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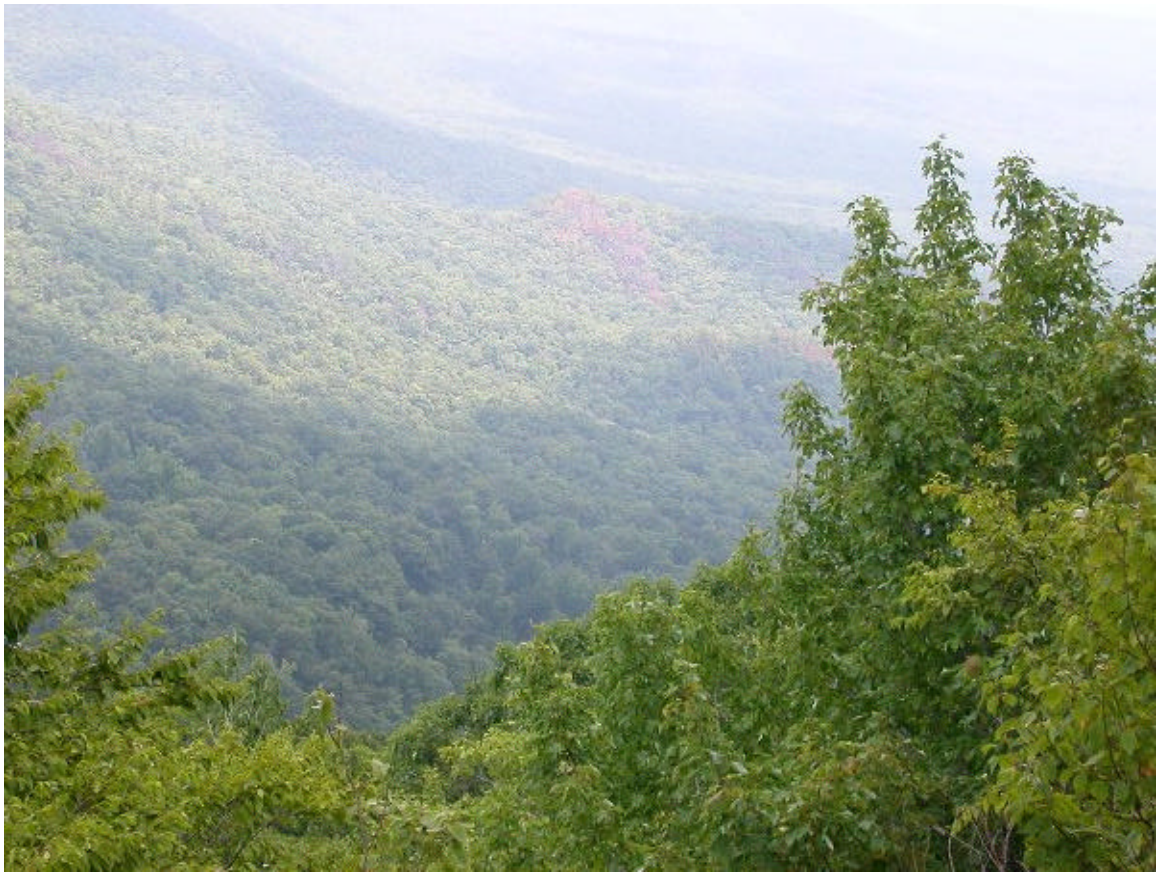
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY

INVENTORY AND PROJECTION OF GREENHOUSE GAS EMISSIONS (2000 – 2025)



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1.0 EXECUTIVE SUMMARY

This report sets forth an inventory of greenhouse gas (GHG) emissions for the Commonwealth of Virginia for the period 2000 to 2005 based on energy consumption and other activities within the state and projects the same through 2025. It is anticipated that this inventory will facilitate the work of the Governor's Climate Change Commission to identify the actions necessary to meet the goal of reducing GHG emissions by 30 percent by 2025 as set forth in the Virginia Energy Plan and Executive Order 59.

This GHG inventory is developed using the State Greenhouse Gas Inventory Tool (SIT) created by ICF International (ICF) for the United States Environmental Protection Agency (EPA) within EPA's Emission Inventory Improvement Program (EIIP) under the State and Local Climate Change agenda. The report covers the period between 2000 and 2025. For 2005 and earlier, emissions are estimated based on available data. For subsequent period, emissions are projected. For projecting future emissions, the trends set by the historical and other available information, population growth and known developmental plans of the state were taken into account.

Emissions from highway vehicles were derived independent of SIT using the EPA Mobile Source Emission Factor Model (MOBILE 6.2.03) based on likely vehicle traffic activity provided by the Virginia Department of Transportation (VDOT). Emissions from non-highway transportation uses were estimated based on fuels consumption. The report includes emissions generated within the state as well as those generated outside the state due to imported electricity consumed within the state.

The report identifies the four broad source categories contributing to GHG emissions: Energy (including the power sector and transportation sector), Industrial Processes, Waste Management, and Agriculture.

A fifth GHG emissions source, land use change and forest management, has a net carbon sequestration effect with an annual rate of sequestration of approximately 20 million metric tons of CO_2 equivalent. Thus, the net emissions are offset to that extent by the sequestration effect of these activities.

A preliminary estimate of carbon removal resulting from natural sequestration has been included in this document, but has not yet been factored into the overall inventory estimate due to the current uncertainty and confidence in the estimate. This estimate will be evaluated further so that it could be included in the final inventory through a net emissions inventory calculation.

Table 1.1 sets forth GHG emissions, by source, expressed in terms of carbon dioxide (CO_2) equivalent for 2000 and projected for 2025. GHG emissions (CO_2 equivalent) by energy consuming sector are provided in Table 1.2. Figure 1.1 shows the distribution of emissions contributed by all sources and Figure 1.2 shows the emission trends from energy consuming sectors.

According to the current assessment, an increasing trend in GHG emissions with time is characterized by the increase in demand for energy by the power and transportation sectors. The inset in Figure 1.2 shows the likely 2025 emissions distribution shared by power, transportation and other energy uses at 40%, 35% and 18% respectively. All other non-energy sources put together contribute the balance 7%.

Table 1.1: Emissions of Greenhouse Gases (2000 & 2025)

Emission Source	2000	2025
1. Energy	Million Metric Tons of CO_2 Equivalent	
1.1 Fossil Fuel Combustion	122.86	169.74
1.2 Coal Mining	6.04	5.78
1.3 Oil & Natural Gas	0.31	0.43
Energy Total	**129.21**	**175.95**
2. Industrial Processes	**4.15**	**4.33**
3. Waste Management		
3.1 Solid Wastes	4.28	5.54
3.2 Wastewater	0.93	1.27
Waste Management Total	**5.21**	**6.81**
4. Agriculture		
4.1 Livestock Rearing	2.52	2.62
4.2 Crops Harvest	3.58	3.50
Agriculture total	**6.10**	**6.12**
Total Emission (Production)	**144.66**	**193.20**
Emissions (Imported Power)	**17.97**	**36.64**
Total Emission (Consumption)	**162.63**	**229.84**

Table 1.2: Emissions from Energy Consuming Sectors

Energy Consuming Sectors	2000	2025
	Million Metric tons of CO_2 Equivalent	
1. Residential	8.40	8.83
2. Commercial	5.82	8.11
3. Industrial	17.86	22.25
4. Transportation	48.27	78.29
5. Generated Power	42.51	52.26
6. Imported Power	17.97	36.64
Energy Consuming Sectors Total	**140.83**	**206.38**

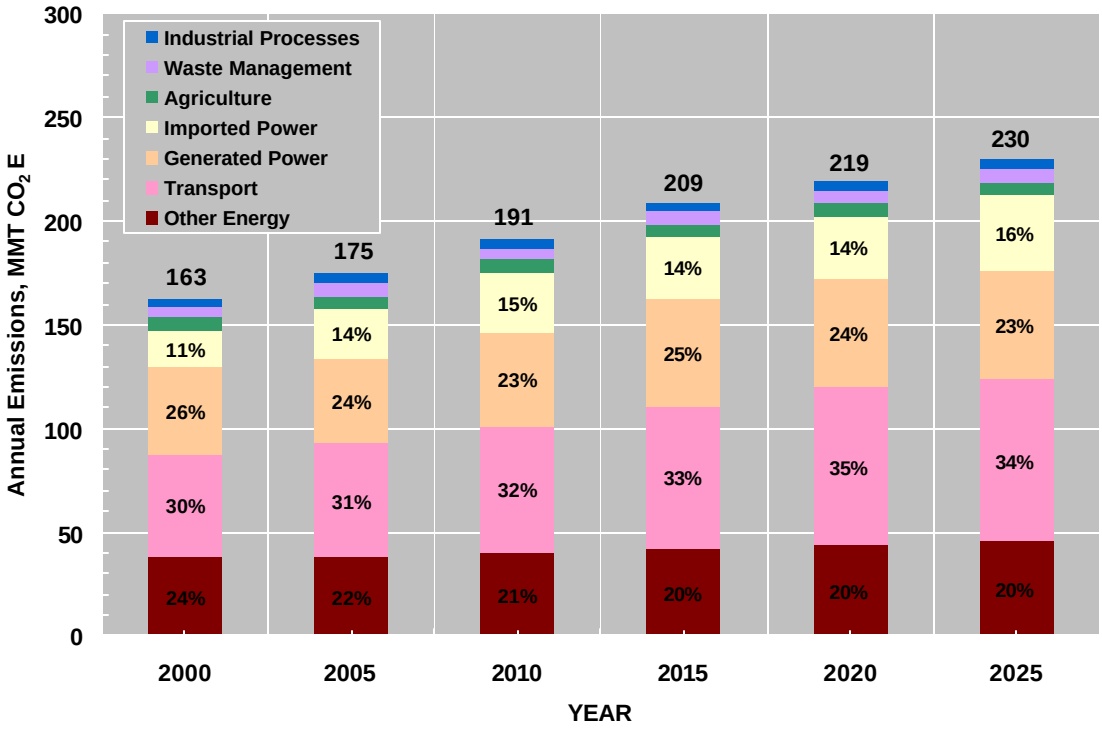

Figure 1.1: Emissions Distribution from Different Sources

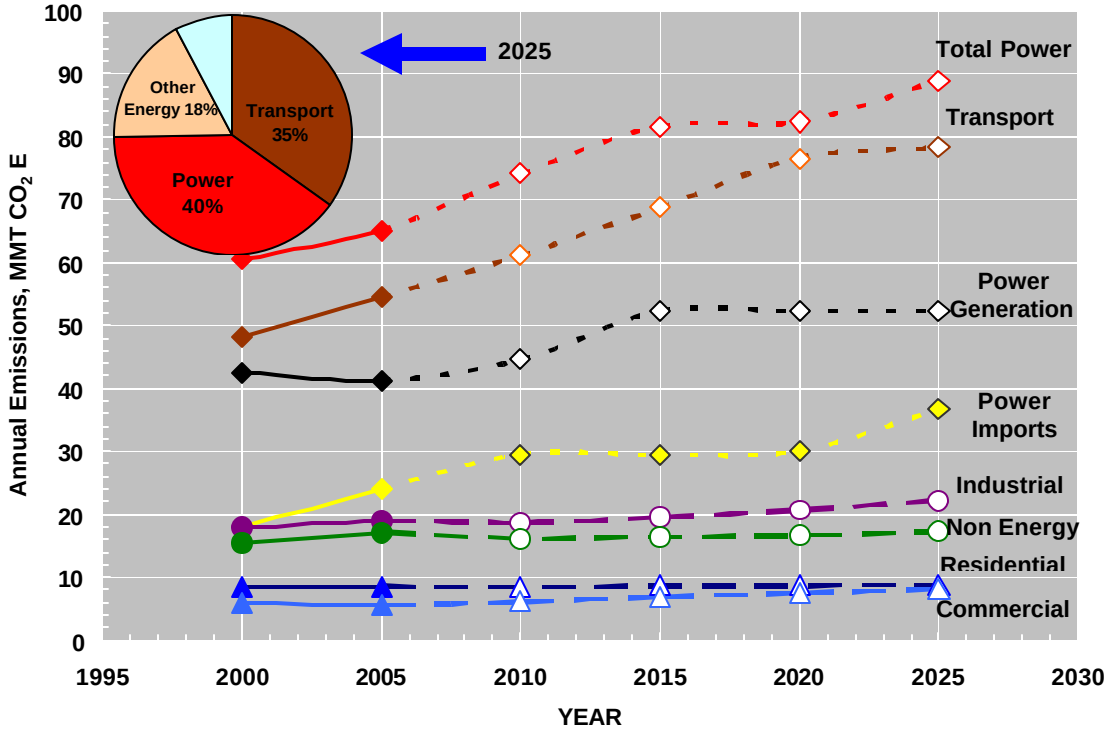

Figure 1.2: Emissions Trend from Energy Consuming Sectors

2.0 BACKGROUND

Gases that trap heat in the atmosphere are often referred to as greenhouse gases (GHGs). The principal GHGs that enter the atmosphere because of human activities are:

- **Carbon Dioxide (CO_2)**: Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is also removed from the atmosphere (or "sequestered") when it is absorbed by plants, as part of the biological carbon cycle, or the ocean.

- **Methane (CH_4)**: Methane is emitted during the production and transport of coal, natural gas, and oil and combustion of fossil fuels. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.

- **Nitrous Oxide (N_2O)**: Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

- **Fluorinated Gases**: Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances (i.e., CFCs, HCFCs, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").

Virginia recently developed a comprehensive energy plan for the Commonwealth. The Virginia Energy Plan was prepared pursuant to legislation that was enacted in 2006, and covers all aspects of energy production and consumption in Virginia. The plan identifies four overall goals, including a goal to reduce GHG emissions by 30 percent by 2025. By Executive Order 59, Governor Kaine established a Commission on Climate Change to prepare a Climate Action Plan. This plan will identify, among other things, the actions necessary to achieve the 30 percent reduction goal. A necessary first step towards reaching this goal is to build an accurate and quality assured inventory of GHG emissions for the past and project emissions into the future with reasonably reliable accuracy.

The energy source category is a major contributor of GHG emissions. This includes transportation, the combustion of fossil fuels used as an energy source as well as production, transport and distribution of primary energy sources like coal, petroleum and natural gas. Other activities contributing to the GHG emissions pool include certain industrial processes, management of wastes and agricultural activities. Changes in land use and forestry also contribute to the GHG emissions pool but the net effect from this category so far has been that of carbon sequestration. Activities and sectors, and the GHGs they emit, are summarized in Table 2.1.

This GHG inventory was developed using the State Greenhouse Gas Inventory Tool (SIT) created by ICF International (ICF) for the United States Environmental Protection Agency (EPA) within EPA's Emission Inventory Improvement Program (EIIP) under the State and Local Climate Change agenda. The inventory covers the period between 2000 and 2005 and projects emissions through 2025.

The inventory provided in this report for the period 2000 to 2005 is based on quality assured data on fuel consumption for all the years reported by the Energy Information Administration (EIA) of the United States Department of Energy (DOE). The future emissions are estimated on the likely energy demand for different needs computed based on historical trends, growth consideration and other related factors.

Table 2.1: Sectors and Activities Contributing Greenhouse Gases

Activity and Sectors		Greenhouse Gases (GHG)			
		CO_2	CH_4	N_2O	Fluorine Compounds
Energy					
Fossil Fuel Combustion	Residential, Commercial, Industrial, Transportation & Power Sectors	X	X	X	
Biomass Combustion			X	X	
Coal Mining	Active & Abandoned Mines		X		
Natural gas	Production, Transmission & Distribution	X	X		
Petroleum	Production, Transport & Distribution	X	X		
Other Sources					
Industrial Processes	Cement, Limestone, Soda Ash, Iron & Steel, Ammonia & Urea, Semiconductors, etc.	X		X	X
Waste Management	Solid Wastes and Wastewater (Municipal & Industrial)	X	X	X	
Agriculture	Livestock Rearing & Crops Harvest	X	X	X	
Land Use Change & Forestry	Urban & Forests	X	X	X	

The projection module available in SIT is used to estimate GHG emissions for future years based on updated information for the previous years. In this process, the assumed fuel utilization data in the projection module is revised as appropriate. For the power sector, the state's anticipated fuel requirements are independently assessed based on projections made by the Integrated Planning Model (IPM) as well as the known plans for the development of the power industry in the state as reflected in the 2007 Virginia Energy Plan (VEP) and recent announcements by Dominion a leading power producer of the region. The difference between the projected demand for power and likely generation within the state is taken as the power that needs to be imported.

For the transportation sector, CO_2 emissions from highway vehicles are independently estimated using the latest version of the Mobile Source Emission Factor Model (MOBILE 6.2.03) developed by EPA and integrated into the inventory. This model is based on inputs of motor vehicle and traffic related information such as age and distribution of registered vehicles and mix of vehicle types that make up the traffic activity (VMT mix). The Virginia Department of Motor Vehicles (DMV) provided the statewide jurisdictional-specific vehicle registration data. CO_2 emissions from non-highway transportation are estimated based on projected fuels consumption. CH_4 and N_2O emissions are derived from the projection tool and prorated based on the estimated fuel consumption.

This report is broken into five sections describing the methods used to estimate and project emissions for each source category and then a final section summarizing the emissions estimates and projections by source category. Input data used for estimating emissions are provided in Appendix A and the details of GHG emissions estimates based on those inputs are provided in Appendix B.

3.0 ENERGY

While combustion of all carbon bearing fuels accounts for a large share of GHG emissions, the process of production and supply of fossil fuels also contributes to the GHG emissions pool. Only the combustion of fossil fuels is considered as a source of CO_2. Biomass and ethanol are discounted based on the conventional approach to treat these fuels as carbon neutral because carbon contained in them is the product of natural sequestration. All combustible fuels are used in estimating emissions of CH_4 and N_2O. Coal mining activity, both active and abandoned mines, contributes emissions of CH_4. Production, transport and distribution of natural gas and oil contribute to emissions of CO_2 and CH_4.

3.1 Combustible Fuels Consumption: Fuel combustion, primarily fossil and to a very small extent biomass, account for nearly 90 percent of GHG emissions in the state. Nearly half of such emissions originate from use of petroleum products dominated by the transportation sector, about a third from coal combustion, mostly used for power generation and the balance from natural gas combustion.

There are three modules built into SIT to estimate emissions resulting from the combustion of fuels. The Fossil Fuels Combustion Module provides CO_2 emissions from all sectors consuming energy. The Stationary Combustion Module estimates CH_4 and N_2O emissions from all energy-consuming sectors, except the transportation sector. The Mobile Combustion Module is used to estimate emissions of CH_4 and N_2O from the transportation sector.

For highway vehicles, however, a better estimate of CO_2 emissions associated with a particular level of activity may be developed using the latest version of the EPA Mobile Source Emission Factor Model (MOBILE 6.2.03). MOBILE 6.2.03 is considered more comprehensive for estimating highway vehicle emissions than the Fossil Fuels Combustion Module. This model requires inputs of motor vehicle and traffic related information such as age and distribution of registered vehicles and the mix of vehicle types that make up the traffic activity (VMT mix). The model also takes into account the performance of vehicles based on fuel efficiency data. The Virginia Department of Motor Vehicles (DMV) provided the statewide jurisdictional-specific vehicle registration information for this inventory.

Statistically compiled, quality assured, precision data on the consumption of fuels by different energy consuming sectors, are maintained for each state by the Energy Information Administration (EIA) of the Department of Energy (DOE) in the State Energy Data System (SEDS) available at:

http://www.eia.doe.gov/emeu/states/sep_use/total/csv/use_csv.html.

The time lag for data availability for a particular year is approximately 2.5 years after the completion of the calendar year. With the information for all the previous years including 2005 being fully posted, estimated emissions for the period up to 2005 can be considered as adequately quality assured.

3.1.1 Future Years Fuels Demand: The projection module in SIT not only projects emissions based on historical data but also provides values for projected fuels consumption for different end uses. Future fuel consumption estimates were linked to the regional projections made in the Annual Energy Outlook for 2006 of EIA and disaggregated to the state level by applying the proportion of actual consumption in 2003. In this report, a different approach is made to assess the future fuel needs by individual energy consuming sectors more precisely, depending upon the sector and supporting data and information available, as described below.

3.1.1.1 Power Sector: Power generation alone emits nearly 30 percent of GHGs from all energy sources in Virginia. Historically, Virginia has been a net importer of electricity and this position is likely to continue into the future. In 2005, 30 percent of the total power consumed in the state was imported. Therefore, a detailed understanding of the anticipated demand and supply for

electric power in the state is needed to assess the impact of economic activity in the state on GHG emissions in future years.

3.1.1.1.1 Demand for Power: An analysis of the historic data on electricity consumption for residential, commercial, industrial and transportation uses indicates a linear growth in demand for residential and commercial uses with population growth from 1960 to present. Demand for power for residential, commercial and industrial uses is correlated with growth in population as indicated in Figure 3.1. Growth in population in the state over time is obtained by extrapolation of the national census data and the population growth numbers used here are the same as those used in the projection module of SIT for estimating emissions from waste management (discussed later).

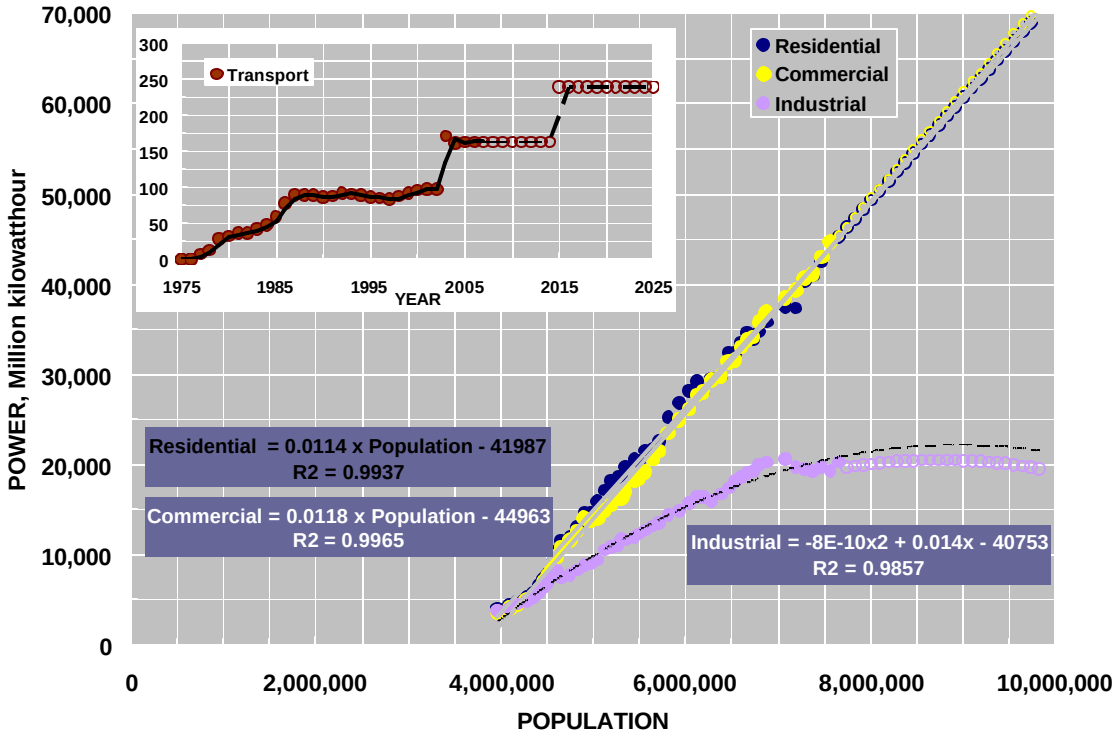

Figure 3.1: Population Growth and Power Demand

Figure 3.1 shows that the demand for electricity by industry appears to stabilize at certain population growth levels. Also, as the inset to Figure 3.1 shows, the power demand for transportation uses as population grows is not significant. Two new projects, the extension of metro rail in Northern Virginia and the Norfolk light rail project will not have any impact on power demand. Additional power may be required if the proposed DC - North Carolina rail project materializes. As such, this project is included in the projections for 2015 and after. Because the demand for power is projected based on actual power sales, the demand for power will be more to accommodate for transmission losses. Transmission losses for the past are the difference between availability (generation plus imports) and actual sales. For future years, transmission losses are prorated based on values for 2006, the latest available data.

3.1.1.1.2 Power Supply Potential: Predicting power generation at different points in time in the future is more complex than assessing the demand situation. How the existing facilities would operate is complicated by the changing market forces on fuel costs on one hand and the impact of new environmental regulations on the other. Best judgment is made on the *likely-situation-to-be* based on two independently available sources. The Integrated Planning Model (IPM) used extensively by EPA for assessing power availability in the country for EPA's various needs presents one scenario for the state in 2010, 2015 & 2020. Electric generation facilities planned in

Virginia as reflected in the VEP and up-dated by the announcements of leading power producers in the state presents another scenario. Table 3.1 summarizes IPM projections and Table 3.2 gives the information contained in the VEP updated with recent announcements.

