

# Appendixes

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Appendix A  
**Reference Case**

**Table A1. Total Energy Supply and Disposition Summary**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Production</b>								
Crude Oil and Lease Condensate .....	10.80	10.73	12.19	12.40	14.06	15.63	15.96	1.7%
Natural Gas Plant Liquids .....	2.36	2.41	2.58	2.55	2.57	2.62	2.61	0.3%
Dry Natural Gas .....	18.99	19.84	20.95	20.88	22.08	23.87	24.26	0.9%
Coal <sup>1</sup> .....	23.79	23.50	24.21	24.49	24.43	25.11	26.93	0.6%
Nuclear Power .....	8.21	8.41	8.45	8.68	8.99	9.04	9.47	0.5%
Hydropower .....	2.87	2.46	2.67	2.94	2.95	2.96	2.97	0.8%
Biomass <sup>2</sup> .....	2.97	3.23	4.20	5.18	6.52	7.83	8.25	4.2%
Other Renewable Energy <sup>3</sup> .....	0.88	0.97	1.54	1.63	1.74	1.95	2.19	3.6%
Other <sup>4</sup> .....	0.42	0.94	0.85	1.08	1.07	1.07	1.15	0.9%
<b>Total</b> .....	<b>71.29</b>	<b>72.49</b>	<b>77.64</b>	<b>79.83</b>	<b>84.41</b>	<b>90.09</b>	<b>93.79</b>	<b>1.1%</b>
<b>Imports</b>								
Crude Oil .....	22.08	21.90	17.76	17.82	16.09	14.76	15.39	-1.5%
Liquid Fuels and Other Petroleum <sup>5</sup> .....	7.22	6.97	5.59	5.69	5.67	5.79	6.33	-0.4%
Natural Gas .....	4.29	4.72	3.27	3.60	3.37	3.12	2.58	-2.6%
Other Imports <sup>6</sup> .....	0.98	0.99	0.89	0.96	1.19	1.11	1.35	1.3%
<b>Total</b> .....	<b>34.57</b>	<b>34.59</b>	<b>27.51</b>	<b>28.07</b>	<b>26.31</b>	<b>24.79</b>	<b>25.65</b>	<b>-1.3%</b>
<b>Exports</b>								
Petroleum <sup>7</sup> .....	2.59	2.84	2.56	2.68	2.90	3.06	3.17	0.5%
Natural Gas .....	0.73	0.83	0.70	1.16	1.44	1.71	1.87	3.6%
Coal .....	1.26	1.51	2.05	1.65	1.33	1.34	1.08	-1.4%
<b>Total</b> .....	<b>4.58</b>	<b>5.17</b>	<b>5.31</b>	<b>5.49</b>	<b>5.66</b>	<b>6.11</b>	<b>6.12</b>	<b>0.7%</b>
<b>Discrepancy<sup>8</sup></b> .....	<b>1.26</b>	<b>0.01</b>	<b>-0.02</b>	<b>-0.46</b>	<b>-0.39</b>	<b>-0.29</b>	<b>-0.25</b>	<b>--</b>
<b>Consumption</b>								
Liquid Fuels and Other Petroleum <sup>9</sup> .....	40.63	40.75	37.89	38.86	38.93	39.84	41.60	0.1%
Natural Gas .....	22.26	23.70	23.20	23.40	24.09	25.36	25.04	0.2%
Coal <sup>10</sup> .....	22.46	22.74	22.91	23.59	23.98	24.45	26.56	0.7%
Nuclear Power .....	8.21	8.41	8.45	8.68	8.99	9.04	9.47	0.5%
Hydropower .....	2.87	2.46	2.67	2.94	2.95	2.96	2.97	0.8%
Biomass <sup>11</sup> .....	2.52	2.62	2.99	3.59	4.58	5.27	5.51	3.3%
Other Renewable Energy <sup>3</sup> .....	0.88	0.97	1.54	1.63	1.74	1.95	2.19	3.6%
Other <sup>12</sup> .....	0.19	0.23	0.21	0.19	0.19	0.18	0.22	-0.2%
<b>Total</b> .....	<b>100.02</b>	<b>101.89</b>	<b>99.85</b>	<b>102.87</b>	<b>105.44</b>	<b>109.05</b>	<b>113.56</b>	<b>0.5%</b>
<b>Prices (2007 dollars per unit)</b>								
Petroleum (dollars per barrel)								
Imported Low Sulfur Light Crude Oil Price <sup>13</sup> ...	67.82	72.33	80.16	110.49	115.45	121.94	130.43	2.6%
Imported Crude Oil Price <sup>13</sup> .....	60.70	63.83	77.56	108.52	112.05	115.33	124.60	3.0%
Natural Gas (dollars per million Btu)								
Price at Henry Hub .....	6.91	6.96	6.66	6.90	7.43	8.08	9.25	1.2%
Wellhead Price <sup>14</sup> .....	6.48	6.22	5.88	6.10	6.56	7.13	8.17	1.2%
Natural Gas (dollars per thousand cubic feet)								
Wellhead Price <sup>14</sup> .....	6.66	6.39	6.05	6.27	6.75	7.33	8.40	1.2%
Coal (dollars per ton)								
Minemouth Price <sup>15</sup> .....	25.29	25.82	29.45	28.71	27.90	28.45	29.10	0.5%
Coal (dollars per million Btu)								
Minemouth Price <sup>15</sup> .....	1.25	1.27	1.44	1.42	1.39	1.42	1.46	0.6%
Average Delivered Price <sup>16</sup> .....	1.83	1.86	1.99	2.02	1.99	2.02	2.08	0.5%
Average Electricity Price (cents per kilowatthour)	9.1	9.1	9.0	9.1	9.4	9.8	10.4	0.6%

## Reference Case

**Table A1. Total Energy Supply and Disposition Summary (Continued)**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Prices (nominal dollars per unit)</b>								
Petroleum (dollars per barrel)								
Imported Low Sulfur Light Crude Oil Price <sup>13</sup> . . .	66.04	72.33	84.42	127.84	149.14	168.24	189.10	4.3%
Imported Crude Oil Price <sup>13</sup> . . . . .	59.10	63.83	81.69	125.57	144.74	159.11	180.66	4.6%
Natural Gas (dollars per million Btu)								
Price at Henry Hub . . . . .	6.73	6.96	7.01	7.99	9.60	11.14	13.42	2.9%
Wellhead Price <sup>14</sup> . . . . .	6.31	6.22	6.19	7.06	8.48	9.84	11.85	2.8%
Natural Gas (dollars per thousand cubic feet)								
Wellhead Price <sup>14</sup> . . . . .	6.49	6.39	6.37	7.26	8.72	10.12	12.18	2.8%
Coal (dollars per ton)								
Minemouth Price <sup>15</sup> . . . . .	24.63	25.82	31.02	33.22	36.04	39.26	42.20	2.2%
Coal (dollars per million Btu)								
Minemouth Price <sup>15</sup> . . . . .	1.21	1.27	1.52	1.65	1.80	1.96	2.11	2.2%
Average Delivered Price <sup>16</sup> . . . . .	1.78	1.86	2.10	2.34	2.57	2.79	3.01	2.1%
Average Electricity Price (cents per kilowatthour)	8.9	9.1	9.5	10.5	12.2	13.6	15.1	2.2%

<sup>1</sup>Includes waste coal.

<sup>2</sup>Includes grid-connected electricity from wood and waste; biomass, such as corn, used for liquid fuels production; and non-electric energy demand from wood. Refer to Table A17 for details.

<sup>3</sup>Includes grid-connected electricity from landfill gas; biogenic municipal waste; wind; photovoltaic and solar thermal sources; and non-electric energy from renewable sources, such as active and passive solar systems. Excludes electricity imports using renewable sources and nonmarketed renewable energy. See Table A17 for selected nonmarketed residential and commercial renewable energy.

<sup>4</sup>Includes non-biogenic municipal waste, liquid hydrogen, methanol, and some domestic inputs to refineries.

<sup>5</sup>Includes imports of finished petroleum products, unfinished oils, alcohols, ethers, blending components, and renewable fuels such as ethanol.

<sup>6</sup>Includes coal, coal coke (net), and electricity (net).

<sup>7</sup>Includes crude oil and petroleum products.

<sup>8</sup>Balancing item. Includes unaccounted for supply, losses, gains, and net storage withdrawals.

<sup>9</sup>Includes petroleum-derived fuels and non-petroleum derived fuels, such as ethanol and biodiesel, and coal-based synthetic liquids. Petroleum coke, which is a solid, is included. Also included are natural gas plant liquids, crude oil consumed as a fuel, and liquid hydrogen. Refer to Table A17 for detailed renewable liquid fuels consumption.

<sup>10</sup>Excludes coal converted to coal-based synthetic liquids.

<sup>11</sup>Includes grid-connected electricity from wood and wood waste, non-electric energy from wood, and biofuels heat and coproducts used in the production of liquid fuels, but excludes the energy content of the liquid fuels.

<sup>12</sup>Includes non-biogenic municipal waste and net electricity imports.

<sup>13</sup>Weighted average price delivered to U.S. refiners.

<sup>14</sup>Represents lower 48 onshore and offshore supplies.

<sup>15</sup>Includes reported prices for both open market and captive mines.

<sup>16</sup>Prices weighted by consumption; weighted average excludes residential and commercial prices, and export free-alongside-ship (f.a.s.) prices.

Btu = British thermal unit.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

**Sources:** 2006 natural gas supply values: Energy Information Administration (EIA), *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007). 2007 natural gas supply values and natural gas wellhead price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2006 natural gas wellhead price: Minerals Management Service and EIA, *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007). 2006 and 2007 coal minemouth and delivered coal prices: EIA, *Annual Coal Report 2007*, DOE/EIA-0584(2007) (Washington, DC, September 2008). 2007 petroleum supply values and 2006 crude oil and lease condensate production: EIA, *Petroleum Supply Annual 2007*, DOE/EIA-0340(2007)/1 (Washington, DC, July 2008). Other 2006 petroleum supply values: EIA, *Petroleum Supply Annual 2006*, DOE/EIA-0340(2006)/1 (Washington, DC, September 2007). 2006 and 2007 low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2006 and 2007 coal values: *Quarterly Coal Report, October-December 2007*, DOE/EIA-0121(2007/4Q) (Washington, DC, March 2008). Other 2006 and 2007 values: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008).

**Projections:** EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

**Table A2. Energy Consumption by Sector and Source**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Energy Consumption</b>								
<b>Residential</b>								
Liquefied Petroleum Gases .....	0.49	0.50	0.49	0.48	0.49	0.50	0.52	0.2%
Kerosene .....	0.07	0.08	0.08	0.07	0.07	0.07	0.07	-0.5%
Distillate Fuel Oil .....	0.71	0.78	0.72	0.64	0.60	0.55	0.51	-1.8%
Liquid Fuels and Other Petroleum Subtotal .	1.27	1.35	1.29	1.19	1.16	1.13	1.10	-0.9%
Natural Gas .....	4.49	4.86	4.92	5.01	5.10	5.13	5.07	0.2%
Coal .....	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-0.8%
Renewable Energy <sup>1</sup> .....	0.39	0.43	0.43	0.46	0.48	0.49	0.50	0.7%
Electricity .....	4.61	4.75	4.80	4.85	5.12	5.39	5.69	0.8%
<b>Delivered Energy</b> .....	<b>10.77</b>	<b>11.40</b>	<b>11.44</b>	<b>11.52</b>	<b>11.86</b>	<b>12.14</b>	<b>12.36</b>	<b>0.4%</b>
Electricity Related Losses .....	10.00	10.36	10.44	10.35	10.81	11.17	11.69	0.5%
<b>Total</b> .....	<b>20.77</b>	<b>21.76</b>	<b>21.88</b>	<b>21.87</b>	<b>22.67</b>	<b>23.31</b>	<b>24.05</b>	<b>0.4%</b>
<b>Commercial</b>								
Liquefied Petroleum Gases .....	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.3%
Motor Gasoline <sup>2</sup> .....	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.4%
Kerosene .....	0.02	0.01	0.01	0.01	0.01	0.01	0.01	1.4%
Distillate Fuel Oil .....	0.40	0.41	0.36	0.34	0.34	0.34	0.34	-0.8%
Residual Fuel Oil .....	0.08	0.08	0.07	0.08	0.08	0.08	0.08	0.3%
Liquid Fuels and Other Petroleum Subtotal .	0.63	0.63	0.58	0.58	0.58	0.59	0.59	-0.3%
Natural Gas .....	2.92	3.10	3.14	3.25	3.34	3.45	3.54	0.6%
Coal .....	0.07	0.07	0.06	0.06	0.06	0.06	0.06	-0.0%
Renewable Energy <sup>3</sup> .....	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.0%
Electricity .....	4.43	4.58	4.75	5.14	5.57	5.95	6.31	1.4%
<b>Delivered Energy</b> .....	<b>8.17</b>	<b>8.50</b>	<b>8.66</b>	<b>9.15</b>	<b>9.69</b>	<b>10.17</b>	<b>10.62</b>	<b>1.0%</b>
Electricity Related Losses .....	9.62	9.99	10.35	10.95	11.77	12.32	12.96	1.1%
<b>Total</b> .....	<b>17.79</b>	<b>18.49</b>	<b>19.01</b>	<b>20.10</b>	<b>21.46</b>	<b>22.49</b>	<b>23.59</b>	<b>1.1%</b>
<b>Industrial<sup>4</sup></b>								
Liquefied Petroleum Gases .....	2.33	2.35	2.02	1.97	1.79	1.72	1.66	-1.5%
Motor Gasoline <sup>2</sup> .....	0.36	0.36	0.34	0.35	0.34	0.34	0.36	-0.1%
Distillate Fuel Oil .....	1.26	1.28	1.17	1.21	1.18	1.19	1.23	-0.1%
Residual Fuel Oil .....	0.24	0.25	0.15	0.16	0.16	0.16	0.16	-1.9%
Petrochemical Feedstocks .....	1.42	1.30	1.01	1.20	1.13	1.10	1.05	-0.9%
Other Petroleum <sup>5</sup> .....	4.51	4.42	3.74	3.82	3.72	3.72	3.84	-0.6%
Liquid Fuels and Other Petroleum Subtotal .	10.13	9.96	8.42	8.71	8.32	8.22	8.30	-0.8%
Natural Gas .....	6.68	6.82	6.77	6.99	6.84	6.95	7.04	0.1%
Natural-Gas-to-Liquids Heat and Power .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Lease and Plant Fuel <sup>6</sup> .....	1.16	1.20	1.27	1.25	1.33	1.44	1.47	0.9%
Natural Gas Subtotal .....	7.83	8.02	8.05	8.24	8.17	8.39	8.51	0.3%
Metallurgical Coal .....	0.60	0.60	0.55	0.53	0.49	0.48	0.48	-1.0%
Other Industrial Coal .....	1.25	1.21	1.24	1.16	1.15	1.16	1.16	-0.2%
Coal-to-Liquids Heat and Power .....	0.00	0.00	0.00	0.13	0.24	0.40	0.58	--
Net Coal Coke Imports .....	0.06	0.03	0.01	0.01	0.01	0.01	0.01	-3.6%
Coal Subtotal .....	1.92	1.83	1.80	1.84	1.89	2.05	2.23	0.9%
Biofuels Heat and Coproducts .....	0.30	0.40	0.75	0.95	1.23	1.62	1.66	6.4%
Renewable Energy <sup>7</sup> .....	1.70	1.64	1.48	1.56	1.64	1.78	1.96	0.8%
Electricity .....	3.45	3.43	3.34	3.50	3.48	3.54	3.67	0.3%
<b>Delivered Energy</b> .....	<b>25.33</b>	<b>25.29</b>	<b>23.83</b>	<b>24.79</b>	<b>24.73</b>	<b>25.60</b>	<b>26.33</b>	<b>0.2%</b>
Electricity Related Losses .....	7.48	7.49	7.27	7.45	7.36	7.32	7.55	0.0%
<b>Total</b> .....	<b>32.81</b>	<b>32.77</b>	<b>31.10</b>	<b>32.24</b>	<b>32.09</b>	<b>32.93</b>	<b>33.87</b>	<b>0.1%</b>

## Reference Case

**Table A2. Energy Consumption by Sector and Source (Continued)**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Transportation</b>								
Liquefied Petroleum Gases .....	0.02	0.02	0.01	0.01	0.01	0.01	0.02	-0.2%
E85 <sup>8</sup> .....	0.00	0.00	0.00	0.35	0.85	1.70	2.18	37.1%
Motor Gasoline <sup>2</sup> .....	17.22	17.29	16.93	16.25	15.56	14.73	14.49	-0.8%
Jet Fuel <sup>9</sup> .....	3.22	3.23	3.00	3.15	3.42	3.74	4.12	1.1%
Distillate Fuel Oil <sup>10</sup> .....	6.41	6.48	6.13	6.97	7.36	8.02	9.09	1.5%
Residual Fuel Oil .....	0.91	0.95	0.86	0.96	0.98	0.99	1.00	0.2%
Liquid Hydrogen .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.5%
Other Petroleum <sup>11</sup> .....	0.18	0.17	0.17	0.18	0.18	0.18	0.18	0.3%
Liquid Fuels and Other Petroleum Subtotal ..	27.96	28.14	27.11	27.87	28.36	29.38	31.09	0.4%
Pipeline Fuel Natural Gas .....	0.60	0.64	0.64	0.65	0.69	0.73	0.72	0.5%
Compressed Natural Gas .....	0.02	0.02	0.03	0.05	0.07	0.08	0.09	5.8%
Electricity .....	0.02	0.02	0.02	0.03	0.03	0.04	0.05	3.7%
<b>Delivered Energy</b> .....	<b>28.60</b>	<b>28.82</b>	<b>27.81</b>	<b>28.60</b>	<b>29.15</b>	<b>30.23</b>	<b>31.94</b>	<b>0.4%</b>
Electricity Related Losses .....	0.05	0.05	0.05	0.06	0.07	0.09	0.10	3.4%
<b>Total</b> .....	<b>28.65</b>	<b>28.87</b>	<b>27.86</b>	<b>28.66</b>	<b>29.22</b>	<b>30.32</b>	<b>32.05</b>	<b>0.5%</b>
<b>Delivered Energy Consumption for All Sectors</b>								
Liquefied Petroleum Gases .....	2.93	2.95	2.61	2.55	2.39	2.34	2.29	-1.1%
E85 <sup>8</sup> .....	0.00	0.00	0.00	0.35	0.85	1.70	2.18	37.1%
Motor Gasoline <sup>2</sup> .....	17.62	17.70	17.33	16.64	15.95	15.12	14.90	-0.7%
Jet Fuel <sup>9</sup> .....	3.22	3.23	3.00	3.15	3.42	3.74	4.12	1.1%
Kerosene .....	0.12	0.11	0.10	0.10	0.10	0.10	0.10	-0.2%
Distillate Fuel Oil .....	8.79	8.94	8.38	9.17	9.49	10.11	11.17	1.0%
Residual Fuel Oil .....	1.22	1.28	1.07	1.21	1.22	1.23	1.25	-0.1%
Petrochemical Feedstocks .....	1.42	1.30	1.01	1.20	1.13	1.10	1.05	-0.9%
Liquid Hydrogen .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.5%
Other Petroleum <sup>12</sup> .....	4.66	4.57	3.89	3.98	3.89	3.88	4.01	-0.6%
Liquid Fuels and Other Petroleum Subtotal ..	39.98	40.08	37.40	38.36	38.42	39.32	41.07	0.1%
Natural Gas .....	14.11	14.79	14.86	15.30	15.34	15.60	15.73	0.3%
Natural-Gas-to-Liquids Heat and Power .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Lease and Plant Fuel <sup>8</sup> .....	1.16	1.20	1.27	1.25	1.33	1.44	1.47	0.9%
Pipeline Natural Gas .....	0.60	0.64	0.64	0.65	0.69	0.73	0.72	0.5%
Natural Gas Subtotal .....	15.86	16.64	16.78	17.20	17.36	17.77	17.92	0.3%
Metallurgical Coal .....	0.60	0.60	0.55	0.53	0.49	0.48	0.48	-1.0%
Other Coal .....	1.33	1.28	1.31	1.24	1.22	1.23	1.23	-0.2%
Coal-to-Liquids Heat and Power .....	0.00	0.00	0.00	0.13	0.24	0.40	0.58	--
Net Coal Coke Imports .....	0.06	0.03	0.01	0.01	0.01	0.01	0.01	-3.6%
Coal Subtotal .....	1.99	1.91	1.87	1.91	1.97	2.12	2.30	0.8%
Biofuels Heat and Coproducts .....	0.30	0.40	0.75	0.95	1.23	1.62	1.66	6.4%
Renewable Energy <sup>13</sup> .....	2.21	2.19	2.03	2.14	2.24	2.39	2.58	0.7%
Electricity .....	12.52	12.79	12.91	13.51	14.20	14.92	15.73	0.9%
<b>Delivered Energy</b> .....	<b>72.87</b>	<b>74.01</b>	<b>71.74</b>	<b>74.07</b>	<b>75.42</b>	<b>78.15</b>	<b>81.26</b>	<b>0.4%</b>
Electricity Related Losses .....	27.15	27.88	28.11	28.80	30.02	30.90	32.30	0.6%
<b>Total</b> .....	<b>100.02</b>	<b>101.89</b>	<b>99.85</b>	<b>102.87</b>	<b>105.44</b>	<b>109.05</b>	<b>113.56</b>	<b>0.5%</b>
<b>Electric Power<sup>14</sup></b>								
Distillate Fuel Oil .....	0.10	0.11	0.11	0.12	0.12	0.12	0.13	0.8%
Residual Fuel Oil .....	0.54	0.56	0.38	0.38	0.39	0.39	0.40	-1.5%
Liquid Fuels and Other Petroleum Subtotal ..	0.65	0.67	0.49	0.50	0.51	0.52	0.53	-1.0%
Natural Gas .....	6.39	7.06	6.42	6.21	6.73	7.59	7.12	0.0%
Steam Coal .....	20.46	20.84	21.03	21.68	22.01	22.33	24.25	0.7%
Nuclear Power .....	8.21	8.41	8.45	8.68	8.99	9.04	9.47	0.5%
Renewable Energy <sup>15</sup> .....	3.76	3.45	4.42	5.07	5.79	6.17	6.43	2.7%
Electricity Imports .....	0.06	0.11	0.08	0.06	0.06	0.05	0.10	-0.5%
<b>Total<sup>16</sup></b> .....	<b>39.67</b>	<b>40.67</b>	<b>41.02</b>	<b>42.32</b>	<b>44.22</b>	<b>45.82</b>	<b>48.03</b>	<b>0.7%</b>

**Table A2. Energy Consumption by Sector and Source (Continued)**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Total Energy Consumption</b>								
Liquefied Petroleum Gases	2.93	2.95	2.61	2.55	2.39	2.34	2.29	-1.1%
E85 <sup>8</sup>	0.00	0.00	0.00	0.35	0.85	1.70	2.18	37.1%
Motor Gasoline <sup>2</sup>	17.62	17.70	17.33	16.64	15.95	15.12	14.90	-0.7%
Jet Fuel <sup>9</sup>	3.22	3.23	3.00	3.15	3.42	3.74	4.12	1.1%
Kerosene	0.12	0.11	0.10	0.10	0.10	0.10	0.10	-0.2%
Distillate Fuel Oil	8.89	9.05	8.49	9.29	9.61	10.23	11.31	1.0%
Residual Fuel Oil	1.77	1.84	1.45	1.59	1.60	1.62	1.64	-0.5%
Petrochemical Feedstocks	1.42	1.30	1.01	1.20	1.13	1.10	1.05	-0.9%
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.5%
Other Petroleum <sup>12</sup>	4.66	4.57	3.89	3.98	3.89	3.88	4.01	-0.6%
Liquid Fuels and Other Petroleum Subtotal	40.63	40.75	37.89	38.86	38.93	39.84	41.60	0.1%
Natural Gas	20.50	21.86	21.29	21.50	22.07	23.19	22.86	0.2%
Natural-Gas-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Lease and Plant Fuel <sup>6</sup>	1.16	1.20	1.27	1.25	1.33	1.44	1.47	0.9%
Pipeline Natural Gas	0.60	0.64	0.64	0.65	0.69	0.73	0.72	0.5%
Natural Gas Subtotal	22.26	23.70	23.20	23.40	24.09	25.36	25.04	0.2%
Metallurgical Coal	0.60	0.60	0.55	0.53	0.49	0.48	0.48	-1.0%
Other Coal	21.79	22.12	22.34	22.92	23.24	23.55	25.49	0.6%
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.13	0.24	0.40	0.58	--
Net Coal Coke Imports	0.06	0.03	0.01	0.01	0.01	0.01	0.01	-3.6%
Coal Subtotal	22.46	22.74	22.91	23.59	23.98	24.45	26.56	0.7%
Nuclear Power	8.21	8.41	8.45	8.68	8.99	9.04	9.47	0.5%
Biofuels Heat and Coproducts	0.30	0.40	0.75	0.95	1.23	1.62	1.66	6.4%
Renewable Energy <sup>17</sup>	5.97	5.65	6.45	7.21	8.03	8.57	9.01	2.1%
Electricity Imports	0.06	0.11	0.08	0.06	0.06	0.05	0.10	-0.5%
<b>Total</b>	<b>100.02</b>	<b>101.89</b>	<b>99.85</b>	<b>102.87</b>	<b>105.44</b>	<b>109.05</b>	<b>113.56</b>	<b>0.5%</b>
<b>Energy Use and Related Statistics</b>								
Delivered Energy Use	72.87	74.01	71.74	74.07	75.42	78.15	81.26	0.4%
Total Energy Use	100.02	101.89	99.85	102.87	105.44	109.05	113.56	0.5%
Ethanol Consumed in Motor Gasoline and E85	0.47	0.56	1.08	1.39	1.66	2.16	2.47	6.6%
Population (millions)	299.57	302.41	311.37	326.70	342.61	358.87	375.12	0.9%
Gross Domestic Product (billion 2000 dollars)	11295	11524	11779	13745	15524	17591	20114	2.5%
Carbon Dioxide Emissions (million metric tons)	5906.8	5990.8	5801.4	5903.5	5982.3	6125.3	6414.4	0.3%

<sup>1</sup>Includes wood used for residential heating. See Table A4 and/or Table A17 for estimates of nonmarketed renewable energy consumption for geothermal heat pumps, solar thermal hot water heating, and solar photovoltaic electricity generation.

<sup>2</sup>Includes ethanol (blends of 10 percent or less) and ethers blended into gasoline.

<sup>3</sup>Excludes ethanol. Includes commercial sector consumption of wood and wood waste, landfill gas, municipal waste, and other biomass for combined heat and power. See Table A5 and/or Table A17 for estimates of nonmarketed renewable energy consumption for solar thermal hot water heating and solar photovoltaic electricity generation.

<sup>4</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>5</sup>Includes petroleum coke, asphalt, road oil, lubricants, still gas, and miscellaneous petroleum products.

<sup>6</sup>Represents natural gas used in well, field, and lease operations, and in natural gas processing plant machinery.

<sup>7</sup>Includes consumption of energy produced from hydroelectric, wood and wood waste, municipal waste, and other biomass sources. Excludes ethanol blends (10 percent or less) in motor gasoline.

<sup>8</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>9</sup>Includes only kerosene type.

<sup>10</sup>Diesel fuel for on- and off- road use.

<sup>11</sup>Includes aviation gasoline and lubricants.

<sup>12</sup>Includes unfinished oils, natural gasoline, motor gasoline blending components, aviation gasoline, lubricants, still gas, asphalt, road oil, petroleum coke, and miscellaneous petroleum products.

<sup>13</sup>Includes electricity generated for sale to the grid and for own use from renewable sources, and non-electric energy from renewable sources. Excludes ethanol and nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

<sup>14</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>15</sup>Includes conventional hydroelectric, geothermal, wood and wood waste, biogenic municipal waste, other biomass, wind, photovoltaic, and solar thermal sources. Excludes net electricity imports.

<sup>16</sup>Includes non-biogenic municipal waste not included above.

<sup>17</sup>Includes conventional hydroelectric, geothermal, wood and wood waste, biogenic municipal waste, other biomass, wind, photovoltaic, and solar thermal sources. Excludes ethanol, net electricity imports, and nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

Btu = British thermal unit.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 consumption based on: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2006 and 2007 population and gross domestic product: IHS Global Insight Industry and Employment models, November 2008. 2006 and 2007 carbon dioxide emissions: EIA, *Emissions of Greenhouse Gases in the United States 2007*, DOE/EIA-0573(2007) (Washington, DC, December 2008). Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

## Reference Case

**Table A3. Energy Prices by Sector and Source**  
(2007 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Residential</b>								
Liquefied Petroleum Gases .....	23.88	24.98	25.86	32.23	32.88	33.43	35.11	1.5%
Distillate Fuel Oil .....	18.46	19.66	18.69	23.59	24.10	24.84	26.67	1.3%
Natural Gas .....	13.70	12.69	12.09	11.98	12.50	13.07	14.31	0.5%
Electricity .....	31.21	31.19	30.89	31.77	32.72	34.05	35.84	0.6%
<b>Commercial</b>								
Liquefied Petroleum Gases .....	21.20	23.04	22.69	29.00	29.60	30.12	31.77	1.4%
Distillate Fuel Oil .....	15.02	16.05	16.15	21.64	22.11	23.06	24.69	1.9%
Residual Fuel Oil .....	8.88	10.21	10.97	16.12	16.68	17.07	17.98	2.5%
Natural Gas .....	11.90	10.99	10.55	10.57	11.13	11.74	12.96	0.7%
Electricity .....	28.38	28.07	27.29	27.13	28.15	29.23	31.01	0.4%
<b>Industrial<sup>1</sup></b>								
Liquefied Petroleum Gases .....	21.04	23.38	21.84	28.19	28.78	29.35	30.99	1.2%
Distillate Fuel Oil .....	15.74	16.82	16.01	22.10	22.56	23.68	25.19	1.8%
Residual Fuel Oil .....	9.21	10.49	15.38	20.43	20.94	21.43	22.73	3.4%
Natural Gas <sup>2</sup> .....	7.96	7.52	6.91	7.01	7.48	7.99	9.07	0.8%
Metallurgical Coal .....	3.64	3.61	4.37	4.40	4.40	4.55	4.41	0.9%
Other Industrial Coal .....	2.40	2.43	2.54	2.57	2.53	2.57	2.67	0.4%
Coal to Liquids .....	--	--	--	1.21	1.23	1.31	1.36	--
Electricity .....	18.41	18.63	18.72	18.33	19.06	20.09	21.59	0.6%
<b>Transportation</b>								
Liquefied Petroleum Gases <sup>3</sup> .....	22.30	25.01	25.67	32.03	32.62	33.13	34.77	1.4%
E85 <sup>4</sup> .....	25.51	26.67	25.47	25.51	29.30	29.75	30.10	0.5%
Motor Gasoline <sup>5</sup> .....	21.78	22.98	23.47	28.74	29.75	30.67	32.10	1.5%
Jet Fuel <sup>6</sup> .....	15.24	16.10	16.03	21.48	22.15	22.98	24.63	1.9%
Diesel Fuel (distillate fuel oil) <sup>7</sup> .....	20.27	20.92	20.05	25.74	26.04	27.16	28.59	1.4%
Residual Fuel Oil .....	8.21	9.35	12.10	17.08	17.46	18.13	19.65	3.3%
Natural Gas <sup>8</sup> .....	16.04	15.46	14.90	14.72	14.90	15.28	16.24	0.2%
Electricity .....	30.39	30.64	30.34	30.17	29.48	31.63	34.15	0.5%
<b>Electric Power<sup>9</sup></b>								
Distillate Fuel Oil .....	13.77	14.77	15.09	19.90	20.45	21.28	23.11	2.0%
Residual Fuel Oil .....	8.38	8.38	13.21	18.19	18.55	19.26	20.67	4.0%
Natural Gas .....	7.05	7.02	6.59	6.72	7.15	7.73	8.70	0.9%
Steam Coal .....	1.74	1.78	1.89	1.94	1.92	1.96	2.04	0.6%
<b>Average Price to All Users<sup>10</sup></b>								
Liquefied Petroleum Gases .....	15.66	18.53	20.96	26.83	27.56	28.13	29.77	2.1%
E85 <sup>4</sup> .....	25.51	26.67	25.47	25.51	29.30	29.75	30.10	0.5%
Motor Gasoline <sup>5</sup> .....	21.65	22.82	23.47	28.74	29.75	30.67	32.10	1.5%
Jet Fuel .....	15.24	16.10	16.03	21.48	22.15	22.98	24.63	1.9%
Distillate Fuel Oil .....	19.17	19.94	18.98	24.89	25.28	26.42	27.94	1.5%
Residual Fuel Oil .....	8.42	9.25	12.66	17.64	18.03	18.67	20.12	3.4%
Natural Gas .....	9.50	9.01	8.56	8.64	9.11	9.61	10.75	0.8%
Metallurgical Coal .....	3.64	3.61	4.37	4.40	4.40	4.55	4.41	0.9%
Other Coal .....	1.78	1.82	1.93	1.98	1.95	1.99	2.07	0.6%
Coal to Liquids .....	--	--	--	1.21	1.23	1.31	1.36	--
Electricity .....	26.68	26.70	26.42	26.53	27.57	28.81	30.56	0.6%
<b>Non-Renewable Energy Expenditures by Sector (billion 2007 dollars)</b>								
Residential .....	231.09	238.38	235.27	246.49	263.30	282.96	310.03	1.1%
Commercial .....	170.28	173.09	172.88	186.98	207.76	228.67	256.75	1.7%
Industrial .....	216.13	226.84	204.25	244.30	242.68	253.34	276.26	0.9%
Transportation .....	564.63	596.75	580.97	735.45	752.82	779.67	853.25	1.6%
Total Non-Renewable Expenditures .....	1182.13	1235.06	1193.36	1413.22	1466.55	1544.64	1696.29	1.4%
Transportation Renewable Expenditures .....	0.03	0.04	0.07	8.97	24.83	50.69	65.71	37.9%
<b>Total Expenditures .....</b>	<b>1182.16</b>	<b>1235.10</b>	<b>1193.43</b>	<b>1422.19</b>	<b>1491.38</b>	<b>1595.33</b>	<b>1762.00</b>	<b>1.6%</b>

**Table A3. Energy Prices by Sector and Source (Continued)**  
(Nominal Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Residential</b>								
Liquefied Petroleum Gases .....	23.26	24.98	27.24	37.30	42.47	46.13	50.90	3.1%
Distillate Fuel Oil .....	17.98	19.66	19.68	27.29	31.14	34.28	38.67	3.0%
Natural Gas .....	13.34	12.69	12.74	13.86	16.14	18.03	20.75	2.2%
Electricity .....	30.39	31.19	32.53	36.77	42.26	46.98	51.96	2.2%
<b>Commercial</b>								
Liquefied Petroleum Gases .....	20.64	23.04	23.89	33.55	38.24	41.56	46.06	3.1%
Distillate Fuel Oil .....	14.63	16.05	17.01	25.03	28.56	31.82	35.80	3.5%
Residual Fuel Oil .....	8.65	10.21	11.55	18.65	21.55	23.55	26.07	4.2%
Natural Gas .....	11.58	10.99	11.11	12.22	14.37	16.20	18.78	2.4%
Electricity .....	27.63	28.07	28.74	31.39	36.37	40.33	44.96	2.1%
<b>Industrial<sup>1</sup></b>								
Liquefied Petroleum Gases .....	20.49	23.38	23.00	32.62	37.17	40.49	44.93	2.9%
Distillate Fuel Oil .....	15.32	16.82	16.86	25.57	29.14	32.67	36.52	3.4%
Residual Fuel Oil .....	8.97	10.49	16.20	23.64	27.05	29.57	32.95	5.1%
Natural Gas <sup>2</sup> .....	7.75	7.52	7.27	8.11	9.66	11.03	13.16	2.5%
Metallurgical Coal .....	3.54	3.61	4.60	5.09	5.69	6.28	6.40	2.5%
Other Industrial Coal .....	2.34	2.43	2.67	2.98	3.27	3.55	3.88	2.0%
Coal to Liquids .....	--	--	--	1.40	1.59	1.81	1.98	--
Electricity .....	17.93	18.63	19.72	21.20	24.63	27.71	31.30	2.3%
<b>Transportation</b>								
Liquefied Petroleum Gases <sup>3</sup> .....	21.71	25.01	27.04	37.06	42.13	45.70	50.41	3.1%
E85 <sup>4</sup> .....	24.84	26.67	26.83	29.51	37.85	41.04	43.63	2.2%
Motor Gasoline <sup>5</sup> .....	21.21	22.98	24.72	33.26	38.43	42.32	46.54	3.1%
Jet Fuel <sup>6</sup> .....	14.84	16.10	16.89	24.86	28.62	31.70	35.70	3.5%
Diesel Fuel (distillate fuel oil) <sup>7</sup> .....	19.74	20.92	21.12	29.78	33.63	37.48	41.44	3.0%
Residual Fuel Oil .....	7.99	9.35	12.74	19.76	22.56	25.02	28.49	5.0%
Natural Gas <sup>8</sup> .....	15.62	15.46	15.69	17.03	19.24	21.08	23.55	1.8%
Electricity .....	29.59	30.64	31.95	34.91	38.09	43.63	49.51	2.1%
<b>Electric Power<sup>9</sup></b>								
Distillate Fuel Oil .....	13.41	14.77	15.89	23.03	26.42	29.36	33.51	3.6%
Residual Fuel Oil .....	8.16	8.38	13.91	21.05	23.97	26.57	29.97	5.7%
Natural Gas .....	6.87	7.02	6.94	7.77	9.24	10.67	12.61	2.6%
Steam Coal .....	1.69	1.78	1.99	2.25	2.48	2.70	2.95	2.2%

## Reference Case

**Table A3. Energy Prices by Sector and Source (Continued)**  
(Nominal Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Average Price to All Users<sup>10</sup></b>								
Liquefied Petroleum Gases .....	15.25	18.53	22.07	31.04	35.61	38.82	43.16	3.7%
E85 <sup>4</sup> .....	24.84	26.67	26.83	29.51	37.85	41.04	43.63	2.2%
Motor Gasoline <sup>5</sup> .....	21.08	22.82	24.71	33.25	38.43	42.31	46.54	3.1%
Jet Fuel .....	14.84	16.10	16.89	24.86	28.62	31.70	35.70	3.5%
Distillate Fuel Oil .....	18.67	19.94	19.99	28.80	32.65	36.45	40.51	3.1%
Residual Fuel Oil .....	8.20	9.25	13.34	20.41	23.29	25.76	29.16	5.1%
Natural Gas .....	9.25	9.01	9.01	10.00	11.77	13.26	15.58	2.4%
Metallurgical Coal .....	3.54	3.61	4.60	5.09	5.69	6.28	6.40	2.5%
Other Coal .....	1.73	1.82	2.04	2.29	2.52	2.75	3.00	2.2%
Coal to Liquids .....	--	--	--	1.40	1.59	1.81	1.98	--
Electricity .....	25.98	26.70	27.82	30.69	35.62	39.75	44.31	2.2%
<b>Non-Renewable Energy Expenditures by Sector (billion nominal dollars)</b>								
Residential .....	225.03	238.38	247.78	285.21	340.12	390.39	449.49	2.8%
Commercial .....	165.82	173.09	182.07	216.35	268.38	315.48	372.25	3.4%
Industrial .....	210.46	226.84	215.12	282.68	313.49	349.53	400.54	2.5%
Transportation .....	549.82	596.75	611.87	850.99	972.48	1075.67	1237.08	3.2%
Total Non-Renewable Expenditures .....	1151.12	1235.06	1256.84	1635.24	1894.47	2131.06	2459.36	3.0%
Transportation Renewable Expenditures .....	0.03	0.04	0.07	10.38	32.08	69.93	95.27	40.1%
<b>Total Expenditures .....</b>	<b>1151.15</b>	<b>1235.10</b>	<b>1256.91</b>	<b>1645.62</b>	<b>1926.55</b>	<b>2201.00</b>	<b>2554.63</b>	<b>3.2%</b>

<sup>1</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>2</sup>Excludes use for lease and plant fuel.

<sup>3</sup>Includes Federal and State taxes while excluding county and local taxes.

<sup>4</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>5</sup>Sales weighted-average price for all grades. Includes Federal, State and local taxes.

<sup>6</sup>Kerosene-type jet fuel. Includes Federal and State taxes while excluding county and local taxes.

<sup>7</sup>Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

<sup>8</sup>Compressed natural gas used as a vehicle fuel. Includes estimated motor vehicle fuel taxes and estimated dispensing costs or charges.

<sup>9</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>10</sup>Weighted averages of end-use fuel prices are derived from the prices shown in each sector and the corresponding sectoral consumption.

Btu = British thermal unit.

-- = Not applicable.

Note: Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

**Sources:** 2006 and 2007 prices for motor gasoline, distillate fuel oil, and jet fuel are based on prices in the Energy Information Administration (EIA), *Petroleum Marketing Annual 2007*, DOE/EIA-0487(2007) (Washington, DC, August 2008). 2006 residential and commercial natural gas delivered prices: EIA, *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007). 2007 residential and commercial natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2006 and 2007 industrial natural gas delivered prices are estimated based on: EIA, *Manufacturing Energy Consumption Survey 1994* and industrial and wellhead prices from the *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007) and the *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2006 transportation sector natural gas delivered prices are based on: EIA, *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007) and estimated State taxes, Federal taxes, and dispensing costs or charges. 2007 transportation sector natural gas delivered prices are model results. 2006 and 2007 electric power sector natural gas prices: EIA, *Electric Power Monthly*, DOE/EIA-0226, April 2007 and April 2008, Table 4.13.B. 2006 and 2007 coal prices based on: EIA, *Quarterly Coal Report, October-December 2007*, DOE/EIA-0121(2007/4Q) (Washington, DC, March 2008) and EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A. 2006 and 2007 electricity prices: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2006 and 2007 E85 prices derived from monthly prices in the Clean Cities Alternative Fuel Price Report. **Projections:** EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

**Table A4. Residential Sector Key Indicators and Consumption**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Key Indicators</b>								
<b>Households (millions)</b>								
Single-Family .....	80.80	81.74	83.61	88.69	93.63	97.66	101.57	0.9%
Multifamily .....	24.81	25.15	25.97	27.39	29.17	30.73	32.47	1.1%
Mobile Homes .....	6.89	6.85	6.73	6.75	6.96	7.03	7.09	0.2%
<b>Total .....</b>	<b>112.50</b>	<b>113.74</b>	<b>116.30</b>	<b>122.82</b>	<b>129.76</b>	<b>135.42</b>	<b>141.14</b>	<b>0.9%</b>
<b>Average House Square Footage .....</b>	<b>1648</b>	<b>1663</b>	<b>1701</b>	<b>1772</b>	<b>1834</b>	<b>1887</b>	<b>1934</b>	<b>0.7%</b>
<b>Energy Intensity</b>								
<b>(million Btu per household)</b>								
Delivered Energy Consumption .....	95.7	100.2	98.4	93.8	91.4	89.7	87.6	-0.6%
Total Energy Consumption .....	184.6	191.3	188.2	178.1	174.7	172.2	170.4	-0.5%
<b>(thousand Btu per square foot)</b>								
Delivered Energy Consumption .....	58.1	60.3	57.8	52.9	49.8	47.5	45.3	-1.2%
Total Energy Consumption .....	112.0	115.0	110.6	100.5	95.2	91.2	88.1	-1.2%
<b>Delivered Energy Consumption by Fuel</b>								
<b>Electricity</b>								
Space Heating .....	0.26	0.28	0.29	0.30	0.31	0.31	0.31	0.4%
Space Cooling .....	0.84	0.89	0.86	0.90	0.97	1.03	1.10	0.9%
Water Heating .....	0.42	0.42	0.42	0.44	0.48	0.50	0.50	0.8%
Refrigeration .....	0.39	0.39	0.37	0.37	0.39	0.40	0.42	0.4%
Cooking .....	0.10	0.11	0.11	0.12	0.13	0.13	0.14	1.3%
Clothes Dryers .....	0.27	0.27	0.27	0.28	0.29	0.30	0.32	0.7%
Freezers .....	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.4%
Lighting .....	0.74	0.73	0.71	0.59	0.55	0.53	0.52	-1.5%
Clothes Washers <sup>1</sup> .....	0.04	0.03	0.03	0.03	0.03	0.03	0.03	-0.9%
Dishwashers <sup>1</sup> .....	0.10	0.10	0.09	0.10	0.10	0.11	0.12	0.8%
Color Televisions and Set-Top Boxes .....	0.34	0.36	0.40	0.41	0.44	0.49	0.56	1.9%
Personal Computers and Related Equipment .....	0.14	0.15	0.18	0.19	0.20	0.21	0.23	1.7%
Furnace Fans and Boiler Circulation Pumps .....	0.11	0.13	0.13	0.14	0.15	0.16	0.16	1.1%
Other Uses <sup>2</sup> .....	0.78	0.82	0.85	0.92	1.01	1.10	1.19	1.7%
<b>Delivered Energy .....</b>	<b>4.61</b>	<b>4.75</b>	<b>4.80</b>	<b>4.85</b>	<b>5.12</b>	<b>5.39</b>	<b>5.69</b>	<b>0.8%</b>
<b>Natural Gas</b>								
Space Heating .....	2.85	3.21	3.27	3.34	3.39	3.42	3.40	0.3%
Space Cooling .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
Water Heating .....	1.35	1.35	1.35	1.37	1.40	1.39	1.35	-0.0%
Cooking .....	0.22	0.22	0.22	0.23	0.24	0.25	0.26	0.7%
Clothes Dryers .....	0.07	0.07	0.07	0.07	0.06	0.06	0.06	-0.9%
<b>Delivered Energy .....</b>	<b>4.49</b>	<b>4.86</b>	<b>4.92</b>	<b>5.01</b>	<b>5.10</b>	<b>5.13</b>	<b>5.07</b>	<b>0.2%</b>
<b>Distillate Fuel Oil</b>								
Space Heating .....	0.59	0.66	0.62	0.57	0.53	0.50	0.46	-1.6%
Water Heating .....	0.12	0.12	0.10	0.08	0.06	0.06	0.05	-3.7%
<b>Delivered Energy .....</b>	<b>0.71</b>	<b>0.78</b>	<b>0.72</b>	<b>0.64</b>	<b>0.60</b>	<b>0.55</b>	<b>0.51</b>	<b>-1.8%</b>
<b>Liquefied Petroleum Gases</b>								
Space Heating .....	0.20	0.22	0.21	0.20	0.20	0.20	0.19	-0.6%
Water Heating .....	0.10	0.09	0.08	0.06	0.06	0.05	0.05	-2.5%
Cooking .....	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.6%
Other Uses <sup>3</sup> .....	0.15	0.15	0.16	0.18	0.20	0.22	0.24	1.9%
<b>Delivered Energy .....</b>	<b>0.49</b>	<b>0.50</b>	<b>0.49</b>	<b>0.48</b>	<b>0.49</b>	<b>0.50</b>	<b>0.52</b>	<b>0.2%</b>
Marketed Renewables (wood) <sup>4</sup> .....	0.39	0.43	0.43	0.46	0.48	0.49	0.50	0.7%
Other Fuels <sup>5</sup> .....	0.08	0.09	0.08	0.08	0.08	0.08	0.08	-0.5%

# Reference Case

**Table A4. Residential Sector Key Indicators and Consumption (Continued)**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Delivered Energy Consumption by End Use</b>								
Space Heating .....	4.37	4.89	4.91	4.95	4.99	4.99	4.95	0.1%
Space Cooling .....	0.84	0.89	0.86	0.90	0.97	1.03	1.10	0.9%
Water Heating .....	1.99	1.98	1.95	1.95	2.00	2.01	1.95	-0.1%
Refrigeration .....	0.39	0.39	0.37	0.37	0.39	0.40	0.42	0.4%
Cooking .....	0.35	0.36	0.37	0.38	0.41	0.42	0.43	0.9%
Clothes Dryers .....	0.34	0.34	0.34	0.34	0.35	0.36	0.38	0.4%
Freezers .....	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.4%
Lighting .....	0.74	0.73	0.71	0.59	0.55	0.53	0.52	-1.5%
Clothes Washers <sup>1</sup> .....	0.04	0.03	0.03	0.03	0.03	0.03	0.03	-0.9%
Dishwashers <sup>1</sup> .....	0.10	0.10	0.09	0.10	0.10	0.11	0.12	0.8%
Color Televisions and Set-Top Boxes .....	0.34	0.36	0.40	0.41	0.44	0.49	0.56	1.9%
Personal Computers and Related Equipment .....	0.14	0.15	0.18	0.19	0.20	0.21	0.23	1.7%
Furnace Fans and Boiler Circulation Pumps .....	0.11	0.13	0.13	0.14	0.15	0.16	0.16	1.1%
Other Uses <sup>6</sup> .....	0.94	0.97	1.01	1.09	1.21	1.32	1.43	1.7%
<b>Delivered Energy</b> .....	<b>10.77</b>	<b>11.40</b>	<b>11.44</b>	<b>11.52</b>	<b>11.86</b>	<b>12.14</b>	<b>12.36</b>	<b>0.4%</b>
<b>Electricity Related Losses</b> .....	<b>10.00</b>	<b>10.36</b>	<b>10.44</b>	<b>10.35</b>	<b>10.81</b>	<b>11.17</b>	<b>11.69</b>	<b>0.5%</b>
<b>Total Energy Consumption by End Use</b>								
Space Heating .....	4.94	5.51	5.53	5.58	5.64	5.63	5.59	0.1%
Space Cooling .....	2.65	2.82	2.73	2.82	3.01	3.17	3.34	0.7%
Water Heating .....	2.89	2.90	2.87	2.88	3.01	3.05	2.98	0.1%
Refrigeration .....	1.24	1.23	1.18	1.16	1.20	1.23	1.29	0.2%
Cooking .....	0.58	0.59	0.60	0.63	0.67	0.70	0.72	0.9%
Clothes Dryers .....	0.92	0.92	0.92	0.94	0.96	0.98	1.03	0.5%
Freezers .....	0.26	0.26	0.25	0.25	0.26	0.27	0.28	0.3%
Lighting .....	2.35	2.33	2.27	1.85	1.73	1.63	1.59	-1.6%
Clothes Washers <sup>1</sup> .....	0.11	0.11	0.10	0.09	0.08	0.08	0.09	-1.1%
Dishwashers <sup>1</sup> .....	0.30	0.30	0.30	0.30	0.32	0.33	0.35	0.7%
Color Televisions and Set-Top Boxes .....	1.07	1.15	1.28	1.29	1.37	1.51	1.71	1.8%
Personal Computers and Related Equipment .....	0.45	0.49	0.58	0.58	0.61	0.65	0.69	1.5%
Furnace Fans and Boiler Circulation Pumps .....	0.36	0.41	0.42	0.44	0.47	0.49	0.50	0.9%
Other Uses <sup>6</sup> .....	2.63	2.75	2.85	3.05	3.34	3.60	3.88	1.5%
<b>Total</b> .....	<b>20.77</b>	<b>21.76</b>	<b>21.88</b>	<b>21.87</b>	<b>22.67</b>	<b>23.31</b>	<b>24.05</b>	<b>0.4%</b>
<b>Nonmarketed Renewables<sup>7</sup></b>								
Geothermal Heat Pumps .....	0.00	0.00	0.00	0.01	0.01	0.02	0.02	9.1%
Solar Hot Water Heating .....	0.00	0.00	0.00	0.00	0.00	0.01	0.01	2.6%
Solar Photovoltaic .....	0.00	0.00	0.01	0.03	0.05	0.05	0.05	25.2%
Wind .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
<b>Total</b> .....	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.05</b>	<b>0.07</b>	<b>0.07</b>	<b>0.08</b>	<b>11.5%</b>

<sup>1</sup>Does not include water heating portion of load.

