the four landfills through 1998. In order to generate emission rates for the BAU scenario, the landfill refuse in place was projected into the future based upon projected growth in Delaware's population. This projection was then manipulated for the three alternative scenarios.

Step 2: Calculation for Flared Methane:

DSWA currently flares 98% of the methane emitted from each of the four landfills (Drew Sammons, DSWA)[1]. The following procedure was used to calculate the total CO_2 equivalent emissions (unflared CH_4 from landfill + CO_2 from landfill + CO_2 from flared methane) per year for each of the four landfills:

1. [amount of CH_4 in tons] x [.02] = amount of CH_4 unflared
2. [amount of CH_4 unflared] x [22] = amount of CH_4 unflared in CO_2 equivalent
3. [amount of CH_4 in tons] x [.98] = amount of CH_4 flared
4. [amount of CH_4 flared] x [2.75] = amount of CO_2 emitted from flared CH_4 process
5. [amount of CO_2 emitted from flared CH_4 process] + [amount of CO_2 from landfill] = total CO_2 emissions
6. [total CO_2 emissions] + [amount of CH_4 unflared in CO_2 equivalent] = total CO_2 equivalent emissions from that particular landfill
7. Add total CO_2 equivalent emissions per year for each of the four landfills to get the total emissions from landfills in the State of Delaware per year

[1] Methane flaring began at PPLF in 1988, at CSWMC in 1990, at SSWMC in 1994, and at CIL in 1990.

APPENDIX P
WASTES SECTOR: THREE SCENARIOS AND MEASURES

Scenarios	Measures	Assumptions
BAU	Recycling	2.5% recycling[1]
Modest Recycling	Recycling	15% recycling by 2001[2]
Major Recycling	Recycling	35% recycling by 2001[3]
Full Implementation	Recycling; Pay-As-You-Throw Program	60% recycling by 2001[4]

[1] The BAU scenario assumes that 2.5% of the total municipal solid waste stream will continue to be recycled up until 2010 through DSWA's Recycle Delaware program.
[2] The Modest Recycling Scenario assumes that the percentage of total municipal solid waste recycled through DSWA's Recycle Delaware program will gradually increase to 15% in 2001 (5% in 1999, 10% in 2000) and remain at 15% until 2010.
[3] The Significant Recycling Scenario reflects DSWA's goal of recycling 35% of the total municipal solid waste stream through the Recycle Delaware program in 2001 (seen as a gradual increase from 10% in 1999 to 20% in 2000, and 35% in 2001) (DSWA, 1997). This rate is assumed to remain at 35% until 2010.
[4] The Full Potential Waste Reduction Scenario also reflects DSWA's goal of recycling 35% of the total municipal solid waste stream through the Recycle Delaware program in 2001 (maintained through 2010). The second component of this scenario is the implementation of a Pay-As-You-Throw program in Delaware, which would result in recycling an additional 25% of the municipal solid waste stream (USEPA, 1997). Thus, in 2001, 60% of the municipal solid waste stream would be recycled.

APPENDIX Q
SINKS SECTOR: DELAWARE'S POLICIES AND PROGRAMS

Types of Policy	Policy Intent and Programs
Economic Incentives	1. **Commercial Forest Plantation Act**: A property tax program providing a 30 year tax exemption for the production of merchantable timber on ten and more acres of forest land. 2. **Cost- Share Incentive Programs**: a. USDA Farm Bill Provisions : Stewardship Incentive Program (SIP) Forest Incentive Program (FIP) Conservation Reserve Program (CRP) Conservation Reserve Enhancement (CREP) Environmental Quality Incentive (EQIP) b. New Castle Conservation Program Urban Forestry 3. **Delaware Center for Horticulture** : Urban tree planting and rural reforestation) 4**. Urban and Community Grants**: Administered through the Delaware Department of Agriculture, to encourage planting and maintaining urban trees and to reduce "urban heat island effect." 5**. Federal Biomass Tax Credit- IRS Section 45 Tax Credit give** % of investment cost that can be taken as a credit.
Regulatory	1. **Unified Development Code for New Castle County** 2. **Riparian Buffer Management** 3. **Forestry Practices Erosion & Sediment Law** 4. **Delaware Seed Tree Law** (replenishes the forest base after harvesting) 5. **Major Subdivision Reviews for Urban Forestry Interests** (New Castle County)
Others	1. **Forestry Educational Program**: Arbor Day Activities Delaware ENVIROTHON Project Learning Tree 2. **Bioenergy Fuelwood Plantations Demonstration Sites** 3. **Delaware Biomass Program Work Group** (network of interested parties that provides biomass information throughout the state between agencies and private interest groups)