Table 3.1: Future Power Generation Scenario Projected by IPM

Fuel Type	2010	2015	2020	2010	2015	2020	2010	2015	2020
	Billion Btu			Generation Million kWh			MMT CO_2		
Coal	424,708	526,558	576,408	40,720	50,885	56,011	43.41	53.83	58.94
Natural Gas	29,042	46,549	25,385	3,781	6,024	3,168	1.70	2.73	1.49
Oil	105	105	112	11	11	11	0.01	0.01	0.01
All Fuels	**453,856**	**573,213**	**601,905**	**44,512**	**56,920**	**59,190**	**45.12**	**56.56**	**60.43**

Table 3.2: Known Development Plans for Power Generation

Owner Name (Plant Name)	Unit	County	Primary Fuel	Name Plate capacity, MW	Estimated Online Year	Additional Power Likely, Million kWh	Annual Fuel Requirement, Billion Btu
Undergoing Feasibility Study							
Hydro Matrix LP (Flanagan Hydroelectric)	1	Dickenson	Water	**5**	**2015** [1]	**35**	-
Virginia Electric & Power (North Anna)[1]	NB 3	Louisa	Uranium	**1,520**	**2015** [2]	**10,506**	-
New Generator Planned for Installation							
Ameresco Inc (Rappahannock Landfill)	IC1 2	Stafford	Landfill Gas	**2.14**	**2008** [1]	**15**	-
Fauquier Landfill Gas LLC (Fauquier landfill)	IC3	Fauquier	Landfill Gas	**1**	**2015** [1]	**7**	-
Virginia Electric & Power (Virginia City Hybrid Energy)[2]	ST1	Wise	Coal	**585**	**2012** [3]	**4,100**	**42,239**
Applications Pending for Regulatory Approval							
CPV Warren LLC(CPV) Warren Power)[3]	CC 1	Warren	Natural Gas	**600**	**2010** [4]	**4,205**	**36,226**
Highland New Wind Development LLC	WT 1 19	Highland	Wind	**38**	**2008** [1]	**166**	-
Virginia Electric & Power (Ladysmith Generating)		Caroline	Natural Gas/Fuel oil	**300**	**2008** [1]	**2,102**	**18,113**
Buckingham Power Station (Acquisition of Tenaska project)[4]		Buckingham	Natural Gas	**580**	**2011** [5]	**4,065**	**35,019**
Utilization factor of 50 percent assumed for wind generation and 80 percent for the rest							
1. www.dmme.virginia.gov/vaenergyplan.shtml							
2. www.dom.com/news/elec2007/pr1128.jsp							
3. www.dom.com/news/elec2008/pr0219.jsp							
4. www.dom.com/new s/dom2008/pr0304.jsp							
5. www.dom.com/news/elec2008/pr0311a.jsp							

According to IPM projections, coal generation is expected to increase substantially while oil-based generation tapers off. Based on current development plans, however, projected increases in coal consumption appear to be moderate (Table 3.2). Because it is unclear whether or how the increased use of coal projected by IPM could be achieved, the development plans set forth in Table 3.2 is considered the more probable future scenario for estimating GHG emissions.

Future fuels requirements based thereon are indicated in Table 3.3 along with the values assumed in projection module of SIT. For coal, values are comparable. Projections for petroleum products requirements were kept low consistent with the IPM projections as well as the recent trends and the requirement for gas is consistent with known development plans. Table 3.3 also sets forth the anticipated generation mix.

It may be noted that the future fuel requirements indicated here were worked out before the issuance of permit to Virginia City Hybrid Energy Plant and as such, the proposed fuel switch in Bremo Power Plant from coal to natural gas is not reflected.

Table 3.3: Projected Fuels Requirement & Estimated Power Generation

Fuel for Power Generation	Projection Tool of SIT				Known Development Plans				
	2006	2010	2015	2020	2006	2010	2015	2020	2025
	Projected Heat Utilization, Billion Btu								
Coal	388,841	414,043	441,307	461,650	353,447	424,708	466,947	466,947	466,947
Natural Gas	44,674	45,862	55,417	58,100	62,038	95,605	166,850	166,850	166,850
Distillate Fuel	21,734	23,551	24,322	24,458	2,951	40	40	40	40
Residual Fuel	24,583	24,582	25,159	25,158	7,929	107	107	107	107
Wood & Wood Wastes	13,103	13,830	14,837	15,731	13,103	13,830	14,837	15,731	15,731
					Generation, Million Kilowatt hour				
Coal					34,305	41,222	45,321	45,321	45,321
Natural Gas					7,201	11,097	19,366	19,366	19,366
Distillate Fuel					221	3	3	3	3
Residual Fuel					594	8	8	8	8
Wood & Wood Wastes					490	517	555	588	588

The column noting fuel requirement of Table 3.2 is only for those new units that contribute GHG. Landfill gas used in power generation is discounted because of the avoided methane generated from wastes. Full implication of the new plants for additional power is considered for the year following expected commencement of operations. Figure 3.2 illustrates the power supply trends in the state in terms of generation giving rise to GHG emissions, generation free of emissions and augmentation by imported power. A steady increase in imported power is projected beyond 2015 in the absence of additional generation within the state.

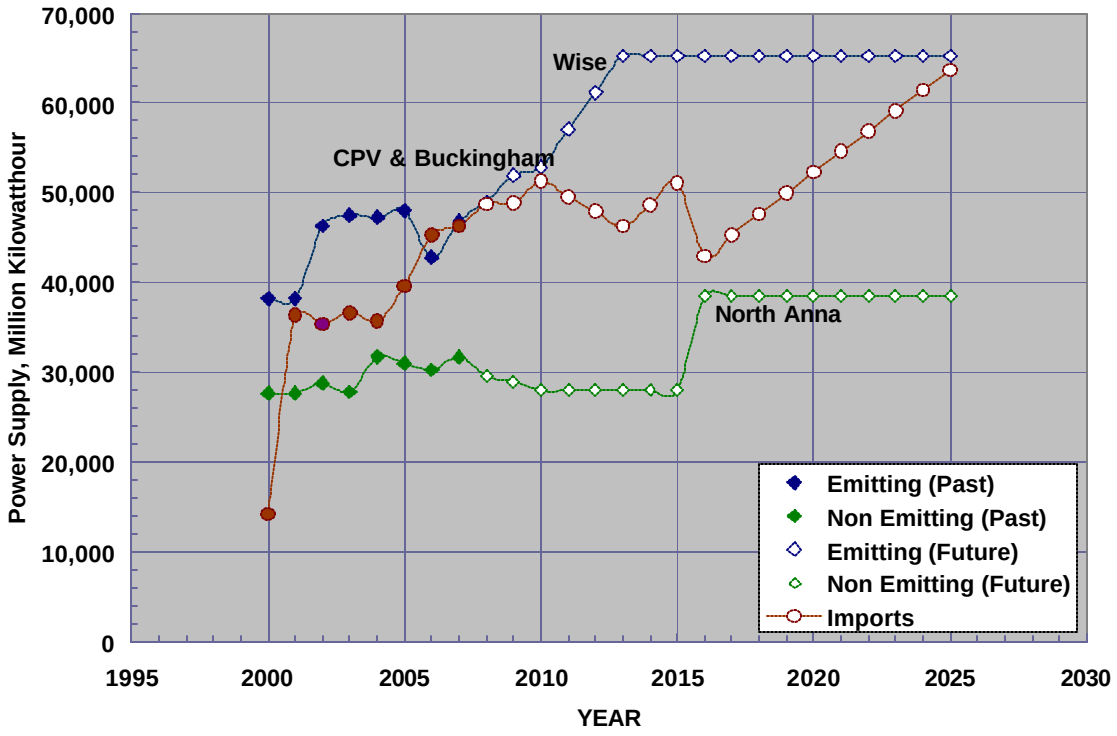

Figure 3.2: Power Supply Trends

3.1.1.1.3 Implications of Imported Power: Virginia has historically been a net importer of power and this trend is likely to continue into the near future. The amount of power required to be imported is estimated based on the likely demand for power (Section 3.1.1.1.1) and the projected generation within the state (Section 3.1.1.1.2). Table 3.4 provides a consolidated account of the estimated demand, in-state supply and the shortfall/expected imports for all years. Transmission losses set forth in the Table 3.4 include a small amount of electricity used within the power plants.

Table 3.4: Demand and Supply Situation for Power in Virginia

YEAR	Population	Residential	Commercial	Industrial	Transportation	Total Generation	Estimated losses due to Transmission	Imports	CO_2 emissions @1,269 lbs/MWh (On Account of Imports)
		Million Kilo-watt hour							MMT CO_2 E
2000	7,078,515	37,541	38,459	20,619	96	77,189	9,000	28,526	17.97
2001	7,192,701	37,325	39,329	19,702	97	74,105	13,954	36,302	22.86
2002	7,285,707	40,358	40,642	19,521	97	75,006	9,776	35,389	21.99
2003	7,375,863	40,877	41,179	19,282	172	75,309	10,427	36,628	22.42
2004	7,472,448	42,503	43,025	19,734	162	78,900	9,183	35,707	21.18
2005	7,564,327	44,662	44,670	19,354	163	78,943	9,684	39,591	23.93
2006	7,653,511	42,906	44,654	18,998	163	73,070	11,645	45,296	26.08
2007	7,742,694	46,280	46,401	19,685	163	78,514	12,279	46,294	26.65
2008	7,831,878	47,296	47,453	19,823	163	78,514	12,520	48,741	28.06
2009	7,921,061	48,313	48,506	19,947	163	80,798	12,759	48,890	28.15
2010	8,010,245	49,330	49,558	20,059	163	80,798	12,997	51,309	29.54
2011	8,100,960	50,364	50,628	20,160	163	85,003	13,238	49,550	28.53
2012	8,191,675	51,398	51,699	20,248	163	89,068	13,477	47,917	27.59
2013	8,282,390	52,432	52,769	20,322	163	93,168	13,714	46,233	26.62
2014	8,373,105	53,466	53,840	20,383	163	93,168	13,951	48,636	28.00
2015	8,463,820	54,501	54,910	20,431	240	93,168	14,194	51,108	29.43
2016	8,554,535	55,535	55,981	20,466	240	103,716	14,428	42,933	24.72
2017	8,645,250	56,569	57,051	20,488	240	103,716	14,660	45,292	26.08
2018	8,735,965	57,603	58,121	20,497	240	103,716	14,890	47,635	27.43
2019	8,826,680	58,637	59,192	20,492	240	103,716	15,119	49,965	28.77
2020	8,917,395	59,671	60,262	20,475	240	103,716	15,347	52,279	30.10
2021	9,008,157	60,706	61,333	20,444	240	103,716	15,573	54,580	31.43
2022	9,098,920	61,741	62,404	20,400	240	103,716	15,798	56,867	32.74
2023	9,189,682	62,775	63,475	20,342	240	103,716	16,022	59,139	34.05
2024	9,280,445	63,810	64,546	20,272	240	103,716	16,244	61,396	35.35
2025	9,371,207	64,845	65,617	20,188	240	103,716	16,465	63,639	36.64

Assessing GHG emissions for imported power is a very complicated matter. In actual practice, the exchange of power takes place both the ways across the national grid, that is, although Virginia is a net importer of power, Virginia also exports power. Thus, to attribute accurately GHG emissions to power consumed, in addition to export–import statistics, information regarding the fuels generating that portion of the power exchanged is required. There are no readily available data sources to derive exclusively the sources and the fuel mix linked to the portion of power imported and exported. Therefore, the emission impact associated with imported power is assessed prorating the emissions based on actual emissions to net generation in the state during the year.

Table 3.5 gives power generation and emission statistics for 2001-2006 upon which the emissions attributable to imports are derived. For all future years a value of 1,269 lbs/megawatt hour rate, the highest of the six preceding years (to set the outer limits of emission) is used.

Table 3.5: Statistics on Generation & Imports of Power in Virginia

(www.eia.doe.gov/cneaf/electricity/st_profiles/virginia.pdf)

Item	Units	2001	2002	2003	2004	2005	2006
Net State Generation from all Sources	Million kilowatt hour	74,105	75,006	75,309	78,900	78,943	73,070
Estimated CO_2 Emissions	Million Metric tons	46.67	46.61	46.09	46.80	47.71	42.07
CO_2 Emission Rate	lbs/Megawatt hour	1,388	1,369	1,349	1,307	1,332	1,269
Net Interstate Imports	Million kilowatt hour	36,302	35,389	36,628	35,707	39,591	45,296
CO_2 Attributable to Imported Power	Million metric Tons	22.86	21.99	22.42	21.18	23.93	**26.08**
CO_2 Emissions due to Projected Imports		**2000**	**2005**	**2010**	**2015**	**2020**	**2025**
Power Imports	Million kilowatt hour	28,526	39,591	51,309	51,108	52,279	63,639
CO_2 Attributed to Imported Power	Million metric Tons	17.97	23.93	29.54	29.43	30.1	36.64

3.1.1.2 Transportation Sector: Historical consumption of major fuels by the transportation sector as well as the projected fuel consumption from SIT for future years is illustrated in Figure 3.3. Solid points in Figure 3.3 (and subsequent figures) indicate actual consumption until 2005 and the solid lines indicate fuel consumption projected in SIT. For motor gasoline, distillate fuel and jet kerosene the projected values are below the likely consumption based on recent trends. Therefore, the consumption of these commodities in future years has been adjusted through graphical extrapolation based on these recent trends and is shown as non-solid points in Figure 3.3. The SIT projections for residual oil and natural gas appear to be consistent with historical trends as seen in Figure 3.3. Future consumption of different fuels for non-highway uses were projected by apportioning total estimated values of each fuel in the same ratio that prevailed in 2005.

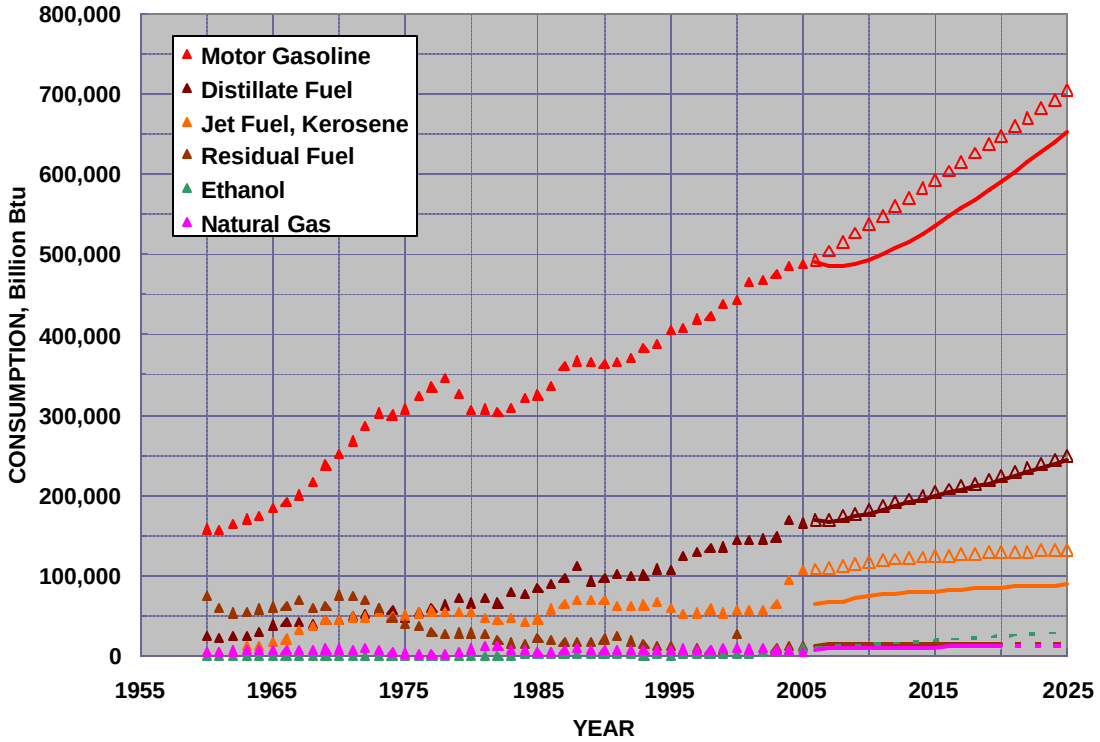

Figure 3.3: Consumption of Major Fuels by Transportation Sector

Use of ethanol as a transportation fuel is a relatively recent occurrence and this use is expected to intensify due to federal laws and regulations. Heat in ethanol mixed with motor gasoline is discounted in estimating CO_2 from burning motor gasoline in vehicles. The SIT projection tool does not provide future estimates for ethanol. Therefore, for projecting future GHG emissions, ethanol use was projected by extrapolation based on recent trends as depicted in the Figure 3. 4.

Based on these projections, ethanol use is likely to increase from the present 2 percent to 4 percent of total gasoline consumed by the transportation sector. The Virginia Energy Plan sets forth an ethanol production goal of 300 million gallons of ethanol per year, which is around 5 percent of projected gasoline use in 2025.

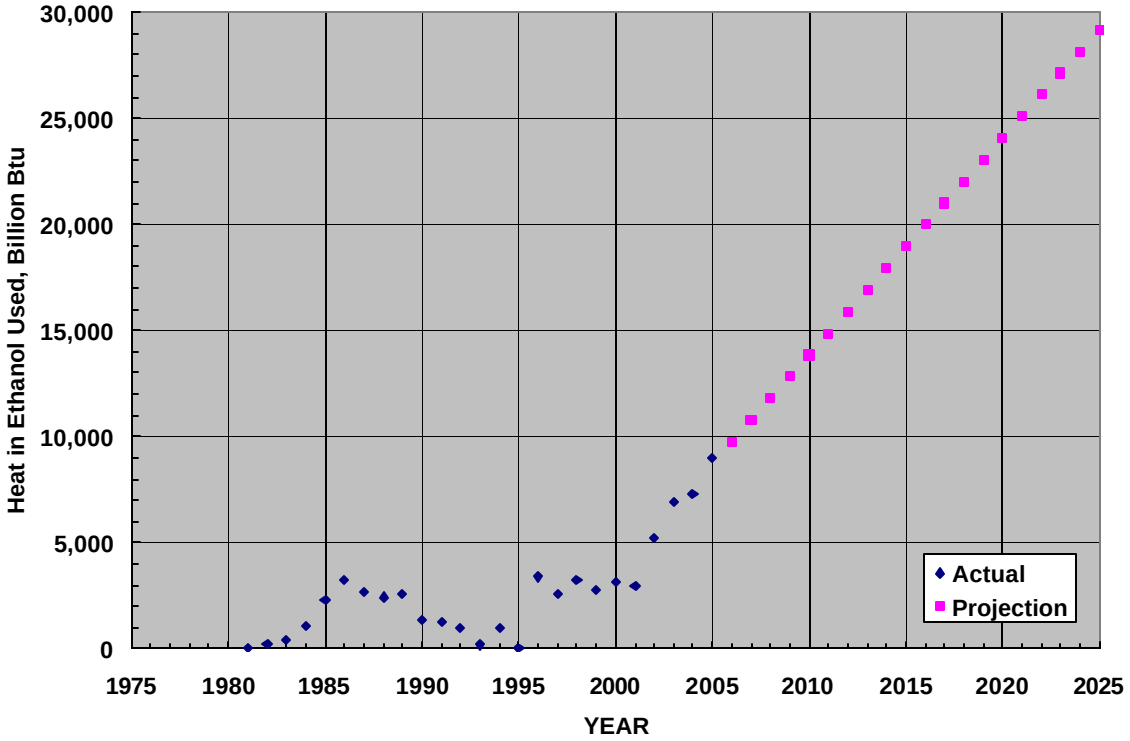

Figure 3.4: Projected Use of Ethanol with Motor Gasoline

3.1.1.3 Industrial Sector: Based on a comparison of fuels used by industry and the SIT projection results of future industrial fuel use, projections relating to natural gas use by the industrial sector were adjusted to reflect recent increases in natural gas consumption that did not appear consistent with the values in projection tool. For all other fuels, the values from the SIT projection module were used for projecting GHG emissions from this sector.

3.1.1.4 Commercial & Residential Sectors: Figures 3.6 and 3.7 show the trend in the use of different fuels by the commercial sector and the residential sector. SIT projections of fuel use were used for projecting future GHG emissions from these sectors.

Data on fuel consumption by the residential, commercial, industrial, transportation and power sectors from 2000 to 2005 and that estimated for the period 2006 to 2025 as described above are provided in Table A.1 of Appendix A. Table A.2 provides the break down of past and likely future fuel consumption by transportation sector required for estimating CH_4 and N_2O emissions with the help of mobile combustion module of SIT. Emissions projected by the SIT projection module were prorated to adjust for the increased fuel usage assessed as described above.

GHG emissions estimates and projections are provided in Appendix B. Table B.1 sets forth CO_2 emissions from fuel combustion for different types of fuels used by individual sectors for the period 2000 to 2025. Table B.2 and B.3 set forth the emissions of CH_4 and N_2O from all sectors except transportation. Table B.4 and B.5 set forth the emissions of CH_4 and N_2O from different parts of the transportation sector.