<sup>2</sup>Includes small electric devices, heating elements, and motors not listed above.

<sup>3</sup>Includes such appliances as outdoor grills and mosquito traps.

<sup>4</sup>Includes wood used for primary and secondary heating in wood stoves or fireplaces as reported in the *Residential Energy Consumption Survey 2005*.

<sup>5</sup>Includes kerosene and coal.

<sup>6</sup>Includes all other uses listed above.

<sup>7</sup>Represents delivered energy displaced.

Btu = British thermal unit.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 based on: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008).

Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

**Table A5. Commercial Sector Key Indicators and Consumption**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Key Indicators</b>								
<b>Total Floorspace (billion square feet)</b>								
Surviving .....	73.7	75.2	79.5	84.2	90.3	95.6	101.2	1.3%
New Additions .....	2.1	2.1	1.7	1.9	1.9	1.9	2.1	-0.1%
<b>Total .....</b>	<b>75.8</b>	<b>77.3</b>	<b>81.2</b>	<b>86.1</b>	<b>92.3</b>	<b>97.5</b>	<b>103.3</b>	<b>1.3%</b>
<b>Energy Consumption Intensity (thousand Btu per square foot)</b>								
Delivered Energy Consumption .....	107.9	110.0	106.7	106.3	105.0	104.3	102.9	-0.3%
Electricity Related Losses .....	126.9	129.3	127.5	127.1	127.6	126.3	125.5	-0.1%
Total Energy Consumption .....	234.8	239.3	234.2	233.4	232.6	230.7	228.4	-0.2%
<b>Delivered Energy Consumption by Fuel</b>								
<b>Purchased Electricity</b>								
Space Heating <sup>1</sup> .....	0.16	0.17	0.17	0.17	0.18	0.18	0.18	0.2%
Space Cooling <sup>1</sup> .....	0.53	0.56	0.54	0.57	0.60	0.62	0.65	0.7%
Water Heating <sup>1</sup> .....	0.10	0.10	0.09	0.10	0.10	0.10	0.10	-0.1%
Ventilation .....	0.48	0.49	0.53	0.59	0.64	0.68	0.71	1.6%
Cooking .....	0.02	0.02	0.02	0.02	0.02	0.02	0.02	-0.1%
Lighting .....	1.08	1.07	1.06	1.10	1.15	1.19	1.22	0.5%
Refrigeration .....	0.40	0.40	0.40	0.38	0.38	0.39	0.40	-0.0%
Office Equipment (PC) .....	0.21	0.24	0.25	0.27	0.29	0.32	0.34	1.5%
Office Equipment (non-PC) .....	0.19	0.21	0.26	0.32	0.38	0.41	0.43	3.2%
Other Uses <sup>2</sup> .....	1.27	1.31	1.43	1.61	1.83	2.04	2.27	2.4%
<b>Delivered Energy .....</b>	<b>4.43</b>	<b>4.58</b>	<b>4.75</b>	<b>5.14</b>	<b>5.57</b>	<b>5.95</b>	<b>6.31</b>	<b>1.4%</b>
<b>Natural Gas</b>								
Space Heating <sup>1</sup> .....	1.35	1.45	1.50	1.54	1.56	1.56	1.53	0.2%
Space Cooling <sup>1</sup> .....	0.04	0.04	0.04	0.04	0.04	0.04	0.04	-0.2%
Water Heating <sup>1</sup> .....	0.44	0.44	0.44	0.47	0.51	0.54	0.56	1.0%
Cooking .....	0.16	0.16	0.18	0.19	0.20	0.21	0.22	1.2%
Other Uses <sup>3</sup> .....	0.94	1.00	0.99	1.01	1.04	1.10	1.19	0.7%
<b>Delivered Energy .....</b>	<b>2.92</b>	<b>3.10</b>	<b>3.14</b>	<b>3.25</b>	<b>3.34</b>	<b>3.45</b>	<b>3.54</b>	<b>0.6%</b>
<b>Distillate Fuel Oil</b>								
Space Heating <sup>1</sup> .....	0.15	0.17	0.16	0.15	0.15	0.15	0.15	-0.5%
Water Heating <sup>1</sup> .....	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.9%
Other Uses <sup>4</sup> .....	0.22	0.22	0.18	0.17	0.17	0.17	0.17	-1.2%
<b>Delivered Energy .....</b>	<b>0.40</b>	<b>0.41</b>	<b>0.36</b>	<b>0.34</b>	<b>0.34</b>	<b>0.34</b>	<b>0.34</b>	<b>-0.8%</b>
Marketed Renewables (biomass) .....	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.0%
Other Fuels <sup>5</sup> .....	0.29	0.29	0.28	0.30	0.31	0.31	0.31	0.3%
<b>Delivered Energy Consumption by End Use</b>								
Space Heating <sup>1</sup> .....	1.66	1.79	1.83	1.86	1.89	1.89	1.86	0.2%
Space Cooling <sup>1</sup> .....	0.57	0.59	0.58	0.61	0.63	0.66	0.69	0.6%
Water Heating <sup>1</sup> .....	0.56	0.56	0.55	0.59	0.63	0.66	0.68	0.9%
Ventilation .....	0.48	0.49	0.53	0.59	0.64	0.68	0.71	1.6%
Cooking .....	0.18	0.19	0.20	0.21	0.22	0.23	0.24	1.1%
Lighting .....	1.08	1.07	1.06	1.10	1.15	1.19	1.22	0.5%
Refrigeration .....	0.40	0.40	0.40	0.38	0.38	0.39	0.40	-0.0%
Office Equipment (PC) .....	0.21	0.24	0.25	0.27	0.29	0.32	0.34	1.5%
Office Equipment (non-PC) .....	0.19	0.21	0.26	0.32	0.38	0.41	0.43	3.2%
Other Uses <sup>6</sup> .....	2.84	2.95	3.00	3.22	3.47	3.74	4.06	1.4%
<b>Delivered Energy .....</b>	<b>8.17</b>	<b>8.50</b>	<b>8.66</b>	<b>9.15</b>	<b>9.69</b>	<b>10.17</b>	<b>10.62</b>	<b>1.0%</b>

## Reference Case

**Table A5. Commercial Sector Key Indicators and Consumption (Continued)**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Electricity Related Losses</b> .....	<b>9.62</b>	<b>9.99</b>	<b>10.35</b>	<b>10.95</b>	<b>11.77</b>	<b>12.32</b>	<b>12.96</b>	<b>1.1%</b>
<b>Total Energy Consumption by End Use</b>								
Space Heating <sup>1</sup> .....	2.01	2.16	2.20	2.23	2.27	2.26	2.23	0.1%
Space Cooling <sup>1</sup> .....	1.73	1.80	1.77	1.82	1.89	1.95	2.03	0.5%
Water Heating <sup>1</sup> .....	0.77	0.77	0.76	0.80	0.83	0.86	0.87	0.6%
Ventilation .....	1.51	1.57	1.68	1.85	2.01	2.10	2.17	1.4%
Cooking .....	0.24	0.24	0.25	0.26	0.27	0.28	0.29	0.8%
Lighting .....	3.41	3.41	3.36	3.44	3.58	3.64	3.71	0.4%
Refrigeration .....	1.26	1.28	1.26	1.18	1.18	1.19	1.22	-0.2%
Office Equipment (PC) .....	0.68	0.77	0.80	0.85	0.91	0.98	1.03	1.3%
Office Equipment (non-PC) .....	0.61	0.67	0.82	1.00	1.18	1.26	1.32	3.0%
Other Uses <sup>6</sup> .....	5.59	5.82	6.11	6.66	7.33	7.96	8.71	1.8%
<b>Total</b> .....	<b>17.79</b>	<b>18.49</b>	<b>19.01</b>	<b>20.10</b>	<b>21.46</b>	<b>22.49</b>	<b>23.59</b>	<b>1.1%</b>
<b>Nonmarketed Renewable Fuels<sup>7</sup></b>								
Solar Thermal .....	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.5%
Solar Photovoltaic .....	0.00	0.00	0.00	0.01	0.01	0.01	0.01	8.4%
Wind .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.3%
<b>Total</b> .....	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.04</b>	<b>0.04</b>	<b>2.0%</b>

<sup>1</sup>Includes fuel consumption for district services.

<sup>2</sup>Includes miscellaneous uses, such as service station equipment, automated teller machines, telecommunications equipment, and medical equipment.

<sup>3</sup>Includes miscellaneous uses, such as pumps, emergency generators, combined heat and power in commercial buildings, and manufacturing performed in commercial buildings.

<sup>4</sup>Includes miscellaneous uses, such as cooking, emergency generators, and combined heat and power in commercial buildings.

<sup>5</sup>Includes residual fuel oil, liquefied petroleum gases, coal, motor gasoline, and kerosene.

<sup>6</sup>Includes miscellaneous uses, such as service station equipment, automated teller machines, telecommunications equipment, medical equipment, pumps, emergency generators, combined heat and power in commercial buildings, manufacturing performed in commercial buildings, and cooking (distillate), plus residual fuel oil, liquefied petroleum gases, coal, motor gasoline, and kerosene.

<sup>7</sup>Represents delivered energy displaced by solar thermal space heating and water heating, and electricity generation by solar photovoltaic systems.

Btu = British thermal unit.

PC = Personal computer.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 based on: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008).  
Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

Table A6. Industrial Sector Key Indicators and Consumption

Key Indicators and Consumption	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Key Indicators</b>								
<b>Value of Shipments (billion 2000 dollars)</b>								
Manufacturing .....	4260	4261	3963	4694	5150	5732	6671	2.0%
Nonmanufacturing .....	1503	1490	1277	1581	1603	1671	1780	0.8%
<b>Total .....</b>	<b>5763</b>	<b>5750</b>	<b>5240</b>	<b>6276</b>	<b>6753</b>	<b>7402</b>	<b>8451</b>	<b>1.7%</b>
<b>Energy Prices</b>								
(2007 dollars per million Btu)								
Liquefied Petroleum Gases .....	21.04	23.38	21.84	28.19	28.78	29.35	30.99	1.2%
Motor Gasoline .....	15.92	15.93	23.41	28.63	29.64	30.58	32.04	3.1%
Distillate Fuel Oil .....	15.74	16.82	16.01	22.10	22.56	23.68	25.19	1.8%
Residual Fuel Oil .....	9.21	10.49	15.38	20.43	20.94	21.43	22.73	3.4%
Petrochemical Feedstocks .....	9.26	12.60	12.09	17.06	17.63	18.09	18.95	1.8%
Asphalt and Road Oil .....	4.75	5.36	6.49	9.30	9.52	9.87	10.70	3.1%
Natural Gas Heat and Power .....	6.94	6.59	6.03	6.18	6.65	7.18	8.31	1.0%
Natural Gas Feedstocks .....	8.71	8.24	7.70	7.80	8.25	8.76	9.83	0.8%
Metallurgical Coal .....	3.64	3.61	4.37	4.40	4.40	4.55	4.41	0.9%
Other Industrial Coal .....	2.40	2.43	2.54	2.57	2.53	2.57	2.67	0.4%
Coal for Liquids .....	--	--	--	1.21	1.23	1.31	1.36	--
Electricity .....	18.41	18.63	18.72	18.33	19.06	20.09	21.59	0.6%
(nominal dollars per million Btu)								
Liquefied Petroleum Gases .....	20.49	23.38	23.00	32.62	37.17	40.49	44.93	2.9%
Motor Gasoline .....	15.51	15.93	24.66	33.13	38.29	42.19	46.45	4.8%
Distillate Fuel Oil .....	15.32	16.82	16.86	25.57	29.14	32.67	36.52	3.4%
Residual Fuel Oil .....	8.97	10.49	16.20	23.64	27.05	29.57	32.95	5.1%
Petrochemical Feedstocks .....	9.02	12.60	12.74	19.74	22.77	24.95	27.48	3.4%
Asphalt and Road Oil .....	4.63	5.36	6.83	10.76	12.30	13.62	15.51	4.7%
Natural Gas Heat and Power .....	6.76	6.59	6.35	7.15	8.59	9.91	12.05	2.7%
Natural Gas Feedstocks .....	8.48	8.24	8.11	9.02	10.66	12.09	14.26	2.4%
Metallurgical Coal .....	3.54	3.61	4.60	5.09	5.69	6.28	6.40	2.5%
Other Industrial Coal .....	2.34	2.43	2.67	2.98	3.27	3.55	3.88	2.0%
Coal for Liquids .....	--	--	--	1.40	1.59	1.81	1.98	--
Electricity .....	17.93	18.63	19.72	21.20	24.63	27.71	31.30	2.3%
<b>Energy Consumption (quadrillion Btu)<sup>1</sup></b>								
<b>Industrial Consumption Excluding Refining</b>								
Liquefied Petroleum Gases Heat and Power ..	0.17	0.18	0.15	0.16	0.15	0.15	0.16	-0.6%
Liquefied Petroleum Gases Feedstocks .....	2.16	2.16	1.83	1.80	1.61	1.57	1.50	-1.6%
Motor Gasoline .....	0.36	0.36	0.34	0.35	0.34	0.34	0.36	-0.1%
Distillate Fuel Oil .....	1.26	1.27	1.17	1.21	1.18	1.19	1.23	-0.1%
Residual Fuel Oil .....	0.23	0.24	0.15	0.16	0.16	0.16	0.16	-1.7%
Petrochemical Feedstocks .....	1.42	1.30	1.01	1.20	1.13	1.10	1.05	-0.9%
Petroleum Coke .....	0.36	0.36	0.27	0.29	0.29	0.29	0.31	-0.6%
Asphalt and Road Oil .....	1.26	1.19	0.96	1.15	1.08	1.07	1.12	-0.3%
Miscellaneous Petroleum <sup>2</sup> .....	0.59	0.62	0.30	0.23	0.21	0.21	0.21	-4.6%
Petroleum Subtotal .....	7.81	7.68	6.18	6.55	6.15	6.08	6.10	-1.0%
Natural Gas Heat and Power .....	4.99	5.14	5.02	5.00	4.86	4.99	5.11	-0.0%
Natural Gas Feedstocks .....	0.58	0.55	0.51	0.52	0.50	0.49	0.44	-0.9%
Lease and Plant Fuel <sup>3</sup> .....	1.16	1.20	1.27	1.25	1.33	1.44	1.47	0.9%
Natural Gas Subtotal .....	6.73	6.89	6.80	6.78	6.69	6.92	7.02	0.1%
Metallurgical Coal and Coke <sup>4</sup> .....	0.66	0.62	0.56	0.55	0.50	0.49	0.49	-1.1%
Other Industrial Coal .....	1.19	1.15	1.18	1.10	1.09	1.10	1.10	-0.2%
Coal Subtotal .....	1.86	1.77	1.74	1.65	1.60	1.59	1.59	-0.5%
Renewables <sup>5</sup> .....	1.70	1.64	1.48	1.56	1.64	1.78	1.96	0.8%
Purchased Electricity .....	3.30	3.27	3.15	3.29	3.27	3.32	3.45	0.2%
<b>Delivered Energy .....</b>	<b>21.39</b>	<b>21.26</b>	<b>19.36</b>	<b>19.83</b>	<b>19.35</b>	<b>19.68</b>	<b>20.11</b>	<b>-0.2%</b>
Electricity Related Losses .....	7.16	7.13	6.86	7.01	6.91	6.88	7.09	-0.0%
<b>Total .....</b>	<b>28.55</b>	<b>28.40</b>	<b>26.22</b>	<b>26.83</b>	<b>26.25</b>	<b>26.57</b>	<b>27.20</b>	<b>-0.2%</b>

## Reference Case

**Table A6. Industrial Sector Key Indicators and Consumption (Continued)**

Key Indicators and Consumption	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Refining Consumption</b>								
Liquefied Petroleum Gases Heat and Power . . . . .	0.01	0.01	0.03	0.01	0.02	0.00	0.00	--
Distillate Fuel Oil . . . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Residual Fuel Oil . . . . .	0.01	0.01	0.00	0.00	0.00	0.00	0.00	--
Petroleum Coke . . . . .	0.57	0.55	0.54	0.54	0.53	0.52	0.53	-0.2%
Still Gas . . . . .	1.69	1.68	1.65	1.60	1.62	1.62	1.67	-0.0%
Miscellaneous Petroleum <sup>2</sup> . . . . .	0.04	0.02	0.01	0.01	0.01	0.01	0.01	-4.8%
Petroleum Subtotal . . . . .	2.32	2.27	2.24	2.16	2.17	2.15	2.20	-0.1%
Natural Gas Heat and Power . . . . .	1.10	1.13	1.25	1.46	1.47	1.47	1.49	1.2%
Natural-Gas-to-Liquids Heat and Power . . . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Natural Gas Subtotal . . . . .	1.10	1.13	1.25	1.46	1.47	1.47	1.49	1.2%
Other Industrial Coal . . . . .	0.06	0.06	0.06	0.06	0.06	0.06	0.06	-0.2%
Coal-to-Liquids Heat and Power . . . . .	0.00	0.00	0.00	0.13	0.24	0.40	0.58	--
Coal Subtotal . . . . .	0.06	0.06	0.06	0.19	0.30	0.46	0.64	10.7%
Biofuels Heat and Coproducts . . . . .	0.30	0.40	0.75	0.95	1.23	1.62	1.66	6.4%
Purchased Electricity . . . . .	0.15	0.16	0.19	0.21	0.22	0.21	0.22	1.4%
<b>Delivered Energy</b> . . . . .	<b>3.94</b>	<b>4.03</b>	<b>4.48</b>	<b>4.97</b>	<b>5.38</b>	<b>5.92</b>	<b>6.22</b>	<b>1.9%</b>
Electricity Related Losses . . . . .	0.32	0.35	0.41	0.44	0.46	0.44	0.46	1.2%
<b>Total</b> . . . . .	<b>4.25</b>	<b>4.38</b>	<b>4.88</b>	<b>5.41</b>	<b>5.84</b>	<b>6.36</b>	<b>6.67</b>	<b>1.9%</b>
<b>Total Industrial Sector Consumption</b>								
Liquefied Petroleum Gases Heat and Power . . . . .	0.18	0.19	0.19	0.17	0.17	0.15	0.16	-0.8%
Liquefied Petroleum Gases Feedstocks . . . . .	2.16	2.16	1.83	1.80	1.61	1.57	1.50	-1.6%
Motor Gasoline . . . . .	0.36	0.36	0.34	0.35	0.34	0.34	0.36	-0.1%
Distillate Fuel Oil . . . . .	1.26	1.28	1.17	1.21	1.18	1.19	1.23	-0.1%
Residual Fuel Oil . . . . .	0.24	0.25	0.15	0.16	0.16	0.16	0.16	-1.9%
Petrochemical Feedstocks . . . . .	1.42	1.30	1.01	1.20	1.13	1.10	1.05	-0.9%
Petroleum Coke . . . . .	0.93	0.91	0.81	0.83	0.82	0.82	0.83	-0.4%
Asphalt and Road Oil . . . . .	1.26	1.19	0.96	1.15	1.08	1.07	1.12	-0.3%
Still Gas . . . . .	1.69	1.68	1.65	1.60	1.62	1.62	1.67	-0.0%
Miscellaneous Petroleum <sup>2</sup> . . . . .	0.63	0.65	0.31	0.23	0.21	0.22	0.22	-4.6%
Petroleum Subtotal . . . . .	10.13	9.96	8.42	8.71	8.32	8.22	8.30	-0.8%
Natural Gas Heat and Power . . . . .	6.10	6.27	6.27	6.47	6.34	6.46	6.60	0.2%
Natural-Gas-to-Liquids Heat and Power . . . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Natural Gas Feedstocks . . . . .	0.58	0.55	0.51	0.52	0.50	0.49	0.44	-0.9%
Lease and Plant Fuel <sup>3</sup> . . . . .	1.16	1.20	1.27	1.25	1.33	1.44	1.47	0.9%
Natural Gas Subtotal . . . . .	7.83	8.02	8.05	8.24	8.17	8.39	8.51	0.3%
Metallurgical Coal and Coke <sup>4</sup> . . . . .	0.66	0.62	0.56	0.55	0.50	0.49	0.49	-1.1%
Other Industrial Coal . . . . .	1.25	1.21	1.24	1.16	1.15	1.16	1.16	-0.2%
Coal-to-Liquids Heat and Power . . . . .	0.00	0.00	0.00	0.13	0.24	0.40	0.58	32.7%
Coal Subtotal . . . . .	1.92	1.83	1.80	1.84	1.89	2.05	2.23	0.9%
Biofuels Heat and Coproducts . . . . .	0.30	0.40	0.75	0.95	1.23	1.62	1.66	6.4%
Renewables <sup>5</sup> . . . . .	1.70	1.64	1.48	1.56	1.64	1.78	1.96	0.8%
Purchased Electricity . . . . .	3.45	3.43	3.34	3.50	3.48	3.54	3.67	0.3%
<b>Delivered Energy</b> . . . . .	<b>25.33</b>	<b>25.29</b>	<b>23.83</b>	<b>24.79</b>	<b>24.73</b>	<b>25.60</b>	<b>26.33</b>	<b>0.2%</b>
Electricity Related Losses . . . . .	7.48	7.49	7.27	7.45	7.36	7.32	7.55	0.0%
<b>Total</b> . . . . .	<b>32.81</b>	<b>32.77</b>	<b>31.10</b>	<b>32.24</b>	<b>32.09</b>	<b>32.93</b>	<b>33.87</b>	<b>0.1%</b>

Table A6. Industrial Sector Key Indicators and Consumption (Continued)

Key Indicators and Consumption	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Energy Consumption per dollar of Shipment (thousand Btu per 2000 dollars)</b>								
Liquefied Petroleum Gases Heat and Power . . .	0.03	0.03	0.04	0.03	0.03	0.02	0.02	-2.4%
Liquefied Petroleum Gases Feedstocks . . . .	0.37	0.38	0.35	0.29	0.24	0.21	0.18	-3.2%
Motor Gasoline . . . . .	0.06	0.06	0.07	0.06	0.05	0.05	0.04	-1.7%
Distillate Fuel Oil . . . . .	0.22	0.22	0.22	0.19	0.18	0.16	0.15	-1.8%
Residual Fuel Oil . . . . .	0.04	0.04	0.03	0.03	0.02	0.02	0.02	-3.5%
Petrochemical Feedstocks . . . . .	0.25	0.23	0.19	0.19	0.17	0.15	0.12	-2.6%
Petroleum Coke . . . . .	0.16	0.16	0.15	0.13	0.12	0.11	0.10	-2.0%
Asphalt and Road Oil . . . . .	0.22	0.21	0.18	0.18	0.16	0.14	0.13	-1.9%
Still Gas . . . . .	0.29	0.29	0.32	0.26	0.24	0.22	0.20	-1.7%
Miscellaneous Petroleum <sup>2</sup> . . . . .	0.11	0.11	0.06	0.04	0.03	0.03	0.03	-6.2%
Petroleum Subtotal . . . . .	1.76	1.73	1.61	1.39	1.23	1.11	0.98	-2.4%
Natural Gas Heat and Power . . . . .	1.06	1.09	1.20	1.03	0.94	0.87	0.78	-1.4%
Natural-Gas-to-Liquids Heat and Power . . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Natural Gas Feedstocks . . . . .	0.10	0.10	0.10	0.08	0.07	0.07	0.05	-2.6%
Lease and Plant Fuel <sup>3</sup> . . . . .	0.20	0.21	0.24	0.20	0.20	0.20	0.17	-0.8%
Natural Gas Subtotal . . . . .	1.36	1.39	1.54	1.31	1.21	1.13	1.01	-1.4%
Metallurgical Coal and Coke <sup>4</sup> . . . . .	0.12	0.11	0.11	0.09	0.07	0.07	0.06	-2.7%
Other Industrial Coal . . . . .	0.22	0.21	0.24	0.19	0.17	0.16	0.14	-1.8%
Coal-to-Liquids Heat and Power . . . . .	0.00	0.00	0.00	0.02	0.04	0.05	0.07	30.5%
Coal Subtotal . . . . .	0.33	0.32	0.34	0.29	0.28	0.28	0.26	-0.8%
Biofuels Heat and Coproducts . . . . .	0.05	0.07	0.14	0.15	0.18	0.22	0.20	4.6%
Renewables <sup>5</sup> . . . . .	0.29	0.29	0.28	0.25	0.24	0.24	0.23	-0.9%
Purchased Electricity . . . . .	0.60	0.60	0.64	0.56	0.52	0.48	0.43	-1.4%
<b>Delivered Energy . . . . .</b>	<b>4.39</b>	<b>4.40</b>	<b>4.55</b>	<b>3.95</b>	<b>3.66</b>	<b>3.46</b>	<b>3.12</b>	<b>-1.5%</b>
Electricity Related Losses . . . . .	1.30	1.30	1.39	1.19	1.09	0.99	0.89	-1.6%
<b>Total . . . . .</b>	<b>5.69</b>	<b>5.70</b>	<b>5.94</b>	<b>5.14</b>	<b>4.75</b>	<b>4.45</b>	<b>4.01</b>	<b>-1.5%</b>
<b>Industrial Combined Heat and Power</b>								
Capacity (gigawatts) . . . . .	25.69	25.42	28.84	31.46	35.01	40.93	45.71	2.6%
Generation (billion kilowatthours) . . . . .	143.19	141.01	160.28	178.75	205.32	251.19	285.32	3.1%

<sup>1</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>2</sup>Includes lubricants and miscellaneous petroleum products.

<sup>3</sup>Represents natural gas used in well, field, and lease operations, and in natural gas processing plant machinery.

<sup>4</sup>Includes net coal coke imports.

<sup>5</sup>Includes consumption of energy produced from hydroelectric, wood and wood waste, municipal waste, and other biomass sources.

Btu = British thermal unit.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 prices for motor gasoline and distillate fuel oil are based on: Energy Information Administration (EIA), *Petroleum Marketing Annual 2007*, DOE/EIA-0487(2007) (Washington, DC, August 2008). 2006 and 2007 petrochemical feedstock and asphalt and road oil prices are based on: EIA, *State Energy Data Report 2006*, DOE/EIA-0214(2006) (Washington, DC, October 2008). 2006 and 2007 coal prices are based on: EIA, *Quarterly Coal Report, October-December 2007*, DOE/EIA-0121(2007/4Q) (Washington, DC, March 2008) and EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A. 2006 and 2007 electricity prices: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2006 and 2007 natural gas prices are based on: EIA, *Manufacturing Energy Consumption Survey 1994* and industrial and wellhead prices from the *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007) and the *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2006 refining consumption values based on: *Petroleum Supply Annual 2006*, DOE/EIA-0340(2006)/1 (Washington, DC, September 2007). 2007 refining consumption based on: *Petroleum Supply Annual 2007*, DOE/EIA-0340(2007)/1 (Washington, DC, July 2008). Other 2006 and 2007 consumption values are based on: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2006 and 2007 shipments: IHS Global Insight industry model, November 2008. Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

# Reference Case

**Table A7. Transportation Sector Key Indicators and Delivered Energy Consumption**

Key Indicators and Consumption	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Key Indicators</b>								
<b>Travel Indicators</b>								
(billion vehicle miles traveled)								
Light-Duty Vehicles less than 8,500 pounds	2695	2702	2747	2869	3161	3489	3827	1.5%
Commercial Light Trucks <sup>1</sup>	70	72	67	78	85	93	105	1.7%
Freight Trucks greater than 10,000 pounds	244	248	232	277	303	334	378	1.9%
(billion seat miles available)								
Air	984	1036	951	1018	1138	1272	1410	1.3%
(billion ton miles traveled)								
Rail	1718	1733	1664	1846	1927	2024	2193	1.0%
Domestic Shipping	659	662	629	697	744	798	839	1.0%
<b>Energy Efficiency Indicators</b>								
(miles per gallon)								
Tested New Light-Duty Vehicle <sup>2</sup>	26.2	26.3	26.9	32.6	35.5	36.8	38.0	1.6%
New Car <sup>2</sup>	30.2	30.3	30.7	36.6	39.1	40.2	41.4	1.4%
New Light Truck <sup>2</sup>	23.1	23.1	23.6	28.3	30.7	32.1	33.1	1.6%
On-Road New Light-Duty Vehicle <sup>3</sup>	21.4	21.8	22.3	27.1	29.5	30.8	31.9	1.7%
New Car <sup>3</sup>	23.8	24.6	25.1	30.1	32.3	33.5	34.7	1.5%
New Light Truck <sup>3</sup>	19.4	19.4	19.8	23.8	25.8	27.0	27.8	1.6%
Light-Duty Stock <sup>4</sup>	20.4	20.6	20.7	22.4	24.7	27.0	28.9	1.5%
New Commercial Light Truck <sup>1</sup>	15.5	15.4	15.7	18.6	19.6	20.0	20.3	1.2%
Stock Commercial Light Truck <sup>1</sup>	14.3	14.4	14.8	16.0	17.6	18.9	19.8	1.4%
Freight Truck	6.0	6.0	6.0	6.2	6.5	6.7	6.9	0.6%
(seat miles per gallon)								
Aircraft	62.2	62.8	64.4	66.2	68.1	70.4	73.6	0.7%
(ton miles per thousand Btu)								
Rail	2.9	2.9	2.9	2.9	3.0	3.0	3.0	0.1%
Domestic Shipping	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.1%
<b>Energy Use by Mode</b>								
<b>(quadrillion Btu)</b>								
Light-Duty Vehicles	16.42	16.47	16.20	15.86	15.80	16.02	16.51	0.0%
Commercial Light Trucks <sup>1</sup>	0.62	0.62	0.57	0.61	0.61	0.62	0.67	0.3%
Bus Transportation	0.27	0.27	0.27	0.27	0.27	0.27	0.28	0.2%
Freight Trucks	5.07	5.15	4.81	5.55	5.79	6.19	6.90	1.3%
Rail, Passenger	0.04	0.05	0.05	0.05	0.05	0.06	0.06	1.3%
Rail, Freight	0.59	0.59	0.57	0.63	0.65	0.68	0.73	0.9%
Shipping, Domestic	0.34	0.34	0.32	0.35	0.37	0.40	0.42	0.9%
Shipping, International	0.84	0.88	0.80	0.89	0.90	0.90	0.91	0.1%
Recreational Boats	0.25	0.25	0.25	0.26	0.26	0.27	0.28	0.4%
Air	2.71	2.71	2.45	2.62	2.87	3.18	3.54	1.2%
Military Use	0.69	0.70	0.74	0.72	0.74	0.76	0.78	0.4%
Lubricants	0.15	0.14	0.14	0.14	0.15	0.15	0.15	0.4%
Pipeline Fuel	0.60	0.64	0.64	0.65	0.69	0.73	0.72	0.5%
<b>Total</b>	<b>28.60</b>	<b>28.82</b>	<b>27.81</b>	<b>28.60</b>	<b>29.15</b>	<b>30.23</b>	<b>31.94</b>	<b>0.4%</b>

**Table A7. Transportation Sector Key Indicators and Delivered Energy Consumption  
(Continued)**

Key Indicators and Consumption	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Energy Use by Mode (million barrels per day oil equivalent)</b>								
Light-Duty Vehicles .....	8.61	8.74	8.72	8.61	8.69	9.00	9.35	0.3%
Commercial Light Trucks <sup>1</sup> .....	0.32	0.33	0.31	0.33	0.33	0.33	0.36	0.4%
Bus Transportation .....	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.2%
Freight Trucks .....	2.42	2.46	2.30	2.66	2.77	2.96	3.31	1.3%
Rail, Passenger .....	0.02	0.02	0.02	0.02	0.03	0.03	0.03	1.3%
Rail, Freight .....	0.28	0.28	0.27	0.30	0.31	0.32	0.35	0.9%
Shipping, Domestic .....	0.16	0.16	0.15	0.16	0.17	0.19	0.19	0.9%
Shipping, International .....	0.37	0.39	0.35	0.39	0.39	0.40	0.40	0.1%
Recreational Boats .....	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.5%
Air .....	1.31	1.31	1.19	1.27	1.39	1.54	1.71	1.2%
Military Use .....	0.33	0.34	0.36	0.35	0.36	0.37	0.37	0.4%
Lubricants .....	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.4%
Pipeline Fuel .....	0.30	0.32	0.32	0.33	0.35	0.37	0.36	0.5%
<b>Total .....</b>	<b>14.46</b>	<b>14.68</b>	<b>14.32</b>	<b>14.76</b>	<b>15.13</b>	<b>15.85</b>	<b>16.80</b>	<b>0.6%</b>

<sup>1</sup>Commercial trucks 8,500 to 10,000 pounds.

<sup>2</sup>Environmental Protection Agency rated miles per gallon.

<sup>3</sup>Tested new vehicle efficiency revised for on-road performance.

<sup>4</sup>Combined car and light truck "on-the-road" estimate.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007: Energy Information Administration (EIA), *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007); EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008); Federal Highway Administration, *Highway Statistics 2005* (Washington, DC, October 2006); Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 27 and Annual* (Oak Ridge, TN, 2008); National Highway Traffic and Safety Administration, *Summary of Fuel Economy Performance* (Washington, DC, March 2004); U.S. Department of Commerce, Bureau of the Census, "Vehicle Inventory and Use Survey," EC97TV (Washington, DC, October 1999); EIA, *Alternatives to Traditional Transportation Fuels 2006 (Part II - User and Fuel Data)*, May 2008; EIA, *State Energy Data Report 2006*, DOE/EIA-0214(2006) (Washington, DC, October 2008); U.S. Department of Transportation, Research and Special Programs Administration, *Air Carrier Statistics Monthly, December 2007/2006* (Washington, DC, 2007); EIA, *Fuel Oil and Kerosene Sales 2006*, DOE/EIA-0535(2006) (Washington, DC, December 2007); and United States Department of Defense, Defense Fuel Supply Center. Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

# Reference Case

**Table A8. Electricity Supply, Disposition, Prices, and Emissions**  
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Generation by Fuel Type</b>								
<b>Electric Power Sector<sup>1</sup></b>								
<b>Power Only<sup>2</sup></b>								
Coal .....	1934	1965	2006	2065	2093	2120	2334	0.8%
Petroleum .....	55	57	43	44	44	45	46	-0.9%
Natural Gas <sup>3</sup> .....	618	685	629	617	687	824	772	0.5%
Nuclear Power .....	787	806	809	831	862	867	907	0.5%
Pumped Storage/Other <sup>4</sup> .....	1	0	1	1	1	1	1	8.8%
Renewable Sources <sup>5</sup> .....	348	314	411	473	543	581	610	2.9%
Distributed Generation (Natural Gas) .....	0	0	0	0	0	0	0	--
<b>Total .....</b>	<b>3742</b>	<b>3827</b>	<b>3899</b>	<b>4030</b>	<b>4230</b>	<b>4438</b>	<b>4670</b>	<b>0.9%</b>
<b>Combined Heat and Power<sup>6</sup></b>								
Coal .....	36	37	32	32	32	32	32	-0.6%
Petroleum .....	5	5	0	0	0	0	0	-10.0%
Natural Gas .....	116	129	107	112	114	114	109	-0.7%
Renewable Sources .....	4	4	4	4	5	5	5	0.6%
<b>Total .....</b>	<b>165</b>	<b>179</b>	<b>143</b>	<b>148</b>	<b>151</b>	<b>151</b>	<b>146</b>	<b>-0.9%</b>
<b>Total Net Generation .....</b>	<b>3908</b>	<b>4006</b>	<b>4042</b>	<b>4178</b>	<b>4381</b>	<b>4589</b>	<b>4816</b>	<b>0.8%</b>
Less Direct Use .....	33	34	34	33	34	34	33	-0.1%
<b>Net Available to the Grid .....</b>	<b>3875</b>	<b>3972</b>	<b>4009</b>	<b>4145</b>	<b>4348</b>	<b>4556</b>	<b>4783</b>	<b>0.8%</b>
<b>End-Use Generation<sup>7</sup></b>								
Coal .....	22	19	19	25	31	39	48	4.1%
Petroleum .....	4	4	13	13	13	14	14	5.6%
Natural Gas .....	77	78	78	87	97	112	131	2.3%
Other Gaseous Fuels <sup>8</sup> .....	5	5	16	15	15	15	15	5.1%
Renewable Sources <sup>9</sup> .....	34	33	36	50	69	98	116	5.6%
Other <sup>10</sup> .....	13	13	12	12	12	12	12	-0.4%
<b>Total .....</b>	<b>155</b>	<b>153</b>	<b>174</b>	<b>203</b>	<b>237</b>	<b>289</b>	<b>337</b>	<b>3.5%</b>
Less Direct Use .....	124	122	142	164	188	223	261	3.4%
<b>Total Sales to the Grid .....</b>	<b>31</b>	<b>31</b>	<b>33</b>	<b>38</b>	<b>49</b>	<b>66</b>	<b>76</b>	<b>3.9%</b>
<b>Total Electricity Generation by Fuel</b>								
Coal .....	1992	2021	2057	2121	2156	2191	2415	0.8%
Petroleum .....	64	66	56	57	58	59	60	-0.3%
Natural Gas .....	812	892	814	815	898	1050	1012	0.6%
Nuclear Power .....	787	806	809	831	862	867	907	0.5%
Renewable Sources <sup>5,9</sup> .....	386	352	451	527	617	684	730	3.2%
Other <sup>11</sup> .....	23	22	29	28	28	28	28	1.1%
<b>Total .....</b>	<b>4063</b>	<b>4159</b>	<b>4217</b>	<b>4381</b>	<b>4618</b>	<b>4879</b>	<b>5153</b>	<b>0.9%</b>
<b>Total Electricity Generation .....</b>	<b>4063</b>	<b>4159</b>	<b>4217</b>	<b>4381</b>	<b>4618</b>	<b>4879</b>	<b>5153</b>	<b>0.9%</b>
<b>Total Net Generation to the Grid .....</b>	<b>3906</b>	<b>4004</b>	<b>4042</b>	<b>4183</b>	<b>4396</b>	<b>4622</b>	<b>4859</b>	<b>0.8%</b>
<b>Net Imports .....</b>	<b>18</b>	<b>31</b>	<b>24</b>	<b>17</b>	<b>18</b>	<b>14</b>	<b>28</b>	<b>-0.5%</b>
<b>Electricity Sales by Sector</b>								
Residential .....	1352	1392	1406	1423	1499	1581	1667	0.8%
Commercial .....	1300	1343	1393	1505	1632	1743	1850	1.4%
Industrial .....	1011	1006	979	1025	1021	1036	1077	0.3%
Transportation .....	6	6	7	8	10	12	15	3.7%
<b>Total .....</b>	<b>3669</b>	<b>3747</b>	<b>3785</b>	<b>3960</b>	<b>4162</b>	<b>4373</b>	<b>4609</b>	<b>0.9%</b>
Direct Use .....	157	156	175	198	222	257	294	2.8%
<b>Total Electricity Use .....</b>	<b>3826</b>	<b>3903</b>	<b>3960</b>	<b>4158</b>	<b>4384</b>	<b>4629</b>	<b>4903</b>	<b>1.0%</b>

**Table A8. Electricity Supply, Disposition, Prices, and Emissions (Continued)**  
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>End-Use Prices</b>								
(2007 cents per kilowatthour)								
Residential .....	10.6	10.6	10.5	10.8	11.2	11.6	12.2	0.6%
Commercial .....	9.7	9.6	9.3	9.3	9.6	10.0	10.6	0.4%
Industrial .....	6.3	6.4	6.4	6.3	6.5	6.9	7.4	0.6%
Transportation .....	10.4	10.5	10.4	10.3	10.1	10.8	11.7	0.5%
<b>All Sectors Average .....</b>	<b>9.1</b>	<b>9.1</b>	<b>9.0</b>	<b>9.1</b>	<b>9.4</b>	<b>9.8</b>	<b>10.4</b>	<b>0.6%</b>
(nominal cents per kilowatthour)								
Residential .....	10.4	10.6	11.1	12.5	14.4	16.0	17.7	2.2%
Commercial .....	9.4	9.6	9.8	10.7	12.4	13.8	15.3	2.1%
Industrial .....	6.1	6.4	6.7	7.2	8.4	9.5	10.7	2.3%
Transportation .....	10.1	10.5	10.9	11.9	13.0	14.9	16.9	2.1%
<b>All Sectors Average .....</b>	<b>8.9</b>	<b>9.1</b>	<b>9.5</b>	<b>10.5</b>	<b>12.2</b>	<b>13.6</b>	<b>15.1</b>	<b>2.2%</b>
<b>Prices by Service Category</b>								
(2007 cents per kilowatthour)								
Generation .....	6.0	6.0	6.0	5.9	6.2	6.6	7.3	0.8%
Transmission .....	0.7	0.7	0.7	0.8	0.8	0.9	0.9	1.3%
Distribution .....	2.4	2.4	2.4	2.4	2.4	2.4	2.3	-0.1%
(nominal cents per kilowatthour)								
Generation .....	5.9	6.0	6.3	6.8	8.1	9.2	10.5	2.4%
Transmission .....	0.7	0.7	0.8	0.9	1.1	1.2	1.3	3.0%
Distribution .....	2.3	2.4	2.5	2.8	3.1	3.3	3.4	1.5%
<b>Electric Power Sector Emissions<sup>1</sup></b>								
Sulfur Dioxide (million tons) .....	9.40	8.95	7.51	4.17	3.86	3.78	3.74	-3.7%
Nitrogen Oxide (million tons) .....	3.41	3.29	2.37	2.10	2.10	2.10	2.12	-1.9%
Mercury (tons) .....	49.04	49.28	45.19	29.08	29.13	29.44	29.57	-2.2%

<sup>1</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>2</sup>Includes plants that only produce electricity.

<sup>3</sup>Includes electricity generation from fuel cells.

<sup>4</sup>Includes non-biogenic municipal waste. The Energy Information Administration estimates approximately 7 billion kilowatthours of electricity were generated from a municipal waste stream containing petroleum-derived plastics and other non-renewable sources. See Energy Information Administration, *Methodology for Allocating Municipal Solid Waste to Biogenic and Non-Biogenic Energy*, (Washington, DC, May 2007).

<sup>5</sup>Includes conventional hydroelectric, geothermal, wood, wood waste, biogenic municipal waste, landfill gas, other biomass, solar, and wind power.

<sup>6</sup>Includes combined heat and power plants whose primary business is to sell electricity and heat to the public (i.e., those that report North American Industry Classification System code 22).

<sup>7</sup>Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors; and small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.

<sup>8</sup>Includes refinery gas and still gas.