Source: Abbot-Donnelly, D. 1998. *Delaware Greenhouse Gas Mitigation Action Plan Forestry Sector Report.*

APPENDIX R

FOREST SINKS SECTOR: METHODOLOGY FOR CALCULATING CO_2 SEQUESTRATION IN FORESTS AND URBAN TREES

General Equation:

Total CO_2 Sequestered = CO_2 Sequestered by Forest + CO_2 Sequestered by Urban Trees

Step 1: Computation of CO_2 Sequestered by Forestlands:

CO_2 Sequestered by Forest = Net Acreage of Standing Forest x CO_2 Sequestration Factor

Net Acreage of Standing Forests = [$X_1+X_2+X_3+X_4+X_5+X_6-X_7-X_8-X_9$];

Where:

- X_1 - acres of existing rural forests
- X_2 - acres of existing community/urban forests
- X_3 - acres of natural regeneration in converting open spaces
- X_4 - acres of natural regeneration in harvested rural forests
- X_5 - acres of artificial regeneration (plantings) in converted open spaces
- X_6 - acres of artificial regeneration (plantings) in harvested rural forests
- X_7 - acres lost due to harvesting of rural forests
- X_8 - acres lost due to community/urban development
- X_9 - acres lost due to agricultural land conversion

For CO_2 forest sequestration factor, the American Forest estimate is used. An average fully stocked forest will remove about 3.6 metric tons of CO_2 per acre per year.[1]

Thus: CO_2 Sequestered by Forest = $3.6 [X_1+X_2+X_3+X_4+X_5+X_6-X_7-X_8-X_9]$

Step 2: Computation of CO_2 Sequestered due to Urban Tree Planting:

The suggested method for calculating carbon sequestration by trees in urban and suburban setting by the Voluntary Reporting of Greenhouse Gases Program of the U.S. Department of Energy is used. For this computation, we used the following assumptions: [1] moderate survival factors by growth rate, [2] hardwood species, and [3] a moderate annual sequestration by tree type and growth rate.

CO_2 Sequestered by Urban Trees = [Number of Trees Planted] x [Survival Factors by Growth Rate] x [Annual Sequestration Rates by Growth Rate]

[1] There has been a good deal of debate regarding the use of carbon sequestration factors for different kinds of carbon sinks. For computation purposes, the estimates by American Forest (1999) of 3.6 tons per acre per year is used to illustrate the trend of carbon sequestration capacity of Delaware's forests and urban trees. Moreover, it is assumed that newly rehabilitated and reforested forests have the same carbon sink capacity as the existing forest stand.

APPENDIX S
FOREST SINKS SECTOR: THREE SEQUESTRATION SCENARIOS AND MEASURES

Scenario	Measures Explored	Other Assumptions [1]
BUSINESS-AS-USUAL SCENARIO	M_1- 10,000 trees planted per year M_2 – 1.5 % of existing forest M_3 – 1,000 acres per year	M_4-1,700 acres annually M_5- 2,100 acres annually M_6 – 200 acres annually
MODEST SINK DEVELOPMENT	M_1- 15,000 trees per year M_2- 1.25 % of existing forest M_3- 33.3 % decrease	M_4-1,700 acres annually M_5- 2,100 acres annually M_6 – 200 acres annually
MAJOR SINK DEVELOPMENT SCENARIO	M_1- 25,000 trees per year M_2 – 1.0% of existing forest M_3 - 66.7% decrease	M_4-1,700 acres annually M_5- 2,100 acres annually M_6 – 200 acres annually
FULL IMPLEMENTATION SCENARIO	M_1- 35,000 trees per year M_2- .75 % of existing forest M_3- 100% decrease in 2010	M_4-1,700 acres annually M_5- 2,100 acres annually M_6 – 200 acres annually

Legend: M1 – number of trees planted in urban areas [2]
M2 – acres lost due to harvesting of rural forests [3]
M3 – acres lost due to community/urban development [4]
M4 – acres of natural regeneration [open spaces and harvested rural areas]
M5 – acres of artificial regeneration [open spaces and harvested rural areas]
M6 – acres lost due to agricultural land conversion.