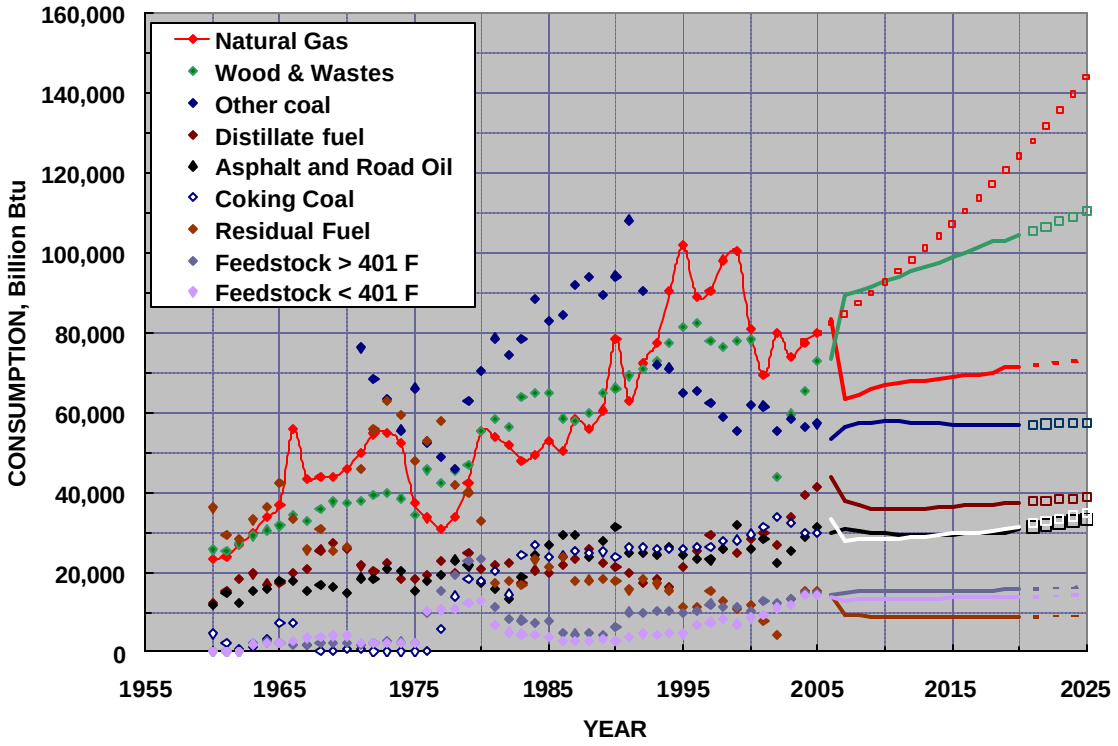

Figure 3.5: Projected Demand for Fuels by Industry

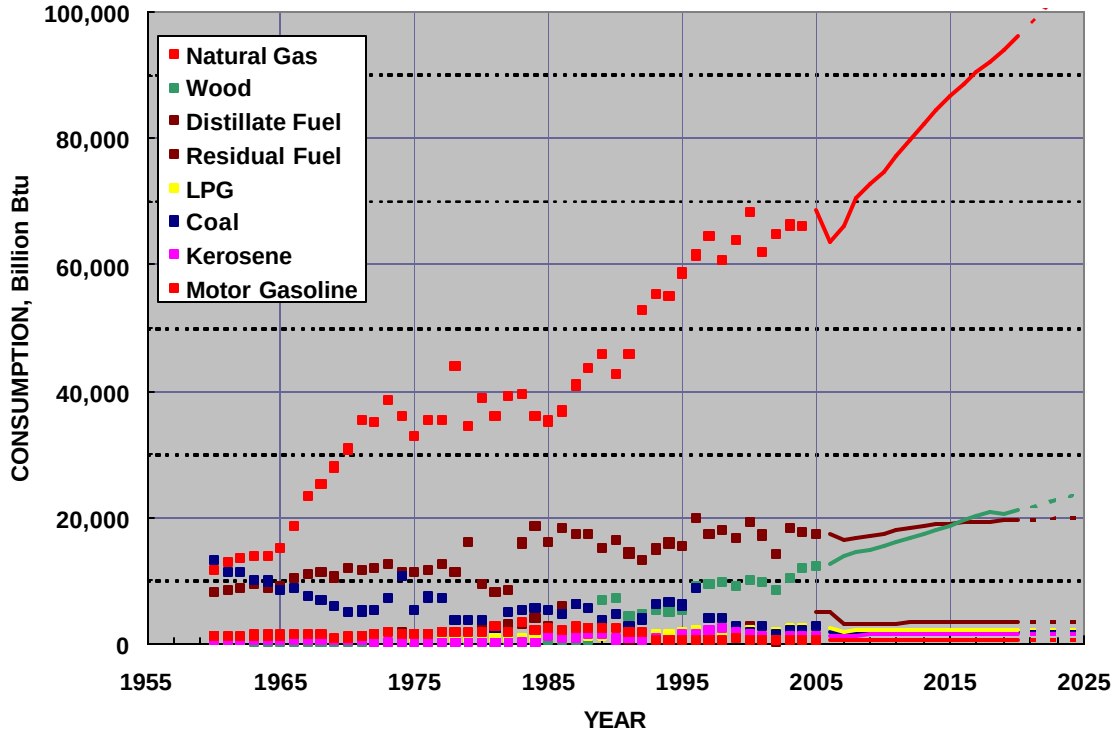

Figure 3.6: Projected Demand for Fuels by Commercial Sector

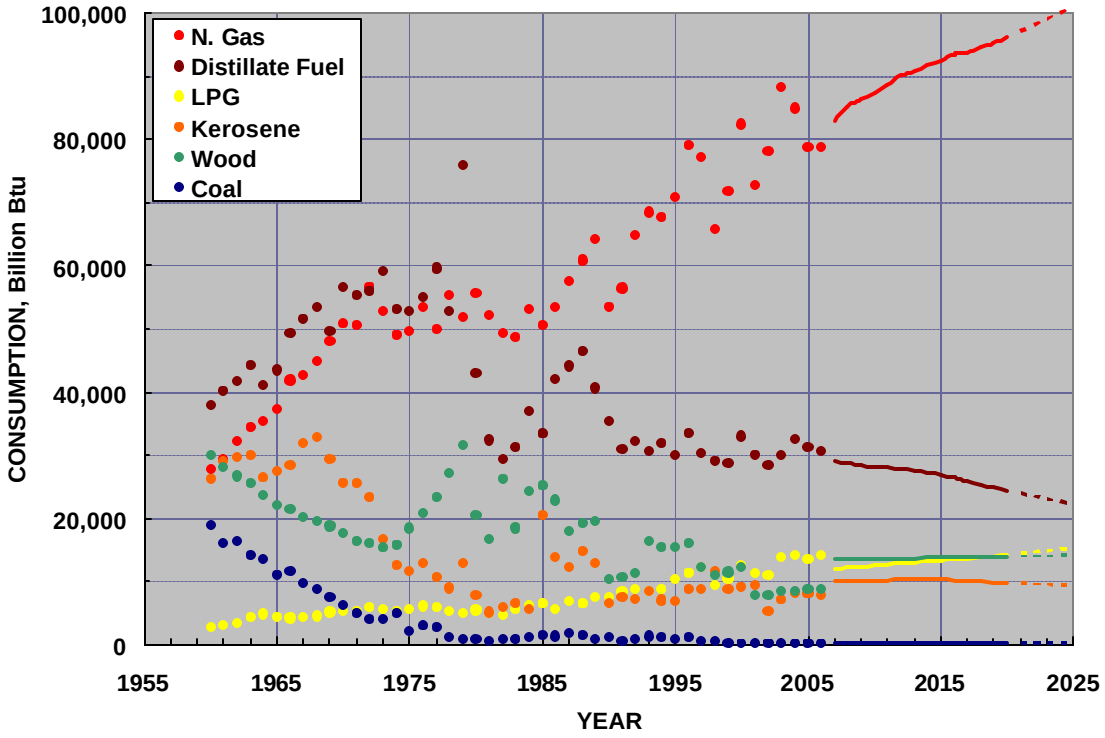

Figure 3.7: Projected Demand for Fuels by Residential Sector

Table 3.6: Carbon dioxide Emissions from Transportation Sector

Highway Vehicles Type	2000	2005	2006	2010	2015	2020	2025
A. MOBILE 6.2.03	Million Metric Tons of Carbon Dioxide						
Gasoline							
Passenger Cars	13.09	13.11	13.16	13.96	15.25	16.82	16.67
Light-Duty Trucks	17.28	19.82	19.89	23.80	27.93	31.95	32.40
Heavy-Duty Vehicles	1.63	0.50	0.50	1.89	2.12	2.40	2.50
Motorcycles	0.06	0.06	0.06	0.06	0.07	0.08	0.09
All Gasoline	**32.06**	**33.49**	**33.61**	**39.72**	**45.37**	**51.25**	**51.66**
Diesel							
Passenger Cars	0.04	0.05	0.05	0.02	0.02	0.02	0.02
Light-Duty Trucks	0.17	1.38	1.38	0.21	0.24	0.27	0.29
Heavy-Duty Vehicles	5.73	6.24	6.26	7.04	7.94	8.95	9.34
All Diesel	**5.94**	**7.67**	**7.69**	**7.27**	**8.20**	**9.25**	**9.65**
All Highways	**38.00**	**41.16**	**41.30**	**46.99**	**53.58**	**60.50**	**61.31**
B. Fuel Based							
All Transportation (Table B.1)	**48.77**	**55.82**	**56.52**	**62.64**	**68.98**	**75.20**	**81.73**
Non-highway (Table B.6)	**8.92**	**12.35**	**12.49**	**13.84**	**14.88**	**15.84**	**16.76**
All Highway	**39.85**	**43.47**	**44.03**	**48.80**	**54.10**	**59.36**	**64.97**
Estimated for Inventory							
Highway Vehicles	38.00	41.16	41.30	46.99	53.58	60.50	61.31
Other Transport Uses	8.92	12.35	12.49	13.84	14.88	15.84	16.76
Total Transportation	**46.92**	**53.51**	**53.79**	**60.83**	**68.46**	**76.34**	**78.07**

3.2 CO_2 Emissions from the Transportation Sector: As described earlier, CO_2 emissions from highway vehicles were estimated using MOBILE 6.02.3 at 5 year intervals based on projected traffic activity provided by VDOT and integrated into this inventory. Table 3.6 provides the results of the MOBILE output.

Table B.6 provides CO_2 emissions from the non-highway portion of the transportation sector. The difference between the fuel-based CO_2 emissions from the transportation sector (Table B.1) and non-highway emissions is the fuel based highway emissions shown in Table 3.6. CO_2 emissions projections developed this way were compared with the emissions estimated using MOBILE 6.2.03 without reference to quantity of fuels used.

As can be seen from Table 3.6 above, CO_2 emissions resulting from the MOBILE model more or less equate with that estimated based on fuel usage. The MOBILE model output was used to determine CO_2 emissions from highway vehicles in the inventory.

3.2 Coal Mining: Coal mines, both active and abandoned, emit CH_4. In addition to production, information from surface and underground mines, ventilation and degasification information on underground mines are required to determine CH_4 emissions. Statistical information on abandoned underground mines classified into vented, sealed or flooded also is needed. Emissions were estimated based on basin specific emission factors for each category of emissions built into the SIT Coal module.

3.3 Natural Gas & Oil: All phases of the natural gas system, including production, transmission, venting and flaring, and distribution and for the petroleum system, including production, refining and transport generate CH_4 and CO_2. Data required for estimating these emissions include:

1. Number of wells and offshore platforms,
2. Amount of natural gas vented and flared,
3. Number of miles of gathering pipeline,
4. Number of gas processing plants and compressor stations,
5. Number of miles of transmission line,
6. Number of miles of distribution line made of each material, and
7. Total number of services (e.g. gas meters).

Input data, for both the coal mining sector and the oil and natural gas sector, was limited to past years. They are shown in Table A.3 in Appendix A. Future year emissions were projected using SIT. GHG emissions for these sectors are provided in Table B.7 in Appendix B.

4.0 INDUSTRIAL PROCESSES

Emissions from Industrial Processes include contribution from the following industrial activities: cement production, lime manufacture, limestone and dolomite used, soda ash manufacture and consumption, production of iron and steel, ammonia, nitric acid, adipic acid, aluminum, HCFC-22, consumption of substitutes for ozone-depleting substances (ODS), electric power transmission and distribution, and magnesium production and processing. Table 4.1 sets forth the details of the raw material and/or processes involved and the data requirements for developing the emissions inventory.

Table 4.1: Data Details of Industrial Processes

Raw Material / Process	Data Requirement
A. Carbon Dioxide (CO_2)	
1. Cement Manufacture	Cement Clinker Production
	Masonry Cement Production
2. Lime Utilization (excluding in sugar industry)	High Calcium Lime
	Dolomite Lime
3. Limestone & Dolomite Used in flux stone, glass making, flue gas desulphurization (FGD), etc.	Limestone Consumption
	Dolomite Consumption
4. Soda Ash	Consumption
5. Iron & Steel Production	From Basic Oxygen Furnace (BOF)
	Open Hearth Furnace (OHF)
	Electric Arc Furnace (EAF)
6. Ammonia Manufacture	Ammonia Production
	Urea Consumption
B. Nitrous Oxide (N_2O)	
7. Nitric Acid	Production
8. Adipic Acid	Production
C. Fluorine Compounds (HFC, PFC and SF_6)	
9. Aluminum	Production
10. Magnesium	Production
10. HCFC-22	Production
11. Ozone Depleting Substances (ODS)	Recent EIIP guidance is to prorate national emissions based on population
12. Semiconductors	
13. Electric Power Transmission & Distribution	Consumption of SF_6

Production/usage data of commodities used in the development of the inventory for 2000 to 2005 are provided in Table A.4 of Appendix A. Emissions for the years before 2005 were estimated based on available data using SIT. For future years, emissions were projected using SIT. Table B.8 of Appendix B sets forth GHG emissions calculated for all years. The default values assumed for integrated iron and steel production based on basic oxygen furnaces in the SIT module were not considered because no such furnaces exist in Virginia.

5.0 WASTE MANAGEMENT

Waste management has two components that contribute to the GHG emissions pool: (1) the containment and disposal of both municipal and industrial solids wastes and (2) the treatment of municipal and industrial wastewater for recovery and disposal.

5.1 Solid Wastes: Disposal of solid wastes in landfills generates CH_4 over a period of time and a portion of the gas is collected and used as an energy source or is flared, both processes giving rise to emissions of CO_2. Emissions of CH_4 from the accumulation of municipal solid waste (MSW) in landfills over time were estimated based on a first order decay model (FOD). Methane emissions so estimated were adjusted for avoided methane due to flaring and that used as an energy source to arrive at net emissions from MSW. Methane from industrial wastes was assumed as 7 percent of that generated by MSW. It was also assumed that 10 percent of CH_4 that is not flared or utilized is oxidized in the top layer of the soil of the landfill.

The incineration (as opposed to landfill) of solid wastes containing plastics, synthetic rubber and synthetic fibers generates emissions of CO_2 and N_2O. Such emissions were estimated by attributing a composition factor to account for the proportion of these types of wastes and assigning appropriate emissions factors. SIT includes default values for this purpose. The data elements required for estimating emissions from solid waste management activities are set forth in Table 5.1.

5.2 Wastewater: Biological and chemical oxidation of municipal and industrial wastewater generates CH_4 and N_2O. Industries producing paper pulp and paperboards, and industries processing food from fruits and vegetables, red meat and poultry are major wastewater generators. The treatment of this wastewater generates GHGs. The data requirements for estimating these emissions are set forth in Table 5.1.

Table 5.1: Waste Management Data Details

Source	Data Requirement
A. Solid Wastes	
1. Landfills	Historic Annual Accumulations
	Annual Population Data
	Amount of CH_4 flared / recovered at landfills
	Industrial landfill CH_4 emissions as percent of municipal wastes
2. Waste Combustion	Amount of wastes combusted
	Proportion of plastics, synthetic rubber and synthetic fibers in the waste combusted
B. Wastewater	
3. Municipal	State Population
	Fraction of population not on septic
	per capita 5-day biological oxygen demand (BOD 5)
	Factor for non-consumption nitrogen
	Protein content
	Fraction of nitrogen in protein
	Direct emissions from wastewater treatment plants
	Bio-solids used as fertilizer
4. Industrial	
4.1 Fruits & Vegetables	Annual production of processed products
4.2 Red Meat	Wastewater outflow, m3/ton of product
4.3 Poultry	Chemical Oxidation Demand (COD)
4.4 Pulp & Paper	Fraction of COD anaerobic ally degraded

The data used to develop the inventory for 2000 to 2005 is provided in Table A.5 of Appendix A. Emissions estimates for 2000 to 2005 and projected for future years are developed using SIT and are provided in Table B.9 of Appendix B. In the projection module of SIT, there are two options for estimating emissions. One is based on population and the other is based on past trends. The reported emissions are based on historic data trends. This option, which gives higher values of the two options, is retained to reflect the upper limit.

6.0 AGRICULTURE

Agriculture has two components giving rise to GHG emissions: (1) livestock rearing that includes both enteric fermentation and manure management and (2) crop harvesting. Enteric fermentation refers to methane emissions that are produced in the digestive systems of ruminant animals such as cows, sheep and water buffalo. Agriculture soil conditioning and the residue burning aspects of crops harvesting also generate GHGs. The data elements required to estimate all emissions from these activities are set forth in Table 6.1.

Table 6.1: Data Requirements for Agriculture

Emission Process	Data Required	Gas Emitted
1. Enteric Fermentation	Animal Population Statistics	CH_4
2. Manure Management	Typical Animal Mass (TAM)	CH_4, N_2O
	Volatile Solids (VS) Production	
	Maximum Potential Emissions (B_O)	
	Kjeldahl (K) Nitrogen excreted	
3. Soils-Plant-Residues & Legumes	Residue Dry Matter Fraction	N_2O
4. Soils-Plant-Fertilizers	Fraction Residue Applied	
5. Soils-Animals	Nitrogen content of the Residue	
	K Nitrogen Excreted	
	Crop Harvest	
	Fertilizer Utilization	
	TAM	
6. Rice Cultivation	Area Harvested	CH_4
&. Residue Burning	Residue /Crop Ratio	CH_4 & N_2O
	Fraction of Residue Burned	
	Dry Matter Fraction	
	Burning Efficiency	
	Combustion Efficiency	
	Carbon Content	
	Nitrogen content	

Details associated with data used to project emissions from livestock rearing are provided in Table A.6 and data on crop harvesting are provided in Table A.7 of Appendix A.

GHG emissions are estimated using SIT and are provided in Table B.10 of Appendix B.

7.0 FORESTRY

The Forest Service of the United States Department of Agriculture (USDA) has reported the estimated changes in carbon stocks for the forests and wood products for the period 1987 to 1997. These estimates were developed as a first approximation of carbon status and trends for forestry to assist states in compiling GHG emissions inventories.

Table 7.1: Carbon Sequestration and Emission from Virginia Forests

(www.fs.fed.us/ne/global/pubs/books/epa/index.html)

Components	**1987**	**1992**	**1997**	**Average Annual Change**		
for Carbon Sequestration				**1987-1992**	**1992-1997**	**1987-1997**
Biomass	472.3	488	503.7	3.13	3.15	3.14
Forest floor and coarse woody debris	68.5	69.1	69.6	0.14	0.08	0.11
Soils	496.1	502	507.8	1.17	1.16	1.17
Wood products and landfills	86.7	96.5	106.7	1.95	2.04	2
TOTAL	**1,123.60**	**1,155.60**	**1,187.80**	**6.4**	**6.44**	**6.42**
for Carbon Emission						
Biomass	0	-4	-7.4	-0.8	-0.68	-0.74
Forest floor and coarse woody debris	0	-0.7	-1.4	-0.14	-0.14	-0.14
Soils	0	-2	-3.8	-0.41	-0.36	-0.38
Wood products and landfills	0	1.2	2.8	0.24	0.32	0.28
TOTAL	**0**	**-5.5**	**-9.8**	**-1.1**	**-0.86**	**-0.98**
Net Carbon Sequestration, Million Metric Tons of Carbon				5.3	5.58	5.44
Net Carbon Sequestration, Million Metric Tons of CO_2				**19.43**	**20.46**	**19.95**

Accordingly, every year it is expected that around 20 million metric tons of CO_2 equivalent carbon dioxide will be sequestered due to changes in land use and forestry.

8.0 EMISSIONS SUMMARY

The tables in Appendix B provide estimated GHG emissions from all sources for the period 2000 to 2025 based on the input data provided in Appendix A.

The fuel and other input data included in Appendix A for the period 2000 to 2005 were obtained from SIT and updated as apt with data that are more recent. For future years, inputs relating to power generation including imports are assessed based on historical trends, population growth and known developmental plans. Energy needs for all other sources including transportation and other input data shown in Appendix A for the period 2005 to 2020 are derived from the projection module of SIT with refinements where found necessary. These inputs were further prorated to cover the period beyond 2020 until 2025. Such a reassessment provides a more realistic estimate on the consumption levels of gasoline, distillate oil and aviation fuels by the transportation sector and of natural gas required by the industrial sector.

GHG emissions from all the data inputs shown in Appendix A, were estimated using emission factors included in SIT except for CO_2 emissions from highway vehicles. CO_2 from highway vehicles, being the bulk from the transportation sector, were independently assessed with the use of MOBILE 6.2.03 based on projected vehicle usage pattern and integrated with the emissions from other non-highway emitting entities estimated from the projected fuels usage. It is also observed that model estimated CO_2 emissions equate well with fuel based emissions estimate.

Table 8.1 summarizes the estimated and projected GHG emissions in terms of million metric tons of CO_2 equivalent for the different source categories. Table 8.2 provides a summary for each GHG. Tables B.11 and B.12 (in Appendix B) provide these summaries for all the years.

Table 8.1: Emissions Summary by Source Category

Source/Sector	2000	2005	2010	2015	2020	2025
	Million Metric tons of Carbon Dioxide					
1. Energy						
1.1 Combustion						
1.1.1 Residential	8.40	8.59	8.40	8.64	8.68	8.83
1.1.2 Commercial	5.82	5.60	6.10	6.91	7.47	8.11
1.1.3 Industrial	17.86	18.93	18.70	19.51	20.69	22.25
1.1.4 Power (Generation)	42.51	41.24	44.55	52.26	52.26	52.26
1.1.5 Transportation	48.27	54.52	61.14	68.75	76.59	78.29
Combustion Total	122.86	128.88	138.89	156.07	165.69	169.74
1.2 Energy Production						
1.2.1 Coal Mining	6.04	4.47	6.39	6.30	6.04	5.78
1.2.1 Oil & Gas	0.31	0.43	0.39	0.40	0.41	0.43
Energy Total	129.21	133.78	145.67	162.77	172.14	175.95
2. Industrial Processes						
Industrial Processes Total	4.15	4.33	4.42	4.23	4.06	4.33
3. Waste Management						
Solid Wastes	4.28	5.93	4.49	4.89	5.22	5.54
Wastewater	0.93	1.07	1.05	1.12	1.20	1.27
4. Agriculture						
Live Stock	2.52	2.44	2.60	2.62	2.62	2.62
Crops Harvest	3.58	3.39	3.54	3.52	3.51	3.50
All Emission (Production)	144.66	150.93	161.76	179.15	188.73	193.2
Power (Imported)	17.97	23.93	29.54	29.43	30.10	36.64
All Emission (Consumption)	162.63	174.86	191.30	208.58	218.83	229.84

Table 8.2: Emissions Summary by Gases

Source/Sector	From Table	2000	2005	2010	2015	2020	2025
		Million Metric tons of Carbon Dioxide					
Carbon Dioxide							
Residential	**B.1**	8.28	8.50	8.27	8.51	8.54	8.69
Commercial	**B.1**	5.73	5.49	5.97	6.75	7.29	7.91
Industrial	**B.1**	17.66	18.74	18.47	19.27	20.44	21.98
Power	**B.1**	42.30	41.03	44.34	52.02	52.02	52.02
Transportation	**B.1**	46.92	53.51	60.83	68.46	76.34	78.07
Industrial Processes	**B.8**	1.68	1.00	3.07	2.42	1.77	1.44
Solid Wastes	**B.9**	0.51	0.92	1.25	1.46	1.67	1.90
Carbon Dioxide Total		**123.08**	**129.18**	**142.20**	**158.89**	**168.07**	**172.01**
Methane							
Residential	**B.2**	0.10	0.07	0.10	0.11	0.11	0.11
Commercial	**B.2**	0.07	0.09	0.11	0.13	0.14	0.16
Industrial	**B.2**	0.07	0.07	0.08	0.08	0.09	0.09
Power	**B.2**	0.01	0.01	0.01	0.01	0.01	0.01
Transportation	**B.4**	0.08	0.06	0.02	0.02	0.02	0.02
Coal mining	**B.7**	6.04	4.47	6.39	6.30	6.04	5.78
Oil & Gas	**B.7**	0.31	0.43	0.39	0.40	0.41	0.43
Solid Wastes	**B.9**	3.76	3.97	3.21	3.40	3.51	3.61
Wastewater	**B.9**	0.51	0.62	0.58	0.61	0.65	0.68
Livestock	**B.10**	2.16	1.90	2.22	2.23	2.22	2.21
Residue burning	**B.10**	0.00	0.01	0.01	0.01	0.01	0.01
Methane Total		**13.12**	**11.70**	**13.11**	**13.30**	**13.21**	**13.12**
Nitrous Oxide							
Residential	**B.3**	0.03	0.02	0.03	0.03	0.03	0.03
Commercial	**B.3**	0.02	0.02	0.03	0.03	0.03	0.04
Industrial	**B.3**	0.13	0.13	0.15	0.16	0.16	0.17
Power	**B.3**	0.19	0.19	0.20	0.23	0.23	0.23
Transportation	**B.5**	1.27	0.95	0.29	0.27	0.23	0.20
Solid Wastes	**B.9**	0.01	1.04	0.02	0.03	0.03	0.03
Wastewater	**B.9**	0.41	0.44	0.48	0.51	0.55	0.58
Live Stock	**B.10**	0.36	0.54	0.38	0.39	0.40	0.41
Crops Harvest	**B.10**	3.57	3.38	3.53	3.51	3.50	3.48
Nitrous Oxide Total		**6.00**	**6.72**	**5.10**	**5.15**	**5.16**	**5.18**
Fluorine compounds	**B.8**	**2.47**	**3.32**	**1.35**	**1.81**	**2.29**	**2.89**
All Gases (Production)		**144.66**	**150.93**	**161.76**	**179.15**	**188.73**	**193.20**
Imported Power (CO_2)	**B.1**	**17.97**	**23.93**	**29.54**	**29.43**	**30.10**	**36.64**
All Gases (Consumption)		**162.63**	**174.86**	**191.30**	**208.58**	**218.83**	**229.84**

9.0 DATA SOURCES

The Climate Registry:
http://www.theclimateregistry.org/

US EPA Greenhouse Gas State Emission Inventory Guidance:
http://epa.gov/climatechange/emissions/state_guidance.html

US EPA National Greenhouse Gas Inventory Reports:
http://epa.gov/climatechange/emissions/usinventoryreport.html

The Virginia Energy Plan:
http://www.governor.virginia.gov/MediaRelations/NewsReleases/viewRelease.cfm?id=495

Virginia Executive Order 48:
http://www.governor.virginia.gov/initiatives/ExecutiveOrders/2007/EO_48.cfm

State Energy Data System (SEDS) of Energy Information Administration (EIA) of the Department of Energy (DOE):
http://www.eia.doe.gov/emeu/states/state.html?q_state_a=va&q_state=VIRGINIA

2005 Virginia Forest Inventory and Analysis (FIA) Data:
http://www.ncrs2.fs.fed.us/FIADatamart/fiadatamart.aspx

APPENDIX A

INPUT DATA DETAILS

Table A.1: Data on Historic & Projected Fuels Consumption

Sector/Fuel	2000	2001	2002	2003	2004	2005	2006	2007	2008
	Billion Btu								
A. Residential									
Coal	239	356	232	341	255	270	291	472	478
Distillate Fuel	33,081	30,213	28,448	29,965	32,629	31,395	30,608	29,009	28,793
Kerosene	9,308	9,531	5,302	7,149	8,244	8,084	7,978	10,042	10,148
LPG	12,623	11,487	11,053	14,040	14,268	13,710	14,177	12,098	12,253
Natural Gas	82,460	72,928	78,243	88,414	84,994	89,182	78,859	83,113	85,317
Wood	12,426	7,897	8,016	8,438	8,649	8,860	8,860	13,536	13,575
B. Commercial									
Coal	1,935	2,883	1,703	2,285	2,061	2,733	1,967	1,912	1,988
Distillate Fuel	19,349	17,238	14,311	18,346	17,633	17,358	17,397	16,618	16,696
Kerosene	1,567	1,291	498	1,106	1,373	1,150	1,182	1,372	1,361
LPG	2,228	2,027	1,950	2,478	2,518	2,419	2,482	2,051	2,198
Motor Gasoline	635	646	660	642	645	598	591	528	564
Residual Fuel	2,708	1,774	465	2,549	1,988	523	5,097	3,085	3,129
Natural Gas	68,386	62,090	64,998	66,317	66,264	68,790	63,530	66,223	70,652
Wood	10,078	9,745	8,516	10,446	11,958	12,202	12,568	13,894	14,446
C. Industrial									
Coking Coal	29,536	31,368	33,723	32,429	29,739	29,532	33,454	27,954	28,142
Other coal	61,947	61,570	55,210	58,441	56,348	57,352	53,430	56,515	57,316
Asphalt and Road Oil	25,766	28,214	22,440	25,271	28,609	31,334	29,891	30,768	30,239
Aviation Gasoline Blends	14	22	27	26	37	-	-	-	-
Distillate fuel	28,291	29,654	26,619	33,769	39,364	41,388	44,004	37,711	36,738
Feedstock < 401 F	8,520	9,385	11,074	11,652	14,247	13,282	13,543	12,974	13,420
Feedstock > 401 F	10,029	12,593	12,015	13,295	14,818	13,459	14,085	14,803	15,312
Kerosene	320	358	263	282	326	379	379	379	379
LPG	7,017	3,895	6,241	3,934	2,772	4,503	4,629	4,433	4,475
Lubricants	2,672	2,448	2,419	2,237	2,266	2,254	2,194	2,723	2,676
Motor Gasoline	2,966	7,175	7,249	7,278	9,082	8,551	8,618	7,183	7,154
Miscellaneous Oil Products	1,655	2,375	2,551	2,394	2,156	2,144	2,156	2,915	2,865
Petroleum Coke	3,002	2,978	2,927	3,058	3,167	3,121	3,167	3,723	3,659
Pentene Plus	4,766	5,003	4,255	4,198	4,229	3,730	4,229	4,229	4,229
Residual Fuel	11,735	7,673	4,311	13,150	15,376	15,124	14,427	9,490	9,051
Still Gas	5,298	5,290	5,194	5,372	5,328	-	-	-	-
Special Naphtha	2,457	3,353	4,374	3,438	2,180	2,670	2,072	1,969	1,872
Unfinished Oils	-1,467	-272	-482	-176	-260	-	-	-	-
Waxes	747	818	724	699	692	706	692	692	692
Natural Gas	80,786	69,423	79,795	73,772	77,602	79,919	83,588	84,763	87,295
Wood & Wastes	78,193	61,453	43,932	59,562	65,345	72,816	73,544	89,335	90,487
D. Transportation									
Aviation Gasoline	490	832	674	589	698	1,126	1,085	751	767
Distillate Fuel	144,691	143,398	145,215	147,809	169,078	165,581	169,919	179,000	184,000
Jet Fuel, Kerosene	56,377	56,591	56,444	64,983	94,998	106,850	108,109	109,015	111,348
LPG	126	29	66	184	166	243	254	789	719
Motor Gasoline	442,522	465,211	468,874	476,431	484,764	488,182	493,277	504,388	515,499
Residual Fuel	26,564	6,589	5,265	9,843	11,501	12,136	11,106	13,295	13,723
Natural Gas	8,492	8,103	8,416	7,441	5,977	5,342	5,830	8,556	8,749
Ethanol	3,153	2,969	5,237	6,906	7,277	8,951	9,756	10,779	11,801
Lubricants	3,353	3,072	3,036	2,806	2,843	2,828	2,697	3,582	3,656
E. Power									
Coal	413,303	391,423	391,890	370,856	364,151	368,565	353,447	396,015	398,355
Distillate Fuel	5,628	8,366	3,138	14,910	7,126	8,186	2,951	2,974	2,991
Residual Fuel	21,205	41,171	32,293	41,504	43,591	34,303	7,929	7,926	7,927
Natural Gas	38,075	34,110	35,785	36,230	50,088	69,103	62,038	61,008	77,492
Wood and Waste	5,687	10,814	16,472	16,889	19,270	18,898	13,103	13,256	13,446
F. International Bunker Fuels									
Distillate Fuel	5	5	5	5	5	5	5	5	5
Residual Fuel	170	170	170	170	170	170	170	170	170