<sup>9</sup>Includes conventional hydroelectric, geothermal, wood, wood waste, all municipal waste, landfill gas, other biomass, solar, and wind power.

<sup>10</sup>Includes batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, and miscellaneous technologies.

<sup>11</sup>Includes pumped storage, non-biogenic municipal waste, refinery gas, still gas, batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, and miscellaneous technologies.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 electric power sector generation; sales to utilities; net imports; electricity sales; and emissions: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008), and supporting databases. 2006 and 2007 prices: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A. Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

# Reference Case

**Table A9. Electricity Generating Capacity  
(Gigawatts)**

Net Summer Capacity <sup>1</sup>	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Electric Power Sector<sup>2</sup></b>								
<b>Power Only<sup>3</sup></b>								
Coal .....	305.2	306.7	316.4	321.5	322.4	323.8	347.9	0.6%
Oil and Natural Gas Steam <sup>4</sup> .....	119.3	118.4	118.0	101.4	101.4	101.4	100.1	-0.7%
Combined Cycle .....	144.7	149.2	163.0	163.9	170.3	197.5	205.2	1.4%
Combustion Turbine/Diesel .....	128.1	130.4	139.2	139.1	152.9	178.7	198.1	1.8%
Nuclear Power <sup>5</sup> .....	100.2	100.5	101.2	104.1	108.4	108.4	112.6	0.5%
Pumped Storage .....	21.5	21.5	21.5	21.5	21.5	21.5	21.5	0.0%
Fuel Cells .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Renewable Sources <sup>6</sup> .....	95.5	100.8	114.9	116.9	121.7	129.0	138.2	1.4%
Distributed Generation <sup>7</sup> .....	0.0	0.0	0.0	0.0	0.0	0.1	0.3	--
<b>Total .....</b>	<b>914.5</b>	<b>927.5</b>	<b>974.2</b>	<b>968.4</b>	<b>998.5</b>	<b>1060.4</b>	<b>1123.8</b>	<b>0.8%</b>
<b>Combined Heat and Power<sup>8</sup></b>								
Coal .....	4.6	4.6	4.6	4.6	4.6	4.6	4.6	0.0%
Oil and Natural Gas Steam <sup>4</sup> .....	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.0%
Combined Cycle .....	31.8	31.8	31.8	32.5	32.5	32.5	32.5	0.1%
Combustion Turbine/Diesel .....	2.9	2.9	2.9	2.9	2.9	2.9	2.9	0.0%
Renewable Sources <sup>6</sup> .....	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.0%
<b>Total .....</b>	<b>40.3</b>	<b>40.3</b>	<b>40.4</b>	<b>41.0</b>	<b>41.0</b>	<b>41.0</b>	<b>41.0</b>	<b>0.1%</b>
<b>Cumulative Planned Additions<sup>9</sup></b>								
Coal .....	0.0	0.0	11.3	17.0	17.0	17.0	17.0	--
Oil and Natural Gas Steam <sup>4</sup> .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Combined Cycle .....	0.0	0.0	13.8	15.3	15.3	15.3	15.3	--
Combustion Turbine/Diesel .....	0.0	0.0	3.2	3.2	3.2	3.2	3.2	--
Nuclear Power .....	0.0	0.0	0.0	1.2	1.2	1.2	1.2	--
Pumped Storage .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Fuel Cells .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Renewable Sources <sup>6</sup> .....	0.0	0.0	9.7	9.8	9.9	10.0	10.1	--
Distributed Generation <sup>7</sup> .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
<b>Total .....</b>	<b>0.0</b>	<b>0.0</b>	<b>38.0</b>	<b>46.5</b>	<b>46.6</b>	<b>46.7</b>	<b>46.8</b>	<b>--</b>
<b>Cumulative Unplanned Additions<sup>9</sup></b>								
Coal .....	0.0	0.0	0.0	0.0	1.0	2.4	26.6	--
Oil and Natural Gas Steam <sup>4</sup> .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Combined Cycle .....	0.0	0.0	0.0	0.0	6.4	33.6	41.3	--
Combustion Turbine/Diesel .....	0.0	0.0	5.9	10.8	24.6	50.4	69.8	--
Nuclear Power .....	0.0	0.0	0.0	0.0	3.3	3.3	11.9	--
Pumped Storage .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Fuel Cells .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Renewable Sources <sup>6</sup> .....	0.0	0.0	4.4	6.4	11.0	18.3	27.3	--
Distributed Generation <sup>7</sup> .....	0.0	0.0	0.0	0.0	0.0	0.1	0.3	--
<b>Total .....</b>	<b>0.0</b>	<b>0.0</b>	<b>10.3</b>	<b>17.1</b>	<b>46.3</b>	<b>108.1</b>	<b>177.1</b>	<b>--</b>
<b>Cumulative Electric Power Sector Additions</b>	<b>0.0</b>	<b>0.0</b>	<b>48.3</b>	<b>63.6</b>	<b>92.9</b>	<b>154.8</b>	<b>223.9</b>	<b>--</b>
<b>Cumulative Retirements<sup>10</sup></b>								
Coal .....	0.0	0.0	1.6	2.1	2.3	2.3	2.3	--
Oil and Natural Gas Steam <sup>4</sup> .....	0.0	0.0	0.4	17.0	17.0	17.0	18.3	--
Combined Cycle .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Combustion Turbine/Diesel .....	0.0	0.0	0.3	5.3	5.3	5.3	5.3	--
Nuclear Power .....	0.0	0.0	0.0	0.0	0.0	0.0	4.4	--
Pumped Storage .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Fuel Cells .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Renewable Sources <sup>6</sup> .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
<b>Total .....</b>	<b>0.0</b>	<b>0.0</b>	<b>2.3</b>	<b>24.4</b>	<b>24.5</b>	<b>24.5</b>	<b>30.2</b>	<b>--</b>
<b>Total Electric Power Sector Capacity .....</b>	<b>954.8</b>	<b>967.8</b>	<b>1014.5</b>	<b>1009.4</b>	<b>1039.5</b>	<b>1101.4</b>	<b>1164.9</b>	<b>0.8%</b>

**Table A9. Electricity Generating Capacity (Continued)**  
(Gigawatts)

Net Summer Capacity <sup>1</sup>	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>End-Use Generators<sup>11</sup></b>								
Coal .....	4.0	4.0	4.0	4.8	5.6	6.7	7.9	3.0%
Petroleum .....	1.2	1.3	2.6	2.6	2.6	2.6	2.7	3.3%
Natural Gas .....	14.1	14.0	13.8	15.1	16.4	18.3	21.0	1.8%
Other Gaseous Fuels .....	1.8	1.5	3.9	3.7	3.7	3.7	3.7	4.2%
Renewable Sources <sup>6</sup> .....	6.0	6.1	7.5	13.6	18.1	22.4	26.4	6.5%
Other .....	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.0%
<b>Total .....</b>	<b>27.9</b>	<b>27.8</b>	<b>32.6</b>	<b>40.6</b>	<b>47.3</b>	<b>54.5</b>	<b>62.6</b>	<b>3.6%</b>
<b>Cumulative Capacity Additions<sup>9</sup> .....</b>	<b>0.0</b>	<b>0.0</b>	<b>4.8</b>	<b>12.8</b>	<b>19.5</b>	<b>26.7</b>	<b>34.8</b>	<b>--</b>

<sup>1</sup>Net summer capacity is the steady hourly output that generating equipment is expected to supply to system load (exclusive of auxiliary power), as demonstrated by tests during summer peak demand.

<sup>2</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>3</sup>Includes plants that only produce electricity. Includes capacity increases (uprates) at existing units.

<sup>4</sup>Includes oil-, gas-, and dual-fired capacity.

<sup>5</sup>Nuclear capacity includes 3.4 gigawatts of uprates through 2030.

<sup>6</sup>Includes conventional hydroelectric, geothermal, wood, wood waste, all municipal waste, landfill gas, other biomass, solar, and wind power. Facilities co-firing biomass and coal are classified as coal.

<sup>7</sup>Primarily peak load capacity fueled by natural gas.

<sup>8</sup>Includes combined heat and power plants whose primary business is to sell electricity and heat to the public (i.e., those that report North American Industry Classification System code 22).

<sup>9</sup>Cumulative additions after December 31, 2007.

<sup>10</sup>Cumulative retirements after December 31, 2007.

<sup>11</sup>Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors; and small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 capacity and projected planned additions: Energy Information Administration (EIA), Form EIA-860, "Annual Electric Generator Report" (preliminary). Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

## Reference Case

**Table A10. Electricity Trade**  
(Billion Kilowatthours, Unless Otherwise Noted)

Electricity Trade	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Interregional Electricity Trade</b>								
Gross Domestic Sales								
Firm Power .....	123.1	124.5	118.7	110.9	81.8	44.9	37.6	-5.1%
Economy .....	151.1	116.7	207.9	232.3	232.0	204.6	186.5	2.1%
<b>Total .....</b>	<b>274.2</b>	<b>241.3</b>	<b>326.6</b>	<b>343.2</b>	<b>313.8</b>	<b>249.5</b>	<b>224.0</b>	<b>-0.3%</b>
Gross Domestic Sales (million 2007 dollars)								
Firm Power .....	7051.4	7133.1	6799.0	6353.0	4683.5	2574.5	2152.7	-5.1%
Economy .....	8652.1	7235.0	11340.4	12499.1	12766.6	12674.0	12768.4	2.5%
<b>Total .....</b>	<b>15703.6</b>	<b>14368.1</b>	<b>18139.4</b>	<b>18852.1</b>	<b>17450.1</b>	<b>15248.5</b>	<b>14921.1</b>	<b>0.2%</b>
<b>International Electricity Trade</b>								
Imports from Canada and Mexico								
Firm Power .....	13.7	15.8	16.6	12.0	7.3	1.5	0.4	-14.9%
Economy .....	28.8	35.6	29.3	27.6	31.4	31.5	46.0	1.1%
<b>Total .....</b>	<b>42.4</b>	<b>51.4</b>	<b>45.9</b>	<b>39.6</b>	<b>38.7</b>	<b>33.1</b>	<b>46.4</b>	<b>-0.4%</b>
Exports to Canada and Mexico								
Firm Power .....	3.2	3.9	0.9	0.9	0.5	0.1	0.0	--
Economy .....	21.4	16.2	20.6	21.3	20.4	18.5	18.5	0.6%
<b>Total .....</b>	<b>24.6</b>	<b>20.1</b>	<b>21.5</b>	<b>22.1</b>	<b>20.9</b>	<b>18.6</b>	<b>18.5</b>	<b>-0.4%</b>

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports. Firm Power Sales are capacity sales, meaning the delivery of the power is scheduled as part of the normal operating conditions of the affected electric systems. Economy Sales are subject to curtailment or cessation of delivery by the supplier in accordance with prior agreements or under specified conditions.

Sources: 2006 and 2007 interregional firm electricity trade data: North American Electric Reliability Council (NERC), Electricity Sales and Demand Database 2007. 2006 and 2007 Mexican electricity trade data: Energy Information Administration (EIA), *Electric Power Annual 2007* DOE/EIA-0348(2007) (Washington, DC, December 2008). 2006 Canadian international electricity trade data: National Energy Board, *Annual Report 2006*. 2007 Canadian electricity trade data: National Energy Board, *Annual Report 2007*. Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

**Table A11. Liquid Fuels Supply and Disposition**  
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Crude Oil</b>								
Domestic Crude Production <sup>1</sup> .....	5.10	5.07	5.62	5.72	6.48	7.21	7.37	1.6%
Alaska .....	0.74	0.72	0.69	0.51	0.72	0.77	0.57	-1.0%
Lower 48 States .....	4.36	4.35	4.93	5.21	5.76	6.44	6.80	2.0%
Net Imports .....	10.09	10.00	8.10	8.10	7.29	6.66	6.95	-1.6%
Gross Imports .....	10.12	10.03	8.13	8.13	7.33	6.70	6.99	-1.6%
Exports .....	0.03	0.03	0.03	0.03	0.03	0.04	0.04	1.6%
Other Crude Supply <sup>2</sup> .....	0.05	0.09	0.00	0.00	0.00	0.00	0.00	-
<b>Total Crude Supply</b> .....	<b>15.24</b>	<b>15.16</b>	<b>13.72</b>	<b>13.83</b>	<b>13.77</b>	<b>13.87</b>	<b>14.32</b>	<b>-0.2%</b>
<b>Other Supply</b>								
Natural Gas Plant Liquids .....	1.74	1.78	1.91	1.89	1.91	1.93	1.92	0.3%
Net Product Imports .....	2.31	2.09	1.66	1.64	1.49	1.35	1.40	-1.7%
Gross Refined Product Imports <sup>3</sup> .....	2.17	1.94	1.64	1.53	1.60	1.51	1.54	-1.0%
Unfinished Oil Imports .....	0.69	0.72	0.58	0.59	0.58	0.60	0.65	-0.4%
Blending Component Imports .....	0.68	0.75	0.62	0.75	0.66	0.67	0.69	-0.4%
Exports .....	1.22	1.32	1.18	1.23	1.35	1.43	1.47	0.5%
Refinery Processing Gain <sup>4</sup> .....	0.99	1.00	0.97	0.96	0.93	0.89	0.86	-0.6%
Other Inputs .....	0.41	0.74	1.22	1.66	1.98	2.63	3.08	6.4%
Ethanol .....	0.36	0.45	0.84	1.07	1.28	1.68	1.91	6.5%
Domestic Production .....	0.32	0.43	0.84	1.06	1.24	1.43	1.43	5.4%
Net Imports .....	0.05	0.02	-0.00	0.01	0.04	0.25	0.49	14.5%
Biodiesel .....	0.02	0.03	0.06	0.10	0.10	0.12	0.13	6.2%
Domestic Production .....	0.02	0.03	0.06	0.10	0.10	0.12	0.13	6.2%
Net Imports .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
Liquids from Gas .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
Liquids from Coal .....	0.00	0.00	0.00	0.06	0.10	0.18	0.26	-
Liquids from Biomass .....	0.00	0.00	0.00	0.01	0.07	0.24	0.33	-
Other <sup>5</sup> .....	0.03	0.26	0.32	0.42	0.42	0.42	0.45	2.4%
<b>Total Primary Supply<sup>6</sup></b> .....	<b>20.70</b>	<b>20.77</b>	<b>19.48</b>	<b>19.98</b>	<b>20.08</b>	<b>20.68</b>	<b>21.59</b>	<b>0.2%</b>
<b>Liquid Fuels Consumption</b>								
<b>by Fuel</b>								
Liquefied Petroleum Gases .....	2.05	2.09	1.99	1.95	1.82	1.78	1.74	-0.8%
E85 <sup>7</sup> .....	0.00	0.00	0.00	0.24	0.58	1.17	1.50	37.1%
Motor Gasoline <sup>8</sup> .....	9.25	9.29	9.34	8.97	8.60	8.15	8.04	-0.6%
Jet Fuel <sup>9</sup> .....	1.63	1.62	1.45	1.52	1.65	1.81	1.99	0.9%
Distillate Fuel Oil <sup>10</sup> .....	4.17	4.20	4.08	4.46	4.62	4.91	5.42	1.1%
Diesel .....	3.21	3.47	3.47	3.89	4.06	4.38	4.91	1.5%
Residual Fuel Oil .....	0.69	0.72	0.63	0.69	0.70	0.71	0.72	-0.0%
Other <sup>11</sup> .....	2.86	2.74	2.19	2.31	2.24	2.22	2.25	-0.8%
<b>by Sector</b>								
Residential and Commercial .....	1.06	1.11	1.05	1.00	0.99	0.98	0.97	-0.6%
Industrial <sup>12</sup> .....	5.32	5.26	4.46	4.57	4.34	4.28	4.28	-0.9%
Transportation .....	14.21	14.25	13.96	14.36	14.65	15.27	16.18	0.6%
Electric Power <sup>13</sup> .....	0.29	0.30	0.22	0.22	0.23	0.23	0.23	-1.0%
<b>Total</b> .....	<b>20.65</b>	<b>20.65</b>	<b>19.69</b>	<b>20.16</b>	<b>20.21</b>	<b>20.76</b>	<b>21.67</b>	<b>0.2%</b>
Discrepancy <sup>14</sup> .....	0.04	0.12	-0.20	-0.17	-0.13	-0.08	-0.08	-

## Reference Case

**Table A11. Liquid Fuels Supply and Disposition (Continued)**  
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
Domestic Refinery Distillation Capacity <sup>15</sup> . . . . .	17.3	17.4	18.0	18.1	18.2	18.3	18.4	0.2%
Capacity Utilization Rate (percent) <sup>16</sup> . . . . .	90.0	89.0	77.8	77.7	77.1	77.4	79.2	-0.5%
Net Import Share of Product Supplied (percent) . . . . .	60.2	58.3	50.1	48.8	44.0	39.9	40.9	-1.5%
Net Expenditures for Imported Crude Oil and Petroleum Products (billion 2007 dollars) . . . . .	272.80	280.13	261.60	360.62	344.32	329.89	376.65	1.3%

<sup>1</sup>Includes lease condensate.

<sup>2</sup>Strategic petroleum reserve stock additions plus unaccounted for crude oil and crude stock withdrawals minus crude product supplied.

<sup>3</sup>Includes other hydrocarbons and alcohols.

<sup>4</sup>The volumetric amount by which total output is greater than input due to the processing of crude oil into products which, in total, have a lower specific gravity than the crude oil processed.

<sup>5</sup>Includes petroleum product stock withdrawals; and domestic sources of other blending components, other hydrocarbons, ethers, and renewable feedstocks for the on-site production of diesel and gasoline.

<sup>6</sup>Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.

<sup>7</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>8</sup>Includes ethanol and ethers blended into gasoline.

<sup>9</sup>Includes only kerosene type.

<sup>10</sup>Includes distillate fuel oil and kerosene from petroleum and biomass feedstocks.

<sup>11</sup>Includes aviation gasoline, petrochemical feedstocks, lubricants, waxes, asphalt, road oil, still gas, special naphthas, petroleum coke, crude oil product supplied, methanol, liquid hydrogen, and miscellaneous petroleum products.

<sup>12</sup>Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.

<sup>13</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>14</sup>Balancing item. Includes unaccounted for supply, losses, and gains.

<sup>15</sup>End-of-year operable capacity.

<sup>16</sup>Rate is calculated by dividing the gross annual input to atmospheric crude oil distillation units by their operable refining capacity in barrels per calendar day.

- - = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 petroleum product supplied based on: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). Other 2006 data: EIA, *Petroleum Supply Annual 2006*, DOE/EIA-0340(2006)/1 (Washington, DC, September 2007). Other 2007 data: EIA, *Petroleum Supply Annual 2007*, DOE/EIA-0340(2007)/1 (Washington, DC, July 2008). Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

**Table A12. Petroleum Product Prices**  
(2007 Cents per Gallon, Unless Otherwise Noted)

Sector and Fuel	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Crude Oil Prices (2007 dollars per barrel)</b>								
Imported Low Sulfur Light Crude Oil <sup>1</sup> . . . . .	67.82	72.33	80.16	110.49	115.45	121.94	130.43	2.6%
Imported Crude Oil <sup>1</sup> . . . . .	60.70	63.83	77.56	108.52	112.05	115.33	124.60	3.0%
<b>Delivered Sector Product Prices</b>								
<b>Residential</b>								
Liquefied Petroleum Gases . . . . .	205.0	213.6	221.1	275.6	281.1	285.9	300.2	1.5%
Distillate Fuel Oil . . . . .	256.1	272.7	259.2	327.1	334.3	344.6	369.9	1.3%
<b>Commercial</b>								
Distillate Fuel Oil . . . . .	207.7	221.7	222.8	298.3	304.9	318.0	340.4	1.9%
Residual Fuel Oil . . . . .	132.9	152.9	164.2	241.3	249.7	255.6	269.1	2.5%
Residual Fuel Oil (2007 dollars per barrel) . .	55.84	64.22	68.96	101.34	104.88	107.34	113.04	2.5%
<b>Industrial<sup>2</sup></b>								
Liquefied Petroleum Gases . . . . .	180.6	199.9	186.7	241.1	246.0	250.9	265.0	1.2%
Distillate Fuel Oil . . . . .	217.8	232.3	220.2	303.3	309.6	325.0	345.8	1.7%
Residual Fuel Oil . . . . .	137.9	157.1	230.2	305.9	313.4	320.8	340.2	3.4%
Residual Fuel Oil (2007 dollars per barrel) . .	57.92	65.98	96.70	128.46	131.64	134.74	142.89	3.4%
<b>Transportation</b>								
Liquefied Petroleum Gases . . . . .	191.4	213.8	219.5	273.9	278.9	283.2	297.3	1.4%
Ethanol (E85) <sup>3</sup> . . . . .	242.1	253.0	241.7	242.0	278.0	282.2	285.5	0.5%
Ethanol Wholesale Price . . . . .	257.0	212.4	192.8	210.8	201.1	189.8	193.8	-0.4%
Motor Gasoline <sup>4</sup> . . . . .	270.7	282.2	283.9	347.7	359.9	371.1	388.4	1.4%
Jet Fuel <sup>5</sup> . . . . .	205.8	217.3	216.5	290.0	299.1	310.2	332.4	1.9%
Diesel Fuel (distillate fuel oil) <sup>6</sup> . . . . .	278.6	287.0	274.9	352.7	356.8	372.2	391.7	1.4%
Residual Fuel Oil . . . . .	122.8	140.0	181.1	255.6	261.4	271.5	294.1	3.3%
Residual Fuel Oil (2007 dollars per barrel) . .	51.59	58.80	76.07	107.37	109.80	114.01	123.54	3.3%
<b>Electric Power<sup>7</sup></b>								
Distillate Fuel Oil . . . . .	191.0	204.9	209.2	276.0	283.6	295.2	320.5	2.0%
Residual Fuel Oil . . . . .	125.4	125.4	197.7	272.3	277.7	288.3	309.5	4.0%
Residual Fuel Oil (2007 dollars per barrel) . .	52.67	52.67	83.03	114.35	116.64	121.08	129.98	4.0%
<b>Refined Petroleum Product Prices<sup>8</sup></b>								
Liquefied Petroleum Gases . . . . .	134.4	158.5	179.2	229.4	235.7	240.6	254.5	2.1%
Motor Gasoline <sup>4</sup> . . . . .	269.0	280.2	283.9	347.7	359.9	371.1	388.4	1.4%
Jet Fuel <sup>5</sup> . . . . .	205.8	217.3	216.5	290.0	299.1	310.2	332.4	1.9%
Distillate Fuel Oil . . . . .	264.3	274.5	260.9	341.5	346.8	362.5	383.2	1.5%
Residual Fuel Oil . . . . .	126.1	138.4	189.6	264.0	269.8	279.5	301.1	3.4%
Residual Fuel Oil (2007 dollars per barrel) . .	52.97	58.15	79.62	110.88	113.34	117.40	126.47	3.4%
<b>Average</b> . . . . .	<b>235.1</b>	<b>249.1</b>	<b>254.9</b>	<b>321.6</b>	<b>331.1</b>	<b>342.4</b>	<b>361.4</b>	<b>1.6%</b>

# Reference Case

**Table A12. Petroleum Product Prices (Continued)**  
(Nominal Cents per Gallon, Unless Otherwise Noted)

Sector and Fuel	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Crude Oil Prices (nominal dollars per barrel)</b>								
Imported Low Sulfur Light Crude Oil <sup>1</sup> . . . . .	66.04	72.33	84.42	127.84	149.14	168.24	189.10	4.3%
Imported Crude Oil <sup>1</sup> . . . . .	59.10	63.83	81.69	125.57	144.74	159.11	180.66	4.6%
<b>Delivered Sector Product Prices</b>								
<b>Residential</b>								
Liquefied Petroleum Gases . . . . .	199.6	213.6	232.9	318.9	363.1	394.4	435.2	3.1%
Distillate Fuel Oil . . . . .	249.4	272.7	273.0	378.5	431.8	475.4	536.3	3.0%
<b>Commercial</b>								
Distillate Fuel Oil . . . . .	202.2	221.7	234.6	345.1	393.8	438.7	493.5	3.5%
Residual Fuel Oil . . . . .	129.5	152.9	172.9	279.2	322.6	352.6	390.2	4.2%
Residual Fuel Oil (nominal dollars per barrel)	54.37	64.22	72.63	117.26	135.48	148.09	163.89	4.2%
<b>Industrial<sup>2</sup></b>								
Liquefied Petroleum Gases . . . . .	175.9	199.9	196.6	278.9	317.8	346.2	384.2	2.9%
Distillate Fuel Oil . . . . .	212.1	232.3	231.9	351.0	400.0	448.4	501.4	3.4%
Residual Fuel Oil . . . . .	134.3	157.1	242.5	353.9	404.9	442.6	493.3	5.1%
Residual Fuel Oil (nominal dollars per barrel)	56.40	65.98	101.84	148.64	170.06	185.89	207.17	5.1%
<b>Transportation</b>								
Liquefied Petroleum Gases . . . . .	186.3	213.8	231.2	316.9	360.3	390.8	431.0	3.1%
Ethanol (E85) <sup>3</sup> . . . . .	235.7	253.0	254.5	280.0	359.1	389.4	414.0	2.2%
Ethanol Wholesale Price . . . . .	250.2	212.4	203.1	243.9	259.8	261.9	280.9	1.2%
Motor Gasoline <sup>4</sup> . . . . .	263.6	282.2	299.0	402.4	464.9	512.0	563.1	3.0%
Jet Fuel <sup>5</sup> . . . . .	200.4	217.3	228.0	335.6	386.4	428.0	482.0	3.5%
Diesel Fuel (distillate fuel oil) <sup>6</sup> . . . . .	271.3	287.0	289.6	408.1	460.9	513.6	567.9	3.0%
Residual Fuel Oil . . . . .	119.6	140.0	190.8	295.8	337.7	374.5	426.5	5.0%
Residual Fuel Oil (nominal dollars per barrel)	50.24	58.80	80.12	124.24	141.83	157.30	179.11	5.0%
<b>Electric Power<sup>7</sup></b>								
Distillate Fuel Oil . . . . .	186.0	204.9	220.4	319.3	366.4	407.3	464.7	3.6%
Residual Fuel Oil . . . . .	122.1	125.4	208.2	315.0	358.8	397.7	448.7	5.7%
Residual Fuel Oil (nominal dollars per barrel)	51.29	52.67	87.45	132.32	150.68	167.04	188.44	5.7%
<b>Refined Petroleum Product Prices<sup>8</sup></b>								
Liquefied Petroleum Gases . . . . .	130.9	158.5	188.7	265.4	304.5	331.9	369.1	3.7%
Motor Gasoline <sup>4</sup> . . . . .	261.9	280.2	299.0	402.3	464.9	512.0	563.1	3.1%
Jet Fuel <sup>5</sup> . . . . .	200.4	217.3	228.0	335.6	386.4	428.0	482.0	3.5%
Distillate Fuel Oil . . . . .	257.3	274.5	274.7	395.2	448.0	500.1	555.7	3.1%
Residual Fuel Oil . . . . .	122.8	138.4	199.7	305.5	348.6	385.6	436.6	5.1%
Residual Fuel Oil (nominal dollars per barrel)	51.58	58.15	83.86	128.30	146.41	161.97	183.36	5.1%
<b>Average</b> . . . . .	<b>228.9</b>	<b>249.1</b>	<b>268.5</b>	<b>372.1</b>	<b>427.7</b>	<b>472.4</b>	<b>524.0</b>	<b>3.3%</b>

<sup>1</sup>Weighted average price delivered to U.S. refiners.

<sup>2</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>3</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>4</sup>Sales weighted-average price for all grades. Includes Federal, State and local taxes.

<sup>5</sup>Includes only kerosene type.

<sup>6</sup>Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

<sup>7</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>8</sup>Weighted averages of end-use fuel prices are derived from the prices in each sector and the corresponding sectoral consumption.

Note: Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 imported low sulfur light crude oil price: Energy Information Administration (EIA), Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." 2006 and 2007 imported crude oil price: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2006 and 2007 prices for motor gasoline, distillate fuel oil, and jet fuel are based on: EIA, *Petroleum Marketing Annual 2007*, DOE/EIA-0487(2007) (Washington, DC, August 2008). 2006 and 2007 residential, commercial, industrial, and transportation sector petroleum product prices are derived from: EIA, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report." 2006 and 2007 electric power prices based on: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2006 and 2007 E85 prices derived from monthly prices in the Clean Cities Alternative Fuel Price Report. 2006 and 2007 wholesale ethanol prices derived from Bloomberg U.S. average rack price. Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

**Table A13. Natural Gas Supply, Disposition, and Prices**  
(Trillion Cubic Feet per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Production</b>								
Dry Gas Production <sup>1</sup> .....	18.48	19.30	20.38	20.31	21.48	23.22	23.60	0.9%
Supplemental Natural Gas <sup>2</sup> .....	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.2%
<b>Net Imports</b> .....	<b>3.46</b>	<b>3.79</b>	<b>2.50</b>	<b>2.36</b>	<b>1.86</b>	<b>1.35</b>	<b>0.66</b>	<b>-7.3%</b>
Pipeline <sup>3</sup> .....	2.94	3.06	2.02	1.11	0.48	0.15	-0.18	--
Liquefied Natural Gas .....	0.52	0.73	0.47	1.25	1.38	1.20	0.85	0.7%
<b>Total Supply</b> .....	<b>22.00</b>	<b>23.15</b>	<b>22.94</b>	<b>22.73</b>	<b>23.40</b>	<b>24.64</b>	<b>24.33</b>	<b>0.2%</b>
<b>Consumption by Sector</b>								
Residential .....	4.37	4.72	4.79	4.87	4.96	4.99	4.93	0.2%
Commercial .....	2.84	3.01	3.06	3.16	3.25	3.36	3.44	0.6%
Industrial <sup>4</sup> .....	6.49	6.63	6.59	6.80	6.65	6.76	6.85	0.1%
Natural-Gas-to-Liquids Heat and Power <sup>5</sup> .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Natural Gas to Liquids Production <sup>6</sup> .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Electric Power <sup>7</sup> .....	6.22	6.87	6.25	6.04	6.54	7.38	6.93	0.0%
Transportation <sup>8</sup> .....	0.02	0.02	0.03	0.05	0.07	0.08	0.09	6.0%
Pipeline Fuel .....	0.58	0.62	0.62	0.63	0.67	0.71	0.70	0.5%
Lease and Plant Fuel <sup>9</sup> .....	1.12	1.17	1.24	1.22	1.29	1.40	1.43	0.9%
<b>Total</b> .....	<b>21.65</b>	<b>23.05</b>	<b>22.57</b>	<b>22.77</b>	<b>23.43</b>	<b>24.67</b>	<b>24.36</b>	<b>0.2%</b>
<b>Discrepancy</b> <sup>10</sup> .....	<b>0.35</b>	<b>0.09</b>	<b>0.37</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>	<b>--</b>
<b>Natural Gas Prices</b>								
<b>(2007 dollars per million Btu)</b>								
Henry Hub Spot Price .....	6.91	6.96	6.66	6.90	7.43	8.08	9.25	1.2%
Average Lower 48 Wellhead Price <sup>11</sup> .....	6.48	6.22	5.88	6.10	6.56	7.13	8.17	1.2%
<b>(2007 dollars per thousand cubic feet)</b>								
Average Lower 48 Wellhead Price <sup>11</sup> .....	6.66	6.39	6.05	6.27	6.75	7.33	8.40	1.2%
<b>Delivered Prices</b>								
<b>(2007 dollars per thousand cubic feet)</b>								
Residential .....	14.08	13.05	12.43	12.32	12.85	13.43	14.71	0.5%
Commercial .....	12.23	11.30	10.84	10.86	11.44	12.07	13.32	0.7%
Industrial <sup>4</sup> .....	8.18	7.73	7.10	7.21	7.69	8.22	9.33	0.8%
Electric Power <sup>7</sup> .....	7.25	7.22	6.77	6.90	7.35	7.95	8.94	0.9%
Transportation <sup>12</sup> .....	16.49	15.89	15.32	15.13	15.31	15.70	16.70	0.2%
<b>Average</b> <sup>13</sup> .....	<b>9.77</b>	<b>9.26</b>	<b>8.80</b>	<b>8.88</b>	<b>9.37</b>	<b>9.88</b>	<b>11.05</b>	<b>0.8%</b>

## Reference Case

**Table A13. Natural Gas Supply, Disposition, and Prices (Continued)**  
(Trillion Cubic Feet per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Natural Gas Prices</b>								
<b>(nominal dollars per million Btu)</b>								
Henry Hub Spot Price . . . . .	6.73	6.96	7.01	7.99	9.60	11.14	13.42	2.9%
Average Lower 48 Wellhead Price <sup>11</sup> . . . . .	6.31	6.22	6.19	7.06	8.48	9.84	11.85	2.8%
<b>(nominal dollars per thousand cubic feet)</b>								
Average Lower 48 Wellhead Price <sup>11</sup> . . . . .	6.49	6.39	6.37	7.26	8.72	10.12	12.18	2.8%
<b>Delivered Prices</b>								
<b>(nominal dollars per thousand cubic feet)</b>								
Residential . . . . .	13.71	13.05	13.09	14.25	16.60	18.53	21.33	2.2%
Commercial . . . . .	11.91	11.30	11.42	12.57	14.77	16.66	19.31	2.4%
Industrial <sup>4</sup> . . . . .	7.96	7.73	7.48	8.34	9.93	11.33	13.52	2.5%
Electric Power <sup>7</sup> . . . . .	7.06	7.22	7.13	7.99	9.49	10.97	12.96	2.6%
Transportation <sup>12</sup> . . . . .	16.06	15.89	16.13	17.51	19.78	21.67	24.21	1.8%
<b>Average<sup>13</sup></b> . . . . .	<b>9.51</b>	<b>9.26</b>	<b>9.26</b>	<b>10.28</b>	<b>12.10</b>	<b>13.63</b>	<b>16.02</b>	<b>2.4%</b>

<sup>1</sup>Marketed production (wet) minus extraction losses.

<sup>2</sup>Synthetic natural gas, propane air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas commingled and distributed with natural gas.

<sup>3</sup>Includes any natural gas regasified in the Bahamas and transported via pipeline to Florida, as well as gas from Canada and Mexico.

<sup>4</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>5</sup>Includes any natural gas used in the process of converting natural gas to liquid fuel that is not actually converted.

<sup>6</sup>Includes any natural gas that is converted into liquid fuel.

<sup>7</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>8</sup>Compressed natural gas used as vehicle fuel.

<sup>9</sup>Represents natural gas used in well, field, and lease operations, and in natural gas processing plant machinery.

<sup>10</sup>Balancing item. Natural gas lost as a result of converting flow data measured at varying temperatures and pressures to a standard temperature and pressure and the merger of different data reporting systems which vary in scope, format, definition, and respondent type. In addition, 2006 and 2007 values include net storage injections.

<sup>11</sup>Represents lower 48 onshore and offshore supplies.

<sup>12</sup>Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes and estimated dispensing costs or charges.

<sup>13</sup>Weighted average prices. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

**Sources:** 2006 supply values; and lease, plant, and pipeline fuel consumption: Energy Information Administration (EIA), *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007). 2007 supply values; and lease, plant, and pipeline fuel consumption; and wellhead price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). Other 2006 and 2007 consumption based on: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2006 wellhead price: Minerals Management Service and EIA, *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007). 2006 residential and commercial delivered prices: EIA, *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007). 2007 residential and commercial delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2006 and 2007 electric power prices: EIA, *Electric Power Monthly*, DOE/EIA-0226, April 2007 and April 2008, Table 4.13.B. 2006 and 2007 industrial delivered prices are estimated based on: EIA, *Manufacturing Energy Consumption Survey 1994* and industrial and wellhead prices from the *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007) and the *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2006 transportation sector delivered prices are based on: EIA, *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007) and estimated state taxes, federal taxes, and dispensing costs or charges. 2007 transportation sector delivered prices are model results. **Projections:** EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

Table A14. Oil and Gas Supply

Production and Supply	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Crude Oil</b>								
<b>Lower 48 Average Wellhead Price<sup>1</sup></b> (2007 dollars per barrel) .....	<b>61.80</b>	<b>65.70</b>	<b>77.30</b>	<b>108.44</b>	<b>110.99</b>	<b>113.79</b>	<b>122.82</b>	<b>2.8%</b>
<b>Production (million barrels per day)<sup>2</sup></b>								
United States Total .....	5.10	5.07	5.62	5.72	6.48	7.21	7.37	1.6%
Lower 48 Onshore .....	2.93	2.91	2.92	3.15	3.37	3.79	4.06	1.5%
Lower 48 Offshore .....	1.43	1.44	2.01	2.07	2.39	2.65	2.74	2.8%
Alaska .....	0.74	0.72	0.69	0.51	0.72	0.77	0.57	-1.0%
<b>Lower 48 End of Year Reserves<sup>2</sup></b> (billion barrels) .....	<b>18.43</b>	<b>18.62</b>	<b>19.21</b>	<b>20.31</b>	<b>22.50</b>	<b>24.39</b>	<b>25.38</b>	<b>1.4%</b>
<b>Natural Gas</b>								
<b>Lower 48 Average Wellhead Price<sup>1</sup></b> (2007 dollars per million Btu)								
Henry Hub Spot Price .....	6.91	6.96	6.66	6.90	7.43	8.08	9.25	1.2%
Average Lower 48 Wellhead Price <sup>1</sup> .....	6.48	6.22	5.88	6.10	6.56	7.13	8.17	1.2%
<b>(2007 dollars per thousand cubic feet)</b>								
Average Lower 48 Wellhead Price <sup>1</sup> .....	6.66	6.39	6.05	6.27	6.75	7.33	8.40	1.2%
<b>Dry Production (trillion cubic feet)<sup>3</sup></b>								
United States Total .....	18.48	19.30	20.38	20.31	21.48	23.22	23.60	0.9%
Lower 48 Onshore .....	15.00	15.91	16.75	16.49	16.11	16.23	16.76	0.2%
Associated-Dissolved <sup>4</sup> .....	1.32	1.39	1.41	1.41	1.37	1.37	1.32	-0.2%
Non-Associated .....	13.69	14.51	15.34	15.08	14.74	14.86	15.44	0.3%
Conventional .....	5.06	5.36	4.70	4.13	3.36	2.65	2.18	-3.8%
Unconventional .....	8.62	9.15	10.64	10.95	11.38	12.20	13.26	1.6%
Gas Shale .....	1.07	1.17	2.31	2.64	2.97	3.45	4.15	5.7%
Coalbed Methane .....	1.84	1.84	1.79	1.76	1.78	1.90	2.01	0.4%
Tight Gas .....	5.71	6.15	6.54	6.55	6.62	6.85	7.10	0.6%
Lower 48 Offshore .....	3.05	2.97	3.26	3.49	4.23	5.04	4.88	2.2%
Associated-Dissolved <sup>4</sup> .....	0.63	0.62	0.72	0.89	1.00	1.10	1.16	2.8%
Non-Associated .....	2.42	2.35	2.55	2.59	3.23	3.94	3.72	2.0%
Alaska .....	0.42	0.42	0.37	0.33	1.14	1.96	1.96	6.9%
<b>Lower 48 End of Year Dry Reserves<sup>3</sup></b> (trillion cubic feet) .....	<b>200.84</b>	<b>225.18</b>	<b>230.11</b>	<b>218.51</b>	<b>213.14</b>	<b>211.99</b>	<b>211.98</b>	<b>-0.3%</b>
<b>Supplemental Gas Supplies (trillion cubic feet)<sup>5</sup></b>	<b>0.07</b>	<b>0.06</b>	<b>0.06</b>	<b>0.06</b>	<b>0.06</b>	<b>0.06</b>	<b>0.06</b>	<b>0.2%</b>
<b>Total Lower 48 Wells Drilled (thousands) .....</b>	<b>49.47</b>	<b>53.51</b>	<b>45.17</b>	<b>45.37</b>	<b>48.20</b>	<b>49.14</b>	<b>53.76</b>	<b>0.0%</b>

<sup>1</sup>Represents lower 48 onshore and offshore supplies.

<sup>2</sup>Includes lease condensate.

<sup>3</sup>Marketed production (wet) minus extraction losses.

<sup>4</sup>Gas which occurs in crude oil reservoirs either as free gas (associated) or as gas in solution with crude oil (dissolved).

<sup>5</sup>Synthetic natural gas, propane air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas commingled and distributed with natural gas.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 crude oil lower 48 average wellhead price: Energy Information Administration (EIA), *Petroleum Marketing Annual 2007*, DOE/EIA-0487(2007) (Washington, DC, August 2008). 2006 and 2007 lower 48 onshore, lower 48 offshore, and Alaska crude oil production: EIA, *Petroleum Supply Annual 2007*, DOE/EIA-0340(2007)/1 (Washington, DC, July 2008). 2006 U.S. crude oil and natural gas reserves: EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*, DOE/EIA-0216(2006) (Washington, DC, December 2007). 2006 Alaska and total natural gas production, and supplemental gas supplies: EIA, *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007). 2006 natural gas lower 48 average wellhead price: Minerals Management Service and EIA, *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007). 2007 natural gas lower 48 average wellhead price, Alaska and total natural gas production, and supplemental gas supplies: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). Other 2006 and 2007 values: EIA, Office of Integrated Analysis and Forecasting. Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

## Reference Case

**Table A15. Coal Supply, Disposition, and Prices**  
(Million Short Tons per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Production<sup>1</sup></b>								
Appalachia .....	392	378	383	343	333	339	353	-0.3%
Interior .....	151	147	163	192	206	220	252	2.4%
West .....	619	621	632	671	671	690	735	0.7%
East of the Mississippi .....	491	478	500	476	478	491	529	0.4%
West of the Mississippi .....	672	668	677	730	732	757	812	0.8%
<b>Total .....</b>	<b>1163</b>	<b>1147</b>	<b>1177</b>	<b>1206</b>	<b>1210</b>	<b>1248</b>	<b>1341</b>	<b>0.7%</b>
<b>Waste Coal Supplied<sup>2</sup> .....</b>	<b>14</b>	<b>14</b>	<b>11</b>	<b>13</b>	<b>12</b>	<b>12</b>	<b>13</b>	<b>-0.4%</b>
<b>Net Imports</b>								
Imports <sup>3</sup> .....	34	34	34	38	48	45	53	1.9%
Exports .....	50	59	82	65	53	53	44	-1.3%
<b>Total .....</b>	<b>-15</b>	<b>-25</b>	<b>-48</b>	<b>-28</b>	<b>-5</b>	<b>-8</b>	<b>10</b>	<b>--</b>
<b>Total Supply<sup>4</sup> .....</b>	<b>1162</b>	<b>1136</b>	<b>1140</b>	<b>1192</b>	<b>1217</b>	<b>1252</b>	<b>1363</b>	<b>0.8%</b>
<b>Consumption by Sector</b>								
Residential and Commercial .....	3	4	3	3	3	3	3	-0.4%
Coke Plants .....	23	23	21	20	19	18	18	-1.0%
Other Industrial <sup>5</sup> .....	59	57	60	56	56	56	57	-0.0%
Coal-to-Liquids Heat and Power .....	0	0	0	9	16	26	38	--
Coal to Liquids Production .....	0	0	0	8	14	22	32	--
Electric Power <sup>6</sup> .....	1027	1046	1056	1096	1110	1126	1215	0.7%
<b>Total .....</b>	<b>1112</b>	<b>1129</b>	<b>1140</b>	<b>1192</b>	<b>1218</b>	<b>1252</b>	<b>1363</b>	<b>0.8%</b>
<b>Discrepancy and Stock Change<sup>7</sup> .....</b>	<b>50</b>	<b>7</b>	<b>0</b>	<b>-0</b>	<b>-0</b>	<b>-0</b>	<b>-0</b>	<b>--</b>
<b>Average Minemouth Price<sup>8</sup></b>								
(2007 dollars per short ton) .....	25.29	25.82	29.45	28.71	27.90	28.45	29.10	0.5%
(2007 dollars per million Btu) .....	1.25	1.27	1.44	1.42	1.39	1.42	1.46	0.6%
<b>Delivered Prices (2007 dollars per short ton)<sup>9</sup></b>								
Coke Plants .....	95.37	94.97	114.53	115.38	115.37	119.22	115.57	0.9%
Other Industrial <sup>5</sup> .....	53.06	54.42	54.81	55.54	54.65	55.51	57.22	0.2%
Coal to Liquids .....	--	--	--	17.14	17.89	19.89	20.96	--
Electric Power								
(2007 dollars per short ton) .....	34.86	35.45	37.71	38.47	38.04	38.83	40.61	0.6%
(2007 dollars per million Btu) .....	1.74	1.78	1.89	1.94	1.92	1.96	2.04	0.6%
<b>Average .....</b>	<b>37.11</b>	<b>37.60</b>	<b>40.03</b>	<b>40.30</b>	<b>39.50</b>	<b>40.03</b>	<b>41.30</b>	<b>0.4%</b>
Exports <sup>10</sup> .....	72.84	70.25	83.77	88.70	89.48	89.86	80.02	0.6%

**Table A15. Coal Supply, Disposition, and Prices (Continued)**  
(Million Short Tons per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Average Minemouth Price<sup>8</sup></b>								
(nominal dollars per short ton) . . . . .	24.63	25.82	31.02	33.22	36.04	39.26	42.20	2.2%
(nominal dollars per million Btu) . . . . .	1.21	1.27	1.52	1.65	1.80	1.96	2.11	2.2%
<b>Delivered Prices (nominal dollars per short ton)<sup>9</sup></b>								
Coke Plants . . . . .	92.87	94.97	120.62	133.51	149.04	164.48	167.56	2.5%
Other Industrial <sup>5</sup> . . . . .	51.67	54.42	57.73	64.27	70.59	76.59	82.96	1.9%
Coal to Liquids . . . . .	0.00	0.00	0.00	19.83	23.11	27.45	30.39	- -
Electric Power								
(nominal dollars per short ton) . . . . .	33.95	35.45	39.72	44.51	49.14	53.57	58.88	2.2%
(nominal dollars per million Btu) . . . . .	1.69	1.78	1.99	2.25	2.48	2.70	2.95	2.2%
<b>Average . . . . .</b>	<b>36.14</b>	<b>37.60</b>	<b>42.16</b>	<b>46.63</b>	<b>51.03</b>	<b>55.22</b>	<b>59.88</b>	<b>2.0%</b>
Exports <sup>10</sup> . . . . .	70.93	70.25	88.23	102.64	115.59	123.97	116.02	2.2%

<sup>1</sup>Includes anthracite, bituminous coal, subbituminous coal, and lignite.

<sup>2</sup>Includes waste coal consumed by the electric power and industrial sectors. Waste coal supplied is counted as a supply-side item to balance the same amount of waste coal included in the consumption data.

<sup>3</sup>Excludes imports to Puerto Rico and the U.S. Virgin Islands.

<sup>4</sup>Production plus waste coal supplied plus net imports.

<sup>5</sup>Includes consumption for combined heat and power plants, except those plants whose primary business is to sell electricity, or electricity and heat, to the public. Excludes all coal use in the coal-to-liquids process.

<sup>6</sup>Includes all electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>7</sup>Balancing item: the sum of production, net imports, and waste coal supplied minus total consumption.