[1] Due to insufficient data, it assumed that there will be an annual natural regeneration of both open spaces and harvested rural forests of 1,700 acres until 2010; annual artificial regeneration of open spaces and harvested rural areas of 2,100 acres until 2010; and annual loss due to agricultural land conversion of 200 acres until 2010.

[2] The average number of trees planted in urban centers from 1991 to 1994 is 10,000 trees. For the Business-as-Usual scenario, it is assumed that the same number of trees will be planted annually in the urban centers until 2010. The projected numbers of urban trees planted for the rest of the scenarios are based on Delaware's Department of Agriculture projections in 1994. The number of trees planted, however, does not include plantings by developers, homeowners and Delaware Department of Transportation (DelDOT). The numbers represent only the seedlings and trees planted through the Department of Agriculture's urban forestry programs.

[3] The 1998 *Delaware Forest Annual Report* indicates that 1.5 % of Delaware's existing forest has been harvested or removed. It is assumed that there will be a decrease of deforestation: 1.25 % for the Modest Sink Development Scenario, 1.0 % for the Major Sink Development Scenario, and .75 % for the Full Implementation Scenario.

[4] In 1998, the number of acres lost due to community/urban development is 1,000 acres. It is assumed that in the next ten years this number will decrease: 33.3 % decrease in 2010 for the Modest Sink Development Scenario, 66.7 % decrease in 2010 for the Major Sink Development Scenario, and 100 % decrease in 2010 for the Full Implementation Scenario. This assumption, however, does not reflect the possibility that the number of acres lost will increase due to development pressures on Delaware's private forests.

APPENDIX T
FOREST SINKS SECTORS: CO_2 SEQUESTRATION PROJECTIONS

Business-as Usual Scenario				Modest Sink Development Scenario			
YEAR	Forest	(urban-trees	Total	YEAR	Forest	(urban-trees	Total
	MT/year	MT/year	MT/yr		MT/year	MT/year	MT/yr
1990	1420020		1420020	1990	1420020		1420020
1992	1400400		1400400	1992	1400400		1400400
1998	1278000		1278036	1998	1278000		1278000
1999	1268190	36	1268226	1999	1271385	54	1271439
2000	1258380	80	1258460	2000	1264962	119	1265081
2001	1248570	131	1248701	2001	1258728	196	1258924
2002	1238760	190	1238950	2002	1252681	285	1252966
2003	1228950	257	1229207	2003	1246819	386	1247205
2004	1219140	334	1219474	2004	1241139	501	1241640
2005	1209330	418	1209748	2005	1235639	627	1236267
2006	1199520	511	1200031	2006	1230317	766	1231083
2007	1189710	612	1190322	2007	1225171	917	1226088
2008	1179900	720	1180620	2008	1220198	1080	1221278
2009	1170090	837	1170927	2009	1215396	1255	1216652
2010	1160280	962	1161242	2010	1210764	1443	1212207

Major Sink Development Scenario				Full Implementation Scenario			
YEAR	Forest	(urban-trees	Total	YEAR	Forest	(urban-trees	Total
	MT/year	MT/year	MT/yr		MT/year	MT/year	MT/yr
1990	1420020		1420020	1990	1420020		1420020
1992	1400400		1400400	1992	1400400		1400400
1998	1278000		1278000	1998	1278000		1278000
1999	1274580	91	1274671	1999	1277775	127	1277902
2000	1271412	199	1271611	2000	1277879	278	1278157
2001	1268495	327	1268821	2001	1278309	457	1278766
2002	1265824	475	1266299	2002	1279064	665	1279728
2003	1263398	644	1264042	2003	1280140	901	1281041
2004	1261215	834	1262050	2004	1281535	1168	1282703
2005	1259272	1046	1260318	2005	1283247	1464	1284711
2006	1257567	1277	1258843	2006	1285273	1787	1287060
2007	1256096	1529	1257625	2007	1287611	2141	1289752
2008	1254859	1800	1256659	2008	1290260	2520	1292780
2009	1253852	2092	1255944	2009	1293215	2929	1296144
2010	1253073	2405	1255478	2010	1296476	3367	1299842