Table A.1 (Contd.): Data on Historic & Projected Fuels Consumption

Sector/Fuel	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Billion Btu								
A. Residential									
Coal	473	469	465	462	457	453	449	447	441
Distillate Fuel	28,412	28,230	28,065	27,944	27,692	27,382	26,951	26,527	25,936
Kerosene	10,161	10,214	10,274	10,351	10,377	10,385	10,333	10,273	10,145
LPG	12,349	12,532	12,728	12,946	13,088	13,255	13,429	13,635	13,761
Natural Gas	86,328	87,473	88,756	90,123	90,893	91,703	92,542	93,532	93,880
Wood	13,614	13,653	13,693	13,732	13,772	13,812	13,852	13,892	13,932
B. Commercial									
Coal	1,988	1,988	1,988	1,988	1,988	1,988	1,988	1,988	1,988
Distillate Fuel	17,123	17,534	17,952	18,354	18,710	18,977	19,135	19,221	19,322
Kerosene	1,486	1,531	1,515	1,539	1,568	1,552	1,569	1,579	1,575
LPG	2,251	2,229	2,244	2,242	2,256	2,287	2,307	2,307	2,314
Motor Gasoline	568	545	554	562	567	571	572	573	577
Residual Fuel	3,331	3,225	3,290	3,353	3,385	3,408	3,405	3,408	3,406
Natural Gas	72,662	74,629	77,342	79,910	82,391	84,561	86,742	88,694	90,402
Wood	14,997	15,569	16,164	16,781	17,421	18,086	18,777	19,493	20,237
C. Industrial									
Coking Coal	28,066	28,244	28,309	28,558	28,898	29,216	29,591	29,915	30,052
Other coal	57,573	57,870	57,682	57,417	57,230	57,165	56,985	56,986	56,863
Asphalt and Road Oil	29,723	29,748	29,300	29,227	29,303	29,457	29,323	29,709	29,958
Aviation Gasoline Blends	-	-	-	-	-	-	-	-	-
Distillate fuel	36,061	35,627	35,629	35,742	35,940	36,141	36,301	36,595	36,810
Feedstock < 401 F	13,393	13,475	13,470	13,478	13,477	13,499	13,514	13,571	13,590
Feedstock > 401 F	15,282	15,374	15,369	15,378	15,377	15,402	15,419	15,485	15,506
Kerosene	379	379	379	379	379	379	379	379	379
LPG	4,404	4,363	4,357	4,353	4,347	4,350	4,349	4,359	4,359
Lubricants	2,631	2,633	2,593	2,587	2,593	2,607	2,595	2,629	2,651
Motor Gasoline	7,151	7,203	7,227	7,249	7,295	7,333	7,392	7,471	7,527
Miscellaneous Oil Products	2,816	2,819	2,776	2,769	2,776	2,791	2,778	2,815	2,839
Petroleum Coke	3,597	3,600	3,546	3,537	3,546	3,565	3,549	3,595	3,625
Pentene Plus	4,229	4,229	4,229	4,229	4,229	4,229	4,229	4,229	4,229
Residual Fuel	8,878	8,910	8,687	8,754	8,780	8,933	8,752	8,855	8,928
Still Gas	-	-	-	-	-	-	-	-	-
Special Naphtha	1,779	1,691	1,607	1,528	1,452	1,380	1,312	1,247	1,185
Unfinished Oils	-	-	-	-	-	-	-	-	-
Waxes	692	692	692	692	692	692	692	692	692
Natural Gas	89,901	92,586	95,351	98,198	101,130	104,150	107,260	110,463	113,762
Wood & Wastes	91,640	92,807	93,989	95,186	96,399	97,627	98,870	100,130	101,405
D. Transportation									
Aviation Gasoline	771	776	781	788	795	801	807	813	819
Distillate Fuel	189,000	194,000	199,000	204,000	209,000	214,000	219,000	224,000	229,000
Jet Fuel, Kerosene	114,152	117,589	119,185	120,428	121,622	122,739	123,779	124,888	126,053
LPG	727	684	707	731	754	770	796	820	842
Motor Gasoline	526,610	537,721	548,832	559,943	571,054	582,165	593,276	604,387	615,498
Residual Fuel	14,140	14,553	14,648	14,753	14,843	14,951	15,048	15,144	15,242
Natural Gas	9,022	9,214	9,598	9,811	10,003	10,216	10,667	10,860	10,968
Ethanol	12,824	13,846	14,868	15,891	16,913	17,936	18,958	19,981	21,003
Lubricants	3,677	3,697	3,723	3,755	3,788	3,819	3,848	3,876	3,904
E. Power									
Coal	406,643	424,708	424,708	424,708	466,947	466,947	466,947	466,947	466,947
Distillate Fuel	3,148	40	40	40	40	40	40	40	40
Residual Fuel	7,927	107	107	107	107	107	107	107	107
Natural Gas	95,605	95,605	131,831	166,850	166,850	166,850	166,850	166,850	166,850
Wood and Waste	13,636	13,830	14,025	14,224	14,425	14,630	14,837	15,047	15,260
F. International Bunker Fuels									
Distillate Fuel	5	5	5	5	5	5	5	5	5
Residual Fuel	170	170	170	170	170	170	170	170	170

Table A.1 (Contd.): Data on Historic & Projected Fuels Consumption

Sector/Fuel	2018	2019	2020	2021	2022	2023	2024	2025
	Billion Btu							
A. Residential								
Coal	437	434	431	428	425	423	420	417
Distillate Fuel	25,421	24,905	24,462	24,028	23,601	23,182	22,770	22,365
Kerosene	10,043	9,937	9,861	9,785	9,709	9,635	9,560	9,487
LPG	13,928	14,101	14,311	14,525	14,742	14,962	15,185	15,412
Natural Gas	94,532	95,239	96,194	97,158	98,132	99,115	100,108	101,112
Wood	13,972	14,006	14,045	14,084	14,124	14,163	14,203	14,243
B. Commercial								
Coal	1,988	1,988	1,988	1,988	1,988	1,988	1,988	1,988
Distillate Fuel	19,423	19,500	19,588	19,676	19,765	19,854	19,943	20,033
Kerosene	1,587	1,588	1,597	1,605	1,614	1,623	1,632	1,641
LPG	2,337	2,352	2,367	2,382	2,398	2,413	2,428	2,444
Motor Gasoline	581	584	587	590	593	596	599	602
Residual Fuel	3,423	3,410	3,419	3,429	3,438	3,447	3,457	3,466
Natural Gas	92,189	94,137	96,166	98,239	100,356	102,519	104,729	106,986
Wood	21,010	20,511	21,062	21,629	22,210	22,807	23,420	24,050
C. Industrial								
Coking Coal	30,419	30,985	31,569	32,165	32,771	33,389	34,019	34,660
Other coal	56,768	56,835	56,926	57,018	57,109	57,201	57,293	57,385
Asphalt and Road Oil	30,014	30,056	30,562	31,077	31,601	32,134	32,675	33,226
Aviation Gasoline Blends	-	-	-	-	-	-	-	-
Distillate fuel	36,947	37,102	37,362	37,623	37,887	38,152	38,419	38,688
Feedstock < 401 F	13,575	13,652	13,743	13,834	13,925	14,018	14,111	14,204
Feedstock > 401 F	15,488	15,577	15,680	15,784	15,889	15,994	16,100	16,207
Kerosene	379	379	379	379	379	379	379	379
LPG	4,347	4,366	4,392	4,418	4,445	4,472	4,499	4,526
Lubricants	2,656	2,660	2,705	2,751	2,797	2,844	2,892	2,941
Motor Gasoline	7,583	7,639	7,717	7,797	7,877	7,958	8,040	8,123
Miscellaneous Oil Products	2,844	2,848	2,896	2,945	2,994	3,045	3,096	3,148
Petroleum Coke	3,632	3,637	3,699	3,761	3,824	3,889	3,954	4,021
Pentene Plus	4,229	4,229	4,229	4,229	4,229	4,229	4,229	4,229
Residual Fuel	8,845	8,773	8,832	8,892	8,952	9,013	9,074	9,136
Still Gas	-	-	-	-	-	-	-	-
Special Naphtha	1,126	1,070	1,017	967	919	873	830	789
Unfinished Oils	-	-	-	-	-	-	-	-
Waxes	692	692	692	692	692	692	692	692
Natural Gas	117,159	120,658	124,261	127,972	131,793	135,729	139,782	143,956
Wood & Wastes	102,697	103,166	104,318	105,484	106,662	107,854	109,059	110,277
D. Transportation								
Aviation Gasoline	825	831	839	846	853	861	868	876
Distillate Fuel	234,000	239,000	244,000	249,000	254,000	265,000	270,000	275,000
Jet Fuel, Kerosene	127,072	128,195	128,771	129,351	129,935	130,523	131,115	131,711
LPG	867	899	923	948	974	1,001	1,028	1,056
Motor Gasoline	626,609	637,720	648,831	659,942	671,053	682,164	693,275	704,386
Residual Fuel	15,345	15,454	15,557	15,661	15,765	15,870	15,976	16,083
Natural Gas	11,175	11,304	11,476	11,651	11,828	12,008	12,191	12,376
Ethanol	22,026	23,048	24,070	25,093	26,115	27,138	28,160	29,183
Lubricants	3,932	3,963	3,998	4,032	4,067	4,103	4,138	4,174
E. Power								
Coal	466,947	466,947	466,947	466,947	466,947	466,947	466,947	466,947
Distillate Fuel	40	40	40	40	40	40	40	40
Residual Fuel	107	107	107	107	107	107	107	107
Natural Gas	166,850	166,850	166,850	166,850	166,850	166,850	166,850	166,850
Wood and Waste	15,476	15,540	15,731	15,731	15,731	15,731	15,731	15,731
F. International Bunker Fuels								
Distillate Fuel	5	5	5	5	5	5	5	5
Residual Fuel	170	170	170	170	170	170	170	170

Table A.2: Fuel Consumption Details of Transportation Sector

Details	2000	2001	2002	2003	2004	2005	2006	2007	2008
I. Highway Usage	Vehicle Miles Traveled (VMT), Million Miles								
A. Gasoline Vehicles									
Passenger Cars (LDGV)	32,687	32,225	32,889	33,590	34,468	35,101	35,345	35,586	35,826
Light-duty Trucks (LDGT)	35,659	35,156	35,879	36,644	37,602	38,293	39,354	40,587	41,769
Heavy-duty Vehicles (HDGV)	1,702	1,678	1,713	1,749	1,795	1,828	1,882	1,917	1,953
Motorcycles (MC)	307	303	309	316	324	330	327	333	340
B. Diesel Vehicles									
Passenger Cars (LDDV)	80	79	80	82	84	86	82	83	85
Light-duty Trucks (LDDT)	341	337	344	351	360	367	409	333	340
Heavy-duty Vehicles (HDDV)	4,025	3,968	4,050	4,136	4,244	4,322	4,418	4,500	4,584
II. Non-highway Usage									
C. Aviation	Billion Btu								
Jet Fuel, kerosene	56,377	56,591	56,444	64,983	85,917	106,850	108,109	109,015	111,348
Aviation Gasoline	490	832	674	589	698	1,126	1,085	751	767
D. Marine Vehicles	1,000 Gallons								
Residual Fuel Oil	133,030	32,996	26,369	49,291	52,088	54,884	50,077	60,124	62,061
Distillate Fuel Oil	62,271	23,619	16,100	32,048	31,392	30,736	31,545	33,227	34,155
Gasoline	24,949	24,113	24,700	24,930	25,041	28,308	28,321	29,248	29,892
E. Locomotives	1,000 Gallons								
Diesel Fuel	34,143	61,272	52,357	48,328	47,138	58,166	59,697	62,880	64,636
F. Farming	1,000 Gallons								
Gasoline Tractor	14,223	18,260	18,854	20,361	25,560	25,515	29,237	26,362	26,943
Diesel Tractor	35,469	32,957	29,743	31,800	30,468	31,722	32,557	34,293	35,251
G. Construction Equipment	1,000 Gallons								
Gasoline	5,156	15,015	13,676	15,845	17,822	15,077	14,849	15,578	15,921
Diesel	137,170	156,546	139,314	154,946	167,622	158,476	162,648	171,319	176,104
H. Miscellaneous	1,000 Gallons								
Gasoline Heavy-duty	4,783	25,172	26,479	23,318	30,320	27,867	28,601	28,792	29,426
Gasoline Small-duty	7,495	13,686	13,706	11,317	13,726	13,657	14,016	14,110	14,421
Diesel Heavy-duty	7,680	16,968	16,328	11,692	22,245	22,263	22,849	24,067	24,740
NON-HIGHWAY FUEL USE, Billion Btu									
Jet Fuel, Kerosene	56,377	56,591	56,444	64,983	94,998	106,850	108,109	65,468	67,801
Aviation Gasoline	490	832	674	589	710	1,126	1,085	751	767
Gasoline	7,080	12,038	12,184	11,978	14,067	13,811	14,174	13,756	13,760
Diesel/distillate	38,380	40,409	35,205	38,669	41,450	41,796	42,896	41,779	42,684
Residual Fuel Oil	19,913	4,939	3,947	7,378	7,797	8,216	7,496	9,000	9,290

Table A.2 (Contd.): Fuel Consumption Details of Transportation Sector

Details	2009	2010	2011	2012	2013	2014	2015	2016	2017
I. Highway Usage	Vehicle Miles Traveled (VMT), Million Miles								
A. Gasoline Vehicles									
Passenger Cars (LDGV)	35,978	36,300	36,714	37,041	37,463	37,889	38,320	38,953	39,498
Light-duty Trucks (LDGT)	43,069	44,230	45,332	46,553	47,807	49,000	50,223	51,280	52,463
Heavy-duty Vehicles (HDGV)	1,989	2,026	2,065	2,104	2,050	2,089	2,129	2,170	2,211
Motorcycles (MC)	346	352	359	366	373	380	387	394	402
B. Diesel Vehicles									
Passenger Cars (LDDV)	86	88	90	91	93	95	97	99	101
Light-duty Trucks (LDDT)	346	352	359	366	373	380	387	394	402
Heavy-duty Vehicles (HDDV)	4,670	4,758	4,847	4,939	5,032	5,128	5,226	5,325	5,427
II. Non-highway Usage									
C. Aviation	Billion Btu								
Jet Fuel, kerosene	114,152	117,589	119,185	120,428	121,622	122,739	123,779	124,888	126,053
Aviation Gasoline	771	776	781	788	795	801	807	813	819
D. Marine Vehicles	1,000 Gallons								
Residual Fuel Oil	63,948	65,815	66,245	66,717	67,128	67,615	68,055	68,489	68,930
Distillate Fuel Oil	35,083	36,011	36,939	37,867	38,795	39,723	40,652	41,580	42,508
Gasoline	30,536	31,181	31,825	32,469	33,113	33,758	34,402	35,046	35,691
E. Locomotives	1,000 Gallons								
Diesel Fuel	66,393	68,149	69,906	71,662	73,418	75,175	76,931	78,688	80,444
F. Farming	1,000 Gallons								
Gasoline Tractor	27,523	28,104	28,685	29,266	29,846	30,427	31,008	31,588	32,169
Diesel Tractor	36,209	37,167	38,124	39,082	40,040	40,998	41,956	42,914	43,872
G. Construction Equipment	1,000 Gallons								
Gasoline	16,264	16,607	16,950	17,293	17,636	17,980	18,323	18,666	19,009
Diesel	180,890	185,675	190,460	195,246	200,031	204,817	209,602	214,388	219,173
H. Miscellaneous	1,000 Gallons								
Gasoline Heavy-duty	30,061	30,695	31,329	31,963	32,598	33,232	33,866	34,500	35,135
Gasoline Small-duty	14,732	15,043	15,354	15,664	15,975	16,286	16,597	16,908	17,219
Diesel Heavy-duty	25,412	26,084	26,756	27,429	28,101	28,773	29,446	30,118	30,790
NON-HIGHWAY FUEL USE, Billion Btu									
Jet Fuel, Kerosene	70,604	74,042	75,637	76,880	78,075	79,192	80,231	81,340	82,506
Aviation Gasoline	771	776	781	788	795	801	807	813	819
Gasoline	13,832	13,950	14,152	14,375	14,619	14,898	15,183	15,479	15,783
Diesel/distillate	43,671	44,740	45,909	47,065	48,160	49,180	50,210	51,305	52,197
Residual Fuel Oil	9,572	9,852	9,916	9,987	10,048	10,121	10,187	10,252	10,318

Table A.2 (Contd.): Fuel Consumption Details of Transportation Sector

Details	2018	2019	2020	2021	2022	2023	2024	2025
I. Highway Usage	Vehicle Miles Traveled (VMT), Million Miles							
A. Gasoline Vehicles								
Passenger Cars (LDGV)	40,154	40,718	41,398	42,048	42,710	43,384	44,071	44,770
Light-duty Trucks (LDGT)	53,573	54,813	55,978	57,127	58,303	59,507	60,738	61,998
Heavy-duty Vehicles (HDGV)	2,254	2,297	2,341	2,408	2,477	2,548	2,621	2,696
Motorcycles (MC)	410	418	426	434	442	451	460	469
B. Diesel Vehicles								
Passenger Cars (LDDV)	102	104	106	108	111	113	115	117
Light-duty Trucks (LDDT)	410	418	426	456	487	519	552	586
Heavy-duty Vehicles (HDDV)	5,531	5,638	5,747	5,902	6,060	6,224	6,391	6,563
II. Non-highway Usage								
C. Aviation	Billion Btu							
Jet Fuel, kerosene	127,072	128,195	128,771	129,351	129,935	130,523	131,115	131,711
Aviation Gasoline	825	831	839	846	853	861	868	876
D. Marine Vehicles	1,000 Gallons							
Residual Fuel Oil	69,396	69,889	70,355	70,825	71,297	71,773	72,252	72,734
Distillate Fuel Oil	43,436	44,364	45,292	46,220	47,148	49,190	50,118	51,047
Gasoline	36,335	36,979	37,623	38,268	38,912	39,556	40,201	40,845
E. Locomotives	1,000 Gallons							
Diesel Fuel	82,201	83,957	85,713	87,470	89,226	93,090	94,847	96,603
F. Farming	1,000 Gallons							
Gasoline Tractor	32,750	33,331	33,911	34,492	35,073	35,654	36,234	36,815
Diesel Tractor	44,830	45,788	46,746	47,703	48,661	50,769	51,727	52,684
G. Construction Equipment	1,000 Gallons							
Gasoline	19,352	19,695	20,038	20,382	20,725	21,068	21,411	21,754
Diesel	223,959	228,744	233,529	238,315	243,100	253,628	258,414	263,199
H. Miscellaneous	1,000 Gallons							
Gasoline Heavy-duty	35,769	36,403	37,037	37,672	38,306	38,940	39,574	40,209
Gasoline Small-duty	17,529	17,840	18,151	18,462	18,773	19,084	19,394	19,705
Diesel Heavy-duty	31,462	32,135	32,807	33,479	34,151	35,630	36,303	36,975
NON-HIGHWAY FUEL USE, Billion Btu								
Jet Fuel, Kerosene	83,524	84,647	85,224	85,804	86,388	86,976	87,568	88,164
Aviation Gasoline	825	831	839	846	853	861	868	876
Gasoline	16,094	16,397	16,721	17,051	17,389	17,732	18,083	18,441
Diesel/distillate	53,066	54,134	55,346	56,585	57,851	59,146	60,470	61,824
Residual Fuel Oil	10,388	10,462	10,531	10,602	10,672	10,744	10,815	10,888

Table A.3: Details on Coal Mining, Oil and Natural Gas Sector

Details	Units	2000	2001	2002	2003	2004	2005
A. Coal Mining							
Underground Mines Production	1,000 short tons	23,181	22,503	20,491	21,225	20,437	16,386
Surface Mines Production		9,654	10,271	9,465	10,371	10,983	11,357
Measured Ventilation Emissions		8,268	7,677	7,843	7,352	7,834	6,061
Degasification Emissions	Million cubic feet	22,506	25,840	26,747	27,719	24,979	16,056
Methane Recovered for use		22,359	25,698	24,746	26,914	24,979	16,056
B. Natural Gas							
Total Number of Wells	Number	3,051	3,521	3,429	3,506	3,870	4,132
C. Petroleum Production							
Oil Production		9	11	22	5	19	26
Oil Refining	1,000 barrels	21,718	21,791	21,389	21,389	21,389	21,672
Data on transmission /distribution and flaring for gas and oil systems not available							

Table A.4: Data on Industrial Processes

Details	2000	2001	2002	2003	2004	2005
A. Cement Manufacture	Tons					
Clinker	981,393	956,333	882,333	807,333	806,968	748,333
Masonry	98,144	106,000	114,333	123,666	139,598	181,000
B. Lime Manufacture						
High calcium Lime	616,330					
Dolomite Lime	139,670					
C. Limestone Use						
Limestone	236,053	213,939	178,911	151,759	196,368	206,186
Dolomite Lime	81,169	44,747	30,519	108,974	157,511	165,387
D. Soda Ash						
Consumption	160,863	160,888	162,592	159,035	159,303	164,550
E. Iron & Steel						
Electric Arc Furnace	612,370	661,395	746,130	826,075	802,331	748,851
F. Ammonia & Urea						
Ammonia Production	272,113	215,695	252,122	222,268	243,601	301,571
Urea consumption	45,198	49,181	54,096	58,658	71,536	89,271
Electricity T & D						
ODS Substitutes	2,040,605	2,239,283	2,456,985	2,684,232	2,920,759	3,148,470
SF_6 Consumption	18	18	17	17	17	16
Not manufactured or no data available for the production of BOF steel, aluminum, magnesium, nitric acid & adipic acid; For ODS substitutes national estimated emissions are distributed in proportion to population						

Table A.5: Data on Wastes Management

Details	2000	2001	2002	2003	2004	2005
A. Solid waste Treatment	**Tons**					
Population	7,104,587	7,192,701	7,285,707	7,375,863	7,472,448	7,564,327
Solid Wastes tons	6,609,820	6,095,459	5,569,394	6,282,886	7,038,086	7,038,086
CH_4 avoided	28,086	4,703	8,546	8,546	8,546	8,546
CH_4 Recovered	48,482	60,791	72,585	72,585	122,301	122,301
MSW Combusted	959,490	1,550,788	2,153,789	1,852,279	1,510,731	1,510,731
	Proportion of Discards in Wastes Incinerated					
Plastics	**14.2%**	**14.8%**	**15.1%**	**15.4%**	**16.0%**	**17.3%**
PET	1.2%	1.3%	1.4%	1.5%	1.6%	1.7%
HDPE	2.7%	2.8%	2.8%	2.8%	3.1%	3.5%
PVC	0.8%	0.9%	0.9%	0.9%	0.9%	1.0%
LDPE/LLDPE	3.4%	3.5%	3.6%	3.7%	3.7%	3.9%
PP	2.0%	2.1%	2.2%	2.2%	2.2%	2.4%
PS	1.4%	1.4%	1.4%	1.4%	1.4%	1.6%
Other	2.6%	2.8%	2.8%	2.9%	3.0%	3.3%
Synthetic Rubber in MSW	**2.0%**	**2.2%**	**2.2%**	**2.3%**	**3.1%**	**4.0%**
Durables	1.5%	1.6%	1.7%	1.7%	2.5%	3.4%
Non-Durables	0.5%	0.5%	0.5%	0.5%	0.6%	0.6%
Clothing and Footwear	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%
Other Non-Durables	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Containers and Packaging	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Synthetic fiber	**4.91%**	**5.17%**	**5.31%**	**5.53%**	**5.37%**	**5.66%**
B. Wastewater Treatment	**Tons**					
Fruits & Vegetables	146	172	157	5,471	3,555	3,200
Meat	327,635	348,682	366,237	341,833	298,469	298,469
pulp & Paper Board	385,349	3,777,155	386,847	370,016	146,452	133,838
Poultry processing data not available						

Table A.6: Data on Livestock Rearing

Livestock Details	2000	2001	2002	2003	2004	2005
	Number of Animals ('000 head)					
Dairy Cattle						
Dairy Cows	119	118	120	116	105	105
Dairy Replacement Heifers	58	54	57	45	38	38
Replacements 0-12 mos.	0	0	0	0	0	0
Replacements 12-24 mos.	0	0	0	0	0	0
Beef Cattle						
Feedlot Heifers	6	7	7	7	8	8
Feedlot Steer	19	22	19	21	19	19
Bulls	38	38	39	39	40	40
Calves	517	524	537	523	375	375
Beef Cows	655	676	696	690	701	701
Beef Replacement Heifers	102	106	110	109	93	94
Steer Stockers	153	176	145	156	130	130
Heifer Stockers	52	54	55	53	43	43
Swine						
Breeding Swine	35	35	35	35	30	30
Market Under 60 lbs	125	125	125	105	115	115
Market 60-119 lbs	92	101	85	80	90	90
Market 120-179 lbs	88	64	80	70	75	75
Market over 180 lbs	85	90	75	90	65	65
Poultry						
Hens > 1 yr	3,367	3,299	3,162	3,261	3,210	3,210
Pullets	944	1,012	1,166	1,000	1,453	1,453
Chickens	242	243	245	248	243	243
Broilers	48,164	49,364	48,273	48,200	47,818	47,818
Turkeys	8,315	7,660	6,250	7,041	6,567	6,567
Other						
Sheep on Feed	15	15	14	15	13	13
Sheep Not on Feed	46	46	45	47	42	42
Goats	20	20	20	20	41	41
Horses	109	110	110	110	118	118

Table A.7: Data on Crop Harvest

Details	Units	2000	2001	2002	2003	2004	2005
Crops		**Crop Production**					
Alfalfa	'000 tons	480	403	350	455	440	440
Corn for Grain	'000 bushels	48,180	40,590	22,100	37,950	52,200	42,480
All Wheat	'000 bushels	12,915	10,200	10,370	7,360	9,900	9,900
Barley	'000 bushels	5,785	3,750	3,157	2,790	2,960	2,960
Sorghum for Grain	'000 bushels	492	180	180	210	136	-
Soybeans	'000 bushels	18,480	17,040	10,580	16,320	20,670	20,670
Peanuts	'000 lbs	210,375	234,750	119,700	95,700	104,000	104,000
Fertilizers		**Total Fertilizer Use (kg N)**					
Synthetic		103,085,290	86,466,660	106,287,534	93,793,136	95,097,811	83,105,663
Organic		1,108,445	969,276	1,154,466	1,006,864	1,019,189	961,337
Dried Manure		6,781	5,734	6,453	5,134	5,617	4,872
Activated Sewage Sludge		916,808	816,114	1,004,113	884,593	897,320	831,751
Other		184,856	147,428	143,899	117,137	116,252	124,713
Dried Manure %		1%	1%	1%	1%	1%	1%
Non-Manure Organics		1,101,663	963,542	1,148,012	1,001,729	1,013,572	956,465
Manure Organics		6,781	5,734	6,453	5,134	5,617	4,872

Other crops not grown or not considered: Oats, rye, millet, rice, edible beans & peas, lentils, red & white clover, birds foot trefoil, arrow leaf clover, crimson clover; Other organic fertilizer not used or not considered: Dried blood, compost, other sewage sludge.