<sup>8</sup>Includes reported prices for both open market and captive mines.

<sup>9</sup>Prices weighted by consumption; weighted average excludes residential and commercial prices, and export free-alongside-ship (f.a.s.) prices.

<sup>10</sup>F.a.s. price at U.S. port of exit.

- - = Not applicable.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 data based on: Energy Information Administration (EIA), *Annual Coal Report 2007*, DOE/EIA-0584(2007) (Washington, DC, September 2008); EIA, *Quarterly Coal Report, October-December 2007*, DOE/EIA-0121(2007/4Q) (Washington, DC, March 2008); and EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A. Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

## Reference Case

**Table A16. Renewable Energy Generating Capacity and Generation**  
(Gigawatts, Unless Otherwise Noted)

Capacity and Generation	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Electric Power Sector<sup>1</sup></b>								
<b>Net Summer Capacity</b>								
Conventional Hydropower .....	76.72	76.72	76.73	76.89	77.02	77.31	77.58	0.0%
Geothermal <sup>2</sup> .....	2.29	2.36	2.53	2.60	2.66	2.73	3.00	1.1%
Municipal Waste <sup>3</sup> .....	3.39	3.43	4.04	4.08	4.12	4.14	4.15	0.8%
Wood and Other Biomass <sup>4,5</sup> .....	2.01	2.18	2.20	2.20	4.22	5.20	8.86	6.3%
Solar Thermal .....	0.40	0.53	0.54	0.79	0.81	0.84	0.86	2.1%
Solar Photovoltaic <sup>6</sup> .....	0.03	0.04	0.06	0.13	0.21	0.29	0.38	10.4%
Wind .....	11.29	16.19	29.46	30.68	33.07	39.00	43.80	4.4%
Offshore Wind .....	0.00	0.00	0.00	0.20	0.20	0.20	0.20	--
<b>Total .....</b>	<b>96.13</b>	<b>101.46</b>	<b>115.57</b>	<b>117.58</b>	<b>122.32</b>	<b>129.71</b>	<b>138.83</b>	<b>1.4%</b>
<b>Generation (billion kilowatthours)</b>								
Conventional Hydropower .....	286.11	245.86	268.05	295.33	296.29	297.94	298.97	0.9%
Geothermal <sup>2</sup> .....	14.57	14.84	17.78	18.62	19.11	19.63	21.80	1.7%
Biogenic Municipal Waste <sup>7</sup> .....	13.71	14.42	19.30	19.61	19.95	20.11	20.17	1.5%
Wood and Other Biomass <sup>5</sup> .....	10.33	10.38	28.07	56.22	117.82	133.50	140.44	12.0%
Dedicated Plants .....	8.42	8.41	12.85	13.11	28.74	36.19	62.27	9.1%
Cofiring .....	1.91	1.97	15.22	43.11	89.08	97.30	78.17	17.4%
Solar Thermal .....	0.49	0.60	0.99	1.81	1.88	1.95	2.02	5.5%
Solar Photovoltaic <sup>6</sup> .....	0.01	0.01	0.14	0.30	0.49	0.72	0.94	21.3%
Wind .....	26.59	32.14	80.50	84.48	92.45	112.13	129.38	6.2%
Offshore Wind .....	0.00	0.00	0.00	0.75	0.75	0.75	0.75	--
<b>Total .....</b>	<b>351.82</b>	<b>318.25</b>	<b>414.82</b>	<b>477.12</b>	<b>548.75</b>	<b>586.72</b>	<b>614.47</b>	<b>2.9%</b>
<b>End-Use Generators<sup>8</sup></b>								
<b>Net Summer Capacity</b>								
Conventional Hydropower <sup>9</sup> .....	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.0%
Geothermal .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Municipal Waste <sup>10</sup> .....	0.33	0.34	0.34	0.34	0.34	0.34	0.34	0.0%
Biomass .....	4.64	4.64	4.65	5.44	7.28	11.03	13.23	4.7%
Solar Photovoltaic <sup>6</sup> .....	0.28	0.43	1.73	7.05	9.72	10.14	11.78	15.5%
Wind .....	0.04	0.04	0.04	0.04	0.09	0.17	0.31	9.2%
<b>Total .....</b>	<b>5.99</b>	<b>6.15</b>	<b>7.45</b>	<b>13.57</b>	<b>18.12</b>	<b>22.37</b>	<b>26.35</b>	<b>6.5%</b>
<b>Generation (billion kilowatthours)</b>								
Conventional Hydropower <sup>9</sup> .....	2.99	2.45	2.45	2.45	2.45	2.45	2.45	0.0%
Geothermal .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Municipal Waste <sup>10</sup> .....	1.98	2.01	2.75	2.75	2.75	2.75	2.75	1.4%
Biomass .....	28.32	28.13	28.20	33.41	47.17	75.54	90.81	5.2%
Solar Photovoltaic <sup>6</sup> .....	0.44	0.68	2.78	11.55	16.02	16.69	19.49	15.7%
Wind .....	0.06	0.06	0.06	0.06	0.12	0.25	0.45	9.5%
<b>Total .....</b>	<b>33.78</b>	<b>33.33</b>	<b>36.24</b>	<b>50.23</b>	<b>68.51</b>	<b>97.69</b>	<b>115.95</b>	<b>5.6%</b>

**Table A16. Renewable Energy Generating Capacity and Generation (Continued)**  
(Gigawatts, Unless Otherwise Noted)

Capacity and Generation	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Total, All Sectors</b>								
<b>Net Summer Capacity</b>								
Conventional Hydropower .....	77.42	77.42	77.43	77.59	77.72	78.01	78.28	0.0%
Geothermal .....	2.29	2.36	2.53	2.60	2.66	2.73	3.00	1.1%
Municipal Waste .....	3.72	3.77	4.38	4.42	4.46	4.48	4.49	0.8%
Wood and Other Biomass <sup>4,5</sup> .....	6.65	6.82	6.85	7.64	11.50	16.23	22.08	5.2%
Solar <sup>6</sup> .....	0.71	1.00	2.33	7.97	10.74	11.27	13.02	11.8%
Wind .....	11.33	16.23	29.50	30.92	33.35	39.37	44.31	4.5%
<b>Total .....</b>	<b>102.12</b>	<b>107.60</b>	<b>123.02</b>	<b>131.15</b>	<b>140.44</b>	<b>152.08</b>	<b>165.18</b>	<b>1.9%</b>
<b>Generation (billion kilowatthours)</b>								
Conventional Hydropower .....	289.11	248.31	270.50	297.78	298.75	300.39	301.42	0.8%
Geothermal .....	14.57	14.84	17.78	18.62	19.11	19.63	21.80	1.7%
Municipal Waste .....	15.69	16.43	22.05	22.37	22.70	22.86	22.93	1.5%
Wood and Other Biomass <sup>5</sup> .....	38.65	38.51	56.26	89.63	164.99	209.04	231.25	8.1%
Solar <sup>6</sup> .....	0.95	1.29	3.91	13.66	18.39	19.36	22.45	13.2%
Wind .....	26.64	32.20	80.55	85.29	93.32	113.12	130.57	6.3%
<b>Total .....</b>	<b>385.61</b>	<b>351.58</b>	<b>451.06</b>	<b>527.36</b>	<b>617.26</b>	<b>684.41</b>	<b>730.42</b>	<b>3.2%</b>

<sup>1</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>2</sup>Includes hydrothermal resources only (hot water and steam).

<sup>3</sup>Includes municipal waste, landfill gas, and municipal sewage sludge. Incremental growth is assumed to be for landfill gas facilities. All municipal waste is included, although a portion of the municipal waste stream contains petroleum-derived plastics and other non-renewable sources.

<sup>4</sup>Facilities co-firing biomass and coal are classified as coal.

<sup>5</sup>Includes projections for energy crops after 2012.

<sup>6</sup>Does not include off-grid photovoltaics (PV). Based on annual PV shipments from 1989 through 2006, EIA estimates that as much as 210 megawatts of remote electricity generation PV applications (i.e., off-grid power systems) were in service in 2006, plus an additional 526 megawatts in communications, transportation, and assorted other non-grid-connected, specialized applications. See Energy Information Administration, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008), Table 10.8 (annual PV shipments, 1989-2006). The approach used to develop the estimate, based on shipment data, provides an upper estimate of the size of the PV stock, including both grid-based and off-grid PV. It will overestimate the size of the stock, because shipments include a substantial number of units that are exported, and each year some of the PV units installed earlier will be retired from service or abandoned.

<sup>7</sup>Includes biogenic municipal waste, landfill gas, and municipal sewage sludge. Incremental growth is assumed to be for landfill gas facilities. Only biogenic municipal waste is included. The Energy Information Administration estimates that in 2007 approximately 6 billion kilowatthours of electricity were generated from a municipal waste stream containing petroleum-derived plastics and other non-renewable sources. See Energy Information Administration, *Methodology for Allocating Municipal Solid Waste to Biogenic and Non-Biogenic Energy* (Washington, DC, May 2007).

<sup>8</sup>Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors; and small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.

<sup>9</sup>Represents own-use industrial hydroelectric power.

<sup>10</sup>Includes municipal waste, landfill gas, and municipal sewage sludge. All municipal waste is included, although a portion of the municipal waste stream contains petroleum-derived plastics and other non-renewable sources.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 capacity: Energy Information Administration (EIA), Form EIA-860, "Annual Electric Generator Report" (preliminary). 2006 and 2007 generation: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

## Reference Case

**Table A17. Renewable Energy, Consumption by Sector and Source<sup>1</sup>**  
(Quadrillion Btu per Year)

Sector and Source	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Marketed Renewable Energy<sup>2</sup></b>								
<b>Residential (wood)</b> .....	<b>0.39</b>	<b>0.43</b>	<b>0.43</b>	<b>0.46</b>	<b>0.48</b>	<b>0.49</b>	<b>0.50</b>	<b>0.7%</b>
<b>Commercial (biomass)</b> .....	<b>0.12</b>	<b>0.12</b>	<b>0.12</b>	<b>0.12</b>	<b>0.12</b>	<b>0.12</b>	<b>0.12</b>	<b>0.0%</b>
<b>Industrial<sup>3</sup></b> .....	<b>2.00</b>	<b>2.04</b>	<b>2.23</b>	<b>2.51</b>	<b>2.87</b>	<b>3.41</b>	<b>3.62</b>	<b>2.5%</b>
Conventional Hydroelectric .....	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.0%
Municipal Waste <sup>4</sup> .....	0.15	0.16	0.12	0.12	0.12	0.12	0.12	-1.2%
Biomass .....	1.52	1.46	1.34	1.41	1.49	1.64	1.81	0.9%
Biofuels Heat and Coproducts .....	0.30	0.40	0.75	0.95	1.23	1.62	1.66	6.4%
<b>Transportation</b> .....	<b>0.50</b>	<b>0.64</b>	<b>1.23</b>	<b>1.68</b>	<b>2.06</b>	<b>2.93</b>	<b>3.43</b>	<b>7.6%</b>
Ethanol used in E85 <sup>5</sup> .....	0.00	0.00	0.00	0.23	0.56	1.12	1.44	37.1%
Ethanol used in Gasoline Blending .....	0.47	0.58	1.08	1.15	1.10	1.04	1.04	2.6%
Biodiesel used in Distillate Blending .....	0.03	0.06	0.12	0.20	0.20	0.24	0.25	6.2%
Liquids from Biomass .....	0.00	0.00	0.00	0.02	0.15	0.47	0.65	--
Green Liquids .....	0.00	0.00	0.02	0.08	0.06	0.06	0.06	--
<b>Electric Power<sup>6</sup></b> .....	<b>3.76</b>	<b>3.45</b>	<b>4.42</b>	<b>5.07</b>	<b>5.79</b>	<b>6.17</b>	<b>6.43</b>	<b>2.7%</b>
Conventional Hydroelectric .....	2.84	2.44	2.65	2.92	2.92	2.94	2.95	0.8%
Geothermal .....	0.31	0.31	0.38	0.41	0.43	0.44	0.51	2.1%
Biogenic Municipal Waste <sup>7</sup> .....	0.15	0.17	0.23	0.24	0.24	0.24	0.24	1.7%
Biomass .....	0.19	0.21	0.35	0.64	1.25	1.40	1.41	8.6%
Dedicated Plants .....	0.15	0.16	0.15	0.13	0.28	0.35	0.61	5.9%
Cofiring .....	0.04	0.05	0.21	0.51	0.98	1.05	0.80	12.9%
Solar Thermal .....	0.00	0.01	0.01	0.02	0.02	0.02	0.02	5.5%
Solar Photovoltaic .....	0.00	0.00	0.00	0.00	0.00	0.01	0.01	21.3%
Wind .....	0.26	0.32	0.80	0.84	0.92	1.12	1.29	6.3%
<b>Total Marketed Renewable Energy</b> .....	<b>6.77</b>	<b>6.69</b>	<b>8.43</b>	<b>9.84</b>	<b>11.32</b>	<b>13.12</b>	<b>14.10</b>	<b>3.3%</b>
<b>Sources of Ethanol</b>								
From Corn .....	0.41	0.55	1.08	1.34	1.42	1.42	1.41	4.2%
From Cellulose .....	0.00	0.00	0.00	0.03	0.18	0.42	0.43	--
Imports .....	0.06	0.03	-0.00	0.01	0.06	0.32	0.63	14.5%
<b>Total</b> .....	<b>0.47</b>	<b>0.58</b>	<b>1.08</b>	<b>1.39</b>	<b>1.66</b>	<b>2.16</b>	<b>2.47</b>	<b>6.5%</b>

**Table A17. Renewable Energy, Consumption by Sector and Source<sup>1</sup> (Continued)**  
(Quadrillion Btu per Year)

Sector and Source	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Nonmarketed Renewable Energy<sup>8</sup></b>								
<b>Selected Consumption</b>								
<b>Residential</b> .....	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.05</b>	<b>0.07</b>	<b>0.07</b>	<b>0.08</b>	<b>11.5%</b>
Solar Hot Water Heating .....	0.00	0.00	0.00	0.00	0.00	0.01	0.01	2.6%
Geothermal Heat Pumps .....	0.00	0.00	0.00	0.01	0.01	0.02	0.02	9.1%
Solar Photovoltaic .....	0.00	0.00	0.01	0.03	0.05	0.05	0.05	25.2%
Wind .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
<b>Commercial</b> .....	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.04</b>	<b>0.04</b>	<b>2.0%</b>
Solar Thermal .....	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.5%
Solar Photovoltaic .....	0.00	0.00	0.00	0.01	0.01	0.01	0.01	8.4%
Wind .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.3%

<sup>1</sup>Actual heat rates used to determine fuel consumption for all renewable fuels except hydropower, solar, and wind. Consumption at hydroelectric, solar, and wind facilities determined by using the fossil fuel equivalent of 10,022 Btu per kilowatt-hour.

<sup>2</sup>Includes nonelectric renewable energy groups for which the energy source is bought and sold in the marketplace, although all transactions may not necessarily be marketed, and marketed renewable energy inputs for electricity entering the marketplace on the electric power grid. Excludes electricity imports; see Table A2.

<sup>3</sup>Includes all electricity production by industrial and other combined heat and power for the grid and for own use.

<sup>4</sup>Includes municipal waste, landfill gas, and municipal sewage sludge. All municipal waste is included, although a portion of the municipal waste stream contains petroleum-derived plastics and other non-renewable sources.

<sup>5</sup>Excludes motor gasoline component of E85.

<sup>6</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>7</sup>Includes biogenic municipal waste, landfill gas, and municipal sewage sludge. Incremental growth is assumed to be for landfill gas facilities. Only biogenic municipal waste is included. The Energy Information Administration estimates that in 2007 approximately 0.3 quadrillion Btus were consumed from a municipal waste stream containing petroleum-derived plastics and other non-renewable sources. See Energy Information Administration, *Methodology for Allocating Municipal Solid Waste to Biogenic and Non-Biogenic Energy* (Washington, DC, May 2007).

<sup>8</sup>Includes selected renewable energy consumption data for which the energy is not bought or sold, either directly or indirectly as an input to marketed energy. The Energy Information Administration does not estimate or project total consumption of nonmarketed renewable energy.

-- = Not applicable.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 ethanol: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2006 and 2007 electric power sector: EIA, Form EIA-860, "Annual Electric Generator Report" (preliminary). Other 2006 and 2007 values: EIA, Office of Integrated Analysis and Forecasting. Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

## Reference Case

**Table A18. Carbon Dioxide Emissions by Sector and Source**  
(Million Metric Tons, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Residential</b>								
Petroleum .....	89	88	89	82	80	77	75	-0.7%
Natural Gas .....	237	257	261	266	270	272	269	0.2%
Coal .....	1	1	1	1	1	1	1	1.1%
Electricity <sup>1</sup> .....	871	904	886	876	899	930	987	0.4%
<b>Total .....</b>	<b>1198</b>	<b>1250</b>	<b>1237</b>	<b>1224</b>	<b>1250</b>	<b>1280</b>	<b>1332</b>	<b>0.3%</b>
<b>Commercial</b>								
Petroleum .....	45	45	41	42	42	42	42	-0.3%
Natural Gas .....	154	163	167	172	177	183	188	0.6%
Coal .....	6	7	6	6	6	6	6	-0.4%
Electricity <sup>1</sup> .....	837	872	878	926	979	1026	1096	1.0%
<b>Total .....</b>	<b>1043</b>	<b>1088</b>	<b>1092</b>	<b>1147</b>	<b>1205</b>	<b>1257</b>	<b>1332</b>	<b>0.9%</b>
<b>Industrial<sup>2</sup></b>								
Petroleum .....	420	406	377	378	369	367	375	-0.4%
Natural Gas <sup>3</sup> .....	395	405	414	424	421	433	440	0.4%
Coal .....	186	175	174	178	183	198	215	0.9%
Electricity <sup>1</sup> .....	652	653	617	631	612	610	638	-0.1%
<b>Total .....</b>	<b>1653</b>	<b>1640</b>	<b>1582</b>	<b>1610</b>	<b>1585</b>	<b>1607</b>	<b>1667</b>	<b>0.1%</b>
<b>Transportation</b>								
Petroleum <sup>4</sup> .....	1975	1974	1851	1880	1896	1931	2032	0.1%
Natural Gas <sup>5</sup> .....	33	35	36	37	40	43	43	0.8%
Electricity <sup>1</sup> .....	4	4	4	5	6	7	9	3.3%
<b>Total .....</b>	<b>2013</b>	<b>2014</b>	<b>1891</b>	<b>1922</b>	<b>1942</b>	<b>1982</b>	<b>2084</b>	<b>0.1%</b>
<b>Electric Power<sup>6</sup></b>								
Petroleum .....	66	66	38	39	40	40	41	-2.0%
Natural Gas .....	339	376	341	329	357	403	378	0.0%
Coal .....	1947	1980	1995	2058	2089	2118	2299	0.7%
Other <sup>7</sup> .....	12	12	12	12	12	12	12	0.1%
<b>Total .....</b>	<b>2364</b>	<b>2433</b>	<b>2385</b>	<b>2437</b>	<b>2497</b>	<b>2572</b>	<b>2729</b>	<b>0.5%</b>
<b>Total by Fuel</b>								
Petroleum <sup>3</sup> .....	2596	2580	2396	2421	2427	2458	2564	-0.0%
Natural Gas .....	1159	1237	1218	1228	1265	1333	1318	0.3%
Coal .....	2140	2162	2176	2242	2278	2322	2521	0.7%
Other <sup>7</sup> .....	12	12	12	12	12	12	12	0.1%
<b>Total .....</b>	<b>5907</b>	<b>5991</b>	<b>5801</b>	<b>5904</b>	<b>5982</b>	<b>6125</b>	<b>6414</b>	<b>0.3%</b>
<b>Carbon Dioxide Emissions</b>								
<b>(tons per person) .....</b>	<b>19.7</b>	<b>19.8</b>	<b>18.6</b>	<b>18.1</b>	<b>17.5</b>	<b>17.1</b>	<b>17.1</b>	<b>-0.6%</b>

<sup>1</sup>Emissions from the electric power sector are distributed to the end-use sectors.

<sup>2</sup>Fuel consumption includes energy for combined heat and power plants, except those plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>3</sup>Includes lease and plant fuel.

<sup>4</sup>This includes carbon dioxide from international bunker fuels, both civilian and military, which are excluded from the accounting of carbon dioxide emissions under the United Nations convention. From 1990 through 2007, international bunker fuels accounted for 84 to 131 million metric tons annually.

<sup>5</sup>Includes pipeline fuel natural gas and compressed natural gas used as vehicle fuel.

<sup>6</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>7</sup>Includes emissions from geothermal power and nonbiogenic emissions from municipal waste.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 emissions and emission factors: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2007*, DOE/EIA-0573(2007) (Washington, DC, December 2008). Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

**Table A19. Energy-Related Carbon Dioxide Emissions by End Use**  
(Million Metric Tons)

Sector and Source	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Residential</b>								
Space Heating .....	262.44	292.79	291.82	290.68	291.30	289.27	286.17	-0.1%
Space Cooling .....	157.96	168.73	158.68	162.58	169.72	177.92	190.05	0.5%
Water Heating .....	165.56	165.97	161.74	161.39	166.79	168.00	165.41	-0.0%
Refrigeration .....	73.73	73.53	68.88	67.07	67.93	69.20	73.42	-0.0%
Cooking .....	33.18	33.74	34.00	35.62	37.37	38.57	40.30	0.8%
Clothes Dryers .....	54.20	54.72	53.38	53.66	53.99	54.92	58.11	0.3%
Freezers .....	15.59	15.54	14.64	14.43	14.66	14.91	15.66	0.0%
Lighting .....	140.12	139.35	132.07	106.42	97.54	91.23	90.61	-1.9%
Clothes Washers <sup>1</sup> .....	6.70	6.65	5.99	5.39	4.74	4.65	4.93	-1.3%
Dishwashers <sup>1</sup> .....	18.04	18.13	17.32	17.27	17.81	18.61	20.07	0.4%
Color Televisions and Set-Top Boxes .....	64.02	68.64	74.30	74.34	77.16	85.02	97.19	1.5%
Personal Computers and Related Equipment ..	27.08	29.19	33.47	33.48	34.62	36.41	39.39	1.3%
Furnace Fans and Boiler Circulation Pumps ...	21.51	24.35	24.21	25.57	26.76	27.36	28.42	0.7%
Other Uses .....	157.49	165.08	166.42	176.29	189.62	203.60	222.05	1.3%
Discrepancy <sup>2</sup> .....	0.57	-6.59	0.00	-0.00	0.00	-0.00	0.00	--
<b>Total Residential .....</b>	<b>1198.19</b>	<b>1249.82</b>	<b>1236.92</b>	<b>1224.19</b>	<b>1250.00</b>	<b>1279.66</b>	<b>1331.78</b>	<b>0.3%</b>
<b>Commercial</b>								
Space Heating <sup>3</sup> .....	112.77	121.65	122.71	124.04	125.18	124.75	123.26	0.1%
Space Cooling <sup>3</sup> .....	102.77	107.73	102.62	104.73	106.83	109.55	115.01	0.3%
Water Heating <sup>3</sup> .....	43.27	43.32	42.19	44.11	45.75	47.13	47.99	0.4%
Ventilation .....	90.03	93.93	97.80	106.84	113.27	117.77	123.43	1.2%
Cooking .....	13.01	13.26	13.67	14.19	14.70	15.23	15.65	0.7%
Lighting .....	203.06	204.00	195.55	198.02	202.04	204.53	210.90	0.1%
Refrigeration .....	74.86	76.78	73.02	68.19	66.80	66.88	69.59	-0.4%
Office Equipment (PC) .....	40.50	46.08	46.77	48.70	51.55	55.00	58.63	1.1%
Office Equipment (non-PC) .....	36.39	40.08	47.47	57.87	66.68	70.90	75.05	2.8%
Other Uses <sup>4</sup> .....	326.54	340.75	350.49	380.06	411.93	445.25	492.05	1.6%
<b>Total Commercial .....</b>	<b>1043.20</b>	<b>1087.58</b>	<b>1092.29</b>	<b>1146.73</b>	<b>1204.72</b>	<b>1256.98</b>	<b>1331.56</b>	<b>0.9%</b>
<b>Industrial</b>								
<b>Manufacturing</b>								
Refining .....	250.67	251.30	258.31	279.74	291.74	304.37	327.84	1.2%
Food Products .....	95.58	98.58	103.37	103.68	107.57	112.37	119.68	0.8%
Paper Products .....	97.37	93.56	87.16	86.97	85.70	85.71	88.86	-0.2%
Bulk Chemicals .....	313.24	313.68	279.94	272.61	247.77	236.18	221.91	-1.5%
Glass .....	17.09	17.18	16.88	20.35	21.25	21.53	21.37	1.0%
Cement Manufacturing .....	42.36	41.73	32.97	39.81	40.16	40.76	40.58	-0.1%
Iron and Steel .....	141.17	137.15	117.98	122.20	113.43	113.69	116.17	-0.7%
Aluminum .....	46.43	44.83	42.50	40.07	36.66	34.18	32.23	-1.4%
Fabricated Metal Products .....	42.57	42.78	36.15	40.05	36.82	36.73	36.51	-0.7%
Machinery .....	21.55	21.37	18.40	21.20	20.66	21.09	21.97	0.1%
Computers and Electronics .....	28.11	29.59	24.66	28.68	32.37	38.09	53.58	2.6%
Transportation Equipment .....	43.21	42.05	39.29	41.73	40.09	41.11	41.69	-0.0%
Electrical Equipment .....	16.99	17.30	13.91	16.23	16.85	18.65	22.37	1.1%
Wood Products .....	18.37	17.78	17.80	22.20	20.10	19.42	19.59	0.4%
Plastics .....	40.88	40.78	37.60	38.42	38.84	39.57	43.38	0.3%
Balance of Manufacturing .....	174.80	170.54	150.34	153.92	154.38	154.34	160.37	-0.3%
<b>Total Manufacturing .....</b>	<b>1390.40</b>	<b>1380.18</b>	<b>1277.28</b>	<b>1327.87</b>	<b>1304.41</b>	<b>1317.79</b>	<b>1368.09</b>	<b>-0.0%</b>
<b>Nonmanufacturing</b>								
Agriculture .....	82.05	96.37	86.33	87.23	85.70	86.14	88.95	-0.3%
Mining .....	81.75	76.75	59.38	76.15	72.43	72.49	76.07	-0.0%
Construction .....	83.77	80.59	77.18	77.98	76.44	78.28	79.62	-0.1%
<b>Total Nonmanufacturing .....</b>	<b>247.57</b>	<b>253.71</b>	<b>222.89</b>	<b>241.36</b>	<b>234.56</b>	<b>236.91</b>	<b>244.63</b>	<b>-0.2%</b>
Discrepancy <sup>2</sup> .....	14.59	5.93	81.53	40.91	46.14	52.42	54.56	10.1%
<b>Total Industrial .....</b>	<b>1652.56</b>	<b>1639.83</b>	<b>1581.70</b>	<b>1610.14</b>	<b>1585.11</b>	<b>1607.12</b>	<b>1667.28</b>	<b>0.1%</b>

**Table A19. Energy-Related Carbon Dioxide Emissions by End Use (Continued)**  
(Million Metric Tons)

Sector and Source	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Transportation</b>								
Light-Duty Vehicles .....	1146.29	1137.83	1076.13	1030.99	1007.98	988.58	1002.45	-0.5%
Commercial Light Trucks <sup>5</sup> .....	43.12	43.08	37.81	40.32	39.85	40.72	44.04	0.1%
Bus Transportation .....	19.95	19.57	19.11	18.99	19.08	19.42	20.06	0.1%
Freight Trucks .....	368.22	371.85	343.12	392.59	409.93	436.61	488.21	1.2%
Rail, Passenger .....	5.69	5.82	5.84	6.29	6.60	6.88	7.30	1.0%
Rail, Freight .....	42.89	43.01	40.74	44.59	46.39	48.30	52.19	0.8%
Shipping, Domestic .....	25.02	25.11	23.52	25.88	27.51	29.30	30.69	0.9%
Shipping, International .....	66.06	69.31	62.74	69.81	70.25	70.69	71.23	0.1%
Recreational Boats .....	17.26	17.48	16.86	17.28	17.63	18.07	18.55	0.3%
Air .....	192.25	192.03	173.66	185.56	203.42	225.45	250.83	1.2%
Military Use .....	49.63	50.27	52.93	51.51	52.83	54.13	55.40	0.4%
Lubricants .....	5.45	5.19	5.17	5.32	5.41	5.52	5.67	0.4%
Pipeline Fuel .....	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.5%
Discrepancy <sup>2</sup> .....	30.97	33.02	32.85	33.30	35.50	37.89	37.16	0.5%
<b>Total Transportation .....</b>	<b>2012.83</b>	<b>2013.59</b>	<b>1890.52</b>	<b>1922.48</b>	<b>1942.43</b>	<b>1981.59</b>	<b>2083.81</b>	<b>0.1%</b>

<sup>1</sup>Does not include water heating portion of load.

<sup>2</sup>Represents differences between total emissions by end-use and total emissions by fuel as reported in Table A18. Emissions by fuel may reflect benchmarking and other modeling adjustments to energy use and the associated emissions that are not assigned to specific end uses.

<sup>3</sup>Includes emissions related to fuel consumption for district services.

<sup>4</sup>Includes miscellaneous uses, such as service station equipment, automated teller machines, telecommunications equipment, medical equipment, pumps, emergency generators, combined heat and power in commercial buildings, manufacturing performed in commercial buildings, and cooking (distillate), plus emissions from residual fuel oil, liquefied petroleum gases, coal, motor gasoline, and kerosene.

<sup>5</sup>Commercial trucks 8,500 to 10,000 pounds.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 emissions and emission factors: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2007*, DOE/EIA-0573(2007) (Washington, DC, December 2008). Projections: EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.

**Table A20. Macroeconomic Indicators**  
(Billion 2000 Chain-Weighted Dollars, Unless Otherwise Noted)

Indicators	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Real Gross Domestic Product</b> . . . . .	11295	11524	11779	13745	15524	17591	20114	2.5%
<b>Components of Real Gross Domestic Product</b>								
Real Consumption . . . . .	8029	8253	8435	9626	10876	12144	13439	2.1%
Real Investment . . . . .	1912	1810	1581	2265	2565	3067	3756	3.2%
Real Government Spending . . . . .	1971	2012	2065	2094	2194	2296	2427	0.8%
Real Exports . . . . .	1315	1426	1585	2291	3061	4122	5820	6.3%
Real Imports . . . . .	1931	1972	1899	2446	3007	3722	4717	3.9%
<b>Energy Intensity</b> (thousand Btu per 2000 dollar of GDP)								
Delivered Energy . . . . .	6.45	6.42	6.09	5.39	4.86	4.44	4.04	-2.0%
Total Energy . . . . .	8.86	8.84	8.48	7.48	6.79	6.20	5.65	-1.9%
<b>Price Indices</b>								
GDP Chain-type Price Index (2000=1.000) . . .	1.167	1.198	1.262	1.386	1.548	1.653	1.737	1.6%
Consumer Price Index (1982-4=1.00)								
All-urban . . . . .	2.02	2.07	2.20	2.49	2.83	3.08	3.31	2.1%
Energy Commodities and Services . . . . .	1.97	2.08	2.18	2.75	3.16	3.48	3.87	2.7%
Wholesale Price Index (1982=1.00)								
All Commodities . . . . .	1.65	1.73	1.80	2.01	2.19	2.27	2.36	1.4%
Fuel and Power . . . . .	1.67	1.77	1.91	2.37	2.74	3.04	3.45	2.9%
Metals and Metal Products . . . . .	1.82	1.93	1.82	2.08	2.21	2.17	2.22	0.6%
<b>Interest Rates (percent, nominal)</b>								
Federal Funds Rate . . . . .	4.96	5.02	1.30	5.43	5.20	5.17	4.04	--
10-Year Treasury Note . . . . .	4.79	4.63	3.67	5.74	5.86	5.64	4.67	--
AA Utility Bond Rate . . . . .	5.84	5.94	6.39	7.71	7.49	7.12	5.79	--
<b>Value of Shipments (billion 2000 dollars)</b>								
Total Industrial . . . . .	5763	5750	5240	6276	6753	7402	8451	1.7%
Nonmanufacturing . . . . .	1503	1490	1277	1581	1603	1671	1780	0.8%
Manufacturing . . . . .	4260	4261	3963	4694	5150	5732	6671	2.0%
Energy-Intensive . . . . .	1218	1239	1238	1321	1374	1441	1525	0.9%
Non-energy Intensive . . . . .	3042	3022	2725	3373	3776	4290	5145	2.3%
<b>Population and Employment (millions)</b>								
Population, with Armed Forces Overseas . . . .	299.6	302.4	311.4	326.7	342.6	358.9	375.1	0.9%
Population, aged 16 and over . . . . .	234.5	237.2	245.2	257.4	270.4	283.9	297.6	1.0%
Population, over age 65 . . . . .	37.4	38.0	40.4	47.0	55.0	64.2	72.3	2.8%
Employment, Nonfarm . . . . .	135.7	137.2	135.6	147.2	152.6	159.2	168.3	0.9%
Employment, Manufacturing . . . . .	14.2	13.9	12.2	12.6	12.3	12.1	11.7	-0.7%
<b>Key Labor Indicators</b>								
Labor Force (millions) . . . . .	151.4	153.1	155.9	163.2	168.4	174.0	181.5	0.7%
Nonfarm Labor Productivity (1992=1.00) . . . .	1.35	1.37	1.45	1.57	1.74	1.93	2.14	2.0%
Unemployment Rate (percent) . . . . .	4.61	4.64	8.26	5.68	5.53	5.41	4.78	--
<b>Key Indicators for Energy Demand</b>								
Real Disposable Personal Income . . . . .	8407	8644	9017	10468	12035	13715	15450	2.6%
Housing Starts (millions) . . . . .	1.93	1.44	1.18	2.00	1.77	1.74	1.74	0.8%
Commercial Floorspace (billion square feet) . .	75.8	77.3	81.2	86.1	92.3	97.5	103.3	1.3%
Unit Sales of Light-Duty Vehicles (millions) . . .	16.50	16.09	14.18	17.07	17.41	18.86	20.99	1.2%

GDP = Gross domestic product.

Btu = British thermal unit.

-- = Not applicable.

**Sources:** 2006 and 2007: IHS Global Insight Industry and Employment models, November 2008. **Projections:** Energy Information Administration, AEO2009 National Energy Modeling System run AEO2009.D120908A.

## Reference Case

**Table A21. International Liquids Supply and Disposition Summary**  
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Crude Oil Prices (2007 dollars per barrel)<sup>1</sup></b>								
Imported Low Sulfur Light Crude Oil .....	67.82	72.33	80.16	110.49	115.45	121.94	130.43	2.6%
Imported Crude Oil .....	60.70	63.83	77.56	108.52	112.05	115.33	124.60	3.0%
<b>Crude Oil Prices (nominal dollars per barrel)<sup>1</sup></b>								
Imported Low Sulfur Light Crude Oil .....	66.04	72.33	84.42	127.84	149.14	168.24	189.10	4.3%
Imported Crude Oil .....	59.10	63.83	81.69	125.57	144.74	159.11	180.66	4.6%
<b>Conventional Production (Conventional)<sup>2</sup></b>								
OPEC <sup>3</sup>								
Middle East .....	23.50	22.97	22.77	23.62	25.22	26.59	28.34	0.9%
North Africa .....	3.93	4.02	4.25	4.54	4.61	4.81	5.19	1.1%
West Africa .....	3.88	4.12	4.81	5.19	5.23	5.48	5.92	1.6%
South America .....	2.68	2.58	2.26	2.14	2.42	2.66	2.73	0.2%
<b>Total OPEC .....</b>	<b>33.99</b>	<b>33.68</b>	<b>34.09</b>	<b>35.49</b>	<b>37.48</b>	<b>39.53</b>	<b>42.18</b>	<b>1.0%</b>
Non-OPEC								
OECD								
United States (50 states) .....	7.86	8.11	8.81	8.96	9.71	10.38	10.44	1.1%
Canada .....	2.06	2.05	1.90	1.50	1.25	1.11	1.02	-3.0%
Mexico .....	3.71	3.50	2.87	2.53	2.24	2.29	2.45	-1.5%
OECD Europe <sup>4</sup> .....	5.48	5.23	4.27	3.61	3.18	3.01	2.94	-2.5%
Japan .....	0.13	0.13	0.14	0.15	0.16	0.17	0.18	1.3%
Australia and New Zealand .....	0.58	0.64	0.82	0.79	0.78	0.78	0.77	0.8%
<b>Total OECD .....</b>	<b>19.82</b>	<b>19.66</b>	<b>18.80</b>	<b>17.54</b>	<b>17.32</b>	<b>17.73</b>	<b>17.81</b>	<b>-0.4%</b>
Non-OECD								
Russia .....	9.68	9.88	9.50	9.73	10.24	10.28	10.50	0.3%
Other Europe and Eurasia <sup>5</sup> .....	2.63	2.88	3.58	4.15	4.50	4.60	4.86	2.3%
China .....	3.84	3.90	3.75	3.53	3.52	3.32	3.19	-0.9%
Other Asia <sup>6</sup> .....	3.88	3.75	3.88	3.73	3.85	3.85	3.68	-0.1%
Middle East .....	1.62	1.52	1.42	1.40	1.40	1.37	1.36	-0.5%
Africa .....	2.41	2.41	2.65	2.60	2.72	2.85	2.98	0.9%
Brazil .....	1.86	1.88	2.48	2.90	3.45	3.82	4.19	3.5%
Other Central and South America .....	1.83	1.79	1.70	1.51	1.56	1.76	2.05	0.6%
<b>Total Non-OECD .....</b>	<b>27.75</b>	<b>28.01</b>	<b>28.96</b>	<b>29.56</b>	<b>31.25</b>	<b>31.83</b>	<b>32.81</b>	<b>0.7%</b>
<b>Total Conventional Production .....</b>	<b>81.56</b>	<b>81.35</b>	<b>81.85</b>	<b>82.58</b>	<b>86.04</b>	<b>89.10</b>	<b>92.80</b>	<b>0.6%</b>
<b>Unconventional Production<sup>7</sup></b>								
United States (50 states) .....	0.34	0.46	0.91	1.27	1.55	2.04	2.31	7.3%
Other North America .....	1.23	1.38	1.92	2.83	3.34	3.86	4.31	5.1%
OECD Europe <sup>4</sup> .....	0.09	0.11	0.13	0.15	0.19	0.23	0.27	4.1%
Middle East .....	0.09	0.09	0.01	0.12	0.17	0.21	0.22	3.7%
Africa .....	0.17	0.23	0.27	0.42	0.50	0.61	0.72	5.2%
Central and South America .....	0.91	1.02	1.15	1.51	2.04	2.61	3.16	5.0%
Other .....	0.24	0.30	0.47	0.60	0.78	1.23	1.63	7.7%
<b>Total Unconventional Production .....</b>	<b>3.06</b>	<b>3.58</b>	<b>4.85</b>	<b>6.89</b>	<b>8.56</b>	<b>10.78</b>	<b>12.61</b>	<b>5.6%</b>
<b>Total Production .....</b>	<b>84.62</b>	<b>84.93</b>	<b>86.71</b>	<b>89.47</b>	<b>94.60</b>	<b>99.88</b>	<b>105.41</b>	<b>0.9%</b>

**Table A21. International Liquids Supply and Disposition Summary (Continued)**  
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	Reference Case							Annual Growth 2007-2030 (percent)
	2006	2007	2010	2015	2020	2025	2030	
<b>Consumption<sup>8</sup></b>								
<b>OECD</b>								
United States (50 states) .....	20.65	20.65	19.69	20.16	20.21	20.76	21.67	0.2%
United States Territories .....	0.38	0.39	0.44	0.49	0.53	0.57	0.62	2.0%
Canada .....	2.31	2.41	2.28	2.24	2.29	2.34	2.39	-0.0%
Mexico .....	2.06	2.10	2.06	2.13	2.28	2.46	2.67	1.0%
OECD Europe <sup>9</sup> .....	15.75	15.36	14.74	14.24	14.24	14.28	14.27	-0.3%
Japan .....	5.22	5.02	4.68	4.37	4.27	4.16	4.02	-1.0%
South Korea .....	2.29	2.34	2.31	2.46	2.58	2.71	2.81	0.8%
Australia and New Zealand .....	1.06	1.08	1.04	1.05	1.09	1.14	1.20	0.5%
<b>Total OECD</b> .....	<b>49.73</b>	<b>49.35</b>	<b>47.24</b>	<b>47.14</b>	<b>47.50</b>	<b>48.43</b>	<b>49.64</b>	<b>0.0%</b>
<b>Non-OECD</b>								
Russia .....	2.83	2.88	2.97	3.02	3.18	3.29	3.35	0.7%
Other Europe and Eurasia <sup>5</sup> .....	2.18	2.24	2.34	2.46	2.64	2.81	2.96	1.2%
China .....	7.22	7.63	8.50	9.34	11.29	13.16	15.08	3.0%
India .....	2.42	2.46	2.60	3.00	3.51	3.99	4.52	2.7%
Other Asia <sup>6</sup> .....	6.21	6.28	6.39	7.08	7.75	8.38	9.03	1.6%
Middle East .....	6.11	6.42	7.02	7.59	8.26	8.87	9.45	1.7%
Africa .....	3.08	3.22	3.49	3.65	3.90	3.99	4.02	1.0%
Brazil .....	2.27	2.37	2.55	2.63	2.84	3.06	3.32	1.5%
Other Central and South America .....	3.20	3.35	3.60	3.58	3.73	3.90	4.04	0.8%
<b>Total Non-OECD</b> .....	<b>35.54</b>	<b>36.85</b>	<b>39.46</b>	<b>42.34</b>	<b>47.10</b>	<b>51.45</b>	<b>55.77</b>	<b>1.8%</b>
<b>Total Consumption</b> .....	<b>85.26</b>	<b>86.20</b>	<b>86.70</b>	<b>89.47</b>	<b>94.60</b>	<b>99.88</b>	<b>105.41</b>	<b>0.9%</b>
OPEC Production <sup>9</sup> .....	34.67	34.38	34.75	36.35	38.51	40.76	43.63	1.0%
Non-OPEC Production <sup>9</sup> .....	49.94	50.55	51.96	53.13	56.09	59.11	61.78	0.9%
Net Eurasia Exports .....	9.15	9.52	10.24	11.30	12.37	12.60	13.25	1.5%
OPEC Market Share (percent) .....	41.0	40.5	40.1	40.6	40.7	40.8	41.4	- -

<sup>1</sup>Weighted average price delivered to U.S. refiners.

<sup>2</sup>Includes production of crude oil (including lease condensate), natural gas plant liquids, other hydrogen and hydrocarbons for refinery feedstocks, alcohol and other sources, and refinery gains.

<sup>3</sup>OPEC = Organization of Petroleum Exporting Countries - Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

<sup>4</sup>OECD Europe = Organization for Economic Cooperation and Development - Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.

<sup>5</sup>Other Europe and Eurasia = Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Malta, Moldova, Montenegro, Romania, Serbia, Slovenia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

<sup>6</sup>Other Asia = Afghanistan, Bangladesh, Bhutan, Brunei, Cambodia (Kampuchea), Fiji, French Polynesia, Guam, Hong Kong, Indonesia, Kiribati, Laos, Malaysia, Macau, Maldives, Mongolia, Myanmar (Burma), Nauru, Nepal, New Caledonia, Niue, North Korea, Pakistan, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Sri Lanka, Taiwan, Thailand, Tonga, Vanuatu, and Vietnam.

<sup>7</sup>Includes liquids produced from energy crops, natural gas, coal, extra-heavy oil, oil sands, and shale. Includes both OPEC and non-OPEC producers in the regional breakdown.

<sup>8</sup>Includes both OPEC and non-OPEC consumers in the regional breakdown.

<sup>9</sup>Includes both conventional and unconventional liquids production.

- - = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2006 and 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2006 and 2007 low sulfur light crude oil price: Energy Information Administration (EIA), Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." 2006 and 2007 imported crude oil price: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2006 quantities derived from: EIA, *International Energy Annual 2006*, DOE/EIA-0219(2006) (Washington, DC, June-October 2008). **2007 quantities and projections:** EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A and EIA, Generate World Oil Balance Model.



# Economic Growth Case Comparisons

**Table B1. Total Energy Supply and Disposition Summary**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
<b>Production</b>										
Crude Oil and Lease Condensate	10.73	12.19	12.19	12.19	13.81	14.06	14.14	15.51	15.96	16.30
Natural Gas Plant Liquids	2.41	2.55	2.58	2.60	2.46	2.57	2.66	2.45	2.61	2.74
Dry Natural Gas	19.84	20.71	20.95	21.11	21.09	22.08	22.86	22.96	24.26	25.41
Coal <sup>1</sup>	23.50	24.20	24.21	24.22	23.92	24.43	24.81	25.21	26.93	28.52
Nuclear Power	8.41	8.45	8.45	8.45	8.77	8.99	9.27	8.53	9.47	10.67
Hydropower	2.46	2.67	2.67	2.67	2.94	2.95	2.97	2.96	2.97	2.98
Biomass <sup>2</sup>	3.23	4.15	4.20	4.23	6.30	6.52	6.70	7.85	8.25	9.16
Other Renewable Energy <sup>3</sup>	0.97	1.52	1.54	1.81	1.65	1.74	2.05	2.04	2.19	2.71
Other <sup>4</sup>	0.94	0.84	0.85	0.84	0.99	1.07	1.20	1.00	1.15	1.37
<b>Total</b>	<b>72.49</b>	<b>77.27</b>	<b>77.64</b>	<b>78.10</b>	<b>81.93</b>	<b>84.41</b>	<b>86.67</b>	<b>88.52</b>	<b>93.79</b>	<b>99.85</b>
<b>Imports</b>										
Crude Oil	21.90	17.49	17.76	18.11	15.20	16.09	17.61	13.05	15.39	17.65
Liquid Fuels and Other Petroleum <sup>5</sup>	6.97	5.51	5.59	5.68	5.07	5.67	6.10	5.40	6.33	7.05
Natural Gas	4.72	3.22	3.27	3.32	3.18	3.37	3.63	2.30	2.58	3.03
Other Imports <sup>6</sup>	0.99	0.89	0.89	0.89	1.09	1.19	1.20	1.14	1.35	1.45
<b>Total</b>	<b>34.59</b>	<b>27.11</b>	<b>27.51</b>	<b>28.00</b>	<b>24.54</b>	<b>26.31</b>	<b>28.55</b>	<b>21.89</b>	<b>25.65</b>	<b>29.18</b>
<b>Exports</b>										
Petroleum <sup>7</sup>	2.84	2.51	2.56	2.56	2.86	2.90	2.93	3.12	3.17	3.19
Natural Gas	0.83	0.70	0.70	0.70	1.47	1.44	1.41	1.98	1.87	1.79
Coal	1.51	2.05	2.05	2.05	1.35	1.33	1.33	1.16	1.08	1.07
<b>Total</b>	<b>5.17</b>	<b>5.26</b>	<b>5.31</b>	<b>5.31</b>	<b>5.68</b>	<b>5.66</b>	<b>5.68</b>	<b>6.27</b>	<b>6.12</b>	<b>6.06</b>
<b>Discrepancy<sup>8</sup></b>	<b>0.01</b>	<b>-0.03</b>	<b>-0.02</b>	<b>0.09</b>	<b>-0.28</b>	<b>-0.39</b>	<b>-0.51</b>	<b>-0.06</b>	<b>-0.25</b>	<b>-0.41</b>
<b>Consumption</b>										
Liquid Fuels and Other Petroleum <sup>9</sup>	40.75	37.55	37.89	38.36	36.94	38.93	41.27	37.42	41.60	45.63
Natural Gas	23.70	22.90	23.20	23.28	22.88	24.09	25.16	23.35	25.04	26.71
Coal <sup>10</sup>	22.74	22.90	22.91	22.92	23.37	23.98	24.35	24.63	26.56	28.23
Nuclear Power	8.41	8.45	8.45	8.45	8.77	8.99	9.27	8.53	9.47	10.67
Hydropower	2.46	2.67	2.67	2.67	2.94	2.95	2.97	2.96	2.97	2.98
Biomass <sup>11</sup>	2.62	2.95	2.99	3.01	4.35	4.58	4.77	5.12	5.51	6.20
Other Renewable Energy <sup>3</sup>	0.97	1.52	1.54	1.81	1.65	1.74	2.05	2.04	2.19	2.71
Other <sup>12</sup>	0.23	0.21	0.21	0.21	0.17	0.19	0.21	0.15	0.22	0.25
<b>Total</b>	<b>101.89</b>	<b>99.15</b>	<b>99.85</b>	<b>100.70</b>	<b>101.07</b>	<b>105.44</b>	<b>110.06</b>	<b>104.20</b>	<b>113.56</b>	<b>123.38</b>
<b>Prices (2007 dollars per unit)</b>										
Petroleum (dollars per barrel)										
Imported Low Sulfur Light Crude Oil Price <sup>13</sup>	72.33	77.68	80.16	78.55	113.36	115.45	116.49	127.30	130.43	135.72
Imported Crude Oil Price <sup>13</sup>	63.83	74.76	77.56	75.89	106.41	112.05	113.50	116.58	124.60	131.46
Natural Gas (dollars per million Btu)										
Price at Henry Hub	6.96	6.47	6.66	6.71	6.84	7.43	7.84	8.72	9.25	9.58
Wellhead Price <sup>14</sup>	6.22	5.72	5.88	5.93	6.04	6.56	6.93	7.70	8.17	8.46
Natural Gas (dollars per thousand cubic feet)										
Wellhead Price <sup>14</sup>	6.39	5.88	6.05	6.10	6.21	6.75	7.12	7.92	8.40	8.70
Coal (dollars per ton)										
Minemouth Price <sup>15</sup>	25.82	29.40	29.45	29.61	27.56	27.90	28.25	27.73	29.10	30.12
Coal (dollars per million Btu)										
Minemouth Price <sup>15</sup>	1.27	1.44	1.44	1.45	1.37	1.39	1.41	1.39	1.46	1.51
Average Delivered Price <sup>16</sup>	1.86	1.98	1.99	1.99	1.96	1.99	2.02	2.01	2.08	2.15
Average Electricity Price (cents per kilowatthour)										
	9.1	8.9	9.0	9.1	8.9	9.4	9.9	9.7	10.4	10.8

# Economic Growth Case Comparisons

**Table B1. Total Energy Supply and Disposition Summary (Continued)**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
<b>Prices (nominal dollars per unit)</b>										
Petroleum (dollars per barrel)										
Imported Low Sulfur Light Crude Oil Price <sup>13</sup>	72.33	82.74	84.42	81.67	158.08	149.14	138.14	209.06	189.10	170.81
Imported Crude Oil Price <sup>13</sup>	63.83	79.63	81.69	78.91	148.39	144.74	134.60	191.46	180.66	165.45
Natural Gas (dollars per million Btu)										
Price at Henry Hub	6.96	6.89	7.01	6.98	9.54	9.60	9.30	14.32	13.42	12.06
Wellhead Price <sup>14</sup>	6.22	6.09	6.19	6.17	8.43	8.48	8.21	12.65	11.85	10.65
Natural Gas (dollars per thousand cubic feet)										
Wellhead Price <sup>14</sup>	6.39	6.26	6.37	6.34	8.66	8.72	8.44	13.00	12.18	10.95
Coal (dollars per ton)										
Minemouth Price <sup>15</sup>	25.82	31.31	31.02	30.79	38.44	36.04	33.50	45.55	42.20	37.91
Coal (dollars per million Btu)										
Minemouth Price <sup>15</sup>	1.27	1.53	1.52	1.51	1.91	1.80	1.67	2.28	2.11	1.90
Average Delivered Price <sup>16</sup>	1.86	2.11	2.10	2.07	2.73	2.57	2.39	3.31	3.01	2.71
Average Electricity Price (cents per kilowatt-hour)										
	9.1	9.5	9.5	9.4	12.4	12.2	11.8	16.0	15.1	13.7

<sup>1</sup>Includes waste coal.

<sup>2</sup>Includes grid-connected electricity from wood and waste; biomass, such as corn, used for liquid fuels production; and non-electric energy demand from wood. Refer to Table A17 for details.

<sup>3</sup>Includes grid-connected electricity from landfill gas; biogenic municipal waste; wind; photovoltaic and solar thermal sources; and non-electric energy from renewable sources, such as active and passive solar systems. Excludes electricity imports using renewable sources and nonmarketed renewable energy. See Table A17 for selected nonmarketed residential and commercial renewable energy.

<sup>4</sup>Includes non-biogenic municipal waste, liquid hydrogen, methanol, and some domestic inputs to refineries.

<sup>5</sup>Includes imports of finished petroleum products, unfinished oils, alcohols, ethers, blending components, and renewable fuels such as ethanol.

<sup>6</sup>Includes coal, coal coke (net), and electricity (net).

<sup>7</sup>Includes crude oil and petroleum products.

<sup>8</sup>Balancing item. Includes unaccounted for supply, losses, gains, and net storage withdrawals.

<sup>9</sup>Includes petroleum-derived fuels and non-petroleum derived fuels, such as ethanol and biodiesel, and coal-based synthetic liquids. Petroleum coke, which is a solid, is included. Also included are natural gas plant liquids, crude oil consumed as a fuel, and liquid hydrogen. Refer to Table A17 for detailed renewable liquid fuels consumption.

<sup>10</sup>Excludes coal converted to coal-based synthetic liquids.

<sup>11</sup>Includes grid-connected electricity from wood and wood waste, non-electric energy from wood, and biofuels heat and coproducts used in the production of liquid fuels, but excludes the energy content of the liquid fuels.

<sup>12</sup>Includes non-biogenic municipal waste and net electricity imports.

<sup>13</sup>Weighted average price delivered to U.S. refiners.

<sup>14</sup>Represents lower 48 onshore and offshore supplies.

<sup>15</sup>Includes reported prices for both open market and captive mines.

<sup>16</sup>Prices weighted by consumption; weighted average excludes residential and commercial prices, and export free-alongside-ship (f.a.s.) prices.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 natural gas supply values and natural gas wellhead price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2007 coal minemouth and delivered coal prices: EIA, *Annual Coal Report 2007*, DOE/EIA-0584(2007) (Washington, DC, September 2008). 2007 petroleum supply values: EIA, *Petroleum Supply Annual 2007*, DOE/EIA-0340(2007)/1 (Washington, DC, July 2008). 2007 low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2007 coal values: *Quarterly Coal Report, October-December 2007*, DOE/EIA-0121(2007/4Q) (Washington, DC, March 2008). Other 2007 values: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). Projections: EIA, AEO2009 National Energy Modeling System runs LM2009.D120908A, AEO2009.D120908A, and HM2009.D120908A.

## Economic Growth Case Comparisons

**Table B2. Energy Consumption by Sector and Source**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
<b>Energy Consumption</b>										
<b>Residential</b>										
Liquefied Petroleum Gases	0.50	0.49	0.49	0.49	0.48	0.49	0.51	0.49	0.52	0.54
Kerosene	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07
Distillate Fuel Oil	0.78	0.72	0.72	0.72	0.60	0.60	0.60	0.51	0.51	0.51
Liquid Fuels and Other Petroleum Subtotal	1.35	1.29	1.29	1.29	1.15	1.16	1.18	1.07	1.10	1.13
Natural Gas	4.86	4.92	4.92	4.92	5.03	5.10	5.18	4.86	5.07	5.30
Coal	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Renewable Energy <sup>1</sup>	0.43	0.43	0.43	0.43	0.47	0.48	0.49	0.48	0.50	0.53
Electricity	4.75	4.78	4.80	4.81	4.98	5.12	5.25	5.34	5.69	6.07
<b>Delivered Energy</b>	<b>11.40</b>	<b>11.43</b>	<b>11.44</b>	<b>11.46</b>	<b>11.63</b>	<b>11.86</b>	<b>12.11</b>	<b>11.75</b>	<b>12.36</b>	<b>13.03</b>
Electricity Related Losses	10.36	10.42	10.44	10.49	10.57	10.81	11.04	11.10	11.69	12.29
<b>Total</b>	<b>21.76</b>	<b>21.85</b>	<b>21.88</b>	<b>21.95</b>	<b>22.20</b>	<b>22.67</b>	<b>23.15</b>	<b>22.85</b>	<b>24.05</b>	<b>25.32</b>
<b>Commercial</b>										
Liquefied Petroleum Gases	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10
Motor Gasoline <sup>2</sup>	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Kerosene	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Distillate Fuel Oil	0.41	0.36	0.36	0.36	0.34	0.34	0.35	0.34	0.34	0.35
Residual Fuel Oil	0.08	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08
Liquid Fuels and Other Petroleum Subtotal	0.63	0.58	0.58	0.58	0.58	0.58	0.59	0.58	0.59	0.60
Natural Gas	3.10	3.14	3.14	3.14	3.30	3.34	3.40	3.40	3.54	3.70
Coal	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Renewable Energy <sup>3</sup>	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Electricity	4.58	4.74	4.75	4.76	5.42	5.57	5.72	6.01	6.31	6.66
<b>Delivered Energy</b>	<b>8.50</b>	<b>8.65</b>	<b>8.66</b>	<b>8.67</b>	<b>9.48</b>	<b>9.69</b>	<b>9.90</b>	<b>10.18</b>	<b>10.62</b>	<b>11.14</b>
Electricity Related Losses	9.99	10.34	10.35	10.38	11.50	11.77	12.02	12.51	12.96	13.49
<b>Total</b>	<b>18.49</b>	<b>18.99</b>	<b>19.01</b>	<b>19.05</b>	<b>20.99</b>	<b>21.46</b>	<b>21.92</b>	<b>22.69</b>	<b>23.59</b>	<b>24.64</b>
<b>Industrial<sup>4</sup></b>										
Liquefied Petroleum Gases	2.35	1.93	2.02	2.12	1.57	1.79	2.03	1.32	1.66	2.04
Motor Gasoline <sup>2</sup>	0.36	0.34	0.34	0.35	0.31	0.34	0.37	0.31	0.36	0.40
Distillate Fuel Oil	1.28	1.15	1.17	1.19	1.08	1.18	1.28	1.08	1.23	1.39
Residual Fuel Oil	0.25	0.15	0.15	0.15	0.15	0.16	0.17	0.14	0.16	0.18
Petrochemical Feedstocks	1.30	0.98	1.01	1.03	0.98	1.13	1.29	0.81	1.05	1.33
Other Petroleum <sup>5</sup>	4.42	3.75	3.74	3.78	3.57	3.72	4.06	3.46	3.84	4.21
Liquid Fuels and Other Petroleum Subtotal	9.96	8.30	8.42	8.62	7.66	8.32	9.21	7.12	8.30	9.55
Natural Gas	6.82	6.59	6.77	6.88	6.32	6.84	7.27	6.05	7.04	8.16
Natural-Gas-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lease and Plant Fuel <sup>6</sup>	1.20	1.26	1.27	1.28	1.29	1.33	1.37	1.41	1.47	1.51
Natural Gas Subtotal	8.02	7.85	8.05	8.16	7.61	8.17	8.64	7.45	8.51	9.67
Metallurgical Coal	0.60	0.55	0.55	0.56	0.45	0.49	0.53	0.38	0.48	0.57
Other Industrial Coal	1.21	1.23	1.24	1.24	1.11	1.15	1.19	1.08	1.16	1.23
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.24	0.24	0.24	0.58	0.58	0.59
Net Coal Coke Imports	0.03	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.02
Coal Subtotal	1.83	1.79	1.80	1.81	1.81	1.89	1.98	2.05	2.23	2.42
Biofuels Heat and Coproducts	0.40	0.74	0.75	0.75	1.24	1.23	1.22	1.66	1.66	1.92
Renewable Energy <sup>7</sup>	1.64	1.46	1.48	1.50	1.52	1.64	1.76	1.69	1.96	2.24
Electricity	3.43	3.31	3.34	3.37	3.26	3.48	3.71	3.13	3.67	4.23
<b>Delivered Energy</b>	<b>25.29</b>	<b>23.46</b>	<b>23.83</b>	<b>24.23</b>	<b>23.09</b>	<b>24.73</b>	<b>26.52</b>	<b>23.10</b>	<b>26.33</b>	<b>30.03</b>
Electricity Related Losses	7.49	7.22	7.27	7.35	6.92	7.36	7.80	6.51	7.55	8.57
<b>Total</b>	<b>32.77</b>	<b>30.68</b>	<b>31.10</b>	<b>31.58</b>	<b>30.01</b>	<b>32.09</b>	<b>34.33</b>	<b>29.61</b>	<b>33.87</b>	<b>38.60</b>

# Economic Growth Case Comparisons

**Table B2. Energy Consumption by Sector and Source (Continued)**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
<b>Transportation</b>										
Liquefied Petroleum Gases	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02
E85 <sup>8</sup>	0.00	0.00	0.00	0.00	0.94	0.85	0.75	2.11	2.18	2.38
Motor Gasoline <sup>2</sup>	17.29	16.85	16.93	17.05	14.86	15.56	16.35	13.30	14.49	15.33
Jet Fuel <sup>9</sup>	3.23	2.96	3.00	3.05	3.28	3.42	3.57	3.78	4.12	4.40
Distillate Fuel Oil <sup>10</sup>	6.48	6.04	6.13	6.23	6.82	7.36	7.94	7.78	9.09	10.47
Residual Fuel Oil	0.95	0.85	0.86	0.86	0.97	0.98	0.98	0.98	1.00	1.02
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Petroleum <sup>11</sup>	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.19
Liquid Fuels and Other Petroleum Subtotal	28.14	26.90	27.11	27.38	27.05	28.36	29.78	28.15	31.09	33.81
Pipeline Fuel Natural Gas	0.64	0.63	0.64	0.65	0.67	0.69	0.71	0.69	0.72	0.75
Compressed Natural Gas	0.02	0.03	0.03	0.03	0.06	0.07	0.07	0.07	0.09	0.10
Electricity	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.05	0.05
<b>Delivered Energy</b>	<b>28.82</b>	<b>27.59</b>	<b>27.81</b>	<b>28.08</b>	<b>27.81</b>	<b>29.15</b>	<b>30.59</b>	<b>28.95</b>	<b>31.94</b>	<b>34.72</b>
Electricity Related Losses	0.05	0.05	0.05	0.05	0.07	0.07	0.07	0.10	0.10	0.11
<b>Total</b>	<b>28.87</b>	<b>27.64</b>	<b>27.86</b>	<b>28.13</b>	<b>27.88</b>	<b>29.22</b>	<b>30.67</b>	<b>29.05</b>	<b>32.05</b>	<b>34.83</b>
<b>Delivered Energy Consumption for All Sectors</b>										
Liquefied Petroleum Gases	2.95	2.52	2.61	2.72	2.16	2.39	2.65	1.92	2.29	2.70
E85 <sup>8</sup>	0.00	0.00	0.00	0.00	0.94	0.85	0.75	2.11	2.18	2.38
Motor Gasoline <sup>2</sup>	17.70	17.24	17.33	17.44	15.22	15.95	16.77	13.66	14.90	15.79
Jet Fuel <sup>9</sup>	3.23	2.96	3.00	3.05	3.28	3.42	3.57	3.78	4.12	4.40
Kerosene	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Distillate Fuel Oil	8.94	8.27	8.38	8.50	8.84	9.49	10.17	9.70	11.17	12.71
Residual Fuel Oil	1.28	1.07	1.07	1.08	1.20	1.22	1.24	1.21	1.25	1.28
Petrochemical Feedstocks	1.30	0.98	1.01	1.03	0.98	1.13	1.29	0.81	1.05	1.33
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Petroleum <sup>12</sup>	4.57	3.90	3.89	3.93	3.73	3.89	4.23	3.62	4.01	4.38
Liquid Fuels and Other Petroleum Subtotal	40.08	37.06	37.40	37.87	36.44	38.42	40.76	36.91	41.07	45.09
Natural Gas	14.79	14.69	14.86	14.98	14.70	15.34	15.92	14.38	15.73	17.25
Natural-Gas-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lease and Plant Fuel <sup>6</sup>	1.20	1.26	1.27	1.28	1.29	1.33	1.37	1.41	1.47	1.51
Pipeline Natural Gas	0.64	0.63	0.64	0.65	0.67	0.69	0.71	0.69	0.72	0.75
Natural Gas Subtotal	16.64	16.58	16.78	16.90	16.66	17.36	18.00	16.47	17.92	19.52
Metallurgical Coal	0.60	0.55	0.55	0.56	0.45	0.49	0.53	0.38	0.48	0.57
Other Coal	1.28	1.30	1.31	1.32	1.18	1.22	1.27	1.15	1.23	1.31
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.24	0.24	0.24	0.58	0.58	0.59
Net Coal Coke Imports	0.03	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.02
Coal Subtotal	1.91	1.86	1.87	1.89	1.88	1.97	2.05	2.12	2.30	2.49
Biofuels Heat and Coproducts	0.40	0.74	0.75	0.75	1.24	1.23	1.22	1.66	1.66	1.92
Renewable Energy <sup>13</sup>	2.19	2.01	2.03	2.05	2.12	2.24	2.38	2.30	2.58	2.89
Electricity	12.79	12.86	12.91	12.98	13.68	14.20	14.72	14.53	15.73	17.01
<b>Delivered Energy</b>	<b>74.01</b>	<b>71.13</b>	<b>71.74</b>	<b>72.44</b>	<b>72.01</b>	<b>75.42</b>	<b>79.12</b>	<b>73.99</b>	<b>81.26</b>	<b>88.92</b>
Electricity Related Losses	27.88	28.03	28.11	28.26	29.06	30.02	30.93	30.21	32.30	34.47
<b>Total</b>	<b>101.89</b>	<b>99.15</b>	<b>99.85</b>	<b>100.70</b>	<b>101.07</b>	<b>105.44</b>	<b>110.06</b>	<b>104.20</b>	<b>113.56</b>	<b>123.38</b>
<b>Electric Power<sup>14</sup></b>										
Distillate Fuel Oil	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.13	0.13
Residual Fuel Oil	0.56	0.38	0.38	0.38	0.38	0.39	0.39	0.39	0.40	0.41
Liquid Fuels and Other Petroleum Subtotal	0.67	0.49	0.49	0.49	0.50	0.51	0.51	0.51	0.53	0.54
Natural Gas	7.06	6.32	6.42	6.38	6.22	6.73	7.16	6.87	7.12	7.20
Steam Coal	20.84	21.04	21.03	21.03	21.49	22.01	22.30	22.51	24.25	25.74
Nuclear Power	8.41	8.45	8.45	8.45	8.77	8.99	9.27	8.53	9.47	10.67
Renewable Energy <sup>15</sup>	3.45	4.38	4.42	4.68	5.59	5.79	6.20	6.17	6.43	7.08
Electricity Imports	0.11	0.08	0.08	0.08	0.04	0.06	0.08	0.02	0.10	0.13
<b>Total<sup>16</sup></b>	<b>40.67</b>	<b>40.89</b>	<b>41.02</b>	<b>41.24</b>	<b>42.74</b>	<b>44.22</b>	<b>45.65</b>	<b>44.74</b>	<b>48.03</b>	<b>51.48</b>

# Economic Growth Case Comparisons

**Table B2. Energy Consumption by Sector and Source (Continued)**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
<b>Total Energy Consumption</b>										
Liquefied Petroleum Gases	2.95	2.52	2.61	2.72	2.16	2.39	2.65	1.92	2.29	2.70
E85 <sup>8</sup>	0.00	0.00	0.00	0.00	0.94	0.85	0.75	2.11	2.18	2.38
Motor Gasoline <sup>2</sup>	17.70	17.24	17.33	17.44	15.22	15.95	16.77	13.66	14.90	15.79
Jet Fuel <sup>9</sup>	3.23	2.96	3.00	3.05	3.28	3.42	3.57	3.78	4.12	4.40
Kerosene	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Distillate Fuel Oil	9.05	8.39	8.49	8.62	8.96	9.61	10.29	9.83	11.31	12.85
Residual Fuel Oil	1.84	1.45	1.45	1.46	1.58	1.60	1.63	1.60	1.64	1.69
Petrochemical Feedstocks	1.30	0.98	1.01	1.03	0.98	1.13	1.29	0.81	1.05	1.33
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Petroleum <sup>12</sup>	4.57	3.90	3.89	3.93	3.73	3.89	4.23	3.62	4.01	4.38
Liquid Fuels and Other Petroleum Subtotal	40.75	37.55	37.89	38.36	36.94	38.93	41.27	37.42	41.60	45.63
Natural Gas	21.86	21.01	21.29	21.36	20.92	22.07	23.09	21.25	22.86	24.45
Natural-Gas-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lease and Plant Fuel <sup>6</sup>	1.20	1.26	1.27	1.28	1.29	1.33	1.37	1.41	1.47	1.51
Pipeline Natural Gas	0.64	0.63	0.64	0.65	0.67	0.69	0.71	0.69	0.72	0.75
Natural Gas Subtotal	23.70	22.90	23.20	23.28	22.88	24.09	25.16	23.35	25.04	26.71
Metallurgical Coal	0.60	0.55	0.55	0.56	0.45	0.49	0.53	0.38	0.48	0.57
Other Coal	22.12	22.35	22.34	22.35	22.67	23.24	23.57	23.66	25.49	27.04
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.24	0.24	0.24	0.58	0.58	0.59
Net Coal Coke Imports	0.03	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.02
Coal Subtotal	22.74	22.90	22.91	22.92	23.37	23.98	24.35	24.63	26.56	28.23
Nuclear Power	8.41	8.45	8.45	8.45	8.77	8.99	9.27	8.53	9.47	10.67
Biofuels Heat and Coproducts	0.40	0.74	0.75	0.75	1.24	1.23	1.22	1.66	1.66	1.92
Renewable Energy <sup>17</sup>	5.65	6.40	6.45	6.74	7.71	8.03	8.57	8.47	9.01	9.97
Electricity Imports	0.11	0.08	0.08	0.08	0.04	0.06	0.08	0.02	0.10	0.13
<b>Total</b>	<b>101.89</b>	<b>99.15</b>	<b>99.85</b>	<b>100.70</b>	<b>101.07</b>	<b>105.44</b>	<b>110.06</b>	<b>104.20</b>	<b>113.56</b>	<b>123.38</b>
<b>Energy Use and Related Statistics</b>										
Delivered Energy Use	74.01	71.13	71.74	72.44	72.01	75.42	79.12	73.99	81.26	88.92
Total Energy Use	101.89	99.15	99.85	100.70	101.07	105.44	110.06	104.20	113.56	123.38
Ethanol Consumed in Motor Gasoline and E85	0.56	1.08	1.08	1.09	1.67	1.66	1.65	2.34	2.47	2.67
Population (millions)	302.41	309.98	311.37	313.17	330.15	342.61	356.39	345.43	375.12	406.67
Gross Domestic Product (billion 2000 dollars)	11524	11453	11779	12114	14327	15524	16726	17351	20114	22875
Carbon Dioxide Emissions (million metric tons)	5990.8	5769.9	5801.4	5831.1	5745.9	5982.3	6209.9	5897.9	6414.4	6885.9

<sup>1</sup>Includes wood used for residential heating. See Table A4 and/or Table A17 for estimates of nonmarketed renewable energy consumption for geothermal heat pumps, solar thermal hot water heating, and solar photovoltaic electricity generation.

<sup>2</sup>Includes ethanol (blends of 10 percent or less) and ethers blended into gasoline.

<sup>3</sup>Excludes ethanol. Includes commercial sector consumption of wood and wood waste, landfill gas, municipal waste, and other biomass for combined heat and power. See Table A5 and/or Table A17 for estimates of nonmarketed renewable energy consumption for solar thermal hot water heating and solar photovoltaic electricity generation.

<sup>4</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>5</sup>Includes petroleum coke, asphalt, road oil, lubricants, still gas, and miscellaneous petroleum products.

<sup>6</sup>Represents natural gas used in well, field, and lease operations, and in natural gas processing plant machinery.

<sup>7</sup>Includes consumption of energy produced from hydroelectric, wood and wood waste, municipal waste, and other biomass sources. Excludes ethanol blends (10 percent or less) in motor gasoline.

<sup>8</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>9</sup>Includes only kerosene type.

<sup>10</sup>Diesel fuel for on- and off- road use.

<sup>11</sup>Includes aviation gasoline and lubricants.

<sup>12</sup>Includes unfinished oils, natural gasoline, motor gasoline blending components, aviation gasoline, lubricants, still gas, asphalt, road oil, petroleum coke, and miscellaneous petroleum products.

<sup>13</sup>Includes electricity generated for sale to the grid and for own use from renewable sources, and non-electric energy from renewable sources. Excludes ethanol and nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

<sup>14</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>15</sup>Includes conventional hydroelectric, geothermal, wood and wood waste, biogenic municipal waste, other biomass, wind, photovoltaic, and solar thermal sources. Excludes net electricity imports.

<sup>16</sup>Includes non-biogenic municipal waste not included above.

<sup>17</sup>Includes conventional hydroelectric, geothermal, wood and wood waste, biogenic municipal waste, other biomass, wind, photovoltaic, and solar thermal sources. Excludes ethanol, net electricity imports, and nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 consumption based on: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2007 population and gross domestic product: IHS Global Insight Industry and Employment models, November 2008. 2007 carbon dioxide emissions: EIA, *Emissions of Greenhouse Gases in the United States 2007*, DOE/EIA-0573(2007) (Washington, DC, December 2008). Projections: EIA, AEO2009 National Energy Modeling System runs LM2009.D120908A, AEO2009.D120908A, and HM2009.D120908A.

# Economic Growth Case Comparisons

**Table B3. Energy Prices by Sector and Source**  
(2007 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
<b>Residential</b>										
Liquefied Petroleum Gases	24.98	25.33	25.86	25.52	31.79	32.88	33.08	33.52	35.11	36.58
Distillate Fuel Oil	19.66	18.23	18.69	18.38	22.98	24.10	24.43	25.16	26.67	28.13
Natural Gas	12.69	11.90	12.09	12.18	11.89	12.50	12.91	13.72	14.31	14.69
Electricity	31.19	30.65	30.89	31.07	31.22	32.72	34.31	33.52	35.84	37.37
<b>Commercial</b>										
Liquefied Petroleum Gases	23.04	22.15	22.69	22.34	28.54	29.60	29.79	30.22	31.77	33.21
Distillate Fuel Oil	16.05	15.68	16.15	15.83	21.04	22.11	22.45	23.07	24.69	26.13
Residual Fuel Oil	10.21	10.52	10.97	10.67	16.20	16.68	16.81	17.64	17.98	18.38
Natural Gas	10.99	10.36	10.55	10.63	10.47	11.13	11.60	12.27	12.96	13.42
Electricity	28.07	27.00	27.29	27.52	26.41	28.15	29.82	28.68	31.01	32.54
<b>Industrial<sup>1</sup></b>										
Liquefied Petroleum Gases	23.38	21.29	21.84	21.48	27.76	28.78	28.95	29.31	30.99	32.44
Distillate Fuel Oil	16.82	15.54	16.01	15.69	21.53	22.56	22.92	23.51	25.19	26.62
Residual Fuel Oil	10.49	14.92	15.38	15.09	20.08	20.94	21.19	21.64	22.73	23.87
Natural Gas <sup>2</sup>	7.52	6.76	6.91	6.95	6.95	7.48	7.83	8.62	9.07	9.39
Metallurgical Coal	3.61	4.37	4.37	4.39	4.33	4.40	4.44	4.36	4.41	4.48
Other Industrial Coal	2.43	2.53	2.54	2.54	2.50	2.53	2.57	2.56	2.67	2.76
Coal to Liquids	--	--	--	--	1.23	1.23	1.26	1.48	1.36	1.39
Electricity	18.63	18.51	18.72	18.88	17.78	19.06	20.50	19.62	21.59	22.60
<b>Transportation</b>										
Liquefied Petroleum Gases <sup>3</sup>	25.01	25.13	25.67	25.33	31.53	32.62	32.83	33.20	34.77	36.24
E85 <sup>4</sup>	26.67	24.93	25.47	25.14	28.24	29.30	29.62	28.65	30.10	30.94
Motor Gasoline <sup>5</sup>	22.98	22.99	23.47	23.17	28.68	29.75	30.14	30.42	32.10	33.71
Jet Fuel <sup>6</sup>	16.10	15.54	16.03	15.71	21.27	22.15	22.50	23.23	24.63	25.95
Diesel Fuel (distillate fuel oil) <sup>7</sup>	20.92	19.55	20.05	19.74	24.96	26.04	26.53	26.75	28.59	30.20
Residual Fuel Oil	9.35	11.65	12.10	11.86	16.66	17.46	17.68	18.70	19.65	20.87
Natural Gas <sup>8</sup>	15.46	14.71	14.90	14.99	14.20	14.90	15.46	15.53	16.24	16.82
Electricity	30.64	29.99	30.34	30.56	27.79	29.48	31.35	31.10	34.15	35.68
<b>Electric Power<sup>9</sup></b>										
Distillate Fuel Oil	14.77	14.64	15.09	14.79	19.42	20.45	20.78	21.69	23.11	24.53
Residual Fuel Oil	8.38	12.75	13.21	12.94	17.77	18.55	18.79	19.71	20.67	21.81
Natural Gas	7.02	6.40	6.59	6.65	6.59	7.15	7.53	8.23	8.70	9.02
Steam Coal	1.78	1.89	1.89	1.89	1.89	1.92	1.94	1.97	2.04	2.11
<b>Average Price to All Users<sup>10</sup></b>										
Liquefied Petroleum Gases	18.53	20.52	20.96	20.60	26.70	27.56	27.64	28.53	29.77	30.85
E85 <sup>4</sup>	26.67	24.93	25.47	25.14	28.24	29.30	29.62	28.65	30.10	30.94
Motor Gasoline <sup>5</sup>	22.82	22.99	23.47	23.17	28.68	29.75	30.14	30.42	32.10	33.70
Jet Fuel	16.10	15.54	16.03	15.71	21.27	22.15	22.50	23.23	24.63	25.95
Distillate Fuel Oil	19.94	18.49	18.98	18.68	24.18	25.28	25.74	26.12	27.94	29.55
Residual Fuel Oil	9.25	12.21	12.66	12.41	17.22	18.03	18.26	19.16	20.12	21.29
Natural Gas	9.01	8.40	8.56	8.62	8.61	9.11	9.46	10.27	10.75	11.07
Metallurgical Coal	3.61	4.37	4.37	4.39	4.33	4.40	4.44	4.36	4.41	4.48
Other Coal	1.82	1.93	1.93	1.93	1.93	1.95	1.98	2.00	2.07	2.14
Coal to Liquids	--	--	--	--	1.23	1.23	1.26	1.48	1.36	1.39
Electricity	26.70	26.18	26.42	26.60	26.11	27.57	29.07	28.52	30.56	31.80
<b>Non-Renewable Energy Expenditures by Sector (billion 2007 dollars)</b>										
Residential	238.38	232.16	235.27	236.76	245.77	263.30	280.31	276.47	310.03	340.96
Commercial	173.09	170.43	172.88	174.43	190.63	207.76	224.08	228.34	256.75	282.60
Industrial	226.84	195.79	204.25	208.24	209.85	242.68	274.85	217.46	276.26	339.95
Transportation	596.75	563.59	580.97	578.11	687.05	752.82	806.73	724.88	853.25	976.29
Total Non-Renewable Expenditures	1235.06	1161.96	1193.36	1197.55	1333.29	1466.55	1585.97	1447.15	1696.29	1939.79
Transportation Renewable Expenditures	0.04	0.06	0.07	0.07	26.65	24.83	22.10	60.50	65.71	73.63
<b>Total Expenditures</b>	<b>1235.10</b>	<b>1162.03</b>	<b>1193.43</b>	<b>1197.61</b>	<b>1359.95</b>	<b>1491.38</b>	<b>1608.07</b>	<b>1507.65</b>	<b>1762.00</b>	<b>2013.43</b>

## Economic Growth Case Comparisons

**Table B3. Energy Prices by Sector and Source (Continued)**  
(Nominal Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
<b>Residential</b>										
Liquefied Petroleum Gases	24.98	26.98	27.24	26.53	44.34	42.47	39.23	55.06	50.90	46.04
Distillate Fuel Oil	19.66	19.42	19.68	19.11	32.05	31.14	28.97	41.32	38.67	35.40
Natural Gas	12.69	12.67	12.74	12.66	16.58	16.14	15.31	22.53	20.75	18.49
Electricity	31.19	32.65	32.53	32.31	43.54	42.26	40.69	55.05	51.96	47.03
<b>Commercial</b>										
Liquefied Petroleum Gases	23.04	23.59	23.89	23.23	39.80	38.24	35.32	49.63	46.06	41.79
Distillate Fuel Oil	16.05	16.70	17.01	16.46	29.35	28.56	26.62	37.88	35.80	32.89
Residual Fuel Oil	10.21	11.20	11.55	11.10	22.59	21.55	19.94	28.97	26.07	23.13
Natural Gas	10.99	11.03	11.11	11.05	14.60	14.37	13.75	20.16	18.78	16.89
Electricity	28.07	28.76	28.74	28.62	36.83	36.37	35.37	47.10	44.96	40.95
<b>Industrial<sup>1</sup></b>										
Liquefied Petroleum Gases	23.38	22.68	23.00	22.34	38.71	37.17	34.32	48.13	44.93	40.82
Distillate Fuel Oil	16.82	16.55	16.86	16.32	30.03	29.14	27.18	38.61	36.52	33.50
Residual Fuel Oil	10.49	15.89	16.20	15.69	28.00	27.05	25.13	35.54	32.95	30.04
Natural Gas <sup>2</sup>	7.52	7.20	7.27	7.23	9.70	9.66	9.29	14.15	13.16	11.82
Metallurgical Coal	3.61	4.65	4.60	4.57	6.04	5.69	5.27	7.17	6.40	5.64
Other Industrial Coal	2.43	2.69	2.67	2.64	3.49	3.27	3.04	4.20	3.88	3.47
Coal to Liquids	--	--	--	--	1.72	1.59	1.49	2.44	1.98	1.75
Electricity	18.63	19.72	19.72	19.63	24.79	24.63	24.30	32.22	31.30	28.44
<b>Transportation</b>										
Liquefied Petroleum Gases <sup>3</sup>	25.01	26.77	27.04	26.34	43.98	42.13	38.93	54.52	50.41	45.61
E85 <sup>4</sup>	26.67	26.55	26.83	26.14	39.38	37.85	35.12	47.06	43.63	38.94
Motor Gasoline <sup>5</sup>	22.98	24.49	24.72	24.09	40.00	38.43	35.75	49.96	46.54	42.42
Jet Fuel <sup>6</sup>	16.10	16.55	16.89	16.34	29.66	28.62	26.68	38.15	35.70	32.66
Diesel Fuel (distillate fuel oil) <sup>7</sup>	20.92	20.82	21.12	20.52	34.81	33.63	31.47	43.93	41.44	38.00
Residual Fuel Oil	9.35	12.41	12.74	12.33	23.23	22.56	20.96	30.72	28.49	26.27
Natural Gas <sup>8</sup>	15.46	15.67	15.69	15.59	19.80	19.24	18.33	25.50	23.55	21.17
Electricity	30.64	31.94	31.95	31.78	38.75	38.09	37.18	51.07	49.51	44.90
<b>Electric Power<sup>9</sup></b>										
Distillate Fuel Oil	14.77	15.59	15.89	15.38	27.07	26.42	24.64	35.62	33.51	30.87
Residual Fuel Oil	8.38	13.58	13.91	13.46	24.78	23.97	22.28	32.36	29.97	27.44
Natural Gas	7.02	6.82	6.94	6.92	9.19	9.24	8.94	13.51	12.61	11.35
Steam Coal	1.78	2.01	1.99	1.97	2.64	2.48	2.30	3.24	2.95	2.65

# Economic Growth Case Comparisons

**Table B3. Energy Prices by Sector and Source (Continued)**  
(Nominal Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
<b>Average Price to All Users<sup>10</sup></b>										
Liquefied Petroleum Gases .....	18.53	21.85	22.07	21.42	37.24	35.61	32.78	46.86	43.16	38.83
E85 <sup>4</sup> .....	26.67	26.55	26.83	26.14	39.38	37.85	35.12	47.06	43.63	38.94
Motor Gasoline <sup>5</sup> .....	22.82	24.49	24.71	24.09	40.00	38.43	35.74	49.95	46.54	42.42
Jet Fuel .....	16.10	16.55	16.89	16.34	29.66	28.62	26.68	38.15	35.70	32.66
Distillate Fuel Oil .....	19.94	19.69	19.99	19.42	33.72	32.65	30.53	42.89	40.51	37.19
Residual Fuel Oil .....	9.25	13.00	13.34	12.91	24.02	23.29	21.66	31.46	29.16	26.80
Natural Gas .....	9.01	8.95	9.01	8.96	12.00	11.77	11.22	16.86	15.58	13.93
Metallurgical Coal .....	3.61	4.65	4.60	4.57	6.04	5.69	5.27	7.17	6.40	5.64
Other Coal .....	1.82	2.05	2.04	2.01	2.69	2.52	2.34	3.29	3.00	2.69
Coal to Liquids .....	--	--	--	--	1.72	1.59	1.49	2.44	1.98	1.75
Electricity .....	26.70	27.88	27.82	27.66	36.41	35.62	34.48	46.83	44.31	40.02
<b>Non-Renewable Energy Expenditures by Sector (billion nominal dollars)</b>										
Residential .....	238.38	247.28	247.78	246.19	342.73	340.12	332.40	454.04	449.49	429.11
Commercial .....	173.09	181.52	182.07	181.38	265.84	268.38	265.72	375.00	372.25	355.66
Industrial .....	226.84	208.54	215.12	216.54	292.64	313.49	325.93	357.14	400.54	427.84
Transportation .....	596.75	600.28	611.87	601.14	958.10	972.48	956.66	1190.47	1237.08	1228.71
Total Non-Renewable Expenditures .....	1235.06	1237.62	1256.84	1245.25	1859.30	1894.47	1880.71	2376.64	2459.36	2441.32
Transportation Renewable Expenditures .....	0.04	0.07	0.07	0.07	37.17	32.08	26.21	99.35	95.27	92.67
<b>Total Expenditures .....</b>	<b>1235.10</b>	<b>1237.69</b>	<b>1256.91</b>	<b>1245.32</b>	<b>1896.47</b>	<b>1926.55</b>	<b>1906.92</b>	<b>2476.00</b>	<b>2554.63</b>	<b>2533.99</b>

<sup>1</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>2</sup>Excludes use for lease and plant fuel.

<sup>3</sup>Includes Federal and State taxes while excluding county and local taxes.

<sup>4</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>5</sup>Sales weighted-average price for all grades. Includes Federal, State and local taxes.

<sup>6</sup>Kerosene-type jet fuel. Includes Federal and State taxes while excluding county and local taxes.

<sup>7</sup>Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

<sup>8</sup>Compressed natural gas used as a vehicle fuel. Includes estimated motor vehicle fuel taxes and estimated dispensing costs or charges.

<sup>9</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>10</sup>Weighted averages of end-use fuel prices are derived from the prices shown in each sector and the corresponding sectoral consumption.

Btu = British thermal unit.

-- = Not applicable.

Note: Data for 2007 are model results and may differ slightly from official EIA data reports.

**Sources:** 2007 prices for motor gasoline, distillate fuel oil, and jet fuel are based on prices in the Energy Information Administration (EIA), *Petroleum Marketing Annual 2007*, DOE/EIA-0487(2007) (Washington, DC, August 2008). 2007 residential and commercial natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2007 industrial natural gas delivered prices are estimated based on: EIA, *Manufacturing Energy Consumption Survey 1994* and industrial and wellhead prices from the *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007) and the *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2007 transportation sector natural gas delivered prices are model results. 2007 electric power sector natural gas prices: EIA, *Electric Power Monthly*, DOE/EIA-0226, April 2007 and April 2008, Table 4.13.B. 2007 coal prices based on: EIA, *Quarterly Coal Report, October-December 2007*, DOE/EIA-0121(2007/4Q) (Washington, DC, March 2008) and EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A. 2007 electricity prices: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2007 E85 prices derived from monthly prices in the Clean Cities Alternative Fuel Price Report.

**Projections:** EIA, AEO2009 National Energy Modeling System runs LM2009.D120908A, AEO2009.D120908A, and HM2009.D120908A.

## Economic Growth Case Comparisons

**Table B4. Macroeconomic Indicators**  
(Billion 2000 Chain-Weighted Dollars, Unless Otherwise Noted)

Indicators	2007	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
<b>Real Gross Domestic Product</b> .....	<b>11524</b>	<b>11453</b>	<b>11779</b>	<b>12114</b>	<b>14327</b>	<b>15524</b>	<b>16726</b>	<b>17351</b>	<b>20114</b>	<b>22875</b>
<b>Components of Real Gross Domestic Product</b>										
Real Consumption .....	8253	8270	8435	8607	10121	10876	11639	11826	13439	15054
Real Investment .....	1810	1438	1581	1728	2270	2565	2856	3004	3756	4478
Real Government Spending .....	2012	2033	2065	2096	2058	2194	2329	2129	2427	2722
Real Exports .....	1426	1574	1585	1597	2765	3061	3365	4906	5820	6757
Real Imports .....	1972	1861	1899	1947	2874	3007	3111	4413	4717	4961
<b>Energy Intensity</b> (thousand Btu per 2000 dollar of GDP)										
Delivered Energy .....	6.42	6.21	6.09	5.98	5.03	4.86	4.73	4.26	4.04	3.89
Total Energy .....	8.84	8.66	8.48	8.31	7.05	6.79	6.58	6.01	5.65	5.39
<b>Price Indices</b>										
GDP Chain-Type Price Index (2000=1.000) ..	1.198	1.276	1.262	1.246	1.671	1.548	1.421	1.968	1.737	1.508
Consumer Price Index (1982-4=1)										
All-Urban .....	2.07	2.22	2.20	2.17	3.05	2.83	2.60	3.74	3.31	2.88
Energy Commodities and Services .....	2.08	2.17	2.18	2.15	3.28	3.16	2.97	4.14	3.87	3.51
Wholesale Price Index (1982=1.00)										
All Commodities .....	1.73	1.82	1.80	1.76	2.39	2.19	1.98	2.75	2.36	1.99
Fuel and Power .....	1.77	1.90	1.91	1.88	2.82	2.74	2.60	3.70	3.45	3.14
Metals and Metal Products .....	1.93	1.84	1.82	1.80	2.37	2.21	2.05	2.50	2.22	1.97
<b>Interest Rates (percent, nominal)</b>										
Federal Funds Rate .....	5.02	1.36	1.30	1.15	5.72	5.20	4.63	4.49	4.04	3.60
10-Year Treasury Note .....	4.63	3.89	3.67	3.36	6.43	5.86	5.24	5.19	4.67	4.18
AA Utility Bond Rate .....	5.94	6.56	6.39	6.12	8.06	7.49	6.86	6.35	5.79	5.24
<b>Value of Shipments (billion 2000 dollars)</b>										
Total Industrial .....	5750	5069	5240	5418	6132	6753	7383	6923	8451	10032
Non-manufacturing .....	1490	1196	1277	1361	1411	1603	1795	1498	1780	2057
Manufacturing .....	4261	3873	3963	4058	4721	5150	5588	5425	6671	7975
Energy-Intensive .....	1239	1215	1238	1265	1277	1374	1481	1319	1525	1743
Non-Energy Intensive .....	3022	2658	2725	2793	3444	3776	4106	4106	5145	6232
<b>Population and Employment (millions)</b>										
Population with Armed Forces Overseas ....	302.4	310.0	311.4	313.2	330.2	342.6	356.4	345.4	375.1	406.7
Population (aged 16 and over) .....	237.2	243.8	245.2	247.0	261.8	270.4	279.7	278.2	297.6	318.3
Population, over age 65 .....	38.0	40.2	40.4	40.5	54.2	55.0	56.0	69.9	72.3	74.8
Employment, Nonfarm .....	137.2	130.7	135.6	140.6	141.7	152.6	163.5	153.1	168.3	183.5
Employment, Manufacturing .....	13.9	12.0	12.2	12.4	11.8	12.3	12.6	10.7	11.7	12.6
<b>Key Labor Indicators</b>										
Labor Force (millions) .....	153.1	154.2	155.9	157.4	162.9	168.4	174.5	171.9	181.5	191.4
Non-farm Labor Productivity (1992=1.00) ....	1.37	1.43	1.45	1.47	1.65	1.74	1.84	1.92	2.14	2.36
Unemployment Rate (percent) .....	4.64	8.42	8.26	8.08	5.72	5.53	5.30	4.98	4.78	4.58
<b>Key Indicators for Energy Demand</b>										
Real Disposable Personal Income .....	8644	8837	9017	9209	11317	12035	12757	13927	15450	16980
Housing Starts (millions) .....	1.44	1.01	1.18	1.37	1.40	1.77	2.16	1.18	1.74	2.31
Commercial Floorspace (billion square feet) ..	77.3	80.9	81.2	81.4	88.3	92.3	96.2	96.2	103.3	110.6
Unit Sales of Light-Duty Vehicles (millions) ...	16.09	13.90	14.18	14.89	16.30	17.41	18.88	18.52	20.99	23.77

GDP = Gross domestic product.

Btu = British thermal unit.

**Sources:** 2007: IHS Global Insight Industry and Employment models, November 2008. **Projections:** Energy Information Administration, AEO2009 National Energy Modeling System runs LM2009.D120908A, AEO2009.D120908A, and HM2009.D120908A.