APPENDIX B

HISTORIC & PROJECTED EMISSIONS DETAILS

Table B.1: Carbon Dioxide Emissions from Fossil Fuels

Sector/Fuel	2000	2001	2002	2003	2004	2005	2006	2007	2008
	Million Metric tons of Carbon Dioxide								
Residential									
Coal	0.02	0.03	0.02	0.03	0.02	0.03	0.03	0.04	0.04
Petroleum	3.89	3.62	3.16	3.59	3.88	3.74	3.71	3.61	3.61
Natural Gas	4.37	3.87	4.15	4.69	4.51	4.73	4.18	4.41	4.52
Residential Total	**8.28**	**7.52**	**7.33**	**8.31**	**8.41**	**8.50**	**7.91**	**8.06**	**8.18**
Commercial									
Coal	0.18	0.27	0.16	0.21	0.19	0.25	0.18	0.18	0.19
Petroleum	1.93	1.67	1.29	1.82	1.75	1.59	1.96	1.72	1.74
Natural Gas	3.63	3.29	3.45	3.52	3.51	3.65	3.37	3.51	3.75
Commercial Total	**5.73**	**5.23**	**4.89**	**5.55**	**5.45**	**5.49**	**5.51**	**5.41**	**5.67**
Industrial									
Coal	8.29	8.41	8.01	8.20	7.78	7.86	7.82	7.65	7.74
Petroleum	5.22	5.51	5.15	6.31	7.00	6.78	6.93	6.13	6.03
Natural Gas	4.15	3.57	4.10	3.79	3.99	4.11	4.29	4.35	4.48
Industrial Total	**17.66**	**17.49**	**17.26**	**18.30**	**18.77**	**18.74**	**19.04**	**18.13**	**18.25**
Transportation									
Petroleum	48.32	48.28	48.54	50.22	54.63	55.54	56.22	57.98	59.33
Natural Gas	0.45	0.43	0.45	0.39	0.32	0.28	0.31	0.45	0.46
Transportation Total	**48.77**	**48.71**	**48.99**	**50.61**	**54.95**	**55.82**	**56.52**	**58.43**	**59.80**
Power									
Coal	38.20	36.18	36.23	34.28	33.66	34.07	32.67	36.61	36.82
Petroleum	2.08	3.85	2.77	4.36	3.95	3.30	0.84	0.84	0.84
Natural Gas	2.02	1.81	1.90	1.92	2.66	3.66	3.29	3.23	4.11
Power Total	**42.30**	**41.84**	**40.89**	**40.56**	**40.27**	**41.03**	**36.80**	**40.68**	**41.77**
Bunker Fuel									
Petroleum	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Bunker Fuels Total	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
FUEL SUMMARY									
Coal	46.70	44.89	44.42	42.73	41.66	42.21	40.70	44.48	44.79
Petroleum	61.45	62.94	60.93	66.31	71.23	70.96	69.66	70.29	71.57
Natural Gas	14.61	12.96	14.03	14.31	14.98	16.43	15.44	15.96	17.32
All Fuels	**122.76**	**120.79**	**119.38**	**123.35**	**127.86**	**129.59**	**125.80**	**130.72**	**133.69**
SECTOR SUMMARY									
Residential	8.28	7.52	7.33	8.31	8.41	8.50	7.91	8.06	8.18
Commercial	5.73	5.23	4.89	5.55	5.45	5.49	5.51	5.41	5.67
Industrial	17.66	17.49	17.26	18.30	18.77	18.74	19.04	18.13	18.25
Power (Generated)	42.30	41.84	40.89	40.56	40.27	41.03	36.80	40.68	41.77
Power (Imported) [1]	17.93	22.86	21.99	22.42	21.18	23.93	26.08	26.65	28.06
Transportation [2]	46.92	46.91	47.08	48.82	51.34	53.51	53.79	55.55	57.31
All Sectors	**138.86**	**141.85**	**139.44**	**143.96**	**145.41**	**151.20**	**149.13**	**154.48**	**159.24**
1: Emissions due to imported power from Table 3.4;									
2: Transportation Sector emissions from Table B.6									

Table B.1 (Contd.): Carbon Dioxide Emissions from Fossil Fuels

Sector/Fuel	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Million Metric tons of Carbon Dioxide								
Residential									
Coal	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Petroleum	3.59	3.59	3.60	3.61	3.60	3.59	3.56	3.54	3.50
Natural Gas	4.58	4.64	4.70	4.78	4.82	4.86	4.91	4.96	4.98
Residential Total	**8.21**	**8.27**	**8.34**	**8.43**	**8.46**	**8.49**	**8.51**	**8.54**	**8.51**
Commercial									
Coal	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Petroleum	1.80	1.83	1.86	1.90	1.93	1.95	1.97	1.97	1.98
Natural Gas	3.85	3.96	4.10	4.24	4.37	4.48	4.60	4.70	4.79
Commercial Total	**5.84**	**5.97**	**6.15**	**6.32**	**6.48**	**6.62**	**6.75**	**6.86**	**6.96**
Industrial									
Coal	7.75	7.80	7.79	7.78	7.79	7.81	7.83	7.86	7.86
Petroleum	5.94	5.92	5.88	5.89	5.91	5.94	5.93	5.98	6.00
Natural Gas	4.62	4.76	4.90	5.04	5.19	5.35	5.51	5.67	5.84
Industrial Total	**18.32**	**18.47**	**18.57**	**18.72**	**18.89**	**19.10**	**19.27**	**19.50**	**19.70**
Transportation									
Petroleum	60.72	62.15	63.43	64.68	65.93	67.17	68.41	69.66	70.90
Natural Gas	0.48	0.49	0.51	0.52	0.53	0.54	0.57	0.58	0.58
Transportation Total	**61.20**	**62.64**	**63.94**	**65.20**	**66.46**	**67.72**	**68.98**	**70.23**	**71.48**
Power									
Coal	37.59	39.26	39.26	39.26	43.16	43.16	43.16	43.16	43.16
Petroleum	0.85	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Natural Gas	5.07	5.07	6.99	8.84	8.84	8.84	8.84	8.84	8.84
Power Total	**43.51**	**44.34**	**46.26**	**48.11**	**52.02**	**52.02**	**52.02**	**52.02**	**52.02**
Bunker Fuel									
Petroleum	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Bunker Fuels Total	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
FUEL SUMMARY									
Coal	45.57	47.29	47.27	47.27	51.18	51.20	51.22	51.25	51.25
Petroleum	72.92	73.51	74.79	76.10	77.39	78.68	79.90	81.17	82.41
Natural Gas	18.59	18.90	21.20	23.42	23.75	24.08	24.42	24.75	25.04
All Fuels	**137.09**	**139.70**	**143.26**	**146.79**	**152.33**	**153.96**	**155.54**	**157.17**	**158.69**
SECTOR SUMMARY									
Residential	8.21	8.27	8.34	8.43	8.46	8.49	8.51	8.54	8.51
Commercial	5.84	5.97	6.15	6.32	6.48	6.62	6.75	6.86	6.96
Industrial	18.32	18.47	18.57	18.72	18.89	19.10	19.27	19.50	19.70
Power (Generated)	43.51	44.34	46.26	48.11	52.02	52.02	52.02	52.02	52.02
Power (Imported) [1]	28.15	29.54	28.53	27.59	26.62	28.00	29.43	24.72	26.08
Transportation [2]	59.07	60.83	62.36	63.88	65.41	66.93	68.46	70.04	71.61
All Sectors	**163.10**	**167.42**	**170.21**	**173.05**	**177.88**	**181.16**	**184.44**	**181.68**	**184.88**
1: Emissions due to imported power from Table 3.4;									
2: Transportation Sector emissions from Table B.6									

Table B.1 (Contd.): Carbon Dioxide Emissions from Fossil Fuels

Sector/Fuel	2018	2019	2020	2021	2022	2023	2024	2025
	Million Metric tons of Carbon Dioxide							
Residential								
Coal	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Petroleum	3.46	3.43	3.40	3.38	3.36	3.33	3.31	3.29
Natural Gas	5.01	5.05	5.10	5.15	5.20	5.25	5.31	5.36
Residential Total	**8.51**	**8.52**	**8.54**	**8.57**	**8.60**	**8.63**	**8.66**	**8.69**
Commercial								
Coal	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Petroleum	1.99	2.00	2.01	2.02	2.03	2.03	2.04	2.05
Natural Gas	4.89	4.99	5.10	5.21	5.32	5.43	5.55	5.67
Commercial Total	**7.06**	**7.17**	**7.29**	**7.41**	**7.53**	**7.65**	**7.78**	**7.91**
Industrial								
Coal	7.88	7.93	7.99	8.05	8.11	8.17	8.23	8.29
Petroleum	6.01	6.02	6.06	6.11	6.15	6.20	6.25	6.30
Natural Gas	6.02	6.20	6.38	6.57	6.77	6.97	7.18	7.39
Industrial Total	**19.90**	**20.15**	**20.44**	**20.73**	**21.03**	**21.34**	**21.66**	**21.98**
Transportation								
Petroleum	72.14	73.39	74.59	75.80	77.01	78.65	79.86	81.07
Natural Gas	0.59	0.60	0.61	0.62	0.63	0.64	0.65	0.66
Transportation Total	**72.73**	**73.99**	**75.20**	**76.42**	**77.63**	**79.29**	**80.51**	**81.73**
Power								
Coal	43.16	43.16	43.16	43.16	43.16	43.16	43.16	43.16
Petroleum	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Natural Gas	8.84	8.84	8.84	8.84	8.84	8.84	8.84	8.84
Power Total	**52.02**	**52.02**	**52.02**	**52.02**	**52.02**	**52.02**	**52.02**	**52.02**
Bunker Fuel								
Petroleum	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Bunker Fuels Total	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
FUEL SUMMARY								
Coal	51.27	51.32	51.38	51.44	51.50	51.56	51.62	51.68
Petroleum	83.63	84.86	86.09	87.33	88.57	90.25	91.49	92.74
Natural Gas	25.35	25.68	26.03	26.39	26.76	27.14	27.53	27.93
All Fuels	**160.25**	**161.86**	**163.50**	**165.16**	**166.83**	**168.95**	**170.64**	**172.34**
SECTOR SUMMARY								
Residential	8.51	8.52	8.54	8.57	8.60	8.63	8.66	8.69
Commercial	7.06	7.17	7.29	7.41	7.53	7.65	7.78	7.91
Industrial	19.90	20.15	20.44	20.73	21.03	21.34	21.66	21.98
Power (Generated)	52.02	52.02	52.02	52.02	52.02	52.02	52.02	52.02
Power (Imported) [1]	27.43	28.77	30.10	31.43	32.74	34.05	35.35	36.64
Transport [2]	73.19	74.76	**76.34**	76.69	77.03	77.38	77.72	**78.07**
All Sectors	**188.11**	**191.39**	**194.73**	**196.85**	**198.95**	**201.07**	**203.19**	**205.31**
1: Emissions due to imported power from Table 3.4;								
2: Transportation Sector emissions from Table B.6								

Table B.2: Methane Emissions from Stationary Combustion

Sector/Fuel	2000	2001	2002	2003	2004	2005	2006	2007	2008
	Million Metric Tons of CO_2 Equivalent								
Residential									
Coal	0.002	0.002	0.001	0.002	0.002	0.002	0.002	0.003	0.003
Petroleum	0.012	0.011	0.009	0.011	0.012	0.011	0.011	0.011	0.011
N. Gas	0.008	0.007	0.008	0.009	0.008	0.009	0.008	0.008	0.009
Wood	0.074	0.047	0.048	0.050	0.052	0.053	0.053	0.081	0.081
Residential Total	**0.096**	**0.068**	**0.067**	**0.072**	**0.073**	**0.075**	**0.074**	**0.103**	**0.104**
Commercial									
Coal	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000
Petroleum	0.006	0.005	0.004	0.005	0.005	0.006	0.006	0.005	0.005
Natural Gas	0.007	0.006	0.006	0.007	0.007	0.007	0.006	0.006	0.007
Wood	0.060	0.058	0.051	0.062	0.072	0.073	0.075	0.083	0.086
Commercial Total	**0.073**	**0.070**	**0.062**	**0.075**	**0.084**	**0.086**	**0.088**	**0.095**	**0.099**
Industrial									
Coal	0.013	0.013	0.012	0.012	0.012	0.012	0.011	0.012	0.012
Petroleum	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003
Natural Gas	0.008	0.007	0.008	0.007	0.007	0.008	0.008	0.008	0.008
Wood & Wastes	0.047	0.037	0.026	0.036	0.039	0.044	0.044	0.053	0.054
Industrial Total	**0.070**	**0.059**	**0.048**	**0.058**	**0.062**	**0.067**	**0.067**	**0.076**	**0.077**
Power									
Coal	0.009	0.008	0.008	0.008	0.008	0.008	0.007	0.008	0.008
Petroleum	0.002	0.003	0.002	0.004	0.003	0.003	0.001	0.001	0.001
Natural Gas	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002
Wood and Waste	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Power Total	**0.011**	**0.012**	**0.012**	**0.012**	**0.012**	**0.012**	**0.010**	**0.011**	**0.011**
FUEL SUMMARY									
Coal	0.024	0.024	0.022	0.023	0.022	0.022	0.021	0.024	0.024
Petroleum	0.021	0.021	0.018	0.023	0.023	0.023	0.021	0.019	0.019
Natural Gas	0.023	0.021	0.023	0.023	0.024	0.025	0.023	0.024	0.025
Wood & Wood Wastes	0.182	0.143	0.126	0.149	0.163	0.170	0.172	0.218	0.222
All Total	**0.250**	**0.208**	**0.187**	**0.217**	**0.231**	**0.240**	**0.238**	**0.285**	**0.291**
SECTOR SUMMARY									
Residential Total	0.096	0.068	0.067	0.072	0.073	0.075	0.074	0.103	0.104
Commercial Total	0.073	0.070	0.062	0.075	0.084	0.086	0.088	0.095	0.099
Industrial Total	0.070	0.059	0.048	0.058	0.062	0.067	0.067	0.076	0.077
Power Total	0.011	0.012	0.012	0.012	0.012	0.012	0.010	0.011	0.011
All Total	**0.250**	**0.208**	**0.187**	**0.217**	**0.231**	**0.240**	**0.238**	**0.285**	**0.291**

Table B.2 (Contd.): Methane Emissions from Stationary Combustion

Sector/Fuel	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Million Metric Tons of CO_2 Equivalent								
Residential									
Coal	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Petroleum	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.010
N. Gas	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Wood	0.081	0.082	0.082	0.082	0.082	0.083	0.083	0.083	0.083
Residential Total	**0.104**	**0.104**	**0.104**	**0.105**	**0.105**	**0.105**	**0.106**	**0.106**	**0.106**
Commercial									
Coal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Petroleum	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
Natural Gas	0.007	0.007	0.008	0.008	0.008	0.008	0.009	0.009	0.009
Wood	0.090	0.093	0.097	0.100	0.104	0.108	0.112	0.117	0.121
Commercial Total	**0.103**	**0.106**	**0.110**	**0.114**	**0.118**	**0.123**	**0.127**	**0.132**	**0.136**
Industrial									
Coal	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
Petroleum	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Natural Gas	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011
Wood & Wastes	0.055	0.056	0.056	0.057	0.058	0.058	0.059	0.060	0.061
Industrial Total	**0.078**	**0.079**	**0.080**	**0.081**	**0.082**	**0.083**	**0.084**	**0.085**	**0.086**
Power									
Coal	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010
Petroleum	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Natural Gas	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Wood and Waste	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Power	**0.011**	**0.011**	**0.012**	**0.013**	**0.013**	**0.013**	**0.013**	**0.013**	**0.013**
FUEL SUMMARY									
Coal	0.024	0.024	0.024	0.024	0.025	0.025	0.025	0.025	0.025
Petroleum	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
Natural Gas	0.026	0.027	0.028	0.030	0.030	0.031	0.031	0.032	0.033
Wood & Wood Wastes	0.226	0.231	0.235	0.240	0.245	0.250	0.255	0.260	0.265
All Total	**0.296**	**0.301**	**0.307**	**0.313**	**0.319**	**0.325**	**0.330**	**0.336**	**0.342**
SECTOR SUMMARY									
Residential Total	0.104	0.104	0.104	0.105	0.105	0.105	0.106	0.106	0.106
Commercial Total	0.103	0.106	0.110	0.114	0.118	0.123	0.127	0.132	0.136
Industrial Total	0.078	0.079	0.080	0.081	0.082	0.083	0.084	0.085	0.086
Total Power	0.011	0.011	0.012	0.013	0.013	0.013	0.013	0.013	0.013
All Total	**0.296**	**0.301**	**0.307**	**0.313**	**0.319**	**0.325**	**0.330**	**0.336**	**0.342**

Table B.2 (Contd.): Methane Emissions from Stationary Combustion

Sector/Fuel	2018	2019	2020	2021	2022	2023	2024	2025
	Million Metric Tons of CO_2 Equivalent							
Residential								
Coal	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Petroleum	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
N. Gas	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.010
Wood	0.084	0.084	0.084	0.084	0.084	0.085	0.085	0.085
Residential Total	**0.106**	**0.106**	**0.107**	**0.107**	**0.107**	**0.107**	**0.108**	**0.108**
Commercial								
Coal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Petroleum	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Natural Gas	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.011
Wood	0.126	0.123	0.126	0.129	0.133	0.136	0.140	0.144
Commercial Total	**0.141**	**0.138**	**0.142**	**0.145**	**0.149**	**0.153**	**0.157**	**0.161**
Industrial								
Coal	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
Petroleum	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Natural Gas	0.011	0.011	0.012	0.012	0.013	0.013	0.013	0.014
Wood & Wastes	0.061	0.062	0.062	0.063	0.064	0.065	0.065	0.066
Industrial Total	**0.087**	**0.088**	**0.089**	**0.090**	**0.091**	**0.092**	**0.094**	**0.095**
Power								
Coal	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Petroleum	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Natural Gas	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Wood and Waste	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Power	**0.013**	**0.013**	**0.013**	**0.013**	**0.013**	**0.013**	**0.013**	**0.013**
FUEL SUMMARY								
Coal	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Petroleum	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
Natural Gas	0.033	0.034	0.034	0.035	0.036	0.036	0.037	0.038
Wood & Wood Wastes	0.271	0.269	0.273	0.277	0.281	0.286	0.291	0.295
All Total	**0.348**	**0.346**	**0.351**	**0.356**	**0.361**	**0.366**	**0.372**	**0.377**
SECTOR SUMMARY								
Residential Total	0.106	0.106	0.107	0.107	0.107	0.107	0.108	0.108
Commercial Total	0.141	0.138	0.142	0.145	0.149	0.153	0.157	0.161
Industrial Total	0.087	0.088	0.089	0.090	0.091	0.092	0.094	0.095
Total Power	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
All Total	**0.348**	**0.346**	**0.351**	**0.356**	**0.361**	**0.366**	**0.372**	**0.377**

Table B.3: Nitrous Oxide Emissions from Stationary Combustion

Sector/Fuel	2000	2001	2002	2003	2004	2005	2006	2007	2008
	Million Metric Tons of CO_2 Equivalent								
Residential									
Coal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Petroleum	0.010	0.010	0.008	0.010	0.010	0.010	0.010	0.010	0.010
N. Gas	0.002	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.003
Wood	0.015	0.009	0.009	0.010	0.010	0.010	0.010	0.016	0.016
Residential Total	**0.027**	**0.021**	**0.020**	**0.022**	**0.023**	**0.023**	**0.023**	**0.028**	**0.028**
Commercial									
Coal	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Petroleum	0.005	0.004	0.003	0.005	0.005	0.005	0.005	0.004	0.004
Natural Gas	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Wood	0.012	0.011	0.010	0.012	0.014	0.014	0.015	0.016	0.017
Commercial Total	**0.020**	**0.019**	**0.016**	**0.020**	**0.021**	**0.023**	**0.023**	**0.024**	**0.024**
Industrial									
Coal	0.027	0.027	0.024	0.025	0.025	0.025	0.023	0.025	0.025
Petroleum	0.010	0.011	0.010	0.013	0.015	0.015	0.015	0.013	0.013
Natural Gas	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Wood & Wastes	0.092	0.072	0.052	0.070	0.077	0.086	0.087	0.105	0.107
Industrial Total	**0.132**	**0.112**	**0.088**	**0.110**	**0.118**	**0.128**	**0.127**	**0.145**	**0.147**
Power									
Coal	0.180	0.170	0.170	0.161	0.158	0.160	0.154	0.172	0.173
Petroleum	0.005	0.009	0.007	0.011	0.009	0.008	0.002	0.002	0.002
Natural Gas	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002
Wood and Waste	0.007	0.013	0.019	0.020	0.023	0.022	0.015	0.016	0.016
Power Total	**0.193**	**0.193**	**0.198**	**0.193**	**0.192**	**0.193**	**0.173**	**0.192**	**0.193**
FUEL SUMMARY									
Coal	0.208	0.198	0.195	0.188	0.184	0.186	0.178	0.198	0.199
Petroleum	0.031	0.034	0.028	0.038	0.039	0.038	0.032	0.029	0.029
Natural Gas	0.008	0.007	0.008	0.008	0.008	0.009	0.008	0.009	0.009
Wood & Wood Wastes	0.125	0.106	0.091	0.112	0.124	0.133	0.127	0.153	0.155
All Total	**0.371**	**0.345**	**0.321**	**0.345**	**0.355**	**0.366**	**0.346**	**0.389**	**0.393**
SECTOR SUMMARY									
Residential	0.027	0.021	0.020	0.022	0.023	0.023	0.023	0.028	0.028
Commercial	0.020	0.019	0.016	0.020	0.021	0.023	0.023	0.024	0.024
Industrial	0.132	0.112	0.088	0.110	0.118	0.128	0.127	0.145	0.147
Power	0.193	0.193	0.198	0.193	0.192	0.193	0.173	0.192	0.193
All Total	**0.371**	**0.345**	**0.321**	**0.345**	**0.355**	**0.366**	**0.346**	**0.389**	**0.393**

Table B.3 (Contd.): Nitrous Oxide Emissions from Stationary Combustion

Sector/Fuel	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Million Metric Tons of CO_2 Equivalent								
Residential									
Coal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Petroleum	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.009
N. Gas	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Wood	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Residential Total	**0.028**	**0.029**	**0.029**	**0.029**	**0.029**	**0.029**	**0.029**	**0.029**	**0.029**
Commercial									
Coal	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Petroleum	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Natural Gas	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003
Wood	0.018	0.018	0.019	0.020	0.021	0.021	0.022	0.023	0.024
Commercial Total	**0.025**	**0.026**	**0.027**	**0.028**	**0.029**	**0.030**	**0.031**	**0.031**	**0.032**
Industrial									
Coal	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Petroleum	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
Natural Gas	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Wood & Wastes	0.108	0.109	0.111	0.112	0.114	0.115	0.116	0.118	0.119
Industrial Total	**0.148**	**0.150**	**0.151**	**0.152**	**0.154**	**0.155**	**0.157**	**0.159**	**0.160**
Power									
Coal	0.177	0.185	0.185	0.185	0.203	0.203	0.203	0.203	0.203
Petroleum	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Natural Gas	0.003	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.005
Wood and Waste	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.018
Power Total	**0.198**	**0.204**	**0.205**	**0.206**	**0.225**	**0.225**	**0.226**	**0.226**	**0.226**
FUEL SUMMARY									
Coal	0.203	0.211	0.211	0.211	0.229	0.229	0.229	0.229	0.229
Petroleum	0.029	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
Natural Gas	0.010	0.010	0.011	0.013	0.013	0.013	0.013	0.013	0.014
Wood & Wood Wastes	0.158	0.160	0.162	0.165	0.167	0.170	0.172	0.175	0.178
All Total	**0.400**	**0.408**	**0.412**	**0.415**	**0.436**	**0.439**	**0.442**	**0.445**	**0.448**
SECTOR SUMMARY									
Residential	0.028	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
Commercial	0.025	0.026	0.027	0.028	0.029	0.030	0.031	0.031	0.032
Industrial	0.148	0.150	0.151	0.152	0.154	0.155	0.157	0.159	0.160
Power	0.198	0.204	0.205	0.206	0.225	0.225	0.226	0.226	0.226
All Total	**0.400**	**0.408**	**0.412**	**0.415**	**0.436**	**0.439**	**0.442**	**0.445**	**0.448**