# Price Case Comparisons

**Table C1. Total Energy Supply and Disposition Summary**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Production</b>										
Crude Oil and Lease Condensate .....	10.73	12.19	12.19	12.20	11.60	14.06	15.54	11.60	15.96	18.31
Natural Gas Plant Liquids .....	2.41	2.60	2.58	2.57	2.55	2.57	2.59	2.42	2.61	2.67
Dry Natural Gas .....	19.84	21.09	20.95	20.88	21.20	22.08	22.47	22.86	24.26	26.04
Coal <sup>1</sup> .....	23.50	24.22	24.21	24.18	24.89	24.43	24.03	26.18	26.93	26.40
Nuclear Power .....	8.41	8.45	8.45	8.45	8.89	8.99	9.10	9.14	9.47	9.57
Hydropower .....	2.46	2.67	2.67	2.67	2.97	2.95	2.95	2.98	2.97	2.98
Biomass <sup>2</sup> .....	3.23	4.20	4.20	4.23	6.28	6.52	7.50	7.81	8.25	8.63
Other Renewable Energy <sup>3</sup> .....	0.97	1.50	1.54	1.59	1.71	1.74	1.77	2.22	2.19	2.20
Other <sup>4</sup> .....	0.94	0.85	0.85	0.89	1.07	1.07	1.28	1.15	1.15	1.21
<b>Total</b> .....	<b>72.49</b>	<b>77.77</b>	<b>77.64</b>	<b>77.66</b>	<b>81.15</b>	<b>84.41</b>	<b>87.24</b>	<b>86.37</b>	<b>93.79</b>	<b>98.02</b>
<b>Imports</b>										
Crude Oil .....	21.90	18.05	17.76	17.59	21.51	16.09	12.08	24.99	15.39	9.64
Liquid Fuels and Other Petroleum <sup>5</sup> .....	6.97	6.07	5.59	5.53	7.07	5.67	5.33	7.58	6.33	5.74
Natural Gas .....	4.72	3.27	3.27	3.27	3.90	3.37	3.21	3.27	2.58	2.15
Other Imports <sup>6</sup> .....	0.99	0.89	0.89	0.89	0.57	1.19	1.43	1.12	1.35	1.67
<b>Total</b> .....	<b>34.59</b>	<b>28.28</b>	<b>27.51</b>	<b>27.28</b>	<b>33.06</b>	<b>26.31</b>	<b>22.05</b>	<b>36.96</b>	<b>25.65</b>	<b>19.19</b>
<b>Exports</b>										
Petroleum <sup>7</sup> .....	2.84	2.58	2.56	2.55	2.81	2.90	2.90	3.18	3.17	2.96
Natural Gas .....	0.83	0.70	0.70	0.70	1.48	1.44	1.41	1.97	1.87	1.80
Coal .....	1.51	2.05	2.05	2.05	1.34	1.33	1.23	1.09	1.08	0.82
<b>Total</b> .....	<b>5.17</b>	<b>5.33</b>	<b>5.31</b>	<b>5.30</b>	<b>5.64</b>	<b>5.66</b>	<b>5.54</b>	<b>6.24</b>	<b>6.12</b>	<b>5.57</b>
<b>Discrepancy<sup>8</sup></b> .....	<b>0.01</b>	<b>-0.09</b>	<b>-0.02</b>	<b>0.01</b>	<b>-0.52</b>	<b>-0.39</b>	<b>-0.25</b>	<b>-0.52</b>	<b>-0.25</b>	<b>-0.16</b>
<b>Consumption</b>										
Liquid Fuels and Other Petroleum <sup>9</sup> .....	40.75	38.73	37.89	37.72	43.21	38.93	36.87	47.48	41.60	38.83
Natural Gas .....	23.70	23.34	23.20	23.10	23.70	24.09	24.18	24.23	25.04	25.72
Coal <sup>10</sup> .....	22.74	22.92	22.91	22.88	23.93	23.98	23.86	25.99	26.56	26.53
Nuclear Power .....	8.41	8.45	8.45	8.45	8.89	8.99	9.10	9.14	9.47	9.57
Hydropower .....	2.46	2.67	2.67	2.67	2.97	2.95	2.95	2.98	2.97	2.98
Biomass <sup>11</sup> .....	2.62	2.99	2.99	3.00	4.51	4.58	5.04	5.35	5.51	5.72
Other Renewable Energy <sup>3</sup> .....	0.97	1.50	1.54	1.59	1.71	1.74	1.77	2.22	2.19	2.20
Other <sup>12</sup> .....	0.23	0.21	0.21	0.22	0.17	0.19	0.22	0.21	0.22	0.25
<b>Total</b> .....	<b>101.89</b>	<b>100.80</b>	<b>99.85</b>	<b>99.62</b>	<b>109.09</b>	<b>105.44</b>	<b>104.00</b>	<b>117.61</b>	<b>113.56</b>	<b>111.80</b>
<b>Prices (2007 dollars per unit)</b>										
Petroleum (dollars per barrel)										
Imported Low Sulfur Light Crude Oil Price <sup>13</sup> .....	72.33	58.61	80.16	91.08	50.43	115.45	184.60	50.23	130.43	200.42
Imported Crude Oil Price <sup>13</sup> .....	63.83	55.45	77.56	88.31	46.77	112.05	181.18	46.44	124.60	197.72
Natural Gas (dollars per million Btu)										
Price at Henry Hub .....	6.96	6.08	6.66	6.89	6.93	7.43	7.80	8.70	9.25	9.62
Wellhead Price <sup>14</sup> .....	6.22	5.37	5.88	6.09	6.12	6.56	6.89	7.68	8.17	8.49
Natural Gas (dollars per thousand cubic feet)										
Wellhead Price <sup>14</sup> .....	6.39	5.52	6.05	6.26	6.29	6.75	7.09	7.90	8.40	8.73
Coal (dollars per ton)										
Minemouth Price <sup>15</sup> .....	25.82	28.93	29.45	29.75	26.97	27.90	29.13	27.41	29.10	29.85
Coal (dollars per million Btu)										
Minemouth Price <sup>15</sup> .....	1.27	1.42	1.44	1.46	1.34	1.39	1.45	1.37	1.46	1.50
Average Delivered Price <sup>16</sup> .....	1.86	1.94	1.99	2.02	1.89	1.99	2.10	1.96	2.08	2.18
Average Electricity Price										
(cents per kilowatthour) .....	9.1	8.8	9.0	9.1	9.1	9.4	9.7	10.1	10.4	10.6

# Price Case Comparisons

**Table C1. Total Energy Supply and Disposition Summary (Continued)**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Prices (nominal dollars per unit)</b>										
Petroleum (dollars per barrel)										
Imported Low Sulfur Light Crude Oil Price <sup>13</sup>	72.33	61.54	84.42	95.98	65.49	149.14	237.86	72.62	189.10	289.12
Imported Crude Oil Price <sup>13</sup>	63.83	58.23	81.69	93.06	60.74	144.74	233.45	67.13	180.66	285.22
Natural Gas (dollars per million Btu)										
Price at Henry Hub	6.96	6.38	7.01	7.26	8.99	9.60	10.05	12.58	13.42	13.87
Wellhead Price <sup>14</sup>	6.22	5.64	6.19	6.41	7.95	8.48	8.88	11.11	11.85	12.25
Natural Gas (dollars per thousand cubic feet)										
Wellhead Price <sup>14</sup>	6.39	5.80	6.37	6.59	8.17	8.72	9.13	11.42	12.18	12.60
Coal (dollars per ton)										
Minemouth Price <sup>15</sup>	25.82	30.38	31.02	31.35	35.03	36.04	37.53	39.62	42.20	43.06
Coal (dollars per million Btu)										
Minemouth Price <sup>15</sup>	1.27	1.49	1.52	1.53	1.74	1.80	1.87	1.97	2.11	2.16
Average Delivered Price <sup>16</sup>	1.86	2.04	2.10	2.13	2.45	2.57	2.70	2.83	3.01	3.14
Average Electricity Price										
(cents per kilowatt-hour)	9.1	9.3	9.5	9.6	11.8	12.2	12.6	14.6	15.1	15.3

<sup>1</sup>Includes waste coal.

<sup>2</sup>Includes grid-connected electricity from wood and waste; biomass, such as corn, used for liquid fuels production; and non-electric energy demand from wood. Refer to Table A17 for details.

<sup>3</sup>Includes grid-connected electricity from landfill gas; biogenic municipal waste; wind; photovoltaic and solar thermal sources; and non-electric energy from renewable sources, such as active and passive solar systems. Excludes electricity imports using renewable sources and nonmarketed renewable energy. See Table A17 for selected nonmarketed residential and commercial renewable energy.

<sup>4</sup>Includes non-biogenic municipal waste, liquid hydrogen, methanol, and some domestic inputs to refineries.

<sup>5</sup>Includes imports of finished petroleum products, unfinished oils, alcohols, ethers, blending components, and renewable fuels such as ethanol.

<sup>6</sup>Includes coal, coal coke (net), and electricity (net).

<sup>7</sup>Includes crude oil and petroleum products.

<sup>8</sup>Balancing item. Includes unaccounted for supply, losses, gains, and net storage withdrawals.

<sup>9</sup>Includes petroleum-derived fuels and non-petroleum derived fuels, such as ethanol and biodiesel, and coal-based synthetic liquids. Petroleum coke, which is a solid, is included. Also included are natural gas plant liquids, crude oil consumed as a fuel, and liquid hydrogen. Refer to Table A17 for detailed renewable liquid fuels consumption.

<sup>10</sup>Excludes coal converted to coal-based synthetic liquids.

<sup>11</sup>Includes grid-connected electricity from wood and wood waste, non-electric energy from wood, and biofuels heat and coproducts used in the production of liquid fuels, but excludes the energy content of the liquid fuels.

<sup>12</sup>Includes non-biogenic municipal waste and net electricity imports.

<sup>13</sup>Weighted average price delivered to U.S. refiners.

<sup>14</sup>Represents lower 48 onshore and offshore supplies.

<sup>15</sup>Includes reported prices for both open market and captive mines.

<sup>16</sup>Prices weighted by consumption; weighted average excludes residential and commercial prices, and export free-alongside-ship (f.a.s.) prices.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 natural gas supply values and natural gas wellhead price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2007 coal minemouth and delivered coal prices: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2007 petroleum supply values: EIA, *Petroleum Supply Annual 2007*, DOE/EIA-0340(2007)/1 (Washington, DC, July 2008). 2007 low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2007 coal values: *Quarterly Coal Report, October-December 2007*, DOE/EIA-0121(2007/4Q) (Washington, DC, March 2008). Other 2007 values: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). Projections: EIA, AEO2009 National Energy Modeling System runs LP2009.D122308A, AEO2009.D120908A, and HP2009.D121108A.

## Price Case Comparisons

**Table C2. Energy Consumption by Sector and Source**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Energy Consumption</b>										
<b>Residential</b>										
Liquefied Petroleum Gases	0.50	0.50	0.49	0.49	0.56	0.49	0.45	0.62	0.52	0.46
Kerosene	0.08	0.08	0.08	0.07	0.08	0.07	0.07	0.08	0.07	0.07
Distillate Fuel Oil	0.78	0.73	0.72	0.71	0.68	0.60	0.54	0.61	0.51	0.46
Liquid Fuels and Other Petroleum Subtotal	1.35	1.31	1.29	1.27	1.32	1.16	1.06	1.31	1.10	0.99
Natural Gas	4.86	4.94	4.92	4.91	5.15	5.10	5.06	5.08	5.07	5.06
Coal	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Renewable Energy <sup>1</sup>	0.43	0.42	0.43	0.44	0.40	0.48	0.55	0.40	0.50	0.57
Electricity	4.75	4.81	4.80	4.79	5.16	5.12	5.07	5.74	5.69	5.65
<b>Delivered Energy</b>	<b>11.40</b>	<b>11.49</b>	<b>11.44</b>	<b>11.42</b>	<b>12.05</b>	<b>11.86</b>	<b>11.75</b>	<b>12.53</b>	<b>12.36</b>	<b>12.29</b>
Electricity Related Losses	10.36	10.44	10.44	10.44	10.87	10.81	10.72	11.72	11.69	11.59
<b>Total</b>	<b>21.76</b>	<b>21.93</b>	<b>21.88</b>	<b>21.86</b>	<b>22.92</b>	<b>22.67</b>	<b>22.46</b>	<b>24.25</b>	<b>24.05</b>	<b>23.88</b>
<b>Commercial</b>										
Liquefied Petroleum Gases	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10
Motor Gasoline <sup>2</sup>	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Kerosene	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Distillate Fuel Oil	0.41	0.37	0.36	0.35	0.41	0.34	0.30	0.44	0.34	0.30
Residual Fuel Oil	0.08	0.08	0.07	0.07	0.09	0.08	0.08	0.09	0.08	0.08
Liquid Fuels and Other Petroleum Subtotal	0.63	0.60	0.58	0.56	0.66	0.58	0.54	0.70	0.59	0.54
Natural Gas	3.10	3.16	3.14	3.13	3.41	3.34	3.30	3.53	3.54	3.54
Coal	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Renewable Energy <sup>3</sup>	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Electricity	4.58	4.76	4.75	4.75	5.65	5.57	5.51	6.36	6.31	6.29
<b>Delivered Energy</b>	<b>8.50</b>	<b>8.72</b>	<b>8.66</b>	<b>8.64</b>	<b>9.90</b>	<b>9.69</b>	<b>9.54</b>	<b>10.77</b>	<b>10.62</b>	<b>10.56</b>
Electricity Related Losses	9.99	10.33	10.35	10.35	11.89	11.77	11.65	12.99	12.96	12.89
<b>Total</b>	<b>18.49</b>	<b>19.05</b>	<b>19.01</b>	<b>18.99</b>	<b>21.79</b>	<b>21.46</b>	<b>21.19</b>	<b>23.76</b>	<b>23.59</b>	<b>23.45</b>
<b>Industrial<sup>4</sup></b>										
Liquefied Petroleum Gases	2.35	2.06	2.02	1.99	1.82	1.79	1.76	1.68	1.66	1.66
Motor Gasoline <sup>2</sup>	0.36	0.35	0.34	0.34	0.34	0.34	0.34	0.37	0.36	0.36
Distillate Fuel Oil	1.28	1.18	1.17	1.16	1.21	1.18	1.18	1.29	1.23	1.23
Residual Fuel Oil	0.25	0.16	0.15	0.14	0.22	0.16	0.14	0.32	0.16	0.15
Petrochemical Feedstocks	1.30	1.03	1.01	1.00	1.14	1.13	1.12	1.08	1.05	1.06
Other Petroleum <sup>5</sup>	4.42	4.04	3.74	3.66	4.83	3.72	3.03	5.41	3.84	3.01
Liquid Fuels and Other Petroleum Subtotal	9.96	8.82	8.42	8.29	9.57	8.32	7.57	10.16	8.30	7.46
Natural Gas	6.82	6.64	6.77	6.80	6.17	6.84	7.28	6.06	7.04	7.45
Natural-Gas-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.49
Lease and Plant Fuel <sup>6</sup>	1.20	1.28	1.27	1.27	1.27	1.33	1.37	1.39	1.47	1.57
Natural Gas Subtotal	8.02	7.92	8.05	8.07	7.44	8.17	8.77	7.45	8.51	9.51
Metallurgical Coal	0.60	0.57	0.55	0.54	0.52	0.49	0.47	0.51	0.48	0.46
Other Industrial Coal	1.21	1.25	1.24	1.23	1.16	1.15	1.14	1.17	1.16	1.15
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.10	0.24	0.26	0.10	0.58	0.65
Net Coal Coke Imports	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Coal Subtotal	1.83	1.83	1.80	1.79	1.79	1.89	1.88	1.79	2.23	2.27
Biofuels Heat and Coproducts	0.40	0.75	0.75	0.75	1.23	1.23	1.69	1.64	1.66	1.81
Renewable Energy <sup>7</sup>	1.64	1.50	1.48	1.48	1.66	1.64	1.62	1.99	1.96	1.93
Electricity	3.43	3.39	3.34	3.32	3.55	3.48	3.46	3.73	3.67	3.66
<b>Delivered Energy</b>	<b>25.29</b>	<b>24.21</b>	<b>23.83</b>	<b>23.70</b>	<b>25.24</b>	<b>24.73</b>	<b>24.99</b>	<b>26.75</b>	<b>26.33</b>	<b>26.65</b>
Electricity Related Losses	7.49	7.37	7.27	7.24	7.46	7.36	7.30	7.61	7.55	7.50
<b>Total</b>	<b>32.77</b>	<b>31.58</b>	<b>31.10</b>	<b>30.94</b>	<b>32.70</b>	<b>32.09</b>	<b>32.29</b>	<b>34.37</b>	<b>33.87</b>	<b>34.15</b>

## Price Case Comparisons

**Table C2. Energy Consumption by Sector and Source (Continued)**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Transportation</b>										
Liquefied Petroleum Gases	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01
E85 <sup>8</sup>	0.00	0.00	0.00	0.00	0.60	0.85	1.74	0.58	2.18	2.73
Motor Gasoline <sup>2</sup>	17.29	17.21	16.93	16.96	18.07	15.56	13.68	19.09	14.49	12.41
Jet Fuel <sup>9</sup>	3.23	3.04	3.00	2.98	3.51	3.42	3.33	4.23	4.12	3.96
Distillate Fuel Oil <sup>10</sup>	6.48	6.20	6.13	6.10	7.53	7.36	7.26	9.21	9.09	9.00
Residual Fuel Oil	0.95	0.86	0.86	0.86	0.97	0.98	0.98	1.00	1.00	1.01
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Petroleum <sup>11</sup>	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.18	0.18
Liquid Fuels and Other Petroleum Subtotal	28.14	27.50	27.11	27.09	30.88	28.36	27.18	34.32	31.09	29.31
Pipeline Fuel Natural Gas	0.64	0.65	0.64	0.64	0.66	0.69	0.69	0.71	0.72	0.72
Compressed Natural Gas	0.02	0.03	0.03	0.03	0.06	0.07	0.07	0.07	0.09	0.10
Electricity	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.06
<b>Delivered Energy</b>	<b>28.82</b>	<b>28.20</b>	<b>27.81</b>	<b>27.78</b>	<b>31.62</b>	<b>29.15</b>	<b>27.98</b>	<b>35.14</b>	<b>31.94</b>	<b>30.19</b>
Electricity Related Losses	0.05	0.05	0.05	0.05	0.06	0.07	0.07	0.09	0.10	0.12
<b>Total</b>	<b>28.87</b>	<b>28.25</b>	<b>27.86</b>	<b>27.83</b>	<b>31.68</b>	<b>29.22</b>	<b>28.05</b>	<b>35.23</b>	<b>32.05</b>	<b>30.32</b>
<b>Delivered Energy Consumption for All Sectors</b>										
Liquefied Petroleum Gases	2.95	2.67	2.61	2.58	2.49	2.39	2.32	2.42	2.29	2.24
E85 <sup>8</sup>	0.00	0.00	0.00	0.00	0.60	0.85	1.74	0.58	2.18	2.73
Motor Gasoline <sup>2</sup>	17.70	17.60	17.33	17.35	18.46	15.95	14.08	19.51	14.90	12.82
Jet Fuel <sup>9</sup>	3.23	3.04	3.00	2.98	3.51	3.42	3.33	4.23	4.12	3.96
Kerosene	0.11	0.11	0.10	0.10	0.11	0.10	0.10	0.11	0.10	0.10
Distillate Fuel Oil	8.94	8.49	8.38	8.33	9.84	9.49	9.28	11.55	11.17	10.99
Residual Fuel Oil	1.28	1.11	1.07	1.06	1.29	1.22	1.20	1.41	1.25	1.23
Petrochemical Feedstocks	1.30	1.03	1.01	1.00	1.14	1.13	1.12	1.08	1.05	1.06
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Petroleum <sup>12</sup>	4.57	4.19	3.89	3.81	4.99	3.89	3.19	5.58	4.01	3.18
Liquid Fuels and Other Petroleum Subtotal	40.08	38.23	37.40	37.23	42.43	38.42	36.36	46.48	41.07	38.30
Natural Gas	14.79	14.77	14.86	14.88	14.78	15.34	15.72	14.74	15.73	16.16
Natural-Gas-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.49
Lease and Plant Fuel <sup>6</sup>	1.20	1.28	1.27	1.27	1.27	1.33	1.37	1.39	1.47	1.57
Pipeline Natural Gas	0.64	0.65	0.64	0.64	0.66	0.69	0.69	0.71	0.72	0.72
Natural Gas Subtotal	16.64	16.70	16.78	16.78	16.71	17.36	17.89	16.84	17.92	18.94
Metallurgical Coal	0.60	0.57	0.55	0.54	0.52	0.49	0.47	0.51	0.48	0.46
Other Coal	1.28	1.32	1.31	1.31	1.23	1.22	1.22	1.24	1.23	1.22
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.10	0.24	0.26	0.10	0.58	0.65
Net Coal Coke Imports	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Coal Subtotal	1.91	1.90	1.87	1.86	1.86	1.97	1.96	1.86	2.30	2.35
Biofuels Heat and Coproducts	0.40	0.75	0.75	0.75	1.23	1.23	1.69	1.64	1.66	1.81
Renewable Energy <sup>13</sup>	2.19	2.04	2.03	2.03	2.19	2.24	2.29	2.51	2.58	2.63
Electricity	12.79	12.99	12.91	12.89	14.39	14.20	14.07	15.86	15.73	15.66
<b>Delivered Energy</b>	<b>74.01</b>	<b>72.61</b>	<b>71.74</b>	<b>71.54</b>	<b>78.81</b>	<b>75.42</b>	<b>74.25</b>	<b>85.19</b>	<b>81.26</b>	<b>79.69</b>
Electricity Related Losses	27.88	28.20	28.11	28.08	30.28	30.02	29.74	32.41	32.30	32.11
<b>Total</b>	<b>101.89</b>	<b>100.80</b>	<b>99.85</b>	<b>99.62</b>	<b>109.09</b>	<b>105.44</b>	<b>104.00</b>	<b>117.61</b>	<b>113.56</b>	<b>111.80</b>
<b>Electric Power<sup>14</sup></b>										
Distillate Fuel Oil	0.11	0.11	0.11	0.11	0.13	0.12	0.12	0.14	0.13	0.13
Residual Fuel Oil	0.56	0.39	0.38	0.38	0.65	0.39	0.39	0.86	0.40	0.40
Liquid Fuels and Other Petroleum Subtotal	0.67	0.50	0.49	0.49	0.78	0.51	0.51	1.00	0.53	0.53
Natural Gas	7.06	6.64	6.42	6.31	6.98	6.73	6.29	7.39	7.12	6.78
Steam Coal	20.84	21.02	21.03	21.02	22.07	22.01	21.91	24.12	24.25	24.18
Nuclear Power	8.41	8.45	8.45	8.45	8.89	8.99	9.10	9.14	9.47	9.57
Renewable Energy <sup>15</sup>	3.45	4.37	4.42	4.49	5.78	5.79	5.79	6.41	6.43	6.46
Electricity Imports	0.11	0.08	0.08	0.09	0.04	0.06	0.09	0.09	0.10	0.12
<b>Total<sup>16</sup></b>	<b>40.67</b>	<b>41.19</b>	<b>41.02</b>	<b>40.97</b>	<b>44.67</b>	<b>44.22</b>	<b>43.82</b>	<b>48.27</b>	<b>48.03</b>	<b>47.77</b>

# Price Case Comparisons

**Table C2. Energy Consumption by Sector and Source (Continued)**  
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Total Energy Consumption</b>										
Liquefied Petroleum Gases	2.95	2.67	2.61	2.58	2.49	2.39	2.32	2.42	2.29	2.24
E85 <sup>8</sup>	0.00	0.00	0.00	0.00	0.60	0.85	1.74	0.58	2.18	2.73
Motor Gasoline <sup>2</sup>	17.70	17.60	17.33	17.35	18.46	15.95	14.08	19.51	14.90	12.82
Jet Fuel <sup>9</sup>	3.23	3.04	3.00	2.98	3.51	3.42	3.33	4.23	4.12	3.96
Kerosene	0.11	0.11	0.10	0.10	0.11	0.10	0.10	0.11	0.10	0.10
Distillate Fuel Oil	9.05	8.61	8.49	8.44	9.97	9.61	9.41	11.68	11.31	11.12
Residual Fuel Oil	1.84	1.50	1.45	1.44	1.93	1.60	1.59	2.27	1.64	1.63
Petrochemical Feedstocks	1.30	1.03	1.01	1.00	1.14	1.13	1.12	1.08	1.05	1.06
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Petroleum <sup>12</sup>	4.57	4.19	3.89	3.81	4.99	3.89	3.19	5.58	4.01	3.18
Liquid Fuels and Other Petroleum Subtotal	40.75	38.73	37.89	37.72	43.21	38.93	36.87	47.48	41.60	38.83
Natural Gas	21.86	21.41	21.29	21.19	21.77	22.07	22.01	22.13	22.86	22.93
Natural-Gas-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.49
Lease and Plant Fuel <sup>6</sup>	1.20	1.28	1.27	1.27	1.27	1.33	1.37	1.39	1.47	1.57
Pipeline Natural Gas	0.64	0.65	0.64	0.64	0.66	0.69	0.69	0.71	0.72	0.72
Natural Gas Subtotal	23.70	23.34	23.20	23.10	23.70	24.09	24.18	24.23	25.04	25.72
Metallurgical Coal	0.60	0.57	0.55	0.54	0.52	0.49	0.47	0.51	0.48	0.46
Other Coal	22.12	22.34	22.34	22.33	23.30	23.24	23.12	25.37	25.49	25.41
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.10	0.24	0.26	0.10	0.58	0.65
Net Coal Coke Imports	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Coal Subtotal	22.74	22.92	22.91	22.88	23.93	23.98	23.86	25.99	26.56	26.53
Nuclear Power	8.41	8.45	8.45	8.45	8.89	8.99	9.10	9.14	9.47	9.57
Biofuels Heat and Coproducts	0.40	0.75	0.75	0.75	1.23	1.23	1.69	1.64	1.66	1.81
Renewable Energy <sup>17</sup>	5.65	6.40	6.45	6.52	7.97	8.03	8.08	8.92	9.01	9.09
Electricity Imports	0.11	0.08	0.08	0.09	0.04	0.06	0.09	0.09	0.10	0.12
<b>Total</b>	<b>101.89</b>	<b>100.80</b>	<b>99.85</b>	<b>99.62</b>	<b>109.09</b>	<b>105.44</b>	<b>104.00</b>	<b>117.61</b>	<b>113.56</b>	<b>111.80</b>
<b>Energy Use and Related Statistics</b>										
Delivered Energy Use	74.01	72.61	71.74	71.54	78.81	75.42	74.25	85.19	81.26	79.69
Total Energy Use	101.89	100.80	99.85	99.62	109.09	105.44	104.00	117.61	113.56	111.80
Ethanol Consumed in Motor Gasoline and E85	0.56	1.10	1.08	1.09	1.66	1.66	2.14	1.73	2.47	2.71
Population (millions)	302.41	311.37	311.37	311.37	342.61	342.61	342.61	375.12	375.12	375.12
Gross Domestic Product (billion 2000 dollars)	11524	11842	11779	11751	15486	15524	15572	20044	20114	20293
Carbon Dioxide Emissions (million metric tons)	5990.8	5865.7	5801.4	5781.7	6262.4	5982.3	5784.8	6792.3	6414.4	6202.6

<sup>1</sup>Includes wood used for residential heating. See Table A4 and/or Table A17 for estimates of nonmarketed renewable energy consumption for geothermal heat pumps, solar thermal hot water heating, and solar photovoltaic electricity generation.

<sup>2</sup>Includes ethanol (blends of 10 percent or less) and ethers blended into gasoline.

<sup>3</sup>Excludes ethanol. Includes commercial sector consumption of wood and wood waste, landfill gas, municipal waste, and other biomass for combined heat and power. See Table A5 and/or Table A17 for estimates of nonmarketed renewable energy consumption for solar thermal hot water heating and solar photovoltaic electricity generation.

<sup>4</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>5</sup>Includes petroleum coke, asphalt, road oil, lubricants, still gas, and miscellaneous petroleum products.

<sup>6</sup>Represents natural gas used in well, field, and lease operations, and in natural gas processing plant machinery.

<sup>7</sup>Includes consumption of energy produced from hydroelectric, wood and wood waste, municipal waste, and other biomass sources. Excludes ethanol blends (10 percent or less) in motor gasoline.

<sup>8</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>9</sup>Includes only kerosene type.

<sup>10</sup>Diesel fuel for on- and off- road use.

<sup>11</sup>Includes aviation gasoline and lubricants.

<sup>12</sup>Includes unfinished oils, natural gasoline, motor gasoline blending components, aviation gasoline, lubricants, still gas, asphalt, road oil, petroleum coke, and miscellaneous petroleum products.

<sup>13</sup>Includes electricity generated for sale to the grid and for own use from renewable sources, and non-electric energy from renewable sources. Excludes ethanol and nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

<sup>14</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>15</sup>Includes conventional hydroelectric, geothermal, wood and wood waste, biogenic municipal waste, other biomass, wind, photovoltaic, and solar thermal sources. Excludes net electricity imports.

<sup>16</sup>Includes non-biogenic municipal waste not included above.

<sup>17</sup>Includes conventional hydroelectric, geothermal, wood and wood waste, biogenic municipal waste, other biomass, wind, photovoltaic, and solar thermal sources. Excludes ethanol, net electricity imports, and nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 consumption based on: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2007 population and gross domestic product: IHS Global Insight Industry and Employment models, November 2008. 2007 carbon dioxide emissions: EIA, *Emissions of Greenhouse Gases in the United States 2007*, DOE/EIA-0573(2007) (Washington, DC, December 2008). Projections: EIA, AEO2009 National Energy Modeling System runs LP2009.D122308A, AEO2009.D120908A, and HP2009.D121108A.

# Price Case Comparisons

**Table C3. Energy Prices by Sector and Source**  
(2007 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Residential</b>										
Liquefied Petroleum Gases	24.98	21.82	25.86	27.93	20.47	32.88	47.65	20.53	35.11	50.76
Distillate Fuel Oil	19.66	15.29	18.69	20.69	13.48	24.10	36.51	13.39	26.67	39.19
Natural Gas	12.69	11.53	12.09	12.33	11.93	12.50	12.91	13.85	14.31	14.61
Electricity	31.19	30.40	30.89	31.14	31.68	32.72	33.78	34.81	35.84	36.49
<b>Commercial</b>										
Liquefied Petroleum Gases	23.04	18.65	22.69	24.75	17.25	29.60	44.35	17.27	31.77	47.40
Distillate Fuel Oil	16.05	12.74	16.15	18.14	11.59	22.11	34.23	11.67	24.69	36.99
Residual Fuel Oil	10.21	7.04	10.97	12.82	5.86	16.68	27.02	5.99	17.98	29.99
Natural Gas	10.99	9.99	10.55	10.78	10.57	11.13	11.53	12.46	12.96	13.24
Electricity	28.07	26.81	27.29	27.53	26.92	28.15	29.30	29.99	31.01	31.70
<b>Industrial<sup>1</sup></b>										
Liquefied Petroleum Gases	23.38	17.79	21.84	23.92	16.39	28.78	43.57	16.51	30.99	46.62
Distillate Fuel Oil	16.82	12.62	16.01	17.99	12.16	22.56	34.48	12.47	25.19	37.30
Residual Fuel Oil	10.49	11.72	15.38	17.26	10.68	20.94	32.04	11.10	22.73	34.48
Natural Gas <sup>2</sup>	7.52	6.39	6.91	7.12	7.05	7.48	7.86	8.73	9.07	9.42
Metallurgical Coal	3.61	4.34	4.37	4.39	4.32	4.40	4.49	4.29	4.41	4.49
Other Industrial Coal	2.43	2.47	2.54	2.57	2.43	2.53	2.63	2.52	2.67	2.75
Coal to Liquids	--	--	--	--	1.10	1.23	1.29	1.02	1.36	1.47
Electricity	18.63	18.36	18.72	18.90	18.45	19.06	19.70	21.05	21.59	21.76
<b>Transportation</b>										
Liquefied Petroleum Gases <sup>3</sup>	25.01	21.65	25.67	27.74	20.26	32.62	47.38	20.27	34.77	50.41
E85 <sup>4</sup>	26.67	19.51	25.47	27.69	16.21	29.30	36.17	16.61	30.10	38.91
Motor Gasoline <sup>5</sup>	22.98	18.29	23.47	25.44	16.73	29.75	41.68	16.82	32.10	45.23
Jet Fuel <sup>6</sup>	16.10	12.60	16.03	18.12	11.05	22.15	33.99	11.03	24.63	36.94
Diesel Fuel (distillate fuel oil) <sup>7</sup>	20.92	16.62	20.05	22.03	15.67	26.04	37.95	15.91	28.59	40.68
Residual Fuel Oil	9.35	9.08	12.10	14.00	7.56	17.46	29.23	7.29	19.65	32.46
Natural Gas <sup>8</sup>	15.46	14.36	14.90	15.12	14.33	14.90	15.30	15.68	16.24	16.57
Electricity	30.64	29.96	30.34	30.53	29.27	29.48	30.56	32.61	34.15	34.98
<b>Electric Power<sup>9</sup></b>										
Distillate Fuel Oil	14.77	11.71	15.09	17.08	9.89	20.45	32.76	9.84	23.11	35.54
Residual Fuel Oil	8.38	9.76	13.21	15.15	7.38	18.55	30.13	6.88	20.67	33.04
Natural Gas	7.02	6.09	6.59	6.79	6.69	7.15	7.47	8.22	8.70	9.01
Steam Coal	1.78	1.84	1.89	1.92	1.81	1.92	2.03	1.89	2.04	2.14
<b>Average Price to All Users<sup>10</sup></b>										
Liquefied Petroleum Gases	18.53	17.19	20.96	22.90	16.16	27.56	41.23	16.38	29.77	44.24
E85 <sup>4</sup>	26.67	19.51	25.47	27.69	16.21	29.30	36.17	16.61	30.10	38.91
Motor Gasoline <sup>5</sup>	22.82	18.29	23.47	25.44	16.73	29.75	41.68	16.82	32.10	45.23
Jet Fuel	16.10	12.60	16.03	18.12	11.05	22.15	33.99	11.03	24.63	36.94
Distillate Fuel Oil	19.94	15.58	18.98	20.96	14.85	25.28	37.24	15.17	27.94	40.07
Residual Fuel Oil	9.25	9.43	12.66	14.57	7.79	18.03	29.60	7.62	20.12	32.66
Natural Gas	9.01	8.02	8.56	8.78	8.66	9.11	9.48	10.35	10.75	11.06
Metallurgical Coal	3.61	4.34	4.37	4.39	4.32	4.40	4.49	4.29	4.41	4.49
Other Coal	1.82	1.88	1.93	1.96	1.84	1.95	2.07	1.92	2.07	2.17
Coal to Liquids	--	--	--	--	1.10	1.23	1.29	1.02	1.36	1.47
Electricity	26.70	25.94	26.42	26.65	26.54	27.57	28.56	29.64	30.56	31.12
<b>Non-Renewable Energy Expenditures by Sector (billion 2007 dollars)</b>										
Residential	238.38	226.46	235.27	239.70	246.77	263.30	280.47	291.88	310.03	324.47
Commercial	173.09	167.42	172.88	175.53	196.17	207.76	218.92	243.25	256.75	267.35
Industrial	226.84	183.13	204.25	215.22	180.75	242.68	314.44	203.51	276.26	349.17
Transportation	596.75	465.56	580.97	634.28	469.76	752.82	995.15	525.91	853.25	1116.08
Total Non-Renewable Expenditures	1235.06	1042.56	1193.36	1264.74	1093.46	1466.55	1808.98	1264.54	1696.29	2057.07
Transportation Renewable Expenditures	0.04	0.06	0.07	0.07	9.78	24.83	63.06	9.71	65.71	106.39
<b>Total Expenditures</b>	<b>1235.10</b>	<b>1042.62</b>	<b>1193.43</b>	<b>1264.81</b>	<b>1103.25</b>	<b>1491.38</b>	<b>1872.04</b>	<b>1274.25</b>	<b>1762.00</b>	<b>2163.46</b>

## Price Case Comparisons

**Table C3. Energy Prices by Sector and Source (Continued)**  
(Nominal Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Residential</b>										
Liquefied Petroleum Gases .....	24.98	22.91	27.24	29.43	26.58	42.47	61.39	29.68	50.90	73.23
Distillate Fuel Oil .....	19.66	16.06	19.68	21.81	17.50	31.14	47.04	19.35	38.67	56.54
Natural Gas .....	12.69	12.10	12.74	12.99	15.49	16.14	16.64	20.02	20.75	21.08
Electricity .....	31.19	31.92	32.53	32.81	41.13	42.26	43.52	50.33	51.96	52.65
<b>Commercial</b>										
Liquefied Petroleum Gases .....	23.04	19.58	23.89	26.08	22.40	38.24	57.14	24.96	46.06	68.38
Distillate Fuel Oil .....	16.05	13.38	17.01	19.11	15.06	28.56	44.10	16.88	35.80	53.36
Residual Fuel Oil .....	10.21	7.40	11.55	13.51	7.61	21.55	34.81	8.66	26.07	43.26
Natural Gas .....	10.99	10.49	11.11	11.36	13.73	14.37	14.85	18.01	18.78	19.10
Electricity .....	28.07	28.15	28.74	29.01	34.96	36.37	37.75	43.36	44.96	45.73
<b>Industrial<sup>1</sup></b>										
Liquefied Petroleum Gases .....	23.38	18.68	23.00	25.20	21.28	37.17	56.13	23.86	44.93	67.25
Distillate Fuel Oil .....	16.82	13.25	16.86	18.96	15.80	29.14	44.43	18.03	36.52	53.81
Residual Fuel Oil .....	10.49	12.30	16.20	18.19	13.87	27.05	41.29	16.05	32.95	49.74
Natural Gas <sup>2</sup> .....	7.52	6.71	7.27	7.51	9.15	9.66	10.12	12.62	13.16	13.59
Metallurgical Coal .....	3.61	4.56	4.60	4.62	5.61	5.69	5.78	6.20	6.40	6.48
Other Industrial Coal .....	2.43	2.60	2.67	2.71	3.15	3.27	3.39	3.64	3.88	3.97
Coal to Liquids .....	--	--	--	--	1.42	1.59	1.67	1.47	1.98	2.11
Electricity .....	18.63	19.28	19.72	19.92	23.97	24.63	25.38	30.43	31.30	31.39
<b>Transportation</b>										
Liquefied Petroleum Gases <sup>3</sup> .....	25.01	22.73	27.04	29.23	26.31	42.13	61.05	29.30	50.41	72.71
E85 <sup>4</sup> .....	26.67	20.49	26.83	29.17	21.05	37.85	46.60	24.01	43.63	56.13
Motor Gasoline <sup>5</sup> .....	22.98	19.21	24.72	26.81	21.72	38.43	53.71	24.32	46.54	65.24
Jet Fuel <sup>6</sup> .....	16.10	13.23	16.89	19.09	14.35	28.62	43.79	15.94	35.70	53.29
Diesel Fuel (distillate fuel oil) <sup>7</sup> .....	20.92	17.45	21.12	23.21	20.35	33.63	48.90	23.00	41.44	58.69
Residual Fuel Oil .....	9.35	9.54	12.74	14.75	9.82	22.56	37.67	10.53	28.49	46.82
Natural Gas <sup>8</sup> .....	15.46	15.08	15.69	15.94	18.62	19.24	19.72	22.67	23.55	23.90
Electricity .....	30.64	31.46	31.95	32.18	38.01	38.09	39.37	47.14	49.51	50.47
<b>Electric Power<sup>9</sup></b>										
Distillate Fuel Oil .....	14.77	12.29	15.89	18.00	12.84	26.42	42.20	14.22	33.51	51.27
Residual Fuel Oil .....	8.38	10.25	13.91	15.97	9.59	23.97	38.82	9.95	29.97	47.66
Natural Gas .....	7.02	6.39	6.94	7.15	8.69	9.24	9.63	11.88	12.61	12.99
Steam Coal .....	1.78	1.94	1.99	2.02	2.34	2.48	2.62	2.73	2.95	3.09

# Price Case Comparisons

**Table C3. Energy Prices by Sector and Source (Continued)**  
(Nominal Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Average Price to All Users<sup>10</sup></b>										
Liquefied Petroleum Gases	18.53	18.05	22.07	24.13	20.99	35.61	53.12	23.68	43.16	63.81
E85 <sup>4</sup>	26.67	20.49	26.83	29.17	21.05	37.85	46.60	24.01	43.63	56.13
Motor Gasoline <sup>5</sup>	22.82	19.20	24.71	26.80	21.72	38.43	53.70	24.32	46.54	65.24
Jet Fuel	16.10	13.23	16.89	19.09	14.35	28.62	43.79	15.94	35.70	53.29
Distillate Fuel Oil	19.94	16.36	19.99	22.09	19.29	32.65	47.99	21.93	40.51	57.81
Residual Fuel Oil	9.25	9.90	13.34	15.35	10.11	23.29	38.14	11.02	29.16	47.12
Natural Gas	9.01	8.42	9.01	9.25	11.25	11.77	12.22	14.96	15.58	15.96
Metallurgical Coal	3.61	4.56	4.60	4.62	5.61	5.69	5.78	6.20	6.40	6.48
Other Coal	1.82	1.98	2.04	2.07	2.39	2.52	2.66	2.78	3.00	3.13
Coal to Liquids	--	--	--	--	1.42	1.59	1.67	1.47	1.98	2.11
Electricity	26.70	27.23	27.82	28.08	34.47	35.62	36.80	42.85	44.31	44.90
<b>Non-Renewable Energy Expenditures by Sector (billion nominal dollars)</b>										
Residential	238.38	237.79	247.78	252.58	320.47	340.12	361.38	421.94	449.49	468.06
Commercial	173.09	175.79	182.07	184.97	254.76	268.38	282.07	351.64	372.25	385.67
Industrial	226.84	192.29	215.12	226.79	234.72	313.49	405.15	294.19	400.54	503.70
Transportation	596.75	488.85	611.87	668.38	610.05	972.48	1282.23	760.26	1237.08	1610.01
Total Non-Renewable Expenditures	1235.06	1094.72	1256.84	1332.72	1419.99	1894.47	2330.83	1828.02	2459.36	2967.44
Transportation Renewable Expenditures	0.04	0.06	0.07	0.07	12.71	32.08	81.25	14.04	95.27	153.48
<b>Total Expenditures</b>	<b>1235.10</b>	<b>1094.78</b>	<b>1256.91</b>	<b>1332.79</b>	<b>1432.70</b>	<b>1926.55</b>	<b>2412.08</b>	<b>1842.06</b>	<b>2554.63</b>	<b>3120.92</b>

<sup>1</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>2</sup>Excludes use for lease and plant fuel.

<sup>3</sup>Includes Federal and State taxes while excluding county and local taxes.

<sup>4</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>5</sup>Sales weighted-average price for all grades. Includes Federal, State and local taxes.

<sup>6</sup>Kerosene-type jet fuel. Includes Federal and State taxes while excluding county and local taxes.

<sup>7</sup>Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

<sup>8</sup>Compressed natural gas used as a vehicle fuel. Includes estimated motor vehicle fuel taxes and estimated dispensing costs or charges.

<sup>9</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>10</sup>Weighted averages of end-use fuel prices are derived from the prices shown in each sector and the corresponding sectoral consumption.

Btu = British thermal unit.

-- = Not applicable.

Note: Data for 2007 are model results and may differ slightly from official EIA data reports.

**Sources:** 2007 prices for motor gasoline, distillate fuel oil, and jet fuel are based on prices in the Energy Information Administration (EIA), *Petroleum Marketing Annual 2007*, DOE/EIA-0487(2007) (Washington, DC, August 2008). 2007 residential and commercial natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2007 industrial natural gas delivered prices are estimated based on: EIA, *Manufacturing Energy Consumption Survey 1994* and industrial and wellhead prices from the *Natural Gas Annual 2006*, DOE/EIA-0131(2006) (Washington, DC, October 2007) and the *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2007 transportation sector natural gas delivered prices are model results. 2007 electric power sector natural gas prices: EIA, *Electric Power Monthly*, DOE/EIA-0226, April 2007 and April 2008, Table 4.13.B. 2007 coal prices based on: EIA, *Quarterly Coal Report, October-December 2007*, DOE/EIA-0121(2007/4Q) (Washington, DC, March 2008) and EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A. 2007 electricity prices: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2007 E85 prices derived from monthly prices in the Clean Cities Alternative Fuel Price Report.

**Projections:** EIA, AEO2009 National Energy Modeling System runs LP2009.D122308A, AEO2009.D120908A, and HP2009.D121108A.