Table B.3 (Contd.): Nitrous Oxide Emissions from Stationary Combustion

Sector/Fuel	2018	2019	2020	2021	2022	2023	2024	2025
	Million Metric Tons of CO_2 Equivalent							
Residential								
Coal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Petroleum	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
N. Gas	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Wood	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017
Residential Total	**0.029**	**0.029**	**0.029**	**0.029**	**0.029**	**0.029**	**0.029**	**0.029**
Commercial								
Coal	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Petroleum	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Natural Gas	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Wood	0.025	0.024	0.025	0.025	0.026	0.027	0.028	0.028
Commercial Total	**0.033**	**0.033**	**0.034**	**0.034**	**0.035**	**0.036**	**0.037**	**0.038**
Industrial								
Coal	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Petroleum	0.013	0.013	0.013	0.013	0.013	0.013	0.014	0.014
Natural Gas	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004
Wood & Wastes	0.121	0.121	0.123	0.124	0.126	0.127	0.128	0.130
Industrial Total	**0.162**	**0.163**	**0.164**	**0.166**	**0.167**	**0.169**	**0.171**	**0.172**
Power								
Coal	0.203	0.203	0.203	0.203	0.203	0.203	0.203	0.203
Petroleum	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Natural Gas	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Wood and Waste	0.018	0.018	0.019	0.019	0.019	0.019	0.019	0.019
Power Total	**0.226**	**0.226**	**0.227**	**0.227**	**0.227**	**0.227**	**0.227**	**0.227**
FUEL SUMMARY								
Coal	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Petroleum	0.027	0.027	0.027	0.028	0.028	0.028	0.028	0.028
Natural Gas	0.014	0.014	0.014	0.014	0.014	0.015	0.015	0.015
Wood & Wood Wastes	0.180	0.180	0.183	0.185	0.187	0.189	0.191	0.193
All Total	**0.450**	**0.451**	**0.453**	**0.456**	**0.458**	**0.460**	**0.463**	**0.466**
SECTOR SUMMARY								
Residential	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
Commercial	0.033	0.033	0.034	0.034	0.035	0.036	0.037	0.038
Industrial	0.162	0.163	0.164	0.166	0.167	0.169	0.171	0.172
Power	0.226	0.226	0.227	0.227	0.227	0.227	0.227	0.227
All Total	**0.450**	**0.451**	**0.453**	**0.456**	**0.458**	**0.460**	**0.463**	**0.466**

Table B.4: Methane Emissions from Transportation Sector

Fuels Used/Vehicle Type	2000	2001	2002	2003	2004	2005	2006	2007	2008
	Billion Btu								
	Values from Projection Tool of SIT								
Aircraft	56,867	57,423	57,118	65,572	95,708	107,976	109,194	66,219	68,568
Distillate Fuel	144,691	143,398	145,215	147,809	169,079	165,581	169,919	165,513	169,100
Motor Gasoline	442,522	465,211	468,874	476,431	484,752	488,182	483,521	475,476	474,594
	Values Considered in this Document								
Aircraft	56,867	57,423	57,118	65,572	95,708	107,976	109,194	109,767	112,115
Distillate Fuel	144,691	143,398	145,215	147,809	169,079	165,581	169,919	179,000	184,000
Motor Gasoline	442,522	465,211	468,874	476,431	484,752	488,182	493,277	504,388	515,499
	Fuel Ratio: (Present Consideration/Projection Module)								
Aircraft	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.66	1.64
Distillate Fuel	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.08	1.09
Motor Gasoline	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.06	1.09
Avg. of diesel & gasoline	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.07	1.09
Emission Source	Prorated Emissions, Million Metric Tons of CO_2 E								
Gasoline Highway									
Passenger Cars	0.041	0.037	0.027	0.024	0.022	0.018	0.007	0.010	0.010
Light-Duty Trucks	0.023	0.020	0.029	0.026	0.023	0.023	0.005	0.008	0.007
Heavy-Duty Vehicles	0.005	0.005	0.003	0.002	0.001	0.002	0.000	0.000	0.000
Motorcycles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gasoline Highway total	**0.070**	**0.062**	**0.059**	**0.052**	**0.046**	**0.043**	**0.012**	**0.019**	**0.017**
Diesel Highway									
Passenger Cars	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Light-Duty Trucks	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy-Duty Vehicles	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000
Diesel Highway total	**0.000**	**0.000**	**0.001**	**0.001**	**0.001**	**0.000**	**0.000**	**0.000**	**0.000**
Alternative Fuel Vehicles	**0.003**	**0.003**	**0.003**	**0.003**	**0.004**	**0.004**	**0.000**	**0.000**	**0.000**
Non-Highway									
Boats	0.004	0.001	0.001	0.002	0.002	0.002	0.001	0.001	0.001
Locomotives	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
Farm Equipment	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001
Construction Equipment	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001
Aircraft	0.003	0.003	0.003	0.003	0.005	0.006	0.000	0.001	0.001
Other*	0.000	0.001	0.001	0.000	0.001	0.001	0.000	0.001	0.001
Non-Highway total	**0.010**	**0.010**	**0.009**	**0.010**	**0.012**	**0.013**	**0.004**	**0.004**	**0.004**
*Other includes snowmobiles, small gasoline powered utility equipment, heavy-duty gasoline and diesel powered equipment									
EMISSION SUMMARY									
Highway CH_4	0.070	0.063	0.060	0.053	0.047	0.044	0.012	0.019	0.017
Non-Highway CH_4	0.013	0.013	0.012	0.013	0.015	0.017	0.004	0.004	0.004
Total Transportation CH_4	**0.084**	**0.076**	**0.072**	**0.066**	**0.062**	**0.060**	**0.016**	**0.023**	**0.022**

Table B.4 (Contd.): Methane Emissions from Transportation Sector

Fuels Used/Vehicle Type	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Billion Btu								
	Values from Projection Tool of SIT								
Aircraft	71,376	74,817	76,419	77,668	78,869	79,993	81,039	82,153	83,324
Distillate Fuel	173,008	177,246	181,876	186,453	190,795	194,833	198,913	203,252	206,788
Motor Gasoline	476,124	479,240	485,368	492,237	499,841	508,664	517,732	527,155	536,897
	Values Considered in this Document								
Aircraft	114,923	118,365	119,966	121,215	122,417	123,540	124,586	125,701	126,872
Distillate Fuel	189,000	194,000	199,000	204,000	209,000	214,000	219,000	224,000	229,000
Motor Gasoline	526,610	537,721	548,832	559,943	571,054	582,165	593,276	604,387	615,498
	Fuel Ratio: (Present Consideration/Projection Module)								
Aircraft	1.61	1.58	1.57	1.56	1.55	1.54	1.54	1.53	1.52
Distillate Fuel	1.09	1.09	1.09	1.09	1.10	1.10	1.10	1.10	1.11
Motor Gasoline	1.11	1.12	1.13	1.14	1.14	1.14	1.15	1.15	1.15
Avg. of diesel & gasoline	1.10	1.11	1.11	1.12	1.12	1.12	1.12	1.12	1.13
Emission Source	Prorated Emissions, Million Metric Tons of CO_2 E								
Gasoline Highway									
Passenger Cars	0.009	0.008	0.007	0.007	0.007	0.006	0.006	0.006	0.006
Light-Duty Trucks	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.005	0.005
Heavy-Duty Vehicles	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Motorcycles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gasoline Highway total	**0.016**	**0.014**	**0.014**	**0.013**	**0.013**	**0.012**	**0.012**	**0.011**	**0.011**
Diesel Highway									
Passenger Cars	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Light-Duty Trucks	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy-Duty Vehicles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Highway total	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Alternative Fuel Vehicles	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Non-Highway									
Boats	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Locomotives	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Farm Equipment	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Construction Equipment	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Aircraft	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Other*	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Non-Highway total	**0.004**	**0.004**	**0.004**	**0.004**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**
*Other includes snowmobiles, small gasoline powered utility equipment, heavy-duty gasoline and diesel powered equipment									
EMISSION SUMMARY									
Highway CH_4	0.016	0.014	0.014	0.013	0.013	0.012	0.012	0.012	0.011
Non-Highway CH_4	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Total Transportation CH_4	**0.020**	**0.019**	**0.018**	**0.018**	**0.018**	**0.017**	**0.017**	**0.017**	**0.017**

Table B.4 (Contd.): Methane Emissions from Transportation Sector

Fuels Used/Vehicle Type	2018	2019	2020	2021	2022	2023	2024	2025
	Billion Btu							
	Values from Projection Tool of SIT							
Aircraft	84,349	85,479	86,062	Not Available				
Distillate Fuel	210,229	214,462	219,262					
Motor Gasoline	546,865	556,532	566,970					
	Values Considered in this Document							
Aircraft	127,896	129,026	129,610	130,197	130,788	131,384	131,983	132,587
Distillate Fuel	234,000	239,000	244,000	249,000	254,000	265,000	270,000	275,000
Motor Gasoline	626,609	637,720	648,831	659,942	671,053	682,164	693,275	704,386
	Fuel Ratio: (Present Consideration/Projection Module)							
Aircraft	1.52	1.51	1.51	Not Applicable				
Distillate Fuel	1.11	1.11	1.11					
Motor Gasoline	1.15	1.15	1.14					
Avg. of diesel & gasoline	1.13	1.13	1.13					
Emission Source	Prorated Emissions, Million Metric Tons of CO_2 E							
Gasoline Highway								
Passenger Cars	0.006	0.006	0.005	0.005	0.005	0.005	0.005	0.005
Light-Duty Trucks	0.005	0.005	0.005	0.005	0.004	0.004	0.004	0.004
Heavy-Duty Vehicles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Motorcycles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gasoline Highway total	**0.011**	**0.011**	**0.011**	**0.010**	**0.010**	**0.010**	**0.010**	**0.010**
Diesel Highway								
Passenger Cars	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Light-Duty Trucks	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy-Duty Vehicles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Highway total	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Alternative Fuel Vehicles	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Non-Highway								
Boats	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Locomotives	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Farm Equipment	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Construction Equipment	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002
Aircraft	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Other*	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Non-Highway total	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**	**0.005**
*Other includes snowmobiles, small gasoline powered utility equipment, heavy-duty gasoline and diesel powered equipment								
EMISSION SUMMARY								
Highway CH_4	0.011	0.011	0.011	0.011	0.010	0.010	0.010	0.010
Non-Highway CH_4	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006
Total Transportation CH_4	**0.016**	**0.016**	**0.016**	**0.016**	**0.016**	**0.016**	**0.016**	**0.016**

Table B.5: Nitrous Oxide Emissions from Transportation Sector

Fuels Used/Vehicle Type	2000	2001	2002	2003	2004	2005	2006	2007	2008
	Billion Btu								
	Values from Projection Tool of SIT								
Aircr aft	56,867	57,423	57,118	65,572	95,708	107,976	109,194	66,219	68,568
Distillate Fuel	144,691	143,398	145,215	147,809	169,079	165,581	169,919	165,513	169,100
Motor Gasoline	442,522	465,211	468,874	476,431	484,752	488,182	483,521	475,476	474,594
	Values Considered in this Document								
Aircraft	56,867	57,423	57,118	65,572	95,708	107,976	109,194	109,767	112,115
Distillate Fuel	144,691	143,398	145,215	147,809	169,079	165,581	169,919	179,000	184,000
Motor Gasoline	442,522	465,211	468,874	476,431	484,752	488,182	493,277	504,388	515,499
	Fuel Ratio: (Present Consideration/Projection Module)								
Aircraft	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.66	1.64
Distillate Fuel	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.08	1.09
Motor Gasoline	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.06	1.09
Avg. of diesel & gasoline	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.07	1.09
Emission Source	Prorated Emissions, Million Metric Tons of CO_2 E								
Gasoline Highway									
Passenger Cars	0.650	0.592	0.437	0.398	0.369	0.310	0.116	0.182	0.169
Light-Duty Trucks	0.485	0.429	0.633	0.555	0.503	0.497	0.103	0.158	0.143
Heavy-Duty Vehicles	0.044	0.046	0.026	0.026	0.007	0.019	0.004	0.006	0.007
Motorcycles	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000
Gasoline Highway Total	**1.180**	**1.067**	**1.096**	**0.980**	**0.880**	**0.826**	**0.223**	**0.346**	**0.318**
Diesel Highway									
Passenger Cars	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Light-Duty Trucks	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy-Duty Vehicles	0.006	0.006	0.007	0.007	0.008	0.006	0.002	0.002	0.003
Diesel Highway Total	**0.006**	**0.006**	**0.007**	**0.007**	**0.008**	**0.007**	**0.002**	**0.003**	**0.003**
Alternative Fuel Vehicles	**0.002**	**0.003**	**0.003**	**0.003**	**0.003**	**0.003**	**0.001**	**0.001**	**0.001**
Non-Highway									
Boats	0.018	0.006	0.005	0.009	0.009	0.009	0.003	0.003	0.003
Locomotives	0.003	0.005	0.005	0.004	0.004	0.005	0.002	0.002	0.002
Farm Equipment	0.004	0.004	0.004	0.004	0.004	0.004	0.008	0.008	0.009
Construction Equipment	0.011	0.013	0.012	0.013	0.014	0.014	0.003	0.003	0.003
Aircraft	0.039	0.039	0.039	0.045	0.059	0.074	0.002	0.004	0.004
Other*	0.001	0.004	0.004	0.003	0.005	0.004	0.003	0.004	0.004
Non-Highway total	**0.077**	**0.072**	**0.069**	**0.078**	**0.096**	**0.111**	**0.021**	**0.024**	**0.025**
*Other includes snowmobiles, small gasoline powered utility equipment, heavy-duty gasoline and diesel powered equipment									
EMISSION SUMMARY									
Highway NO_2	1.186	1.073	1.103	0.987	0.888	0.833	0.226	0.349	0.321
Non-Highway NO_2	0.079	0.075	0.071	0.081	0.099	0.114	0.022	0.025	0.026
Total Transportation NO_2	**1.265**	**1.148**	**1.175**	**1.068**	**0.987**	**0.947**	**0.247**	**0.374**	**0.346**

Table B.5 (Contd.): Nitrous Oxide Emissions from Transportation Sector

Fuels Used/Vehicle Type	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Billion Btu								
	Values from Projection Tool of SIT								
Aircraft	71,376	74,817	76,419	77,668	78,869	79,993	81,039	82,153	83,324
Distillate Fuel	173,008	177,246	181,876	186,453	190,795	194,833	198,913	203,252	206,788
Motor Gasoline	476,124	479,240	485,368	492,237	499,841	508,664	517,732	527,155	536,897
	Values Considered in this Document								
Aircraft	114,923	118,365	119,966	121,215	122,417	123,540	124,586	125,701	126,872
Distillate Fuel	189,000	194,000	199,000	204,000	209,000	214,000	219,000	224,000	229,000
Motor Gasoline	526,610	537,721	548,832	559,943	571,054	582,165	593,276	604,387	615,498
	Fuel Ratio: (Present Consideration/Projection Module)								
Aircraft	1.61	1.58	1.57	1.56	1.55	1.54	1.54	1.53	1.52
Distillate Fuel	1.09	1.09	1.09	1.09	1.10	1.10	1.10	1.10	1.11
Motor Gasoline	1.11	1.12	1.13	1.14	1.14	1.14	1.15	1.15	1.15
Avg. of diesel & gasoline	1.10	1.11	1.11	1.12	1.12	1.12	1.12	1.12	1.13
Emission Source	Prorated Emissions, Million Metric Tons of CO_2 E								
Gasoline Highway									
Passenger Cars	0.156	0.143	0.138	0.134	0.129	0.125	0.121	0.119	0.118
Light-Duty Trucks	0.127	0.112	0.112	0.111	0.110	0.110	0.109	0.102	0.096
Heavy-Duty Vehicles	0.007	0.007	0.006	0.006	0.006	0.005	0.005	0.005	0.005
Motorcycles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gasoline Highway Total	**0.290**	**0.262**	**0.256**	**0.251**	**0.245**	**0.240**	**0.235**	**0.227**	**0.219**
Diesel Highway									
Passenger Cars	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Light-Duty Trucks	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy-Duty Vehicles	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Diesel Highway Total	**0.003**	**0.003**	**0.003**	**0.003**	**0.003**	**0.003**	**0.003**	**0.003**	**0.003**
Alternative Fuel Vehicles	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**
Non-Highway									
Boats	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Locomotives	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Farm Equipment	0.009	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011
Construction Equipment	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004
Aircraft	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.005
Other*	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.005
Non-Highway total	**0.025**	**0.026**	**0.026**	**0.027**	**0.027**	**0.028**	**0.028**	**0.029**	**0.029**
*Other includes snowmobiles, small gasoline powered utility equipment, heavy-duty gasoline and diesel powered equipment									
EMISSION SUMMARY									
Highway NO_2	0.293	0.265	0.259	0.254	0.248	0.243	0.238	0.230	0.222
Non-Highway NO_2	0.026	0.027	0.028	0.028	0.029	0.029	0.030	0.030	0.030
Total Transportation NO_2	**0.319**	**0.292**	**0.287**	**0.282**	**0.277**	**0.272**	**0.268**	**0.260**	**0.253**

Table B.5 (Contd.): Nitrous Oxide Emissions from Transportation Sector

Fuels Used/Vehicle Type	2018	2019	2020	2021	2022	2023	2024	2025
	Billion Btu							
	Values from Projection Tool of SIT							
Aircraft	84,349	85,479	86,062	Not Available				
Distillate Fuel	210,229	214,462	219,262					
Motor Gasoline	546,865	556,532	566,970					
	Values Considered in this Document							
Aircraft	127,896	129,026	129,610	130,197	130,788	131,384	131,983	132,587
Distillate Fuel	234,000	239,000	244,000	249,000	254,000	265,000	270,000	275,000
Motor Gasoline	626,609	637,720	648,831	659,942	671,053	682,164	693,275	704,386
	Fuel Ratio: (Present Consideration/Projection Module)							
Aircraft	1.52	1.51	1.51	Not Applicable				
Distillate Fuel	1.11	1.11	1.11					
Motor Gasoline	1.15	1.15	1.14					
Avg. of diesel & gasoline	1.13	1.13	1.13					
Emission Source	Prorated Emissions, Million Metric Tons of CO_2 E							
Gasoline Highway								
Passenger Cars	0.117	0.116	0.115	0.114	0.113	0.112	0.112	0.111
Light-Duty Trucks	0.089	0.082	0.076	0.070	0.065	0.060	0.055	0.051
Heavy-Duty Vehicles	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Motorcycles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gasoline Highway Total	**0.211**	**0.203**	**0.196**	**0.189**	**0.182**	**0.175**	**0.169**	**0.163**
Diesel Highway								
Passenger Cars	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Light-Duty Trucks	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy-Duty Vehicles	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004
Diesel Highway Total	**0.003**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**
Alternative Fuel Vehicles	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.002**
Non-Highway								
Boats	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004
Locomotives	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Farm Equipment	0.011	0.011	0.011	0.011	0.011	0.011	0.012	0.012
Construction Equipment	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Aircraft	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Other*	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Non-Highway total	**0.030**	**0.030**	**0.030**	**0.031**	**0.031**	**0.031**	**0.032**	**0.032**
*Other includes snowmobiles, small gasoline powered utility equipment, heavy-duty gasoline and diesel powered equipment								
EMISSION SUMMARY								
Highway NO_2	0.214	0.207	0.199	0.192	0.186	0.179	0.173	0.167
Non-Highway NO_2	0.031	0.031	0.032	0.032	0.032	0.033	0.033	0.034
Total Transportation NO_2	**0.245**	**0.238**	**0.231**	**0.224**	**0.218**	**0.212**	**0.206**	**0.200**

Table B.6: Transportation Sector Carbon Dioxide Emissions Distribution

Transport Use Details	2000	2001	2002	2003	2004	2005	2006	2007	2008
	CO_2 Emissions, Million Metric Tons								
Jet Kerosene	4.00	4.01	4.00	4.61	6.09	7.58	7.67	7.73	7.90
Jet Naphtha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aviation Gasoline	0.03	0.06	0.05	0.04	0.06	0.08	0.08	0.05	0.05
Marine Residual Fuel Oil	1.57	0.39	0.31	0.58	0.61	0.65	0.59	0.71	0.73
Marine Distillate Fuel Oil	0.63	0.24	0.16	0.32	0.32	0.31	0.32	0.34	0.35
Marine Gasoline	0.22	0.21	0.22	0.22	0.22	0.25	0.26	0.26	0.27
Loco Diesel Fuel	0.35	0.62	0.53	0.49	0.48	0.59	0.61	0.64	0.66
Gasoline Tractor	0.13	0.16	0.17	0.18	0.23	0.23	0.23	0.23	0.24
Diesel Tractor	0.36	0.33	0.30	0.32	0.31	0.32	0.33	0.35	0.36
Gasoline Construction	0.05	0.13	0.12	0.14	0.16	0.13	0.14	0.14	0.14
Diesel Construction	1.39	1.59	1.41	1.57	1.70	1.61	1.65	1.74	1.79
Gasoline HD Utility	0.04	0.22	0.23	0.21	0.27	0.25	0.25	0.26	0.26
Gasoline Small Utility	0.07	0.12	0.12	0.10	0.12	0.12	0.12	0.13	0.13
Diesel HD Utility	0.08	0.17	0.17	0.12	0.23	0.23	0.23	0.24	0.25
Bunker Fuels [1]	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total Non-highway	**8.92**	**8.28**	**7.81**	**8.92**	**10.81**	**12.35**	**12.49**	**12.82**	**13.12**
Total Highway [2]	**38.00**	38.63	39.26	39.90	40.53	**41.16**	**41.30**	42.73	44.19
Total Transportation	**46.92**	**46.91**	**47.08**	**48.82**	**51.34**	**53.51**	**53.79**	**55.55**	**57.31**

1 Bunker fuels emissions from Table B.1

2 CO_2 emissions for highway transport are derived independently from MOBILE 6.2.03 for 2000, 2005 & 2006; For intermediate years the values are extrapolated.

Transport Use Details	2009	2010	2011	2012	2013	2014	2015	2016	2017
	CO_2 Emissions, Million Metric Tons								
Jet Kerosene	8.09	8.34	8.45	8.54	8.62	8.70	8.78	8.86	8.94
Jet Naphtha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aviation Gasoline	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06
Marine Residual Fuel Oil	0.75	0.78	0.78	0.79	0.79	0.80	0.80	0.81	0.81
Marine Distillate Fuel Oil	0.36	0.37	0.37	0.38	0.39	0.40	0.41	0.42	0.43
Marine Gasoline	0.27	0.28	0.28	0.29	0.29	0.30	0.31	0.31	0.32
Loco Diesel Fuel	0.67	0.69	0.71	0.73	0.74	0.76	0.78	0.80	0.82
Gasoline Tractor	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.28	0.29
Diesel Tractor	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.44
Gasoline Construction	0.14	0.15	0.15	0.15	0.16	0.16	0.16	0.17	0.17
Diesel Construction	1.83	1.88	1.93	1.98	2.03	2.08	2.13	2.17	2.22
Gasoline HD Utility	0.27	0.27	0.28	0.28	0.29	0.29	0.30	0.31	0.31
Gasoline Small Utility	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15
Diesel HD Utility	0.26	0.26	0.27	0.28	0.28	0.29	0.30	0.31	0.31
Bunker Fuels [1]	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total Non-highway	**13.46**	**13.84**	**14.07**	**14.28**	**14.49**	**14.69**	**14.88**	**15.08**	**15.28**
Total Highway [2a]	45.61	**46.99**	48.29	49.60	50.92	52.24	**53.58**	54.96	56.33
Total Transportation	**59.07**	**60.83**	**62.36**	**63.88**	**65.41**	**66.93**	**68.46**	**70.04**	**71.61**

1 Bunker fuels emissions from Table B.1

2 CO_2 emissions for highway transport are derived independently from MOBILE 6.2.03 for 2000, 2005 & 2006; For intermediate years the values are extrapolated.

Table B.6 (Contd.): Transportation Sector Carbon Dioxide Emissions Distribution

Transport Use Details	2018	2019	2020	2021	2022	2023	2024	2025
	CO_2 Emissions, Million Metric Tons							
Jet Kerosene	9.01	9.09	9.13	9.17	9.21	9.26	9.30	9.34
Jet Naphtha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aviation Gasoline	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Marine Residual Fuel Oil	0.82	0.82	0.83	0.83	0.84	0.85	0.85	0.86
Marine Distillate Fuel Oil	0.44	0.45	0.46	0.47	0.48	0.50	0.51	0.52
Marine Gasoline	0.32	0.33	0.33	0.34	0.35	0.35	0.36	0.36
Loco Diesel Fuel	0.83	0.85	0.87	0.89	0.90	0.94	0.96	0.98
Gasoline Tractor	0.29	0.30	0.30	0.31	0.31	0.32	0.32	0.33
Diesel Tractor	0.45	0.46	0.47	0.48	0.49	0.51	0.52	0.53
Gasoline Construction	0.17	0.17	0.18	0.18	0.18	0.19	0.19	0.19
Diesel Construction	2.27	2.32	2.37	2.42	2.46	2.57	2.62	2.67
Gasoline HD Utility	0.32	0.32	0.33	0.33	0.34	0.35	0.35	0.36
Gasoline Small Utility	0.16	0.16	0.16	0.16	0.17	0.17	0.17	0.17
Diesel HD Utility	0.32	0.33	0.33	0.34	0.35	0.36	0.37	0.37
Bunker Fuels [1]	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total Non-highway	**15.47**	**15.68**	**15.84**	**16.00**	**16.16**	**16.43**	**16.60**	**16.76**
Total Highway [2]	57.72	59.08	**60.50**	60.69	60.87	60.95	61.12	**61.31**
Total Transportation	**73.19**	**74.76**	**76.34**	**76.69**	**77.03**	**77.38**	**77.72**	**78.07**

1 Bunker fuels emissions from Table B.1

2 CO_2 emissions for highway transport are derived independently from MOBILE 6.2.03 for 2000, 2005 & 2006; For intermediate years the values are extrapolated.