## Price Case Comparisons

**Table C4. Liquid Fuels Supply and Disposition**  
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Crude Oil</b>										
Domestic Crude Production <sup>1</sup> .....	5.07	5.62	5.62	5.62	5.35	6.48	7.16	5.36	7.37	8.47
Alaska .....	0.72	0.69	0.69	0.69	0.41	0.72	0.74	0.26	0.57	0.59
Lower 48 States .....	4.35	4.93	4.93	4.93	4.95	5.76	6.42	5.10	6.80	7.88
Net Imports .....	10.00	8.23	8.10	8.02	9.81	7.29	5.44	11.41	6.95	4.30
Gross Imports .....	10.03	8.26	8.13	8.05	9.84	7.33	5.47	11.44	6.99	4.35
Exports .....	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.04	0.05
Other Crude Supply <sup>2</sup> .....	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total Crude Supply .....</b>	<b>15.16</b>	<b>13.85</b>	<b>13.72</b>	<b>13.64</b>	<b>15.16</b>	<b>13.77</b>	<b>12.59</b>	<b>16.77</b>	<b>14.32</b>	<b>12.77</b>
<b>Other Supply</b>										
Natural Gas Plant Liquids .....	1.78	1.92	1.91	1.90	1.89	1.91	1.92	1.79	1.92	1.97
Net Product Imports .....	2.09	1.87	1.66	1.63	2.20	1.49	1.28	2.32	1.40	1.14
Gross Refined Product Imports <sup>3</sup> .....	1.94	1.82	1.64	1.62	2.01	1.60	1.46	2.03	1.54	1.31
Unfinished Oil Imports .....	0.72	0.59	0.58	0.57	0.75	0.58	0.44	0.95	0.65	0.46
Blending Component Imports .....	0.75	0.64	0.62	0.62	0.73	0.66	0.71	0.80	0.69	0.74
Exports .....	1.32	1.18	1.18	1.17	1.29	1.35	1.33	1.46	1.47	1.37
Refinery Processing Gain <sup>4</sup> .....	1.00	1.01	0.97	0.98	1.02	0.93	0.88	1.06	0.86	0.72
Other Inputs .....	0.74	1.23	1.22	1.25	1.84	1.98	2.60	2.20	3.08	3.76
Ethanol .....	0.45	0.85	0.84	0.84	1.29	1.28	1.66	1.34	1.91	2.10
Domestic Production .....	0.43	0.85	0.84	0.84	1.23	1.24	1.56	1.35	1.43	1.48
Net Imports .....	0.02	-0.00	-0.00	0.00	0.06	0.04	0.10	-0.00	0.49	0.62
Biodiesel .....	0.03	0.06	0.06	0.07	0.06	0.10	0.13	0.07	0.13	0.17
Domestic Production .....	0.03	0.06	0.06	0.07	0.06	0.10	0.13	0.07	0.13	0.17
Net Imports .....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Liquids from Gas .....	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.38
Liquids from Coal .....	0.00	0.00	0.00	0.00	0.04	0.10	0.11	0.04	0.26	0.29
Liquids from Biomass .....	0.00	0.00	0.00	0.00	0.04	0.07	0.10	0.29	0.33	0.34
Other <sup>5</sup> .....	0.26	0.32	0.32	0.34	0.41	0.42	0.51	0.45	0.45	0.49
<b>Total Primary Supply<sup>6</sup> .....</b>	<b>20.77</b>	<b>19.88</b>	<b>19.48</b>	<b>19.41</b>	<b>22.11</b>	<b>20.08</b>	<b>19.28</b>	<b>24.13</b>	<b>21.59</b>	<b>20.36</b>
<b>Liquid Fuels Consumption</b>										
<b>by Fuel</b>										
Liquefied Petroleum Gases .....	2.09	2.04	1.99	1.97	1.90	1.82	1.77	1.84	1.74	1.71
E85 <sup>7</sup> .....	0.00	0.00	0.00	0.00	0.42	0.58	1.20	0.40	1.50	1.88
Motor Gasoline <sup>8</sup> .....	9.29	9.49	9.34	9.35	9.95	8.60	7.59	10.52	8.04	6.92
Jet Fuel <sup>9</sup> .....	1.62	1.47	1.45	1.44	1.70	1.65	1.61	2.04	1.99	1.91
Distillate Fuel Oil <sup>10</sup> .....	4.20	4.14	4.08	4.06	4.79	4.62	4.52	5.61	5.42	5.33
Diesel .....	3.47	3.51	3.47	3.45	4.17	4.06	4.00	5.01	4.91	4.85
Residual Fuel Oil .....	0.72	0.65	0.63	0.63	0.84	0.70	0.69	0.99	0.72	0.71
Other <sup>11</sup> .....	2.74	2.33	2.19	2.15	2.73	2.24	1.93	2.96	2.25	1.89
<b>by Sector</b>										
Residential and Commercial .....	1.11	1.07	1.05	1.04	1.13	0.99	0.92	1.16	0.97	0.89
Industrial <sup>12</sup> .....	5.26	4.65	4.46	4.39	4.90	4.34	4.00	5.12	4.28	3.92
Transportation .....	14.25	14.16	13.96	13.95	15.96	14.65	14.17	17.67	16.18	15.32
Electric Power <sup>13</sup> .....	0.30	0.22	0.22	0.22	0.34	0.23	0.23	0.44	0.23	0.23
<b>Total .....</b>	<b>20.65</b>	<b>20.11</b>	<b>19.69</b>	<b>19.60</b>	<b>22.33</b>	<b>20.21</b>	<b>19.31</b>	<b>24.37</b>	<b>21.67</b>	<b>20.35</b>
<b>Discrepancy<sup>14</sup> .....</b>	<b>0.12</b>	<b>-0.23</b>	<b>-0.20</b>	<b>-0.19</b>	<b>-0.22</b>	<b>-0.13</b>	<b>-0.02</b>	<b>-0.24</b>	<b>-0.08</b>	<b>0.01</b>

## Price Case Comparisons

**Table C4. Liquid Fuels Supply and Disposition (Continued)**  
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
Domestic Refinery Distillation Capacity <sup>15</sup> . . . . .	17.4	18.0	18.0	18.0	18.7	18.2	18.2	19.1	18.4	18.3
Capacity Utilization Rate (percent) <sup>16</sup> . . . . .	89.0	78.5	77.8	77.3	82.6	77.1	70.5	89.7	79.2	71.3
Net Import Share of Product Supplied (percent)	58.3	50.8	50.1	49.8	54.6	44.0	35.4	56.9	40.9	29.8
Net Expenditures for Imported Crude Oil and Petroleum Products (billion 2007 dollars) . . . . .	280.13	194.37	261.60	294.55	196.02	344.32	425.05	220.00	376.65	387.94

<sup>1</sup>Includes lease condensate.

<sup>2</sup>Strategic petroleum reserve stock additions plus unaccounted for crude oil and crude stock withdrawals minus crude product supplied.

<sup>3</sup>Includes other hydrocarbons and alcohols.

<sup>4</sup>The volumetric amount by which total output is greater than input due to the processing of crude oil into products which, in total, have a lower specific gravity than the crude oil processed.

<sup>5</sup>Includes petroleum product stock withdrawals; and domestic sources of other blending components, other hydrocarbons, ethers, and renewable feedstocks for the on-site production of diesel and gasoline.

<sup>6</sup>Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.

<sup>7</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>8</sup>Includes ethanol and ethers blended into gasoline.

<sup>9</sup>Includes only kerosene type.

<sup>10</sup>Includes distillate fuel oil and kerosene from petroleum and biomass feedstocks.

<sup>11</sup>Includes aviation gasoline, petrochemical feedstocks, lubricants, waxes, asphalt, road oil, still gas, special naphthas, petroleum coke, crude oil product supplied, methanol, liquid hydrogen, and miscellaneous petroleum products.

<sup>12</sup>Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.

<sup>13</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>14</sup>Balancing item. Includes unaccounted for supply, losses, and gains.

<sup>15</sup>End-of-year operable capacity.

<sup>16</sup>Rate is calculated by dividing the gross annual input to atmospheric crude oil distillation units by their operable refining capacity in barrels per calendar day.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 petroleum product supplied based on: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). Other 2007 data: EIA, *Petroleum Supply Annual 2007*, DOE/EIA-0340(2007)/1 (Washington, DC, July 2008). Projections: EIA, AEO2009 National Energy Modeling System runs LP2009.D122308A, AEO2009.D120908A, and HP2009.D121108A.

## Price Case Comparisons

**Table C5. Petroleum Product Prices**  
(2007 Cents per Gallon, Unless Otherwise Noted)

Sector and Fuel	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Crude Oil Prices (2007 dollars per barrel)</b>										
Imported Low Sulfur Light Crude Oil <sup>1</sup> . . . . .	72.33	58.61	80.16	91.08	50.43	115.45	184.60	50.23	130.43	200.42
Imported Crude Oil <sup>1</sup> . . . . .	63.83	55.45	77.56	88.31	46.77	112.05	181.18	46.44	124.60	197.72
<b>Delivered Sector Product Prices</b>										
<b>Residential</b>										
Liquefied Petroleum Gases . . . . .	213.6	186.6	221.1	238.8	175.0	281.1	407.4	175.6	300.2	434.0
Distillate Fuel Oil . . . . .	272.7	212.1	259.2	287.0	186.9	334.3	506.4	185.7	369.9	543.6
<b>Commercial</b>										
Distillate Fuel Oil . . . . .	221.7	175.8	222.8	250.2	159.8	304.9	471.9	161.0	340.4	510.0
Residual Fuel Oil . . . . .	152.9	105.4	164.2	192.0	87.7	249.7	404.5	89.7	269.1	448.9
Residual Fuel Oil (2007 dollars per barrel) . .	64.22	44.28	68.96	80.62	36.85	104.88	169.87	37.66	113.04	188.52
<b>Industrial<sup>2</sup></b>										
Liquefied Petroleum Gases . . . . .	199.9	152.1	186.7	204.5	140.1	246.0	372.5	141.1	265.0	398.6
Distillate Fuel Oil . . . . .	232.3	173.5	220.2	247.4	167.0	309.6	473.4	171.3	345.8	512.1
Residual Fuel Oil . . . . .	157.1	175.4	230.2	258.4	159.9	313.4	479.6	166.2	340.2	516.2
Residual Fuel Oil (2007 dollars per barrel) . .	65.98	73.66	96.70	108.53	67.14	131.64	201.45	69.80	142.89	216.79
<b>Transportation</b>										
Liquefied Petroleum Gases . . . . .	213.8	185.1	219.5	237.1	173.2	278.9	405.1	173.3	297.3	431.0
Ethanol (E85) <sup>3</sup> . . . . .	253.0	185.1	241.7	262.7	153.8	278.0	343.2	157.6	285.5	369.1
Ethanol Wholesale Price . . . . .	212.4	163.8	192.8	196.4	195.9	201.1	219.3	146.7	193.8	202.3
Motor Gasoline <sup>4</sup> . . . . .	282.2	221.3	283.9	307.8	202.4	359.9	504.3	203.6	388.4	547.2
Jet Fuel <sup>5</sup> . . . . .	217.3	170.1	216.5	244.6	149.2	299.1	458.8	148.9	332.4	498.7
Diesel Fuel (distillate fuel oil) <sup>6</sup> . . . . .	287.0	227.8	274.9	302.0	214.7	356.8	520.1	218.0	391.7	557.5
Residual Fuel Oil . . . . .	140.0	135.9	181.1	209.5	113.2	261.4	437.6	109.1	294.1	485.8
Residual Fuel Oil (2007 dollars per barrel) . .	58.80	57.09	76.07	88.01	47.54	109.80	183.79	45.81	123.54	204.05
<b>Electric Power<sup>7</sup></b>										
Distillate Fuel Oil . . . . .	204.9	162.4	209.2	236.9	137.1	283.6	454.3	136.4	320.5	492.9
Residual Fuel Oil . . . . .	125.4	146.1	197.7	226.8	110.5	277.7	451.0	103.0	309.5	494.5
Residual Fuel Oil (2007 dollars per barrel) . .	52.67	61.35	83.03	95.25	46.43	116.64	189.44	43.27	129.98	207.70
<b>Refined Petroleum Product Prices<sup>8</sup></b>										
Liquefied Petroleum Gases . . . . .	158.5	147.0	179.2	195.8	138.2	235.7	352.5	140.1	254.5	378.2
Motor Gasoline <sup>4</sup> . . . . .	280.2	221.3	283.9	307.8	202.4	359.9	504.3	203.5	388.4	547.2
Jet Fuel <sup>5</sup> . . . . .	217.3	170.1	216.5	244.6	149.2	299.1	458.8	148.9	332.4	498.7
Distillate Fuel Oil . . . . .	274.5	214.1	260.9	288.1	203.8	346.8	511.0	208.1	383.2	549.7
Residual Fuel Oil . . . . .	138.4	141.2	189.6	218.1	116.5	269.8	443.0	114.1	301.1	488.9
Residual Fuel Oil (2007 dollars per barrel) . .	58.15	59.30	79.62	91.58	48.95	113.34	186.08	47.93	126.47	205.34
<b>Average</b> . . . . .	<b>249.1</b>	<b>201.7</b>	<b>254.9</b>	<b>279.3</b>	<b>185.6</b>	<b>331.1</b>	<b>479.2</b>	<b>187.3</b>	<b>361.4</b>	<b>519.4</b>

# Price Case Comparisons

**Table C5. Petroleum Product Prices (Continued)**  
(Nominal Cents per Gallon, Unless Otherwise Noted)

Sector and Fuel	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Crude Oil Prices (nominal dollars per barrel)</b>										
Imported Low Sulfur Light Crude Oil <sup>1</sup>	72.33	61.54	84.42	95.98	65.49	149.14	237.86	72.62	189.10	289.12
Imported Crude Oil <sup>1</sup>	63.83	58.23	81.69	93.06	60.74	144.74	233.45	67.13	180.66	285.22
<b>Delivered Sector Product Prices</b>										
<b>Residential</b>										
Liquefied Petroleum Gases	213.6	195.9	232.9	251.6	227.3	363.1	524.9	253.8	435.2	626.1
Distillate Fuel Oil	272.7	222.7	273.0	302.4	242.7	431.8	652.4	268.4	536.3	784.2
<b>Commercial</b>										
Distillate Fuel Oil	221.7	184.6	234.6	263.7	207.6	393.8	608.1	232.7	493.5	735.7
Residual Fuel Oil	152.9	110.7	172.9	202.3	113.9	322.6	521.1	129.6	390.2	647.5
<b>Industrial<sup>2</sup></b>										
Liquefied Petroleum Gases	199.9	159.7	196.6	215.5	182.0	317.8	479.9	204.0	384.2	575.0
Distillate Fuel Oil	232.3	182.2	231.9	260.7	216.8	400.0	609.9	247.6	501.4	738.7
Residual Fuel Oil	157.1	184.2	242.5	272.3	207.6	404.9	618.0	240.2	493.3	744.6
<b>Transportation</b>										
Liquefied Petroleum Gases	213.8	194.4	231.2	249.9	224.9	360.3	522.0	250.5	431.0	621.7
Ethanol (E85) <sup>3</sup>	253.0	194.4	254.5	276.8	199.7	359.1	442.1	227.8	414.0	532.5
Ethanol Wholesale Price	212.4	171.9	203.1	207.0	254.4	259.8	282.5	212.1	280.9	291.8
Motor Gasoline <sup>4</sup>	282.2	232.4	299.0	324.3	262.8	464.9	649.8	294.3	563.1	789.4
Jet Fuel <sup>5</sup>	217.3	178.6	228.0	257.7	193.7	386.4	591.2	215.2	482.0	719.5
Diesel Fuel (distillate fuel oil) <sup>6</sup>	287.0	239.2	289.6	318.2	278.8	460.9	670.1	315.2	567.9	804.2
Residual Fuel Oil	140.0	142.7	190.8	220.8	147.0	337.7	563.8	157.7	426.5	700.8
<b>Electric Power<sup>7</sup></b>										
Distillate Fuel Oil	204.9	170.5	220.4	249.7	178.1	366.4	585.3	197.2	464.7	711.1
Residual Fuel Oil	125.4	153.4	208.2	239.0	143.6	358.8	581.2	148.9	448.7	713.4
<b>Refined Petroleum Product Prices<sup>8</sup></b>										
Liquefied Petroleum Gases	158.5	154.3	188.7	206.3	179.4	304.5	454.2	202.5	369.1	545.6
Motor Gasoline <sup>4</sup>	280.2	232.3	299.0	324.3	262.8	464.9	649.8	294.2	563.1	789.4
Jet Fuel <sup>5</sup>	217.3	178.6	228.0	257.7	193.7	386.4	591.2	215.2	482.0	719.5
Distillate Fuel Oil	274.5	224.8	274.7	303.5	264.7	448.0	658.4	300.9	555.7	793.0
Residual Fuel Oil (nominal dollars per barrel)	58.15	62.27	83.86	96.51	63.57	146.41	239.76	69.29	183.36	296.21
<b>Average</b>	<b>249.1</b>	<b>211.8</b>	<b>268.5</b>	<b>294.3</b>	<b>241.0</b>	<b>427.7</b>	<b>617.5</b>	<b>270.8</b>	<b>524.0</b>	<b>749.3</b>

<sup>1</sup>Weighted average price delivered to U.S. refiners.

<sup>2</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>3</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>4</sup>Sales weighted-average price for all grades. Includes Federal, State and local taxes.

<sup>5</sup>Includes only kerosene type.

<sup>6</sup>Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

<sup>7</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>8</sup>Weighted averages of end-use fuel prices are derived from the prices in each sector and the corresponding sectoral consumption.

Note: Data for 2007 are model results and may differ slightly from official EIA data reports.

**Sources:** 2007 imported low sulfur light crude oil price: Energy Information Administration (EIA), Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." 2007 imported crude oil price: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2007 prices for motor gasoline, distillate fuel oil, and jet fuel are based on: EIA, *Petroleum Marketing Annual 2007*, DOE/EIA-0487(2007) (Washington, DC, August 2008). 2007 residential, commercial, industrial, and transportation sector petroleum product prices are derived from: EIA, Form EIA-782A, "Refiners/Gas Plant Operators' Monthly Petroleum Product Sales Report." 2007 electric power prices based on: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2007 E85 prices derived from monthly prices in the Clean Cities Alternative Fuel Price Report. 2007 wholesale ethanol prices derived from Bloomberg U.S. average rack price. **Projections:** EIA, AEO2009 National Energy Modeling System runs LP2009.D122308A, AEO2009.D120908A, and HP2009.D121108A.

## Price Case Comparisons

**Table C6. International Liquids Supply and Disposition Summary**  
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Crude Oil Prices (2007 dollars per barrel)<sup>1</sup></b>										
Imported Low Sulfur Light Crude Oil Price . . .	72.33	58.61	80.16	91.08	50.43	115.45	184.60	50.23	130.43	200.42
Imported Crude Oil Price . . . . .	63.83	55.45	77.56	88.31	46.77	112.05	181.18	46.44	124.60	197.72
<b>Crude Oil Prices (nominal dollars per barrel)<sup>1</sup></b>										
Imported Low Sulfur Light Crude Oil Price . . .	72.33	61.54	84.42	95.98	65.49	149.14	237.86	72.62	189.10	289.12
Imported Crude Oil Price . . . . .	63.83	58.23	81.69	93.06	60.74	144.74	233.45	67.13	180.66	285.22
<b>Conventional Production (Conventional)<sup>2</sup></b>										
OPEC <sup>3</sup>										
Middle East . . . . .	22.97	23.55	22.77	22.02	31.04	25.22	18.53	36.75	28.34	18.33
North Africa . . . . .	4.02	4.35	4.25	4.07	5.57	4.61	3.44	6.64	5.19	3.45
West Africa . . . . .	4.12	4.97	4.81	4.58	6.54	5.23	3.74	7.94	5.92	3.67
South America . . . . .	2.58	2.32	2.26	2.16	2.94	2.42	1.79	3.54	2.73	1.78
<b>Total OPEC . . . . .</b>	<b>33.68</b>	<b>35.19</b>	<b>34.09</b>	<b>32.84</b>	<b>46.10</b>	<b>37.48</b>	<b>27.50</b>	<b>54.87</b>	<b>42.18</b>	<b>27.22</b>
Non-OPEC										
OECD										
United States (50 states) . . . . .	8.11	8.86	8.81	8.82	8.60	9.71	10.46	8.58	10.44	11.48
Canada . . . . .	2.05	1.93	1.90	1.86	1.27	1.25	1.16	1.02	1.02	0.92
Mexico . . . . .	3.50	2.92	2.87	2.76	2.42	2.24	2.05	2.87	2.45	2.12
OECD Europe <sup>4</sup> . . . . .	5.23	4.36	4.27	4.12	3.31	3.18	2.84	2.96	2.94	2.44
Japan . . . . .	0.13	0.14	0.14	0.14	0.18	0.16	0.13	0.20	0.18	0.14
Australia and New Zealand . . . . .	0.64	0.84	0.82	0.79	0.81	0.78	0.71	0.75	0.77	0.66
<b>Total OECD . . . . .</b>	<b>19.66</b>	<b>19.05</b>	<b>18.80</b>	<b>18.49</b>	<b>16.58</b>	<b>17.32</b>	<b>17.34</b>	<b>16.38</b>	<b>17.81</b>	<b>17.76</b>
Non-OECD										
Russia . . . . .	9.88	9.72	9.50	9.10	11.46	10.24	9.08	13.17	10.50	8.63
Other Europe and Eurasia <sup>5</sup> . . . . .	2.88	3.66	3.58	3.43	4.97	4.50	4.10	5.88	4.86	4.31
China . . . . .	3.90	3.84	3.75	3.59	3.68	3.52	3.09	3.14	3.19	2.57
Other Asia <sup>6</sup> . . . . .	3.75	3.96	3.88	3.74	3.96	3.85	3.47	3.57	3.68	3.12
Middle East . . . . .	1.52	1.45	1.42	1.36	1.44	1.40	1.25	1.31	1.36	1.13
Africa . . . . .	2.41	2.71	2.65	2.53	2.82	2.72	2.41	2.86	2.98	2.43
Brazil . . . . .	1.88	2.54	2.48	2.38	3.88	3.45	3.05	5.30	4.19	3.42
Other Central and South America . . . . .	1.79	1.74	1.70	1.64	1.61	1.56	1.40	1.99	2.05	1.71
<b>Total Non-OECD . . . . .</b>	<b>28.01</b>	<b>29.62</b>	<b>28.96</b>	<b>27.78</b>	<b>33.83</b>	<b>31.25</b>	<b>27.84</b>	<b>37.22</b>	<b>32.81</b>	<b>27.33</b>
<b>Total Conventional Production . . . . .</b>	<b>81.35</b>	<b>83.86</b>	<b>81.85</b>	<b>79.11</b>	<b>96.52</b>	<b>86.04</b>	<b>72.68</b>	<b>108.47</b>	<b>92.80</b>	<b>72.31</b>
<b>Unconventional Production<sup>7</sup></b>										
United States (50 states) . . . . .	0.46	0.92	0.91	0.93	1.44	1.55	2.00	1.83	2.31	2.82
Other North America . . . . .	1.38	1.85	1.92	1.92	2.79	3.34	3.47	3.67	4.31	5.25
OECD Europe <sup>3</sup> . . . . .	0.11	0.09	0.13	0.13	0.09	0.19	0.24	0.12	0.27	0.43
Middle East . . . . .	0.09	0.01	0.01	0.01	0.14	0.17	0.15	0.16	0.22	0.21
Africa . . . . .	0.23	0.20	0.27	0.27	0.28	0.50	0.55	0.35	0.72	0.94
Central and South America . . . . .	1.02	1.24	1.15	1.07	2.49	2.04	2.06	3.92	3.16	3.97
Other . . . . .	0.30	0.34	0.47	0.47	0.39	0.78	0.99	0.75	1.63	2.95
<b>Total Unconventional Production . . . . .</b>	<b>3.58</b>	<b>4.66</b>	<b>4.85</b>	<b>4.79</b>	<b>7.62</b>	<b>8.56</b>	<b>9.47</b>	<b>10.81</b>	<b>12.61</b>	<b>16.57</b>
<b>Total Production . . . . .</b>	<b>84.93</b>	<b>88.52</b>	<b>86.71</b>	<b>83.90</b>	<b>104.14</b>	<b>94.60</b>	<b>82.15</b>	<b>119.28</b>	<b>105.41</b>	<b>88.87</b>

# Price Case Comparisons

**Table C6. International Liquids Supply and Disposition Summary (Continued)**  
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2007	Projections								
		2010			2020			2030		
		Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price	Low Oil Price	Reference	High Oil Price
<b>Consumption<sup>8</sup></b>										
OECD										
United States (50 states) . . . . .	20.65	20.11	19.69	19.60	22.33	20.21	19.31	24.37	21.67	20.35
United States Territories . . . . .	0.39	0.45	0.44	0.44	0.55	0.53	0.52	0.65	0.62	0.60
Canada . . . . .	2.41	2.33	2.28	2.21	2.55	2.29	2.00	2.76	2.39	2.07
Mexico . . . . .	2.10	2.10	2.06	1.99	2.51	2.28	1.97	3.03	2.67	2.20
OECD Europe <sup>3</sup> . . . . .	15.36	15.04	14.74	14.31	15.74	14.24	12.20	16.31	14.27	12.20
Japan . . . . .	5.02	4.81	4.68	4.46	4.85	4.27	3.39	4.80	4.02	3.11
South Korea . . . . .	2.34	2.37	2.31	2.25	2.85	2.58	2.17	3.21	2.81	2.26
Australia and New Zealand . . . . .	1.08	1.06	1.04	1.01	1.20	1.09	0.96	1.36	1.20	1.06
<b>Total OECD . . . . .</b>	<b>49.35</b>	<b>48.27</b>	<b>47.24</b>	<b>46.26</b>	<b>52.58</b>	<b>47.50</b>	<b>42.51</b>	<b>56.49</b>	<b>49.64</b>	<b>43.86</b>
Non-OECD										
Russia . . . . .	2.88	3.03	2.97	2.88	3.49	3.18	2.83	3.77	3.35	2.96
Other Europe and Eurasia <sup>5</sup> . . . . .	2.24	2.39	2.34	2.26	2.89	2.64	2.27	3.33	2.96	2.55
China . . . . .	7.63	8.71	8.50	8.13	12.45	11.29	9.14	17.10	15.08	11.14
India . . . . .	2.46	2.67	2.60	2.47	3.92	3.51	2.76	5.22	4.52	3.12
Other Non-OECD Asia . . . . .	6.28	6.52	6.39	6.06	8.52	7.75	6.34	10.23	9.03	7.27
Middle East . . . . .	6.42	7.05	7.02	6.61	8.74	8.26	7.72	10.16	9.45	8.79
Africa . . . . .	3.22	3.58	3.49	3.23	4.30	3.90	3.21	4.59	4.02	3.33
Brazil . . . . .	2.37	2.61	2.55	2.37	3.14	2.84	2.39	3.79	3.32	2.65
Other Central and South America . . . . .	3.35	3.69	3.60	3.62	4.12	3.73	2.99	4.61	4.04	3.22
<b>Total Non-OECD . . . . .</b>	<b>36.85</b>	<b>40.25</b>	<b>39.46</b>	<b>37.64</b>	<b>51.55</b>	<b>47.10</b>	<b>39.64</b>	<b>62.80</b>	<b>55.77</b>	<b>45.01</b>
<b>Total Consumption . . . . .</b>	<b>86.20</b>	<b>88.52</b>	<b>86.70</b>	<b>83.90</b>	<b>104.14</b>	<b>94.60</b>	<b>82.15</b>	<b>119.28</b>	<b>105.41</b>	<b>88.87</b>
OPEC Production <sup>9</sup> . . . . .	34.38	36.09	34.75	33.42	48.16	38.51	28.21	58.13	43.63	28.27
Non-OPEC Production <sup>9</sup> . . . . .	50.55	52.43	51.96	50.48	55.98	56.09	53.94	61.15	61.78	60.61
Net Eurasia Exports . . . . .	9.52	10.49	10.24	9.76	13.93	12.37	11.14	17.24	13.25	10.85
OPEC Market Share (percent) . . . . .	40.5	40.8	40.1	39.8	46.2	40.7	34.3	48.7	41.4	31.8

<sup>1</sup>Weighted average price delivered to U.S. refiners.

<sup>2</sup>Includes production of crude oil (including lease condensate), natural gas plant liquids, other hydrogen and hydrocarbons for refinery feedstocks, alcohol and other sources, and refinery gains.

<sup>3</sup>OPEC = Organization of Petroleum Exporting Countries - Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

<sup>4</sup>OECD Europe = Organization for Economic Cooperation and Development - Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.

<sup>5</sup>Other Europe and Eurasia = Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Malta, Moldova, Montenegro, Romania, Serbia, Slovenia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

<sup>6</sup>Other Asia = Afghanistan, Bangladesh, Bhutan, Brunei, Cambodia (Kampuchea), Fiji, French Polynesia, Guam, Hong Kong, Indonesia, Kiribati, Laos, Malaysia, Macau, Maldives, Mongolia, Myanmar (Burma), Nauru, Nepal, New Caledonia, Niue, North Korea, Pakistan, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Sri Lanka, Taiwan, Thailand, Tonga, Vanuatu, and Vietnam.

<sup>7</sup>Includes liquids produced from energy crops, natural gas, coal, extra-heavy oil, oil sands, and shale. Includes both OPEC and non-OPEC producers in the regional breakdown.

<sup>8</sup>Includes both OPEC and non-OPEC consumers in the regional breakdown.

<sup>9</sup>Includes both conventional and unconventional liquids production.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 low sulfur light crude oil price: Energy Information Administration (EIA), Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." 2007 imported crude oil price: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). **2007 quantities and projections:** EIA, AEO2009 National Energy Modeling System runs LP2009.D122308A, AEO2009.D120908A, and HP2009.D121108A and EIA, Generate World Oil Balance Model.



Appendix D

# Results from Side Cases

**Table D1. Key Results for Residential and Commercial Sector Technology Cases**

Energy Consumption	2007	2010				2020			
		2009 Technology	Reference	High Technology	Best Available Technology	2009 Technology	Reference	High Technology	Best Available Technology
<b>Residential</b>									
<b>Energy Consumption (quadrillion Btu)</b>									
Liquefied Petroleum Gases	0.50	0.49	0.49	0.49	0.48	0.50	0.49	0.48	0.46
Kerosene	0.08	0.08	0.08	0.08	0.07	0.08	0.07	0.07	0.06
Distillate Fuel Oil	0.78	0.72	0.72	0.72	0.71	0.62	0.60	0.58	0.54
Liquid Fuels and Other Petroleum	1.35	1.29	1.29	1.28	1.27	1.20	1.16	1.13	1.06
Natural Gas	4.86	4.93	4.92	4.90	4.81	5.25	5.10	4.94	4.24
Coal	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Renewable Energy <sup>1</sup>	0.43	0.43	0.43	0.43	0.42	0.49	0.48	0.47	0.44
Electricity	4.75	4.81	4.80	4.78	4.35	5.26	5.12	4.82	4.04
<b>Delivered Energy</b>	<b>11.40</b>	<b>11.46</b>	<b>11.44</b>	<b>11.39</b>	<b>10.87</b>	<b>12.20</b>	<b>11.86</b>	<b>11.38</b>	<b>9.79</b>
Electricity Related Losses	10.36	10.46	10.44	10.40	9.48	11.11	10.81	10.19	8.53
<b>Total</b>	<b>21.76</b>	<b>21.92</b>	<b>21.88</b>	<b>21.80</b>	<b>20.34</b>	<b>23.31</b>	<b>22.67</b>	<b>21.57</b>	<b>18.32</b>
<b>Delivered Energy Intensity (million Btu per household)</b>	<b>100.2</b>	<b>98.6</b>	<b>98.4</b>	<b>98.0</b>	<b>93.4</b>	<b>94.0</b>	<b>91.4</b>	<b>87.7</b>	<b>75.5</b>
<b>Nonmarketed Renewables Consumption (quadrillion Btu)</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.06</b>	<b>0.07</b>	<b>0.08</b>	<b>0.10</b>
<b>Commercial</b>									
<b>Energy Consumption (quadrillion Btu)</b>									
Liquefied Petroleum Gases	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10
Motor Gasoline <sup>2</sup>	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Kerosene	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Distillate Fuel Oil	0.41	0.36	0.36	0.36	0.36	0.35	0.34	0.34	0.35
Residual Fuel Oil	0.08	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08
Liquid Fuels and Other Petroleum	0.63	0.58	0.58	0.58	0.58	0.59	0.58	0.58	0.59
Natural Gas	3.10	3.15	3.14	3.12	3.11	3.38	3.34	3.27	3.20
Coal	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Renewable Energy <sup>3</sup>	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Electricity	4.58	4.76	4.75	4.74	4.66	5.74	5.57	5.41	4.66
<b>Delivered Energy</b>	<b>8.50</b>	<b>8.67</b>	<b>8.66</b>	<b>8.63</b>	<b>8.53</b>	<b>9.89</b>	<b>9.69</b>	<b>9.45</b>	<b>8.64</b>
Electricity Related Losses	9.99	10.36	10.35	10.32	10.14	12.12	11.77	11.44	9.85
<b>Total</b>	<b>18.49</b>	<b>19.04</b>	<b>19.01</b>	<b>18.95</b>	<b>18.68</b>	<b>22.01</b>	<b>21.46</b>	<b>20.89</b>	<b>18.49</b>
<b>Delivered Energy Intensity (thousand Btu per square foot)</b>	<b>110.0</b>	<b>106.9</b>	<b>106.7</b>	<b>106.3</b>	<b>105.2</b>	<b>107.1</b>	<b>105.0</b>	<b>102.5</b>	<b>93.7</b>
<b>Commercial Sector Generation</b>									
<b>Net Summer Generation Capacity (megawatts)</b>									
Natural Gas	658	697	699	699	700	1039	1244	1454	1464
Solar Photovoltaic	375	749	749	749	749	1190	1275	1434	1717
Wind	18	18	18	18	18	52	64	99	108
<b>Electricity Generation (billion kilowatthours)</b>									
Natural Gas	4.74	5.02	5.03	5.03	5.04	7.48	9.00	10.53	10.60
Solar Photovoltaic	0.59	1.20	1.20	1.20	1.20	1.90	2.06	2.32	2.77
Wind	0.02	0.02	0.02	0.02	0.02	0.07	0.09	0.14	0.16
<b>Nonmarketed Renewables Consumption (quadrillion Btu)</b>	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.04</b>	<b>0.04</b>

<sup>1</sup>Includes wood used for residential heating. See Table A4 and/or Table A17 for estimates of nonmarketed renewable energy consumption for geothermal heat pumps, solar thermal hot water heating, and solar photovoltaic electricity generation.

<sup>2</sup>Includes ethanol (blends of 10 percent or less) and ethers blended into gasoline.

<sup>3</sup>Includes commercial sector consumption of wood and wood waste, landfill gas, municipal solid waste, and other biomass for combined heat and power.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports. Side cases were run without the fully integrated modeling system, so not all feedbacks are captured. The reference case ratio of electricity losses to electricity use was used to compute electricity losses for the technology cases.

Source: Energy Information Administration, AEO2009 National Energy Modeling System, runs BLDFRZN.D121008A, AEO2009.D120908A, BLDHIGH.D121008A, and BLDBEST.D121008A.

## Results from Side Cases

2030				Annual Growth 2007-2030 (percent)			
2009 Technology	Reference	High Technology	Best Available Technology	2009 Technology	Reference	High Technology	Best Available Technology
0.54	0.52	0.49	0.47	0.3%	0.2%	-0.1%	-0.3%
0.08	0.07	0.07	0.05	-0.2%	-0.5%	-0.9%	-1.9%
0.55	0.51	0.49	0.43	-1.5%	-1.8%	-2.0%	-2.5%
1.16	1.10	1.04	0.95	-0.7%	-0.9%	-1.1%	-1.5%
5.36	5.07	4.88	3.64	0.4%	0.2%	0.0%	-1.2%
0.01	0.01	0.01	0.01	-0.5%	-0.8%	-0.9%	-1.0%
0.53	0.50	0.48	0.44	0.9%	0.7%	0.5%	0.1%
6.01	5.69	5.31	4.22	1.0%	0.8%	0.5%	-0.5%
<b>13.07</b>	<b>12.36</b>	<b>11.72</b>	<b>9.26</b>	<b>0.6%</b>	<b>0.4%</b>	<b>0.1%</b>	<b>-0.9%</b>
12.34	11.69	10.90	8.66	0.8%	0.5%	0.2%	-0.8%
<b>25.42</b>	<b>24.05</b>	<b>22.62</b>	<b>17.92</b>	<b>0.7%</b>	<b>0.4%</b>	<b>0.2%</b>	<b>-0.8%</b>
<b>92.6</b>	<b>87.6</b>	<b>83.0</b>	<b>65.6</b>	<b>-0.3%</b>	<b>-0.6%</b>	<b>-0.8%</b>	<b>-1.8%</b>
<b>0.06</b>	<b>0.08</b>	<b>0.11</b>	<b>0.15</b>	<b>10.0%</b>	<b>11.5%</b>	<b>12.9%</b>	<b>14.5%</b>
0.10	0.10	0.10	0.10	0.3%	0.3%	0.3%	0.3%
0.05	0.05	0.05	0.05	0.4%	0.4%	0.4%	0.4%
0.01	0.01	0.01	0.01	1.4%	1.4%	1.4%	1.4%
0.35	0.34	0.34	0.35	-0.7%	-0.8%	-0.8%	-0.6%
0.08	0.08	0.08	0.08	0.2%	0.3%	0.2%	0.2%
0.59	0.59	0.58	0.60	-0.3%	-0.3%	-0.3%	-0.2%
3.56	3.54	3.52	3.43	0.6%	0.6%	0.6%	0.4%
0.06	0.06	0.06	0.06	-0.0%	-0.0%	-0.0%	-0.0%
0.12	0.12	0.12	0.12	0.0%	0.0%	0.0%	0.0%
6.65	6.31	5.98	4.76	1.6%	1.4%	1.2%	0.2%
<b>10.99</b>	<b>10.62</b>	<b>10.27</b>	<b>8.98</b>	<b>1.1%</b>	<b>1.0%</b>	<b>0.8%</b>	<b>0.2%</b>
13.66	12.96	12.28	9.79	1.4%	1.1%	0.9%	-0.1%
<b>24.65</b>	<b>23.59</b>	<b>22.56</b>	<b>18.77</b>	<b>1.3%</b>	<b>1.1%</b>	<b>0.9%</b>	<b>0.1%</b>
<b>106.4</b>	<b>102.9</b>	<b>99.5</b>	<b>87.0</b>	<b>-0.1%</b>	<b>-0.3%</b>	<b>-0.4%</b>	<b>-1.0%</b>
1991	3524	4897	5147	4.9%	7.6%	9.1%	9.4%
1547	2296	3485	5449	6.4%	8.2%	10.2%	12.3%
214	286	704	1313	11.4%	12.8%	17.3%	20.5%
14.34	25.59	35.57	37.39	4.9%	7.6%	9.2%	9.4%
2.44	3.74	5.72	8.94	6.4%	8.4%	10.4%	12.5%
0.31	0.42	1.01	1.84	11.9%	13.3%	17.7%	20.8%
<b>0.04</b>	<b>0.04</b>	<b>0.05</b>	<b>0.07</b>	<b>1.4%</b>	<b>2.0%</b>	<b>2.9%</b>	<b>4.0%</b>

# Results from Side Cases

**Table D2. Key Results for Industrial Sector Technology Cases**

Consumption and Indicators	2007	2010			2020			2030		
		2009 Technology	Reference	High Technology	2009 Technology	Reference	High Technology	2009 Technology	Reference	High Technology
<b>Value of Shipments (billion 2000 dollars)</b>										
Manufacturing .....	4261	3963	3963	3963	5150	5150	5150	6671	6671	6671
Nonmanufacturing .....	1490	1277	1277	1277	1603	1603	1603	1780	1780	1780
<b>Total .....</b>	<b>5750</b>	<b>5240</b>	<b>5240</b>	<b>5240</b>	<b>6753</b>	<b>6753</b>	<b>6753</b>	<b>8451</b>	<b>8451</b>	<b>8451</b>
<b>Energy Consumption excluding Refining<sup>1</sup> (quadrillion Btu)</b>										
Liquefied Petroleum Gases .....	2.34	2.01	1.98	1.96	2.04	1.77	1.55	1.95	1.66	1.42
Heat and Power .....	0.18	0.16	0.15	0.15	0.17	0.15	0.15	0.18	0.16	0.15
Feedstocks .....	2.16	1.85	1.83	1.80	1.88	1.61	1.40	1.78	1.50	1.27
Motor Gasoline .....	0.36	0.35	0.34	0.34	0.37	0.34	0.32	0.40	0.36	0.32
Distillate Fuel Oil .....	1.27	1.17	1.17	1.16	1.28	1.18	1.10	1.39	1.23	1.11
Residual Fuel Oil .....	0.24	0.15	0.15	0.15	0.18	0.16	0.15	0.19	0.16	0.15
Petrochemical Feedstocks .....	1.30	1.01	1.01	1.00	1.18	1.13	1.08	1.14	1.05	0.99
Petroleum Coke .....	0.36	0.27	0.27	0.26	0.33	0.29	0.26	0.38	0.31	0.27
Asphalt and Road Oil .....	1.19	0.98	0.96	0.95	1.26	1.08	0.93	1.38	1.12	0.92
Miscellaneous Petroleum <sup>2</sup> .....	0.62	0.31	0.30	0.30	0.27	0.21	0.19	0.30	0.21	0.19
Petroleum Subtotal .....	7.68	6.25	6.18	6.13	6.91	6.15	5.58	7.13	6.10	5.37
Natural Gas Heat and Power .....	5.14	5.08	5.02	5.01	5.69	4.86	4.79	6.17	5.11	4.97
Natural Gas Feedstocks .....	0.55	0.51	0.51	0.50	0.59	0.50	0.44	0.54	0.44	0.37
Lease and Plant Fuel <sup>3</sup> .....	1.20	1.27	1.27	1.27	1.33	1.33	1.33	1.47	1.47	1.47
Natural Gas Subtotal .....	6.89	6.87	6.80	6.79	7.61	6.69	6.56	8.17	7.02	6.81
Metallurgical Coal and Coke <sup>4</sup> .....	0.62	0.57	0.56	0.56	0.56	0.50	0.44	0.57	0.49	0.39
Other Industrial Coal .....	1.15	1.18	1.18	1.17	1.17	1.09	1.05	1.20	1.10	1.03
Coal Subtotal .....	1.77	1.75	1.74	1.73	1.72	1.60	1.49	1.76	1.59	1.42
Renewables <sup>5</sup> .....	1.64	1.48	1.48	1.48	1.61	1.64	1.69	1.88	1.96	2.08
Purchased Electricity .....	3.27	3.18	3.15	3.10	3.49	3.27	3.06	3.83	3.45	3.11
<b>Delivered Energy .....</b>	<b>21.26</b>	<b>19.53</b>	<b>19.36</b>	<b>19.24</b>	<b>21.34</b>	<b>19.35</b>	<b>18.38</b>	<b>22.77</b>	<b>20.11</b>	<b>18.79</b>
Electricity Related Losses .....	7.13	6.91	6.86	6.75	7.38	6.91	6.66	7.87	7.09	6.76
<b>Total .....</b>	<b>28.40</b>	<b>26.44</b>	<b>26.22</b>	<b>25.99</b>	<b>28.72</b>	<b>26.25</b>	<b>25.04</b>	<b>30.65</b>	<b>27.20</b>	<b>25.56</b>
<b>Delivered Energy Use per Dollar of Shipments (thousand Btu per 2000 dollar) .....</b>										
	<b>3.70</b>	<b>3.73</b>	<b>3.69</b>	<b>3.67</b>	<b>3.16</b>	<b>2.86</b>	<b>2.72</b>	<b>2.69</b>	<b>2.38</b>	<b>2.22</b>
<b>Onsite Industrial Combined Heat and Power</b>										
Capacity (gigawatts) .....	22.02	23.00	23.04	23.13	25.60	25.84	26.71	28.38	29.16	31.42
Generation (billion kilowatthours) .....	119.66	125.89	126.15	126.80	144.22	145.85	151.51	163.93	169.15	183.55

<sup>1</sup>Fuel consumption includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>2</sup>Includes lubricants and miscellaneous petroleum products.

<sup>3</sup>Represents natural gas used in the field gathering and processing plant machinery.

<sup>4</sup>Includes net coal coke imports.

<sup>5</sup>Includes consumption of energy from hydroelectric, wood and wood waste, municipal solid waste, and other biomass.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports. Side cases were run without the fully integrated modeling system, so not all feedbacks are captured. The reference case ratio of electricity losses to electricity use was used to compute electricity losses for the technology cases.

Source: Energy Information Administration, AEO2009 National Energy Modeling System runs INDFRZN.D121608A, AEO2009.D120908A, and INDHIGH.D121608A.

## Results from Side Cases

**Table D3. Key Results for Transportation Sector Technology Cases**

Consumption and Indicators	2007	2010			2020			2030		
		Low Technology	Reference	High Technology	Low Technology	Reference	High Technology	Low Technology	Reference	High Technology
<b>Level of Travel</b>										
(billion vehicle miles traveled)										
Light-Duty Vehicles less than 8,500 . . .	2702	2747	2747	2747	3155	3161	3165	3813	3827	3837
Commercial Light Trucks <sup>1</sup> . . . . .	72	67	67	67	85	85	85	105	105	105
Freight Trucks greater than 10,000 . . .	248	232	232	232	303	303	303	378	378	378
(billion seat miles available)										
Air . . . . .	1036	951	951	951	1138	1138	1138	1410	1410	1410
(billion ton miles traveled)										
Rail . . . . .	1733	1664	1664	1664	1927	1927	1927	2193	2193	2193
Domestic Shipping . . . . .	662	629	629	629	744	744	744	839	839	839
<b>Energy Efficiency Indicators</b>										
(miles per gallon)										
Tested New Light-Duty Vehicle <sup>2</sup> . . . . .	26.3	26.9	26.9	27.2	34.6	35.5	36.0	36.9	38.0	39.0
New Car <sup>2</sup> . . . . .	30.3	30.6	30.7	31.4	38.1	39.1	40.2	40.4	41.4	43.2
New Light Truck <sup>2</sup> . . . . .	23.1	23.6	23.6	23.6	30.6	30.7	30.9	32.5	33.1	33.7
Light-Duty Stock <sup>3</sup> . . . . .	20.6	20.7	20.7	20.7	24.4	24.7	25.0	28.3	28.9	29.5
New Commercial Light Truck <sup>1</sup> . . . . .	15.4	15.6	15.7	15.7	19.5	19.6	19.8	19.8	20.3	20.9
Stock Commercial Light Truck <sup>1</sup> . . . . .	14.4	14.8	14.8	14.8	17.4	17.6	17.7	19.5	19.8	20.1
Freight Truck . . . . .	6.0	6.0	6.0	6.0	6.3	6.5	6.8	6.5	6.9	7.2
(seat miles per gallon)										
Aircraft . . . . .	62.8	64.4	64.4	64.5	67.8	68.1	68.8	72.1	73.6	75.3
(ton miles per thousand Btu)										
Rail . . . . .	2.9	2.9	2.9	2.9	2.9	3.0	3.1	2.9	3.0	3.2
Domestic Shipping . . . . .	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.2
<b>Energy Use (quadrillion Btu)</b>										
<b>by Mode</b>										
Light-Duty Vehicles . . . . .	16.47	16.21	16.20	16.19	16.01	15.80	15.66	16.83	16.51	16.22
Commercial Light Trucks <sup>1</sup> . . . . .	0.62	0.57	0.57	0.57	0.61	0.61	0.60	0.68	0.67	0.66
Bus Transportation . . . . .	0.27	0.27	0.27	0.27	0.28	0.27	0.26	0.30	0.28	0.27
Freight Trucks . . . . .	5.15	4.82	4.81	4.80	6.01	5.79	5.59	7.25	6.90	6.58
Rail, Passenger . . . . .	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06
Rail, Freight . . . . .	0.59	0.57	0.57	0.57	0.66	0.65	0.63	0.75	0.73	0.69
Shipping, Domestic . . . . .	0.34	0.32	0.32	0.32	0.38	0.37	0.36	0.43	0.42	0.38
Shipping, International . . . . .	0.88	0.80	0.80	0.80	0.90	0.90	0.89	0.91	0.91	0.90
Recreational Boats . . . . .	0.25	0.25	0.25	0.25	0.26	0.26	0.26	0.28	0.28	0.28
Air . . . . .	2.71	2.45	2.45	2.45	2.89	2.87	2.84	3.61	3.54	3.46
Military Use . . . . .	0.70	0.74	0.74	0.74	0.74	0.74	0.74	0.78	0.78	0.78
Lubricants . . . . .	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.15
Pipeline Fuel . . . . .	0.64	0.64	0.64	0.64	0.69	0.69	0.69	0.72	0.72	0.72
<b>Total</b> . . . . .	<b>28.82</b>	<b>27.82</b>	<b>27.81</b>	<b>27.78</b>	<b>29.63</b>	<b>29.15</b>	<b>28.72</b>	<b>32.74</b>	<b>31.94</b>	<b>31.14</b>
<b>by Fuel</b>										
Liquefied Petroleum Gases . . . . .	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01
E85 <sup>4</sup> . . . . .	0.00	0.00	0.00	0.00	0.88	0.85	0.85	2.32	2.18	2.19
Motor Gasoline <sup>5</sup> . . . . .	17.29	16.94	16.93	16.92	15.72	15.56	15.42	14.63	14.49	14.24
Jet Fuel <sup>6</sup> . . . . .	3.23	3.00	3.00	3.00	3.43	3.42	3.39	4.19	4.12	4.04
Distillate Fuel Oil <sup>7</sup> . . . . .	6.48	6.14	6.13	6.12	7.63	7.36	7.11	9.54	9.09	8.64
Residual Fuel Oil . . . . .	0.95	0.86	0.86	0.86	0.98	0.98	0.97	1.01	1.00	0.99
Liquid Hydrogen . . . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Petroleum <sup>8</sup> . . . . .	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.18	0.18
Liquid Fuels and Other Petroleum . . .	28.14	27.13	27.11	27.09	28.84	28.36	27.94	31.89	31.09	30.29
Pipeline Fuel Natural Gas . . . . .	0.64	0.64	0.64	0.64	0.69	0.69	0.69	0.72	0.72	0.72
Compressed Natural Gas . . . . .	0.02	0.03	0.03	0.03	0.07	0.07	0.06	0.09	0.09	0.08
Electricity . . . . .	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05
<b>Delivered Energy</b> . . . . .	<b>28.82</b>	<b>27.82</b>	<b>27.81</b>	<b>27.78</b>	<b>29.63</b>	<b>29.15</b>	<b>28.72</b>	<b>32.74</b>	<b>31.94</b>	<b>31.14</b>
Electricity Related Losses . . . . .	0.05	0.05	0.05	0.05	0.06	0.07	0.07	0.09	0.10	0.11
<b>Total</b> . . . . .	<b>28.87</b>	<b>27.82</b>	<b>27.86</b>	<b>27.78</b>	<b>29.63</b>	<b>29.22</b>	<b>28.72</b>	<b>32.74</b>	<b>32.05</b>	<b>31.14</b>

<sup>1</sup>Commercial trucks 8,500 to 10,000 pounds.