Table B.7: Emissions from Coal Mining, Natural Gas & Oil Sectors

Sector	2000	2001	2002	2003	2004	2005	2006	2007	2008
Coal mining	Million Metric Tons of CO_2 E								
Active Mines	4.83	4.57	4.45	3.99	4.48	3.57	4.39	4.83	5.27
Abandoned Mines	Million Metric Tons of CO_2 E								
Vented	0.18	0.17	0.17	0.16	0.17	0.07	0.15	0.04	0.04
Sealed	0.50	0.46	0.46	0.42	0.43	0.40	0.40	0.10	0.09
Flooded	0.52	0.45	0.50	0.44	0.50	0.44	0.04	0.11	0.10
Abandoned Total	1.21	1.08	1.12	1.02	1.09	0.91	0.09	0.24	0.23
Coal Mining Total	**6.04**	**5.65**	**5.58**	**5.01**	**5.58**	**4.47**	**4.48**	**5.07**	**5.51**
Oil & Gas	Million Metric Tons of CO_2 E								
Natural Gas	0.31	0.36	0.35	0.36	0.40	0.42	0.38	0.38	0.38
Petroleum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Oil & Gas	**0.31**	**0.36**	**0.35**	**0.36**	**0.40**	**0.43**	**0.38**	**0.38**	**0.38**

Table B.7 (Contd.): Emissions from Coal Mining, Natural Gas & Oil Sectors

Sector	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coal mining	**Million Metric Tons of CO_2 E**								
Active Mines	5.72	6.17	6.16	6.15	6.13	6.12	6.11	6.06	6.01
Abandoned Mines	**Million Metric Tons of CO_2 E**								
Vented	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Sealed	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.07
Flooded	0.10	0.10	0.09	0.09	0.09	0.09	0.08	0.08	0.08
Abandoned Total	0.23	0.22	0.21	0.21	0.20	0.20	0.19	0.19	0.18
Coal Mining Total	**5.95**	**6.39**	**6.37**	**6.35**	**6.34**	**6.32**	**6.30**	**6.25**	**6.20**
Oil & Gas	**Million Metric Tons of CO_2 E**								
Natural Gas	0.39	0.39	0.39	0.39	0.39	0.40	0.40	0.40	0.40
Petroleum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Oil & Gas	**0.39**	**0.39**	**0.39**	**0.39**	**0.39**	**0.40**	**0.40**	**0.40**	**0.40**

Table B.7 (Contd.): Emissions from Coal Mining, Natural Gas & Oil Sectors

Sector	2018	2019	2020	2021	2022	2023	2024	2025
Coal mining	**Million Metric Tons of CO_2 E**							
Active Mines	5.96	5.91	5.86	5.82	5.77	5.72	5.67	5.62
Abandoned Mines	**Million Metric Tons of CO_2 E**							
Vented	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Sealed	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Flooded	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07
Abandoned Total	0.18	0.18	0.17	0.17	0.17	0.17	0.16	0.16
Coal Mining Total	**6.14**	**6.09**	**6.04**	**5.99**	**5.94**	**5.88**	**5.83**	**5.78**
Oil & Gas	**Million Metric Tons of CO_2 E**							
Natural Gas	0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.43
Petroleum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Oil & Gas	**0.41**	**0.41**	**0.41**	**0.42**	**0.42**	**0.42**	**0.42**	**0.43**

Table B.8: Emissions from Industrial Processes

Emissions ($MTCO_2E$)	2000	2001	2002	2003	2004	2005	2006	2007	2008
Carbon Dioxide Emissions	**Million Metric Tons of CO_2 E**								
Cement Manufacture	0.51	0.50	0.46	0.42	0.42	0.39	0.47	0.47	0.47
Lime Manufacture	0.58								
Limestone and Dolomite Use	0.14	0.12	0.09	0.12	0.16	0.12	0.14	2.32	2.18
Soda Ash	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ammonia & Urea	0.33	0.26	0.30	0.27	0.29	0.36	0.35	0.29	0.29
Iron & Steel Production	0.05	0.05	0.06	0.07	0.06	0.06	0.31	0.32	0.33
Carbon Dioxide Emissions Total	**1.68**	**0.99**	**0.98**	**0.94**	**1.01**	**1.00**	**3.59**	**3.46**	**3.33**
HFC, PFC, and SF_6 Emissions	**Million Metric Tons of CO_2 E**								
ODS Substitutes	2.04	2.24	2.46	2.68	2.92	2.92	0.86	0.93	1.01
Semiconductor Manufacturing	0.00	0.00					0.00	0.00	0.00
Electric Power Transmission and Distribution Systems	0.43	0.43	0.42	0.40	0.40	0.40	0.13	0.13	0.13
HFC, PFC, and SF_6 Emissions Total	**2.47**	**2.67**	**2.87**	**3.09**	**3.33**	**3.32**	**0.99**	**1.06**	**1.14**
Industrial Processes Total	**4.15**	**3.66**	**3.86**	**4.03**	**4.33**	**4.33**	**2.32**	**4.52**	**4.47**

Table B.8 (Contd.): Emissions from Industrial Processes

Emissions ($MTCO_2E$)	2009	2010	2011	2012	2013	2014	2015	2016	2017
Carbon Dioxide Emissions	**Million Metric Tons of CO_2 E**								
Cement Manufacture	0.47	0.48	0.48	0.48	0.48	0.49	0.49	0.49	0.50
Lime Manufacture									
Limestone and Dolomite Use	2.04	1.91	1.77	1.63	1.49	1.36	1.22	1.08	0.95
Soda Ash	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ammonia & Urea	0.28	0.28	0.27	0.26	0.26	0.25	0.25	0.24	0.23
Iron & Steel Production	0.34	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42
Carbon Dioxide Emissions Total	**3.20**	**3.07**	**2.94**	**2.81**	**2.68**	**2.55**	**2.42**	**2.29**	**2.16**
HFC, PFC, and SF_6 Emissions	**Million Metric Tons of CO_2 E**								
ODS Substitutes	1.12	1.22	1.31	1.40	1.49	1.58	1.68	1.77	1.87
Semiconductor Manufacturing									
Electric Power Transmission and Distribution Systems	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.12
HFC, PFC, and SF_6 Emissions Total	**1.25**	**1.35**	**1.44**	**1.53**	**1.61**	**1.71**	**1.81**	**1.90**	**1.99**
Industrial Processes Total	**4.45**	**4.42**	**4.38**	**4.34**	**4.29**	**4.26**	**4.23**	**4.19**	**4.15**

Table B.8 (Contd.): Emissions from Industrial Processes

Emissions ($MTCO_2E$)	2018	2019	2020	2021	2022	2023	2024	2025
Carbon Dioxide Emissions	**Million Metric Tons of CO_2 E**							
Cement Manufacture	0.50	0.50	0.50	0.51	0.51	0.51	0.52	0.52
Lime Manufacture								
Limestone and Dolomite Use	0.81	0.67	0.54	0.43	0.34	0.27	0.22	0.17
Soda Ash	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ammonia & Urea	0.23	0.22	0.21	0.21	0.20	0.20	0.19	0.19
Iron & Steel Production	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50
Carbon Dioxide Emissions Total	**2.03**	**1.90**	**1.77**	**1.67**	**1.59**	**1.53**	**1.48**	**1.44**
HFC, PFC, and SF_6 Emissions	**Million Metric Tons of CO_2 E**							
ODS Substitutes	1.97	2.07	2.17	2.28	2.39	2.51	2.64	2.77
Semiconductor Manufacturing								
Electric Power Transmission and Distribution Systems	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
HFC, PFC, and SF_6 Emissions Total	**2.09**	**2.19**	**2.29**	**2.40**	**2.51**	**2.63**	**2.75**	**2.89**
Industrial Processes Total	**4.12**	**4.09**	**4.06**	**4.07**	**4.10**	**4.16**	**4.23**	**4.33**

Table B.9: Emissions from Waste Management

Source of Emissions	2000	2001	2002	2003	2004	2005	2006	2007	2008
Landfills									
Potential Methane Generation	**Million Metric tons of CO_2 E**								
From Municipal Solid Wastes (MSW)	5.269	5.398	5.496	5.281	5.241	5.705	5.505	5.609	5.706
From Industrial Wastes	0.369	0.378	0.385	0.370	0.367	0.399	0.385	0.393	0.399
Total Potential Methane	**5.638**	**5.776**	**5.881**	**5.651**	**5.608**	**6.104**	**5.890**	**6.002**	**6.106**
Avoided Methane	**Million Metric tons of CO_2 E**								
From Flare	(0.535)	(0.090)	(0.163)	(0.163)	(0.163)	(0.163)	(0.170)	(0.173)	(0.176)
From Landfill Gas-to-Energy	(0.924)	(1.158)	(1.383)	(1.383)	(2.176)	(2.330)	(2.378)	(2.423)	(2.465)
Total Methane Avoided	**(1.459)**	**(1.248)**	**(1.546)**	**(1.546)**	**(2.339)**	**(2.493)**	**(2.548)**	**(2.596)**	**(2.641)**
Oxidation at MSW Landfills	0.381	0.415	0.395	0.374	0.290	0.321	0.296	0.301	0.307
Oxidation at Industrial Landfills	0.037	0.038	0.038	0.037	0.037	0.040	0.039	0.039	0.040
Total CH_4 Emissions	**3.762**	**4.076**	**3.902**	**3.694**	**2.942**	**3.973**	**3.008**	**3.065**	**3.118**
Waste Combustion	**Million Metric tons of CO_2 E**								
Carbon dioxide	0.506	0.860	1.218	1.073	0.924	0.920	1.082	1.124	1.167
Nitrogen Oxide	0.012	0.019	0.027	0.023	0.019	1.040	0.022	0.022	0.022
Methane from Wastewater	**Million Metric tons of CO_2 E**								
Domestic	0.48	0.48	0.49	0.50	0.51	0.51	0.52	0.52	0.53
Industrial	0.04	0.04	0.04	0.04	0.02	0.11	0.03	0.03	0.03
Total Methane from Wastewater	**0.51**	**0.52**	**0.53**	**0.53**	**0.53**	**0.62**	**0.55**	**0.55**	**0.56**
Nitrogen Oxide from Wastewater	**0.41**	**0.42**	**0.42**	**0.43**	**0.44**	**0.44**	**0.45**	**0.46**	**0.46**
GASES SUMMARY									
Carbon dioxide	**0.51**	**0.86**	**1.22**	**1.07**	**0.92**	**0.92**	**1.08**	**1.12**	**1.17**
Methane	**4.27**	**4.60**	**4.43**	**4.23**	**3.47**	**4.60**	**3.56**	**3.62**	**3.68**
Nitrous Oxide	**0.42**	**0.44**	**0.45**	**0.45**	**0.46**	**1.48**	**0.47**	**0.48**	**0.49**
Total Emissions from Wastes	**5.21**	**5.89**	**6.09**	**5.75**	**4.86**	**7.00**	**5.11**	**5.22**	**5.33**
SECTOR SUMMARY									
Source of Emissions	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
	Million Metric tons of CO_2 E								
Solid Wastes	4.28	4.95	5.15	4.79	3.88	5.93	4.11	4.21	4.31
Wastewater	0.93	0.94	0.95	0.96	0.97	1.07	1.00	1.01	1.03
Total Waste Management	**5.21**	**5.89**	**6.09**	**5.75**	**4.86**	**7.00**	**5.11**	**5.22**	**5.33**

Table B.9 (Contd.): Emissions from Waste Management

Source of Emissions	2009	2010	2011	2012	2013	2014	2015	2016	2017
Landfills									
Potential Methane Generation	**Million Metric tons of CO_2 E**								
From Municipal Solid Wastes (MSW)	5.797	5.882	5.961	6.034	6.101	6.163	6.220	6.271	6.318
From Industrial Wastes	0.406	0.412	0.417	0.422	0.427	0.431	0.435	0.439	0.442
Total Potential Methane	**6.203**	**6.294**	**6.378**	**6.456**	**6.528**	**6.594**	**6.655**	**6.710**	**6.760**
Avoided Methane	**Million Metric tons of CO_2 E**								
From Flare	(0.179)	(0.181)	(0.184)	(0.186)	(0.188)	(0.190)	(0.192)	(0.193)	(0.195)
From Landfill Gas-to-Energy	(2.505)	(2.541)	(2.575)	(2.607)	(2.636)	(2.662)	(2.687)	(2.709)	(2.729)
Total Methane Avoided	**(2.683)**	**(2.722)**	**(2.759)**	**(2.793)**	**(2.824)**	**(2.852)**	**(2.879)**	**(2.903)**	**(2.924)**
Oxidation at MSW Landfills	0.311	0.316	0.320	0.324	0.328	0.331	0.334	0.337	0.339
Oxidation at Industrial Landfills	0.041	0.041	0.042	0.042	0.043	0.043	0.044	0.044	0.044
Total CH_4 Emissions	**3.168**	**3.214**	**3.257**	**3.297**	**3.334**	**3.368**	**3.399**	**3.427**	**3.452**
Waste Combustion	**Million Metric tons of CO_2 E**								
Carbon dioxide	1.209	1.251	1.293	1.336	1.378	1.420	1.463	1.505	1.547
Nitrogen Oxide	0.023	0.023	0.024	0.024	0.025	0.025	0.026	0.026	0.027
Methane from Wastewater	**Million Metric tons of CO_2 E**								
Domestic	0.53	0.54	0.55	0.55	0.56	0.57	0.57	0.58	0.59
Industrial	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Total Methane from Wastewater	**0.57**	**0.58**	**0.58**	**0.59**	**0.60**	**0.60**	**0.61**	**0.62**	**0.63**
Nitrogen Oxide from Wastewater	**0.47**	**0.48**	**0.49**	**0.49**	**0.50**	**0.51**	**0.51**	**0.52**	**0.53**
GASES SUMMARY									
Carbon dioxide	**1.21**	**1.25**	**1.29**	**1.34**	**1.38**	**1.42**	**1.46**	**1.50**	**1.55**
Methane	**3.74**	**3.79**	**3.84**	**3.89**	**3.93**	**3.97**	**4.01**	**4.05**	**4.08**
Nitrous Oxide	**0.49**	**0.50**	**0.51**	**0.52**	**0.52**	**0.53**	**0.54**	**0.55**	**0.55**
Total Emissions from Wastes	**5.44**	**5.54**	**5.64**	**5.74**	**5.83**	**5.92**	**6.01**	**6.10**	**6.18**

SECTOR SUMMARY

Source of Emissions	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Million Metric tons of CO_2 E								
Solid Wastes	4.40	4.49	4.57	4.66	4.74	4.81	4.89	4.96	5.03
Wastewater	1.04	1.05	1.07	1.08	1.10	1.11	1.12	1.14	1.15
Total Waste Management	**5.44**	**5.54**	**5.64**	**5.74**	**5.83**	**5.92**	**6.01**	**6.10**	**6.18**

Table B.9 (Contd.): Emissions from Waste Management

Source of Emissions	2018	2019	2020	2021	2022	2023	2024	2025
Landfills	**Million Metric tons of CO_2 E**							
Potential Methane Generation								
From Municipal Solid Wastes (MSW)	6.360	6.398	6.431	6.465	6.498	6.532	6.566	6.601
From Industrial Wastes	0.445	0.448	0.450	0.453	0.455	0.457	0.460	0.462
Total Potential Methane	**6.805**	**6.846**	**6.881**	**6.917**	**6.953**	**6.990**	**7.026**	**7.063**
Avoided Methane	**Million Metric tons of CO_2 E**							
From Flare	(0.196)	(0.197)	(0.198)	(0.199)	(0.200)	(0.201)	(0.202)	(0.203)
From Landfill Gas-to-Energy	(2.748)	(2.764)	(2.778)	(2.793)	(2.807)	(2.822)	(2.837)	(2.852)
Total Methane Avoided	**(2.944)**	**(2.961)**	**(2.977)**	**(2.992)**	**(3.008)**	**(3.023)**	**(3.039)**	**(3.055)**
Oxidation at MSW Landfills	0.342	0.344	0.345	0.347	0.349	0.351	0.353	0.355
Oxidation at Industrial Landfills	0.045	0.045	0.045	0.045	0.045	0.046	0.046	0.046
Total CH_4 Emissions	**3.475**	**3.496**	**3.514**	**3.533**	**3.551**	**3.570**	**3.588**	**3.607**
Waste Combustion	**Million Metric tons of CO_2 E**							
Carbon dioxide	1.589	1.632	1.674	1.717	1.762	1.808	1.854	1.902
Nitrogen Oxide	0.027	0.028	0.028	0.028	0.029	0.029	0.030	0.030
Methane from Wastewater	**Million Metric tons of CO_2 E**							
Domestic	0.59	0.60	0.60	0.61	0.62	0.62	0.63	0.64
Industrial	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05
Total Methane from Wastewater	**0.63**	**0.64**	**0.65**	**0.65**	**0.66**	**0.67**	**0.68**	**0.68**
Nitrogen Oxide from Wastewater	**0.53**	**0.54**	**0.55**	**0.56**	**0.56**	**0.57**	**0.58**	**0.58**
GASES SUMMARY								
Carbon dioxide	**1.59**	**1.63**	**1.67**	**1.72**	**1.76**	**1.81**	**1.85**	**1.90**
Methane	**4.11**	**4.14**	**4.16**	**4.19**	**4.21**	**4.24**	**4.26**	**4.29**
Nitrous Oxide	**0.56**	**0.57**	**0.58**	**0.58**	**0.59**	**0.60**	**0.61**	**0.62**
Total Emissions from Wastes	**6.26**	**6.34**	**6.41**	**6.49**	**6.57**	**6.64**	**6.72**	**6.80**

SECTOR SUMMARY

Source of Emissions	2018	2019	2020	2021	2022	2023	2024	2025
	Million Metric tons of CO_2 E							
Solid Wastes	5.09	5.16	5.22	5.28	5.34	5.41	5.47	5.54
Wastewater	1.17	1.18	1.20	1.21	1.22	1.24	1.25	1.27
Total Waste Management	**6.26**	**6.34**	**6.41**	**6.49**	**6.57**	**6.65**	**6.73**	**6.81**

Table B.10: Emissions from Agriculture

Emission Source	2000	2001	2002	2003	2004	2005	2006	2007	2008
	Million Metric Tons of CO_2 E								
Enteric Fermentation	**1.860**	**1.926**	**1.938**	**1.909**	**1.836**	**1.836**	**1.841**	**1.859**	**1.873**
Manure Management	Million Metric Tons of CO_2 E								
CH_4	0.297	0.300	0.302	0.296	0.278	0.063	0.305	0.318	0.320
N_2O	0.362	0.355	0.325	0.338	0.326	0.541	0.364	0.369	0.371
Manure Management Total	**0.659**	**0.655**	**0.627**	**0.634**	**0.604**	**0.604**	**0.669**	**0.686**	**0.691**
Agriculture Soils	Million Metric Tons of CO_2 E								
Nitrous Oxide from Ag. Soils	**3.571**	**3.542**	**3.463**	**3.494**	**3.444**	**3.380**	**3.029**	**3.527**	**3.524**
Residue burning	Million Metric Tons of CO_2 E								
Methane	0.004	0.004	0.002	0.003	0.004	0.007	0.006	0.011	0.011
Nitrous Oxide	0.003	0.002	0.002	0.002	0.003	0.003	0.006	0.007	0.007
Residue burning Total	**0.007**	**0.006**	**0.004**	**0.005**	**0.007**	**0.010**	**0.012**	**0.017**	**0.018**
GASES SUMMARY									
Total Methane	**2.16**	**2.23**	**2.24**	**2.21**	**2.12**	**1.91**	**2.15**	**2.19**	**2.20**
Total Nitrous Oxide	**3.94**	**3.90**	**3.79**	**3.83**	**3.77**	**3.92**	**3.40**	**3.90**	**3.90**
Total Emissions	**6.10**	**6.13**	**6.03**	**6.04**	**5.89**	**5.83**	**5.55**	**6.09**	**6.11**
SECTOR SUMMARY									
Source of Emissions	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Livestock Rearing	2.52	2.58	2.57	2.54	2.44	2.44	2.51	2.55	2.56
Crops Harvest	3.58	3.55	3.47	3.50	3.45	3.39	3.04	3.54	3.54
Total Agriculture	**6.10**	**6.13**	**6.03**	**6.04**	**5.89**	**5.83**	**5.55**	**6.09**	**6.11**

Table B.10 (Contd.): Emissions from Agriculture

Emission Source	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Million Metric Tons of CO_2 E								
Enteric Fermentation	**1.887**	**1.896**	**1.903**	**1.911**	**1.914**	**1.912**	**1.900**	**1.896**	**1.893**
Manure Management	Million Metric Tons of CO_2 E								
CH_4	0.322	0.324	0.326	0.328	0.329	0.330	0.331	0.333	0.334
N_2O	0.373	0.376	0.378	0.381	0.383	0.385	0.388	0.391	0.393
Manure Management Total	**0.696**	**0.700**	**0.704**	**0.708**	**0.712**	**0.715**	**0.719**	**0.723**	**0.727**
Agriculture Soils	Million Metric Tons of CO_2 E								
Nitrous Oxide from Ag. Soils	**3.521**	**3.518**	**3.515**	**3.512**	**3.509**	**3.506**	**3.503**	**3.500**	**3.497**
Residue burning	Million Metric Tons of CO_2 E								
Methane	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.012	0.012
Nitrous Oxide	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.008
Residue burning Total	**0.018**	**0.018**	**0.018**	**0.019**	**0.019**	**0.019**	**0.019**	**0.020**	**0.020**
GASES SUMMARY									
Total Methane	**2.22**	**2.23**	**2.24**	**2.25**	**2.25**	**2.25**	**2.24**	**2.24**	**2.24**
Total Nitrous Oxide	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**
Total Emissions	**6.12**	**6.13**	**6.14**	**6.15**	**6.15**	**6.15**	**6.14**	**6.14**	**6.14**
SECTOR SUMMARY									
Source of Emissions	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Livestock Rearing	2.58	2.60	2.61	2.62	2.63	2.63	2.62	2.62	2.62
Crops Harvest	3.54	3.54	3.53	3.53	3.53	3.53	3.52	3.52	3.52
Total Agriculture	**6.12**	**6.13**	**6.14**	**6.15**	**6.15**	**6.15**	**6.14**	**6.14**	**6.14**

Table B.10 (Contd.): Emissions from Agriculture

Emission Source	2018	2019	2020	2021	2022	2023	2024	2025
	Million Metric Tons of CO_2 E							
Enteric Fermentation	**1.889**	**1.886**	**1.882**	**1.879**	**1.875**	**1.872**	**1.869**	**1.865**
Manure Management	Million Metric Tons of CO_2 E							
CH_4	0.335	0.337	0.338	0.339	0.341	0.342	0.344	0.345
N_2O	0.396	0.398	0.401	0.403	0.406	0.409	0.411	0.414
Manure Management Total	**0.731**	**0.735**	**0.739**	**0.743**	**0.747**	**0.751**	**0.755**	**0.759**
Agriculture Soils	Million Metric Tons of CO_2 E							
Nitrous Oxide from Ag. Soils	**3.494**	**3.492**	**3.489**	**3.486**	**3.483**	**3.480**	**3.477**	**3.474**
Residue burning	Million Metric Tons of CO_2 E							
Methane	0.012	0.013	0.013	0.013	0.013	0.013	0.013	0.013
Nitrous Oxide	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Residue burning Total	**0.020**	**0.020**	**0.021**	**0.021**	**0.021**	**0.021**	**0.022**	**0.022**
GASES SUMMARY								
Total Methane	**2.24**	**2.24**	**2.23**	**2.23**	**2.23**	**2.23**	**2.23**	**2.22**
Total Nitrous Oxide	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**
Total Emissions	**6.14**	**6.13**	**6.13**	**6.13**	**6.13**	**6.12**	**6.12**	**6.12**
SECTOR SUMMARY								
Source of Emissions	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Livestock Rearing	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62
Crops Harvest	3.51	3.51	3.51	3.51	3.50	3.50	3.50	3.50
Total Agriculture	**6.14**	**6.13**	**6.13**	**6.13**	**6.13**	**6.12**	**6.12**	**6.12**

Table B.11: Emissions Summary by Source

Source/Sector	From Table	2000	2001	2002	2003	2004	2005	2006	2007	2008
		Million Metric tons of Carbon Dioxide								
1. Energy										
1.1 Combustion										
Residential (CO_2)	B.1	8.28	7.52	7.33	8.31	8.41	8.50	7.91	8.06	8.18
Residential (CH_4)	B.2	0.10	0.07	0.07	0.07	0.07	0.07	0.07	0.10	0.10
Residential (N_2O)	B.3	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03
1.1.1 Residential		**8.40**	**7.61**	**7.42**	**8.40**	**8.51**	**8.59**	**8.01**	**8.19**	**8.31**
Commercial (CO_2)	B.1	5.73	5.23	4.89	5.55	5.45	5.49	5.51	5.41	5.67
Commercial (CH_4)	B.2	0.07	0.07	0.06	0.07	0.08	0.09	0.09	0.09	0.10
Commercial (N_2O)	B.3	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
1.1.2 Commercial		**5.82**	**5.32**	**4.97**	**5.65**	**5.56**	**5.60**	**5.62**	**5.53**	**5.80**
Industrial (CO_2)	B.1	17.66	17.49	17.26	18.30	18.77	18.74	19.04	18.13	18.25
Industrial (CH_4)	B.2	0.07	0.06	0.05	0.06	0.06	0.07	0.07	0.08	0.08
Industrial (N_2O)	B.3	0.13	0.11	0.09	0.11	0.12	0.13	0.13	0.15	0.15
1.1.3 Industrial		**17.86**	**17.66**	**17.40**	**18.47**	**18.95**	**18.93**	**19.24**	**18.35**	**18.48**
Power (CO_2)	B.1	42.30	41.84	40.89	40.56	40.27	41.03	36.80	40.68	41.77
Power (CH_4)	B.2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Power (N_2O)	B.3	0.19	0.19	0.20	0.19	0.19	0.19	0.17	0.19	0.19
1.1.4 Power (Generation)		**42.51**	**42.05**	**41.10**	**40.76**	**40.47**	**41.24**	**36.98**	**40.88**	**41.98**
Transportation (CO_2)	B.1	46.92	46.91	47.08	48.82	51.34	53.51	53.79	55.55	57.31
Transportation (CH_4)	B.4	0.08	0.08	0.07	0.07	0.06	0.06	0.02	0.02	0.02
Transportation (N_2O)	B.5	1.27	1.15	1.17	1.07	0.99	0.95	0.25	0.37	0.35
1.1.5 Transportation		**48.27**	**48.14**	**48.32**	**49.95**	**52.38**	**54.52**	**54.05**	**55.94**	**57.68**
Combustion Total		**122.86**	**120.77**	**119.21**	**123.24**	**125.87**	**128.88**	**123.90**	**128.89**	**132.25**
1.2 Energy Production										
1.2.1 Coal Mining (CH_4)	**B.7**	**6.04**	**5.65**	**5.58**	**5.01**	**5.58**	**4.47**	**4.48**	**5.07**	**5.51**
1.2.1 Oil & Gas (CH_4)	**B.7**	**0.31**	**0.36**	**0.35**	**0.36**	**0.40**	**0.43**	**0.38**	**0.38**	**0.38**
Energy Sector Total		**129.21**	**126.77**	**125.14**	**128.61**	**131.85**	**133.78**	**128.76**	**134.34**	**138.14**
2. Industrial Processes										
2.1 Industrial (CO_2)	B.8	1.68	0.99	0.98	0.94	1.01	1.00	3.59	3.46	3.33
2.2 Industrial (F Compds.)	B.8	2.47	2.67	2.87	3.09	3.33	3.32	0.99	1.06	1.14
Industrial Processes Total	**B.8**	**4.15**	**3.66**	**3.86**	**4.03**	**4.33**	**4.33**	**2.32**	**4.52**	**4.47**
3. Waste Management										
Solid Wastes (CO_2)	B.9	0.51	0.86	1.22	1.07	0.92	0.92	1.08	1.12	1.17
Solid Wastes (CH_4)	B.9	3.76	4.08	3.90	3.69	2.94	3.97	3.01	3.07	3.12
Solid Wastes (N_2O)	B.9	0.01	0.02	0.03	0.02	0.02	1.04	0.02	0.02	0.02
Solid Wastes Total		**4.28**	**4.95**	**5.15**	**4.79**	**3.88**	**5.93**	**4.11**	**4.21**	**4.31**
Wastewater (CH_4)	B.9	0.51	0.52	0.53	0.53	0.53	0.62	0.55	0.55	0.56
Wastewater (N_2O)	B.9	0.41	0.42	0.42	0.43	0.44	0.44	0.45	0.46	0.46
Wastewater Total		**0.93**	**0.94**	**0.95**	**0.96**	**0.97**	**1.07**	**1.00**	**1.01**	**1.03**
4. Agriculture										
Livestock (CH_4)	B.10	2.16	2.23	2.24	2.20	2.11	1.90	2.15	2.18	2.19
Live Stock (N_2O)	B.10	0.36	0.36	0.33	0.34	0.33	0.54	0.36	0.37	0.37
Live Stock total		**2.52**	**2.58**	**2.57**	**2.54**	**2.44**	**2.44**	**2.51**	**2.55**	**2.56**
Residue burning (CH_4)	B.10	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Crops Harvest (N_2O)	B.10	3.57	3.54	3.46	3.50	3.45	3.38	3.04	3.53	3.53
Crops Harvest Total		**3.58**	**3.55**	**3.47**	**3.50**	**3.45**	**3.39**	**3.04**	**3.54**	**3.54**
All Emission (Production)		**144.66**	**142.45**	**141.12**	**144.42**	**146.92**	**150.93**	**141.74**	**150.18**	**154.04**
Power (Imported)	B.1	**17.97**	**22.86**	**21.99**	**22.42**	**21.18**	**23.93**	**26.08**	**26.65**	**28.06**
All Emissions (Consumption)		**162.63**	**165.31**	**163.11**	**166.84**	**168.10**	**174.86**	**167.82**	**176.83**	**182.10**

Table B.11 (Contd.): Emissions Summary by Source

Source/Sector	From Table	2009	2010	2011	2012	2013	2014	2015	2016	2017
		Million Metric tons of Carbon Dioxide								
1. Energy										
1.1 Combustion										
Residential (CO_2)	B.1	8.21	8.27	8.34	8.43	8.46	8.49	8.51	8.54	8.51
Residential (CH_4)	B.2	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11
Residential (N_2O)	B.3	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
1.1.1 Residential		**8.34**	**8.40**	**8.48**	**8.56**	**8.59**	**8.62**	**8.64**	**8.68**	**8.65**
Commercial (CO_2)	B.1	5.84	5.97	6.15	6.32	6.48	6.62	6.75	6.86	6.96
Commercial (CH_4)	B.2	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.14
Commercial (N_2O)	B.3	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
1.1.2 Commercial		**5.97**	**6.10**	**6.28**	**6.46**	**6.63**	**6.77**	**6.91**	**7.02**	**7.13**
Industrial (CO_2)	B.1	18.32	18.47	18.57	18.72	18.89	19.10	19.27	19.50	19.70
Industrial (CH_4)	B.2	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09
Industrial (N_2O)	B.3	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16
1.1.3 Industrial		**18.54**	**18.70**	**18.80**	**18.95**	**19.13**	**19.34**	**19.51**	**19.75**	**19.95**
Power (CO_2)	B.1	43.51	44.34	46.26	48.11	52.02	52.02	52.02	52.02	52.02
Power (CH_4)	B.2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Power (N_2O)	B.3	0.20	0.20	0.21	0.21	0.23	0.23	0.23	0.23	0.23
1.1.4 Power (Generation)		**43.72**	**44.55**	**46.48**	**48.33**	**52.26**	**52.26**	**52.26**	**52.26**	**52.26**
Transportation (CO_2)	B.1	59.07	60.83	62.36	63.88	65.41	66.93	68.46	70.04	71.61
Transportation (CH_4)	B.4	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Transportation (N_2O)	B.5	0.32	0.29	0.29	0.28	0.28	0.27	0.27	0.26	0.25
1.1.5 Transportation		**59.41**	**61.14**	**62.67**	**64.18**	**65.71**	**67.22**	**68.75**	**70.32**	**71.88**
Combustion Total		**135.98**	**138.89**	**142.71**	**146.48**	**152.32**	**154.21**	**156.07**	**158.03**	**159.87**
1.2 Energy Production										
1.2.1 Coal Mining (CH_4)	**B.7**	**5.95**	**6.39**	**6.37**	**6.35**	**6.34**	**6.32**	**6.30**	**6.25**	**6.20**
1.2.1 Oil & Gas (CH_4)	**B.7**	**0.39**	**0.39**	**0.39**	**0.39**	**0.39**	**0.40**	**0.40**	**0.40**	**0.40**
Energy Sector Total		**142.32**	**145.67**	**149.47**	**153.22**	**159.05**	**160.93**	**162.77**	**164.68**	**166.47**
2. Industrial Processes										
2.1 Industrial (CO_2)	B.8	3.20	3.07	2.94	2.81	2.68	2.55	2.42	2.29	2.16
2.2 Industrial (F Compds.)	B.8	1.25	1.35	1.44	1.53	1.61	1.71	1.81	1.90	1.99
Industrial Processes Total	**B.8**	**4.45**	**4.42**	**4.38**	**4.34**	**4.29**	**4.26**	**4.23**	**4.19**	**4.15**
3. Waste Management										
Solid Wastes (CO_2)	B.9	1.21	1.25	1.29	1.34	1.38	1.42	1.46	1.50	1.55
Solid Wastes (CH_4)	B.9	3.17	3.21	3.26	3.30	3.33	3.37	3.40	3.43	3.45
Solid Wastes (N_2O)	B.9	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03
Solid Wastes Total		**4.40**	**4.49**	**4.57**	**4.66**	**4.74**	**4.81**	**4.89**	**4.96**	**5.03**
Wastewater (CH_4)	B.9	0.57	0.58	0.58	0.59	0.60	0.60	0.61	0.62	0.63
Wastewater (N_2O)	B.9	0.47	0.48	0.49	0.49	0.50	0.51	0.51	0.52	0.53
Wastewater Total		**1.04**	**1.05**	**1.07**	**1.08**	**1.10**	**1.11**	**1.12**	**1.14**	**1.15**
4. Agriculture										
Livestock (CH_4)	B.10	2.21	2.22	2.23	2.24	2.24	2.24	2.23	2.23	2.23
Live Stock (N_2O)	B.10	0.37	0.38	0.38	0.38	0.38	0.39	0.39	0.39	0.39
Live Stock total		**2.58**	**2.60**	**2.61**	**2.62**	**2.63**	**2.63**	**2.62**	**2.62**	**2.62**
Residue burning (CH_4)	B.10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Crops Harvest (N_2O)	B.10	3.53	3.53	3.52	3.52	3.52	3.51	3.51	3.51	3.51
Crops Harvest Total		**3.54**	**3.54**	**3.53**	**3.53**	**3.53**	**3.53**	**3.52**	**3.52**	**3.52**
All Emission (Production)		**158.32**	**161.76**	**165.62**	**169.46**	**175.32**	**177.26**	**179.15**	**181.09**	**182.93**
Power (Imported)	B.1	**28.15**	**29.54**	**28.53**	**27.59**	**26.62**	**28.00**	**29.43**	**24.72**	**26.08**
All Emissions (Consumption)		**186.47**	**191.30**	**194.15**	**197.05**	**201.94**	**205.26**	**208.58**	**205.81**	**209.01**

Table B.11 (Contd.): Emissions Summary by Source

Source/Sector	From Table	2018	2019	2020	2021	2022	2023	2024	2025
		Million Metric tons of Carbon Dioxide							
1. Energy									
1.1 Combustion									
Residential (CO_2)	B.1	8.51	8.52	8.54	8.57	8.60	8.63	8.66	8.69
Residential (CH_4)	B.2	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Residential (N_2O)	B.3	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
1.1.1 Residential		**8.65**	**8.65**	**8.68**	**8.70**	**8.73**	**8.76**	**8.79**	**8.83**
Commercial (CO_2)	B.1	7.06	7.17	7.29	7.41	7.53	7.65	7.78	7.91
Commercial (CH_4)	B.2	0.14	0.14	0.14	0.15	0.15	0.15	0.16	0.16
Commercial (N_2O)	B.3	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04
1.1.2 Commercial		**7.24**	**7.34**	**7.47**	**7.59**	**7.71**	**7.84**	**7.97**	**8.11**
Industrial (CO_2)	B.1	19.90	20.15	20.44	20.73	21.03	21.34	21.66	21.98
Industrial (CH_4)	B.2	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Industrial (N_2O)	B.3	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.17
1.1.3 Industrial		**20.15**	**20.40**	**20.69**	**20.99**	**21.29**	**21.60**	**21.92**	**22.25**
Power (CO_2)	B.1	52.02	52.02	52.02	52.02	52.02	52.02	52.02	52.02
Power (CH_4)	B.2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Power (N_2O)	B.3	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
1.1.4 Power (Generation)		**52.26**	**52.26**	**52.26**	**52.26**	**52.26**	**52.26**	**52.26**	**52.26**
Transportation (CO_2)	B.1	73.19	74.76	76.34	76.69	77.03	77.38	77.72	78.07
Transportation (CH_4)	B.4	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Transportation (N_2O)	B.5	0.25	0.24	0.23	0.22	0.22	0.21	0.21	0.20
1.1.5 Transportation		**73.46**	**75.02**	**76.59**	**76.93**	**77.27**	**77.61**	**77.95**	**78.29**
Combustion Total		**161.76**	**163.67**	**165.69**	**166.47**	**167.26**	**168.07**	**168.89**	**169.74**
1.2 Energy Production									
1.2.1 Coal Mining (CH_4)	**B.7**	**6.14**	**6.09**	**6.04**	**5.99**	**5.94**	**5.88**	**5.83**	**5.78**
1.2.1 Oil & Gas (CH_4)	**B.7**	**0.41**	**0.41**	**0.41**	**0.42**	**0.42**	**0.42**	**0.42**	**0.43**
Energy Sector Total		**168.31**	**170.17**	**172.14**	**172.88**	**173.62**	**174.37**	**175.14**	**175.95**
2. Industrial Processes									
2.1 Industrial (CO_2)	B.8	2.03	1.90	1.77	1.67	1.59	1.53	1.48	1.44
2.2 Industrial (F Compds.)	B.8	2.09	2.19	2.29	2.40	2.51	2.63	2.75	2.89
Industrial Processes Total	**B.8**	**4.12**	**4.09**	**4.06**	**4.07**	**4.10**	**4.16**	**4.23**	**4.33**
3. Waste Management									
Solid Wastes (CO_2)	B.9	1.59	1.63	1.67	1.72	1.76	1.81	1.85	1.90
Solid Wastes (CH4)	B.9	3.48	3.50	3.51	3.53	3.55	3.57	3.59	3.61
Solid Wastes (N_2O)	B.9	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Solid Wastes Total		**5.09**	**5.16**	**5.22**	**5.28**	**5.34**	**5.41**	**5.47**	**5.54**
Wastewater (CH4)	B.9	0.63	0.64	0.65	0.65	0.66	0.67	0.68	0.68
Wastewater (N2O)	B.9	0.53	0.54	0.55	0.56	0.56	0.57	0.58	0.58
Wastewater Total		**1.17**	**1.18**	**1.20**	**1.21**	**1.22**	**1.24**	**1.25**	**1.27**
4. Agriculture									
Livestock (CH4)	B.10	2.22	2.22	2.22	2.22	2.22	2.21	2.21	2.21
Live Stock (N2O)	B.10	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41
Live Stock total		**2.62**	**2.62**	**2.62**	**2.62**	**2.62**	**2.62**	**2.62**	**2.62**
Residue burning (CH_4)	B.10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Crops Harvest (N_2O)	B.10	3.50	3.50	3.50	3.49	3.49	3.49	3.49	3.48
Crops Harvest Total		**3.51**	**3.51**	**3.51**	**3.51**	**3.50**	**3.50**	**3.50**	**3.50**
All Emission (Production)		**184.81**	**186.74**	**188.73**	**189.56**	**190.40**	**191.31**	**192.22**	**193.20**
Power (Imported)	B.1	**27.43**	**28.77**	**30.10**	**31.43**	**32.74**	**34.05**	**35.35**	**36.64**
All Emissions (Consumption)		**212.24**	**215.51**	**218.83**	**220.99**	**223.14**	**225.36**	**227.57**	**229.84**

Table B.12: Emissions Summary by Gases

Source/Sector	From Table	2000	2001	2002	2003	2004	2005	2006	2007	2008
		Million Metric tons of Carbon Dioxide								
Carbon Dioxide										
Residential	**B.1**	8.28	7.52	7.33	8.31	8.41	8.50	7.91	8.06	8.18
Commercial	**B.1**	5.73	5.23	4.89	5.55	5.45	5.49	5.51	5.41	5.67
Industrial	**B.1**	17.66	17.49	17.26	18.30	18.77	18.74	19.04	18.13	18.25
Power	**B.1**	42.30	41.84	40.89	40.56	40.27	41.03	36.80	40.68	41.77
Transportation	**B.1**	46.92	46.91	47.08	48.82	51.34	53.51	53.79	55.55	57.31
Industrial Processes	**B.8**	1.68	0.99	0.98	0.94	1.01	1.00	3.59	3.46	3.33
Solid Wastes	**B.9**	0.51	0.86	1.22	1.07	0.92	0.92	1.08	1.12	1.17
Carbon Dioxide Total		**123.08**	**120.84**	**119.65**	**123.55**	**126.16**	**129.18**	**127.73**	**132.41**	**135.68**
Methane										
Residential	**B.2**	0.10	0.07	0.07	0.07	0.07	0.07	0.07	0.10	0.10
Commercial	**B.2**	0.07	0.07	0.06	0.07	0.08	0.09	0.09	0.09	0.10
Industrial	**B.2**	0.07	0.06	0.05	0.06	0.06	0.07	0.07	0.08	0.08
Power	**B.2**	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Transportation	**B.4**	0.08	0.08	0.07	0.07	0.06	0.06	0.02	0.02	0.02
Coal mining	**B.7**	6.04	5.65	5.58	5.01	5.58	4.47	4.48	5.07	5.51
Oil & Gas	**B.7**	0.31	0.36	0.35	0.36	0.40	0.43	0.38	0.38	0.38
Solid Wastes	**B.9**	3.76	4.08	3.90	3.69	2.94	3.97	3.01	3.07	3.12
Wastewater	**B.9**	0.51	0.52	0.53	0.53	0.53	0.62	0.55	0.55	0.56
Livestock	**B.10**	2.16	2.23	2.24	2.20	2.11	1.90	2.15	2.18	2.19
Residue burning	**B.10**	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Methane Total		**13.12**	**13.12**	**12.86**	**12.09**	**11.86**	**11.70**	**10.82**	**11.57**	**12.09**
Nitrous Oxide										
Residential	**B.3**	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03
Commercial	**B.3**	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Industrial	**B.3**	0.13	0.11	0.09	0.11	0.12	0.13	0.13	0.15	0.15
Power	**B.3**	0.19	0.19	0.20	0.19	0.19	0.19	0.17	0.19	0.19
Transportation	**B.5**	1.27	1.15	1.17	1.07	0.99	0.95	0.25	0.37	0.35
Solid Wastes	**B.9**	0.01	0.02	0.03	0.02	0.02	1.04	0.02	0.02	0.02
Wastewater	**B.9**	0.41	0.42	0.42	0.43	0.44	0.44	0.45	0.46	0.46
Live Stock	**B.10**	0.36	0.36	0.33	0.34	0.33	0.54	0.36	0.37	0.37
Crops Harvest	**B.10**	3.57	3.54	3.46	3.50	3.45	3.38	3.04	3.53	3.53
Nitrous Oxide Total		**6.00**	**5.83**	**5.73**	**5.70**	**5.57**	**6.72**	**4.46**	**5.14**	**5.13**
Fluorine compounds	**B.8**	**2.47**	**2.67**	**2.87**	**3.09**	**3.33**	**3.32**	**0.99**	**1.06**	**1.14**
All Gases (Production)		**144.66**	**142.45**	**141.12**	**144.42**	**146.92**	**150.93**	**144.00**	**150.18**	**154.04**
Imported Power (CO_2)	**B.1**	**17.97**	**22.86**	**21.99**	**22.42**	**21.18**	**23.93**	**26.08**	**26.65**	**28.06**
All Gases (Consumption)		**162.63**	**165.31**	**163.11**	**166.84**	**168.10**	**174.86**	**170.08**	**176.83**	**182.10**

Table B.12 (Contd.): Emissions Summary by Gases

Source/Sector	From Table	2009	2010	2011	2012	2013	2014	2015	2016	2017
		Million Metric tons of Carbon Dioxide								
Carbon Dioxide										
Residential	**B.1**	8.21	8.27	8.34	8.43	8.46	8.49	8.51	8.54	8.51
Commercial	**B.1**	5.84	5.97	6.15	6.32	6.48	6.62	6.75	6.86	6.96
Industrial	**B.1**	18.32	18.47	18.57	18.72	18.89	19.10	19.27	19.50	19.70
Power	**B.1**	43.51	44.34	46.26	48.11	52.02	52.02	52.02	52.02	52.02
Transportation	**B.1**	59.07	60.83	62.36	63.88	65.41	66.93	68.46	70.04	71.61
Industrial Processes	**B.8**	3.20	3.07	2.94	2.81	2.68	2.55	2.42	2.29	2.16
Solid Wastes	**B.9**	1.21	1.25	1.29	1.34	1.38	1.42	1.46	1.50	1.55
Carbon Dioxide Total		**139.36**	**142.20**	**145.91**	**149.61**	**155.32**	**157.13**	**158.89**	**160.75**	**162.51**
Methane										
Residential	**B.2**	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11
Commercial	**B.2**	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.14
Industrial	**B.2**	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09
Power	**B.2**	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Transportation	**B.4**	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Coal mining	**B.7**	5.95	6.39	6.37	6.35	6.34	6.32	6.30	6.25	6.20
Oil & Gas	**B.7**	0.39	0.39	0.39	0.39	0.39	0.40	0.40	0.40	0.40
Solid Wastes	**B.9**	3.17	3.21	3.26	3.30	3.33	3.37	3.40	3.43	3.45
Wastewater	**B.9**	0.57	0.58	0.58	0.59	0.60	0.60	0.61	0.62	0.63
Livestock	**B.10**	2.21	2.22	2.23	2.24	2.24	2.24	2.23	2.23	2.23
Residue burning	**B.10**	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Methane Total		**12.60**	**13.11**	**13.16**	**13.21**	**13.25**	**13.28**	**13.30**	**13.29**	**13.28**
Nitrous Oxide										
Residential	**B.3**	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Commercial	**B.3**	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Industrial	**B.3**	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16
Power	**B.3**	0.20	0.20	0.21	0.21	0.23	0.23	0.23	0.23	0.23
Transportation	**B.5**	0.32	0.29	0.29	0.28	0.28	0.27	0.27	0.26	0.25
Solid Wastes	**B.9**	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03
Wastewater	**B.9**	0.47	0.48	0.49	0.49	0.50	0.51	0.51	0.52	0.53
Live Stock	**B.10**	0.37	0.38	0.38	0.38	0.38	0.39	0.39	0.39	0.39
Crops Harvest	**B.10**	3.53	3.53	3.52	3.52	3.52	3.51	3.51	3.51	3.51
Nitrous Oxide Total		**5.11**	**5.10**	**5.11**	**5.11**	**5.14**	**5.14**	**5.15**	**5.15**	**5.15**
Fluorine compounds	**B.8**	**1.25**	**1.35**	**1.44**	**1.53**	**1.61**	**1.71**	**1.81**	**1.90**	**1.99**
All Gases (Production)		**158.32**	**161.76**	**165.62**	**169.46**	**175.32**	**177.26**	**179.15**	**181.09**	**182.93**
Imported Power (CO_2)	**B.1**	**28.15**	**29.54**	**28.53**	**27.59**	**26.62**	**28.00**	**29.43**	**24.72**	**26.08**
All Gases (Consumption)		**186.47**	**191.30**	**194.15**	**197.05**	**201.94**	**205.26**	**208.58**	**205.81**	**209.01**

Table B.12 (Contd.): Emissions Summary by Gases

Source/Sector	From Table	2018	2019	2020	2021	2022	2023	2024	2025
		Million Metric tons of Carbon Dioxide							
Carbon Dioxide									
Residential	**B.1**	8.51	8.52	8.54	8.57	8.60	8.63	8.66	8.69
Commercial	**B.1**	7.06	7.17	7.29	7.41	7.53	7.65	7.78	7.91
Industrial	**B.1**	19.90	20.15	20.44	20.73	21.03	21.34	21.66	21.98
Power	**B.1**	52.02	52.02	52.02	52.02	52.02	52.02	52.02	52.02
Transportation	**B.1**	79.24	81.29	83.29	85.38	87.48	89.69	91.78	93.88
Industrial Processes	**B.8**	2.03	1.90	1.77	1.67	1.59	1.53	1.48	1.44
Solid Wastes	**B.9**	1.59	1.63	1.67	1.72	1.76	1.81	1.85	1.90
Carbon Dioxide Total		**170.36**	**172.67**	**175.02**	**177.49**	**180.01**	**182.66**	**185.23**	**187.83**
Methane									
Residential	**B.2**	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Commercial	**B.2**	0.14	0.14	0.14	0.15	0.15	0.15	0.16	0.16
Industrial	**B.2**	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Power	**B.2**	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Transportation	**B.4**	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Coal mining	**B.7**	6.14	6.09	6.04	5.99	5.94	5.88	5.83	5.78
Oil & Gas	**B.7**	0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.43
Solid Wastes	**B.9**	3.48	3.50	3.51	3.53	3.55	3.57	3.59	3.61
Wastewater	**B.9**	0.63	0.64	0.65	0.65	0.66	0.67	0.68	0.68
Livestock	**B.10**	2.22	2.22	2.22	2.22	2.22	2.21	2.21	2.21
Residue burning	**B.10**	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Methane Total		**13.26**	**13.24**	**13.21**	**13.19**	**13.17**	**13.15**	**13.13**	**13.12**
Nitrous Oxide									
Residential	**B.3**	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Commercial	**B.3**	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04
Industrial	**B.3**	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.17
Power	**B.3**	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Transportation	**B.5**	0.25	0.24	0.23	0.22	0.22	0.21	0.21	0.20
Solid Wastes	**B.9**	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Wastewater	**B.9**	0.53	0.54	0.55	0.56	0.56	0.57	0.58	0.58
Live Stock	**B.10**	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41
Crops Harvest	**B.10**	3.50	3.50	3.50	3.49	3.49	3.49	3.49	3.48
Nitrous Oxide Total		**5.16**	**5.16**	**5.16**	**5.16**	**5.16**	**5.17**	**5.17**	**5.18**
Fluorine compounds	**B.8**	**2.09**	**2.19**	**2.29**	**2.40**	**2.51**	**2.63**	**2.75**	**2.89**
All Gases (Production)		**184.81**	**186.74**	**188.73**	**189.56**	**190.40**	**191.31**	**192.22**	**193.20**
Imported Power (CO_2)	**B.1**	**27.43**	**28.77**	**30.10**	**31.43**	**32.74**	**34.05**	**35.35**	**36.64**
All Gases (Consumption)		**212.24**	**215.51**	**218.83**	**220.99**	**223.14**	**225.36**	**227.57**	**229.84**