<sup>2</sup>Environmental Protection Agency rated miles per gallon.

<sup>3</sup>Combined car and light truck "on-the-road" estimate.

<sup>4</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>5</sup>Includes ethanol (blends of 10 percent or less) and ethers blended into gasoline.

<sup>6</sup>Includes only kerosene type.

<sup>7</sup>Diesel fuel for on- and off- road use.

<sup>8</sup>Includes aviation gasoline and lubricants.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports. Side cases were run without the fully integrated modeling system, so not all feedbacks are captured. The reference case ratio of electricity losses to electricity use was used to compute electricity losses for the technology cases.

Source: Energy Information Administration, AEO2009 National Energy Modeling System runs TRNLOW.D011409A, AEO2009.D120908A, and TRNHIGH.D011409A.

# Results from Side Cases

**Table D4. Key Results for Integrated Technology Cases**

Consumption and Emissions	2007	2010			2020			2030		
		2009 Technology	Reference	High Technology	2009 Technology	Reference	High Technology	2009 Technology	Reference	High Technology
<b>Energy Consumption by Sector (quadrillion Btu)</b>										
Residential	11.40	11.46	11.44	11.40	12.13	11.86	11.44	12.97	12.36	11.82
Commercial	8.50	8.67	8.66	8.63	9.78	9.69	9.56	10.86	10.62	10.40
Industrial <sup>1</sup>	25.29	24.05	23.83	23.72	26.64	24.73	23.89	28.97	26.33	25.13
Transportation	28.82	27.83	27.81	27.78	29.59	29.15	28.76	32.61	31.94	31.23
Electric Power <sup>2</sup>	40.67	41.18	41.02	40.82	45.26	44.22	42.90	49.50	48.03	46.13
<b>Total</b>	<b>101.89</b>	<b>100.24</b>	<b>99.85</b>	<b>99.50</b>	<b>108.82</b>	<b>105.44</b>	<b>102.85</b>	<b>118.38</b>	<b>113.56</b>	<b>109.77</b>
<b>Energy Consumption by Fuel (quadrillion Btu)</b>										
Liquid Fuels and Other Petroleum <sup>3</sup>	40.75	37.97	37.89	37.82	40.14	38.93	38.06	43.36	41.60	40.13
Natural Gas	23.70	23.26	23.20	22.98	25.44	24.09	22.87	27.81	25.04	23.52
Coal	22.74	22.93	22.91	22.85	24.50	23.98	23.34	27.16	26.56	25.38
Nuclear Power	8.41	8.45	8.45	8.45	9.01	8.99	9.20	8.81	9.47	9.72
Renewable Energy <sup>4</sup>	6.05	7.42	7.20	7.19	9.53	9.26	9.21	10.89	10.67	10.88
Other <sup>5</sup>	0.23	0.21	0.21	0.21	0.22	0.19	0.17	0.36	0.22	0.14
<b>Total</b>	<b>101.89</b>	<b>100.24</b>	<b>99.85</b>	<b>99.50</b>	<b>108.82</b>	<b>105.44</b>	<b>102.85</b>	<b>118.38</b>	<b>113.56</b>	<b>109.77</b>
<b>Energy Intensity (thousand Btu per 2000 dollar of GDP)</b>	<b>8.84</b>	<b>8.51</b>	<b>8.48</b>	<b>8.45</b>	<b>7.03</b>	<b>6.79</b>	<b>6.61</b>	<b>5.90</b>	<b>5.65</b>	<b>5.45</b>
<b>Carbon Dioxide Emissions by Sector (million metric tons)</b>										
Residential	346	351	351	349	360	351	343	363	344	333
Commercial	216	215	214	213	225	226	224	236	236	236
Industrial <sup>1</sup>	987	974	965	962	1055	973	943	1145	1030	980
Transportation	2009	1888	1886	1884	1969	1937	1908	2122	2075	2021
Electric Power <sup>6</sup>	2433	2383	2385	2373	2550	2497	2398	2840	2729	2574
<b>Total</b>	<b>5991</b>	<b>5810</b>	<b>5801</b>	<b>5782</b>	<b>6159</b>	<b>5982</b>	<b>5817</b>	<b>6705</b>	<b>6414</b>	<b>6144</b>
<b>Carbon Dioxide Emissions by Fuel (million metric tons)</b>										
Petroleum	2580	2399	2396	2393	2485	2427	2386	2654	2564	2485
Natural Gas	1237	1221	1218	1207	1335	1265	1202	1462	1318	1238
Coal	2162	2178	2176	2171	2327	2278	2217	2577	2521	2410
Other <sup>7</sup>	12	12	12	12	12	12	12	12	12	12
<b>Total</b>	<b>5991</b>	<b>5810</b>	<b>5801</b>	<b>5782</b>	<b>6159</b>	<b>5982</b>	<b>5817</b>	<b>6705</b>	<b>6414</b>	<b>6144</b>
<b>Carbon Dioxide Emissions (tons per person)</b>	<b>19.8</b>	<b>18.7</b>	<b>18.6</b>	<b>18.6</b>	<b>18.0</b>	<b>17.5</b>	<b>17.0</b>	<b>17.9</b>	<b>17.1</b>	<b>16.4</b>

<sup>1</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>2</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>3</sup>Includes petroleum-derived fuels and non-petroleum derived fuels, such as ethanol and biodiesel, and coal-based synthetic liquids. Petroleum coke, which is a solid, is included. Also included are natural gas plant liquids, crude oil consumed as a fuel, and liquid hydrogen.

<sup>4</sup>Includes grid-connected electricity from conventional hydroelectric; wood and wood waste; landfill gas; biogenic municipal solid waste; other biomass; wind; photovoltaic and solar thermal sources; and non-electric energy from renewable sources, such as active and passive solar systems, and wood; and both the ethanol and gasoline components of E85, but not the ethanol component of blends less than 85 percent. Excludes electricity imports using renewable sources and nonmarketed renewable energy.

<sup>5</sup>Includes non-biogenic municipal waste and net electricity imports.

<sup>6</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>7</sup>Includes emissions from geothermal power and nonbiogenic emissions from municipal solid waste.

Btu = British thermal unit.

GDP = Gross domestic product.

Note: Includes end-use, fossil electricity, and renewable technology assumptions. Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2009 National Energy Modeling System runs LTRKITE.D011509A, AEO2009.D120908A, and HTRKITE.D011509A.

**Table D5. Key Results for Advanced Nuclear Cost Cases**  
(Gigawatts, Unless Otherwise Noted)

Net Summer Capacity, Generation, Emissions, and Fuel Prices	2007	2010			2020			2030		
		High Nuclear Cost	Reference	Low Nuclear Cost	High Nuclear Cost	Reference	Low Nuclear Cost	High Nuclear Cost	Reference	Low Nuclear Cost
<b>Capacity</b>										
Coal Steam	311.2	321.0	321.0	321.0	327.1	327.0	327.0	364.0	352.5	338.7
Oil and Natural Gas Steam	118.8	118.4	118.4	118.4	101.3	101.8	101.8	100.6	100.5	100.3
Combined Cycle	181.0	194.8	194.8	194.8	205.2	202.7	199.9	260.0	237.7	231.6
Combustion Turbine/Diesel	133.3	142.0	142.1	142.2	155.2	155.8	155.2	198.2	201.0	204.3
Nuclear Power	100.5	101.2	101.2	101.2	105.1	108.4	113.8	74.3	112.6	132.2
Pumped Storage	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewable Sources	101.5	115.5	115.6	115.5	122.7	122.3	122.4	142.3	138.8	136.9
Distributed Generation (Natural Gas)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.3
Combined Heat and Power <sup>1</sup>	27.8	32.5	32.6	32.5	47.3	47.3	47.3	62.8	62.6	62.3
<b>Total</b>	<b>995.6</b>	<b>1046.9</b>	<b>1047.1</b>	<b>1047.0</b>	<b>1085.3</b>	<b>1086.8</b>	<b>1088.8</b>	<b>1223.8</b>	<b>1227.4</b>	<b>1228.0</b>
<b>Cumulative Additions</b>										
Coal Steam	0.0	11.3	11.3	11.3	18.0	18.0	18.0	55.0	43.6	29.7
Oil and Natural Gas Steam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combined Cycle	0.0	13.8	13.8	13.8	24.1	21.7	18.8	79.0	56.6	50.5
Combustion Turbine/Diesel	0.0	9.1	9.1	9.2	27.1	27.8	27.1	70.0	73.0	76.3
Nuclear Power	0.0	0.0	0.0	0.0	1.2	4.5	9.9	1.2	13.1	32.7
Pumped Storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewable Sources	0.0	14.0	14.1	14.0	21.2	20.9	21.0	40.8	37.4	35.4
Distributed Generation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.3
Combined Heat and Power <sup>1</sup>	0.0	4.7	4.8	4.7	19.5	19.5	19.5	35.0	34.8	34.6
<b>Total</b>	<b>0.0</b>	<b>52.9</b>	<b>53.1</b>	<b>53.1</b>	<b>111.2</b>	<b>112.4</b>	<b>114.4</b>	<b>281.3</b>	<b>258.7</b>	<b>259.5</b>
<b>Cumulative Retirements</b>	<b>0.0</b>	<b>2.3</b>	<b>2.3</b>	<b>2.3</b>	<b>24.8</b>	<b>24.5</b>	<b>24.5</b>	<b>56.4</b>	<b>30.2</b>	<b>30.4</b>
<b>Generation by Fuel (billion kilowatthours)</b>										
Coal	2002	2038	2038	2038	2127	2125	2118	2464	2367	2252
Petroleum	61	43	43	43	45	45	44	46	46	46
Natural Gas	814	738	737	738	816	801	771	1037	880	858
Nuclear Power	806	809	809	809	840	862	903	594	907	1062
Pumped Storage	0	1	1	1	1	1	1	1	1	1
Renewable Sources	318	415	415	415	550	549	548	629	614	610
Distributed Generation	0	0	0	0	0	0	0	0	0	0
Combined Heat and Power <sup>1</sup>	153	174	174	175	237	237	237	338	337	336
<b>Total</b>	<b>4155</b>	<b>4217</b>	<b>4217</b>	<b>4218</b>	<b>4616</b>	<b>4618</b>	<b>4622</b>	<b>5109</b>	<b>5153</b>	<b>5163</b>
<b>Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)<sup>2</sup></b>										
Petroleum	66	38	38	38	40	39	41	41	41	41
Natural Gas	376	341	341	341	362	357	346	431	378	370
Coal	1980	1995	1995	1995	2090	2089	2080	2375	2299	2203
Other <sup>3</sup>	12	12	12	12	12	12	12	12	12	12
<b>Total</b>	<b>2433</b>	<b>2385</b>	<b>2385</b>	<b>2385</b>	<b>2503</b>	<b>2497</b>	<b>2477</b>	<b>2858</b>	<b>2729</b>	<b>2625</b>
<b>Prices to the Electric Power Sector<sup>2</sup> (2007 dollars per million Btu)</b>										
Petroleum	9.42	13.60	13.64	13.57	19.01	19.01	19.01	21.20	21.28	21.18
Natural Gas	7.02	6.59	6.59	6.58	7.24	7.15	7.02	9.29	8.70	8.65
Coal	1.78	1.89	1.89	1.89	1.92	1.92	1.92	2.08	2.04	2.01

<sup>1</sup>Includes combined heat and power plants and electricity-only plants in commercial and industrial sectors. Includes small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid. Excludes off-grid photovoltaics and other generators not connected to the distribution or transmission systems.

<sup>2</sup>Includes electricity-only and combined heat and power plants whose primary business to sell electricity, or electricity and heat, to the public.

<sup>3</sup>Includes emissions from geothermal power and nonbiogenic emissions from municipal solid waste.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2009 National Energy Modeling System runs HCNUC09.D121108A, AEO2009.D120908A, and LCNUC09.D121108A.

## Results from Side Cases

**Table D6. Key Results for Electric Power Sector Fossil Technology Cases**  
(Gigawatts, Unless Otherwise Noted)

Net Summer Capacity, Generation Consumption, and Emissions	2007	2010			2020			2030		
		High Fossil Cost	Reference	Low Fossil Cost	High Fossil Cost	Reference	Low Fossil Cost	High Fossil Cost	Reference	Low Fossil Cost
<b>Capacity</b>										
Pulverized Coal	310.7	320.5	320.5	320.5	324.1	324.0	324.3	327.0	345.6	369.5
Coal Gasification Combined-Cycle	0.5	0.5	0.5	0.5	3.0	3.0	3.0	3.0	6.9	20.0
Conventional Natural Gas Combined-Cycle	181.0	194.8	194.8	194.8	196.3	196.4	196.6	196.6	196.5	196.9
Advanced Natural Gas Combined-Cycle	0.0	0.0	0.0	0.0	2.5	6.3	12.1	29.8	41.1	47.4
Conventional Combustion Turbine	133.3	139.6	140.6	140.9	136.5	138.5	138.8	145.6	140.9	138.9
Advanced Combustion Turbine	0.0	1.5	1.5	1.5	16.9	17.3	20.7	62.7	60.1	51.9
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuclear	100.5	101.2	101.2	101.2	110.2	108.4	105.1	119.1	112.6	100.7
Oil and Natural Gas Steam	118.8	118.4	118.4	118.4	99.9	101.8	103.9	99.8	100.5	100.2
Renewable Sources/Pumped Storage	122.9	137.0	137.0	137.0	143.7	143.6	143.4	170.0	160.1	155.0
Distributed Generation	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.8	0.3	0.0
Combined Heat and Power <sup>1</sup>	27.8	32.5	32.6	32.5	47.4	47.3	47.2	62.9	62.6	61.7
<b>Total</b>	<b>995.6</b>	<b>1046.0</b>	<b>1047.1</b>	<b>1047.3</b>	<b>1080.6</b>	<b>1086.6</b>	<b>1094.9</b>	<b>1218.3</b>	<b>1227.2</b>	<b>1242.3</b>
<b>Cumulative Additions</b>										
Pulverized Coal	0.0	11.3	11.3	11.3	16.6	16.6	16.8	19.6	38.2	62.5
Coal Gasification Combined-Cycle	0.0	0.0	0.0	0.0	1.4	1.4	1.4	1.4	5.4	18.0
Conventional Natural Gas Combined-Cycle	0.0	13.8	13.8	13.8	15.3	15.4	15.6	15.5	15.5	15.9
Advanced Natural Gas Combined-Cycle	0.0	0.0	0.0	0.0	2.5	6.3	12.1	29.8	41.1	47.4
Conventional Combustion Turbine	0.0	6.6	7.6	8.0	9.0	10.5	10.1	18.0	12.9	10.2
Advanced Combustion Turbine	0.0	1.5	1.5	1.5	16.9	17.3	20.7	62.7	60.1	51.9
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuclear	0.0	0.0	0.0	0.0	6.3	4.5	1.2	19.6	13.1	1.2
Oil and Natural Gas Steam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewable Sources	0.0	14.1	14.1	14.1	21.1	20.9	20.7	47.3	37.4	32.3
Distributed Generation	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.8	0.3	0.0
Combined Heat and Power <sup>1</sup>	0.0	4.7	4.8	4.7	19.6	19.5	19.4	35.1	34.8	33.9
<b>Total</b>	<b>0.0</b>	<b>52.0</b>	<b>53.1</b>	<b>53.4</b>	<b>108.7</b>	<b>112.4</b>	<b>117.8</b>	<b>250.9</b>	<b>258.7</b>	<b>273.3</b>
<b>Cumulative Retirements</b>	<b>0.0</b>	<b>2.3</b>	<b>2.3</b>	<b>2.3</b>	<b>26.8</b>	<b>24.5</b>	<b>21.6</b>	<b>31.4</b>	<b>30.2</b>	<b>29.7</b>
<b>Generation by Fuel (billion kilowatthours)</b>										
Coal	2002	2038	2038	2038	2122	2125	2129	2225	2367	2596
Petroleum	61	43	43	43	45	45	45	46	46	46
Natural Gas	814	737	737	737	786	801	822	908	880	808
Nuclear Power	806	809	809	809	875	862	840	959	907	817
Renewable Sources/Pumped Storage	319	416	415	416	551	549	549	654	615	605
Distributed Generation	0	0	0	0	0	0	0	3	0	0
Combined Heat and Power <sup>1</sup>	153	174	174	174	237	237	237	339	337	333
<b>Total</b>	<b>4155</b>	<b>4217</b>	<b>4217</b>	<b>4217</b>	<b>4616</b>	<b>4618</b>	<b>4622</b>	<b>5134</b>	<b>5153</b>	<b>5206</b>
<b>Fuel Consumption by the Electric Power Sector (quadrillion Btu)<sup>2</sup></b>										
Coal	20.84	21.03	21.03	21.03	21.97	22.01	22.05	23.09	24.25	26.03
Petroleum	0.67	0.49	0.49	0.49	0.51	0.51	0.51	0.52	0.53	0.53
Natural Gas	7.06	6.43	6.42	6.43	6.64	6.73	6.85	7.39	7.12	6.55
Nuclear Power	8.41	8.45	8.45	8.45	9.13	8.99	8.77	10.01	9.47	8.53
Renewable Sources	3.45	4.43	4.42	4.42	5.81	5.79	5.79	6.73	6.43	6.33
<b>Total</b>	<b>40.56</b>	<b>40.95</b>	<b>40.94</b>	<b>40.94</b>	<b>44.19</b>	<b>44.16</b>	<b>44.09</b>	<b>47.86</b>	<b>47.93</b>	<b>48.10</b>
<b>Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)<sup>2</sup></b>										
Coal	1980	1995	1995	1994	2085	2089	2092	2190	2299	2464
Petroleum	66	38	38	38	40	40	40	40	41	41
Natural Gas	376	341	341	341	352	357	363	392	378	348
Other <sup>3</sup>	12	12	12	12	12	12	12	12	12	12
<b>Total</b>	<b>2433</b>	<b>2385</b>	<b>2385</b>	<b>2385</b>	<b>2488</b>	<b>2497</b>	<b>2507</b>	<b>2634</b>	<b>2729</b>	<b>2864</b>

<sup>1</sup>Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors. Includes small on-site generating systems in the residential, commercial, and industrial sectors used primarily for on-site use generation, but which may also sell some power to the grid. Excludes off-grid photovoltaics and other generators not connected to the distribution or transmission systems.

<sup>2</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>3</sup>Includes emissions from geothermal power and nonbiogenic emissions from municipal solid waste.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2009 National Energy Modeling System runs HCF0SS09.D121108A, AEO2009.D120908A, and LCF0SS09.D121608A.

## Results from Side Cases

**Table D7. Key Results for Electric Power Sector Plant Capital Cost Cases**  
(Gigawatts, Unless Otherwise Noted)

Net Summer Capacity, Generation Consumption, and Emissions	2007	2020				2030			
		Falling Plant Costs	Reference	Frozen Plant Costs	High Plant Costs	Falling Plant Costs	Reference	Frozen Plant Costs	High Plant Costs
<b>Capacity</b>									
Pulverized Coal .....	310.7	324.1	324.0	324.1	324.0	348.3	345.6	335.5	324.4
Coal Gasification Combined-Cycle .....	0.5	3.0	3.0	3.0	3.0	13.1	6.9	6.0	3.0
Conventional Natural Gas Combined-Cycle .....	181.0	196.4	196.4	196.7	196.5	196.5	196.5	197.2	197.0
Advanced Natural Gas Combined-Cycle .....	0.0	8.9	6.3	8.4	6.4	39.8	41.1	53.6	56.0
Conventional Combustion Turbine .....	133.3	139.1	138.5	137.4	135.2	138.9	140.9	143.8	144.6
Advanced Combustion Turbine .....	0.0	20.1	17.3	14.9	14.1	60.2	60.1	59.5	63.5
Fuel Cells .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuclear .....	100.5	111.4	108.4	105.1	105.1	121.6	112.6	100.7	100.7
Oil and Natural Gas Steam .....	118.8	103.0	101.8	99.9	99.9	99.5	100.5	99.8	99.8
Renewable Sources/Pumped Storage .....	122.9	143.8	143.6	143.5	143.1	174.4	160.1	155.8	151.4
Distributed Generation .....	0.0	0.1	0.0	0.0	0.0	1.6	0.3	0.0	0.0
Combined Heat and Power <sup>1</sup> .....	27.8	47.2	47.3	47.3	47.4	61.6	62.6	63.0	63.4
<b>Total .....</b>	<b>995.6</b>	<b>1097.1</b>	<b>1086.6</b>	<b>1080.4</b>	<b>1074.7</b>	<b>1255.5</b>	<b>1227.2</b>	<b>1214.9</b>	<b>1203.9</b>
<b>Cumulative Additions</b>									
Pulverized Coal .....	0.0	16.6	16.6	16.6	16.6	40.9	38.2	28.0	17.0
Coal Gasification Combined-Cycle .....	0.0	1.4	1.4	1.4	1.4	11.5	5.4	4.4	1.4
Conventional Natural Gas Combined-Cycle .....	0.0	15.4	15.4	15.7	15.5	15.5	15.5	16.2	16.0
Advanced Natural Gas Combined-Cycle .....	0.0	8.9	6.3	8.4	6.4	39.8	41.1	53.6	56.0
Conventional Combustion Turbine .....	0.0	10.5	10.5	9.4	8.6	11.1	12.9	15.8	18.0
Advanced Combustion Turbine .....	0.0	20.1	17.3	14.9	14.1	60.2	60.1	59.5	63.5
Fuel Cells .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuclear .....	0.0	7.5	4.5	1.2	1.2	22.1	13.1	1.2	1.2
Oil and Natural Gas Steam .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewable Sources .....	0.0	21.1	20.9	20.8	20.4	51.7	37.4	33.1	28.7
Distributed Generation .....	0.0	0.1	0.0	0.0	0.0	1.6	0.3	0.0	0.0
Combined Heat and Power <sup>1</sup> .....	0.0	19.4	19.5	19.5	19.6	33.8	34.8	35.2	35.6
<b>Total .....</b>	<b>0.0</b>	<b>121.0</b>	<b>112.4</b>	<b>107.9</b>	<b>103.8</b>	<b>288.2</b>	<b>258.7</b>	<b>247.0</b>	<b>237.5</b>
<b>Cumulative Retirements .....</b>	<b>0.0</b>	<b>22.6</b>	<b>24.5</b>	<b>26.3</b>	<b>27.8</b>	<b>31.3</b>	<b>30.2</b>	<b>30.8</b>	<b>32.4</b>
<b>Generation by Fuel (billion kilowatthours)</b>									
Coal .....	2002	2123	2125	2125	2125	2425	2367	2282	2168
Petroleum .....	61	45	45	45	45	47	46	46	46
Natural Gas .....	814	784	801	817	817	773	880	1021	1103
Nuclear Power .....	806	884	862	840	840	979	907	817	817
Renewable Sources/Pumped Storage .....	319	550	549	550	549	657	615	604	596
Distributed Generation .....	0	0	0	0	0	1	0	0	0
Combined Heat and Power <sup>1</sup> .....	153	237	237	237	237	333	337	339	341
<b>Total .....</b>	<b>4155</b>	<b>4623</b>	<b>4618</b>	<b>4614</b>	<b>4614</b>	<b>5214</b>	<b>5153</b>	<b>5108</b>	<b>5071</b>
<b>Fuel Consumption by the Electric Power Sector (quadrillion Btu)<sup>2</sup></b>									
Coal .....	20.84	22.00	22.01	22.01	22.01	24.67	24.25	23.52	22.55
Petroleum .....	0.67	0.51	0.51	0.51	0.51	0.53	0.53	0.52	0.52
Natural Gas .....	7.06	6.58	6.73	6.82	6.84	6.35	7.12	8.03	8.63
Nuclear Power .....	8.41	9.23	8.99	8.77	8.77	10.21	9.47	8.53	8.53
Renewable Sources .....	3.45	5.80	5.79	5.80	5.79	6.83	6.43	6.34	6.27
<b>Total .....</b>	<b>40.56</b>	<b>44.24</b>	<b>44.16</b>	<b>44.04</b>	<b>44.05</b>	<b>48.72</b>	<b>47.93</b>	<b>47.07</b>	<b>46.62</b>
<b>Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)<sup>2</sup></b>									
Coal .....	1980	2087	2089	2089	2089	2338	2299	2230	2139
Petroleum .....	66	39	40	40	40	41	41	40	40
Natural Gas .....	376	349	357	362	363	337	378	426	458
Other <sup>3</sup> .....	12	12	12	12	12	12	12	12	12
<b>Total .....</b>	<b>2433</b>	<b>2487</b>	<b>2497</b>	<b>2502</b>	<b>2503</b>	<b>2727</b>	<b>2729</b>	<b>2709</b>	<b>2649</b>
<b>Average Electricity Price (cents per kilowatthour)</b>	<b>9.1</b>	<b>9.3</b>	<b>9.4</b>	<b>9.4</b>	<b>9.5</b>	<b>9.9</b>	<b>10.4</b>	<b>10.7</b>	<b>10.9</b>

<sup>1</sup>Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors. Includes small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid. Excludes off-grid photovoltaics and other generators not connected to the distribution or transmission systems.

<sup>2</sup>Includes electricity-only and combined heat and power plants whose primary business to sell electricity, or electricity and heat, to the public.

<sup>3</sup>Includes emissions from geothermal power and nonbiogenic emissions from municipal solid waste.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2009 National Energy Modeling System runs DECCST09.D121108A, AEO2009.D120908A, FRZCST09.D121108a, and INCCST09.D121208A.

# Results from Side Cases

**Table D8. Key Results for Greenhouse Gas Cases**

Emissions, Prices, and Consumption	2007	2010			2020			2030		
		No GHG Concern	Reference	LW110	No GHG Concern	Reference	LW110	No GHG Concern	Reference	LW110
<b>Greenhouse Gas Emissions</b> (million metric tons carbon dioxide equivalent)										
Energy-related Carbon Dioxide	5990.8	5805.0	5801.4	5699.4	6044.5	5982.3	5436.0	6745.0	6414.4	4614.8
Other Covered Emissions	334.9	334.8	334.8	334.8	376.6	376.7	346.1	432.5	432.6	388.1
<b>Total</b>	<b>6325.7</b>	<b>6139.8</b>	<b>6136.2</b>	<b>6034.2</b>	<b>6421.1</b>	<b>6358.9</b>	<b>5782.2</b>	<b>7177.6</b>	<b>6847.0</b>	<b>5002.9</b>
Total Greenhouse Gas Emissions	7282.3	7120.4	7116.7	7014.7	7546.3	7483.9	6766.8	8501.7	8170.5	6177.9
Emissions Cap Assumed	--	--	--	--	--	--	4924.0	--	--	3860.0
Covered Emissions Net of Offsets	6368.8	6139.8	6136.2	6034.2	6421.1	6358.9	4671.8	7177.6	6847.0	3845.4
Difference (banking)	--	--	--	--	--	--	252.2	--	--	14.6
Emission Allowance Price (2007 dollars per metric ton carbon dioxide equivalent)	--	--	--	--	--	--	36.03	--	--	73.57
<b>Energy Prices (2007 dollars per unit)</b>										
Liquid Fuels (dollars per gallon)										
Transportation										
Motor Gasoline <sup>1</sup>	2.82	2.79	2.84	2.79	3.59	3.60	3.85	3.79	3.88	4.37
Jet Fuel <sup>2</sup>	2.17	2.11	2.16	2.11	2.97	2.99	3.30	3.24	3.32	3.95
Diesel <sup>3</sup>	2.87	2.69	2.75	2.69	3.54	3.57	3.87	3.80	3.92	4.53
Natural Gas (dollars per thousand cubic feet)										
Wellhead Price <sup>4</sup>	6.39	6.02	6.05	5.99	6.57	6.75	6.21	8.02	8.40	7.38
Residential	13.05	12.40	12.43	12.37	12.64	12.85	14.84	14.29	14.71	18.97
Electric Power <sup>5</sup>	7.22	6.74	6.77	6.70	7.15	7.35	9.01	8.47	8.94	12.51
Coal (dollars per million Btu)										
Minemouth <sup>6</sup>	1.27	1.44	1.44	1.43	1.41	1.39	1.38	1.54	1.46	1.38
Electric Power <sup>5</sup>	1.78	1.89	1.89	1.85	1.94	1.92	5.25	2.16	2.04	8.72
Electricity (cents per kilowatthour)	9.1	9.0	9.0	9.0	9.3	9.4	10.2	10.1	10.4	12.7
<b>Energy Consumption</b> (quadrillion Btu)										
Liquid Fuels and Other Petroleum <sup>7</sup>	40.75	37.93	37.89	37.91	38.97	38.93	38.35	41.66	41.60	39.87
Natural Gas	23.70	23.22	23.20	22.98	23.78	24.09	22.88	24.02	25.04	22.45
Coal <sup>8</sup>	22.74	22.90	22.91	21.93	24.80	23.98	20.30	30.62	26.56	16.40
Nuclear Power	8.41	8.45	8.45	8.45	8.77	8.99	9.36	8.58	9.47	12.21
Renewable/Other <sup>9</sup>	6.28	7.40	7.41	8.67	9.46	9.45	11.38	10.87	10.90	15.68
<b>Total</b>	<b>101.89</b>	<b>99.89</b>	<b>99.85</b>	<b>99.95</b>	<b>105.78</b>	<b>105.44</b>	<b>102.29</b>	<b>115.75</b>	<b>113.56</b>	<b>106.59</b>

<sup>1</sup>Sales weighted-average price for all grades. Includes Federal, State and local taxes.

<sup>2</sup>Includes only kerosene type.

<sup>3</sup>Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

<sup>4</sup>Represents lower 48 onshore and offshore supplies.

<sup>5</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>6</sup>Includes reported prices for both open market and captive mines.

<sup>7</sup>Includes petroleum-derived fuels and non-petroleum derived fuels, such as ethanol and biodiesel, and coal-based synthetic liquids. Petroleum coke, which is a solid, is included. Also included are natural gas plant liquids, crude oil consumed as a fuel, and liquid hydrogen.

<sup>8</sup>Excludes coal converted to coal-based synthetic liquids.

<sup>9</sup>Includes grid-connected electricity from landfill gas; municipal waste; wind; photovoltaic and solar thermal sources; and non-electric energy from renewable sources, such as active and passive solar systems. Includes net electricity imports.

-- = Not applicable.

GHG = Greenhouse gas.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2009 National Energy Modeling System runs NORSEK2009.D120908A, AEO2009.D120908A, and CAP2009.D010909A.

**Table D9. Key Results for Greenhouse Gas Cases**  
(Gigawatts, Unless Otherwise Noted)

Net Summer Capacity, Generation Consumption, and Emissions	2007	2010			2020			2030		
		No GHG Concern	Reference	LW110	No GHG Concern	Reference	LW110	No GHG Concern	Reference	LW110
<b>Capacity</b>										
Pulverized Coal	310.7	320.5	320.5	320.4	333.6	324.0	301.2	380.5	345.6	216.7
Coal Gasification Combined-Cycle	0.5	0.5	0.5	0.5	3.4	3.0	14.5	17.2	6.9	100.5
Conventional Natural Gas Combined-Cycle	181.0	194.8	194.8	194.8	196.3	196.4	196.6	196.6	196.5	196.8
Advanced Natural Gas Combined-Cycle	0.0	0.0	0.0	0.0	1.8	6.3	6.4	22.2	41.1	36.9
Conventional Combustion Turbine	133.3	140.7	140.6	138.9	137.3	138.5	134.5	138.3	140.9	134.4
Advanced Combustion Turbine	0.0	1.5	1.5	1.5	17.4	17.3	4.4	55.7	60.1	13.9
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuclear	100.5	101.2	101.2	101.2	105.1	108.4	113.0	101.4	112.6	146.3
Oil and Natural Gas Steam	118.8	118.4	118.4	118.4	102.6	101.8	94.9	100.6	100.5	91.7
Renewable Sources/Pumped Storage	122.9	136.8	137.0	145.4	143.4	143.6	154.4	156.4	160.1	225.7
Distributed Generation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0
Combined Heat and Power <sup>1</sup>	27.8	32.5	32.6	32.4	49.1	47.3	46.6	75.4	62.6	61.9
<b>Total</b>	<b>995.6</b>	<b>1046.9</b>	<b>1047.1</b>	<b>1053.4</b>	<b>1090.0</b>	<b>1086.6</b>	<b>1066.4</b>	<b>1244.5</b>	<b>1227.2</b>	<b>1224.8</b>
<b>Cumulative Additions</b>										
Pulverized Coal	0.0	11.3	11.3	11.3	26.3	16.6	28.1	73.2	38.2	114.1
Coal Gasification Combined-Cycle	0.0	0.0	0.0	0.0	1.9	1.4	1.4	15.7	5.4	1.4
Conventional Natural Gas Combined-Cycle	0.0	13.8	13.8	13.8	15.3	15.4	17.7	15.6	15.5	33.1
Advanced Natural Gas Combined-Cycle	0.0	0.0	0.0	0.0	1.8	6.3	4.3	22.2	41.1	19.5
Conventional Combustion Turbine	0.0	7.7	7.6	5.9	9.0	10.5	5.9	10.0	12.9	6.0
Advanced Combustion Turbine	0.0	1.5	1.5	1.5	17.4	17.3	4.4	55.7	60.1	13.9
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuclear	0.0	0.0	0.0	0.0	1.2	4.5	9.1	1.9	13.1	46.8
Oil and Natural Gas Steam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewable Sources	0.0	13.9	14.1	22.5	20.7	20.9	31.7	33.7	37.4	103.0
Distributed Generation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0
Combined Heat and Power <sup>1</sup>	0.0	4.7	4.8	4.6	21.3	19.5	18.8	47.6	34.8	34.1
<b>Total</b>	<b>0.0</b>	<b>53.0</b>	<b>53.1</b>	<b>59.6</b>	<b>114.7</b>	<b>112.4</b>	<b>121.4</b>	<b>275.7</b>	<b>258.7</b>	<b>372.0</b>
<b>Cumulative Retirements</b>	<b>0.0</b>	<b>2.3</b>	<b>2.3</b>	<b>2.4</b>	<b>23.5</b>	<b>24.5</b>	<b>53.7</b>	<b>29.9</b>	<b>30.2</b>	<b>145.9</b>
<b>Generation by Fuel (billion kilowatthours)</b>										
Coal	2002	2037	2038	1944	2192	2125	1822	2633	2367	1600
Petroleum	61	43	43	43	45	45	42	48	46	40
Natural Gas	814	741	737	711	755	801	735	724	880	675
Nuclear Power	806	809	809	809	840	862	897	822	907	1170
Renewable Sources/Pumped Storage	319	415	415	538	551	549	715	613	615	927
Distributed Generation	0	0	0	0	0	0	0	0	0	0
Combined Heat and Power <sup>1</sup>	153	174	174	173	249	237	231	432	337	326
<b>Total</b>	<b>4155</b>	<b>4219</b>	<b>4217</b>	<b>4218</b>	<b>4632</b>	<b>4618</b>	<b>4442</b>	<b>5272</b>	<b>5153</b>	<b>4737</b>
<b>Fuel Consumption by the Electric Power Sector (quadrillion Btu)<sup>2</sup></b>										
Coal	20.84	21.03	21.03	20.06	22.59	22.01	18.58	26.35	24.25	14.82
Petroleum	0.67	0.49	0.49	0.49	0.51	0.51	0.48	0.54	0.53	0.46
Natural Gas	7.06	6.45	6.42	6.22	6.41	6.73	6.25	6.05	7.12	5.74
Nuclear Power	8.41	8.45	8.45	8.45	8.77	8.99	9.36	8.58	9.47	12.21
Renewable Sources	3.45	4.41	4.42	5.68	5.80	5.79	7.51	6.47	6.43	10.28
<b>Total</b>	<b>40.56</b>	<b>40.95</b>	<b>40.94</b>	<b>41.02</b>	<b>44.22</b>	<b>44.16</b>	<b>42.31</b>	<b>48.11</b>	<b>47.93</b>	<b>43.63</b>
<b>Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)<sup>2</sup></b>										
Coal	1980	1994	1995	1903	2142	2089	1685	2494	2299	868
Petroleum	66	38	38	38	40	40	37	42	41	36
Natural Gas	376	342	341	330	340	357	325	321	378	260
Other <sup>3</sup>	12	12	12	12	12	12	12	12	12	13
<b>Total</b>	<b>2433</b>	<b>2386</b>	<b>2385</b>	<b>2282</b>	<b>2534</b>	<b>2497</b>	<b>2059</b>	<b>2869</b>	<b>2729</b>	<b>1176</b>

<sup>1</sup>Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors. Includes small on-site generating systems in the residential, commercial, and industrial sectors used primarily for on-site generation, but which may also sell some power to the grid. Excludes off-grid photovoltaics and other generators not connected to the distribution or transmission systems.

<sup>2</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>3</sup>Includes emissions from geothermal power and nonbiogenic emissions from municipal solid waste.

GHG = Greenhouse gas.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2009 National Energy Modeling System runs NORSK2009.D120908A, AEO2009.D120908A, and CAP2009.D010909A.

# Results from Side Cases

**Table D10. Key Results for Renewable Technology Cases**

Capacity, Generation, and Emissions	2007	2010			2020			2030		
		High Renewable Cost	Reference	Low Renewable Cost	High Renewable Cost	Reference	Low Renewable Cost	High Renewable Cost	Reference	Low Renewable Cost
<b>Net Summer Capacity (gigawatts)</b>										
<b>Electric Power Sector<sup>1</sup></b>										
Conventional Hydropower	76.72	76.73	76.73	76.73	77.02	77.02	77.16	77.20	77.58	78.54
Geothermal <sup>2</sup>	2.36	2.53	2.53	2.53	2.64	2.66	2.64	2.64	3.00	3.03
Municipal Waste <sup>3</sup>	3.43	3.97	4.04	4.04	4.06	4.12	4.07	4.15	4.15	4.07
Wood and Other Biomass <sup>4</sup>	2.18	2.20	2.20	2.20	3.97	4.22	5.58	5.00	8.86	27.00
Solar Thermal	0.53	0.54	0.54	0.54	0.81	0.81	0.81	0.86	0.86	0.86
Solar Photovoltaic	0.04	0.06	0.06	0.06	0.21	0.21	0.21	0.38	0.38	0.38
Wind	16.19	29.43	29.46	29.46	33.68	33.07	33.05	41.34	43.80	60.75
<b>Total</b>	<b>101.46</b>	<b>115.46</b>	<b>115.57</b>	<b>115.56</b>	<b>122.39</b>	<b>122.12</b>	<b>123.51</b>	<b>131.57</b>	<b>138.63</b>	<b>174.63</b>
<b>End-Use Sector<sup>5</sup></b>										
Conventional Hydropower	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal Waste <sup>6</sup>	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Wood and Other Biomass	4.64	4.65	4.65	4.65	7.08	7.28	7.56	12.74	13.23	14.03
Solar Photovoltaic	0.43	1.73	1.73	1.74	8.81	9.72	12.45	9.25	11.78	17.50
Wind	0.04	0.04	0.04	0.04	0.07	0.09	0.12	0.24	0.31	0.70
<b>Total</b>	<b>6.15</b>	<b>7.45</b>	<b>7.45</b>	<b>7.46</b>	<b>17.00</b>	<b>18.12</b>	<b>21.16</b>	<b>23.27</b>	<b>26.35</b>	<b>33.26</b>
<b>Generation (billion kilowatthours)</b>										
<b>Electric Power Sector<sup>1</sup></b>										
Coal	2002	2040	2038	2035	2129	2125	2121	2374	2367	2258
Petroleum	61	43	43	43	45	45	45	47	46	46
Natural Gas	814	738	737	737	801	801	797	883	880	871
<b>Total Fossil</b>	<b>2877</b>	<b>2820</b>	<b>2818</b>	<b>2816</b>	<b>2975</b>	<b>2970</b>	<b>2963</b>	<b>3304</b>	<b>3293</b>	<b>3175</b>
Conventional Hydropower	245.86	268.05	268.05	268.05	296.37	296.29	296.96	297.40	298.97	303.84
Geothermal	14.84	17.78	17.78	17.78	18.91	19.11	18.91	18.94	21.80	22.06
Municipal Waste <sup>7</sup>	14.42	18.71	19.30	19.30	19.45	19.95	19.50	20.15	20.17	19.50
Wood and Other Biomass <sup>4</sup>	10.38	26.35	28.07	30.80	113.21	117.82	130.90	131.41	140.44	261.52
Dedicated Plants	8.41	12.88	12.85	12.87	25.96	28.74	39.05	34.57	62.27	193.82
Cofiring	1.97	13.47	15.22	17.93	87.25	89.08	91.85	96.85	78.17	67.70
Solar Thermal	0.60	0.99	0.99	0.99	1.88	1.88	1.88	2.02	2.02	2.02
Solar Photovoltaic	0.01	0.14	0.14	0.14	0.49	0.49	0.49	0.94	0.94	0.94
Wind	32.14	80.39	80.50	80.49	94.62	92.45	93.20	120.48	129.38	188.34
<b>Total Renewable</b>	<b>318.25</b>	<b>412.42</b>	<b>414.82</b>	<b>417.54</b>	<b>544.94</b>	<b>547.99</b>	<b>561.84</b>	<b>591.34</b>	<b>613.71</b>	<b>798.22</b>
<b>End-Use Sector<sup>5</sup></b>										
Total Fossil	101	110	110	110	141	141	140	195	194	192
Conventional Hydropower <sup>8</sup>	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal Waste <sup>6</sup>	2.01	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
Wood and Other Biomass	28.13	28.19	28.20	28.22	46.00	47.17	48.82	87.93	90.81	95.83
Solar Photovoltaic	0.68	2.77	2.78	2.79	14.15	16.02	20.34	14.82	19.49	28.92
Wind	0.06	0.06	0.06	0.06	0.10	0.12	0.17	0.35	0.45	1.00
<b>Total Renewable</b>	<b>33.33</b>	<b>36.22</b>	<b>36.24</b>	<b>36.27</b>	<b>65.46</b>	<b>68.51</b>	<b>74.54</b>	<b>108.30</b>	<b>115.95</b>	<b>130.95</b>
<b>Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)<sup>1</sup></b>										
Coal	1979.7	1996.7	1995.0	1992.3	2091.9	2088.5	2083.4	2300.5	2299.0	2209.9
Petroleum	65.7	38.0	38.0	38.0	39.6	39.5	39.5	41.1	40.9	40.4
Natural Gas	376.5	341.2	340.7	341.0	357.1	356.9	355.4	378.3	377.9	375.0
Other <sup>9</sup>	11.6	11.6	11.6	11.6	11.7	11.7	11.7	11.7	11.7	11.7
<b>Total</b>	<b>2433.4</b>	<b>2387.5</b>	<b>2385.4</b>	<b>2382.9</b>	<b>2500.2</b>	<b>2496.6</b>	<b>2489.9</b>	<b>2731.5</b>	<b>2729.5</b>	<b>2637.1</b>

<sup>1</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>2</sup>Includes hydrothermal resources only (hot water and steam).

<sup>3</sup>Includes all municipal waste, landfill gas, and municipal sewage sludge. Incremental growth is assumed to be for landfill gas facilities. All municipal waste is included, although a portion of the municipal waste stream contains petroleum-derived plastics and other non-renewable sources.

<sup>4</sup>Includes projections for energy crops after 2010.

<sup>5</sup>Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors; and small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid. Excludes off-grid photovoltaics and other generators not connected to the distribution or transmission systems.

<sup>6</sup>Includes municipal waste, landfill gas, and municipal sewage sludge. All municipal waste is included, although a portion of the municipal waste stream contains petroleum-derived plastics and other non-renewable sources.

<sup>7</sup>Includes biogenic municipal waste, landfill gas, and municipal sewage sludge. Incremental growth is assumed to be for landfill gas facilities.

<sup>8</sup>Represents own-use industrial hydroelectric power.

<sup>9</sup>Includes emissions from geothermal power and nonbiogenic emissions from municipal solid waste.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2009 National Energy Modeling System runs HIRENCST09.D011309B, AEO2009.D120908A, and LORENCST09.D011509B.

**Table D11. Key Results for Production Tax Credit Case**

Capacity, Generation, and Emissions	2007	2010		2020		2030	
		Reference	Production Tax Credit Extension	Reference	Production Tax Credit Extension	Reference	Production Tax Credit Extension
<b>Net Summer Capacity (gigawatts)</b>							
<b>Electric Power Sector<sup>1</sup></b>							
Conventional Hydropower	76.72	76.73	76.73	77.02	77.03	77.58	77.47
Geothermal <sup>2</sup>	2.36	2.53	2.53	2.66	2.64	3.00	2.72
Municipal Waste <sup>3</sup>	3.43	4.04	3.81	4.12	4.09	4.15	4.14
Wood and Other Biomass <sup>4</sup>	2.18	2.20	2.20	4.22	4.67	8.86	9.18
Solar Thermal	0.53	0.54	0.54	0.81	0.81	0.86	0.86
Solar Photovoltaic	0.04	0.06	0.06	0.21	0.21	0.38	0.38
Wind	16.19	29.46	33.33	33.07	49.65	43.80	52.08
<b>Total</b>	<b>101.46</b>	<b>115.57</b>	<b>119.20</b>	<b>122.12</b>	<b>139.09</b>	<b>138.63</b>	<b>146.83</b>
<b>End-Use Sector<sup>5</sup></b>							
Conventional Hydropower	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal Waste <sup>6</sup>	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Wood and Other Biomass	4.64	4.65	4.65	7.28	7.28	13.23	13.23
Solar Photovoltaic	0.43	1.73	1.73	9.72	9.72	11.78	11.76
Wind	0.04	0.04	0.04	0.09	0.09	0.31	0.31
<b>Total</b>	<b>6.15</b>	<b>7.45</b>	<b>7.45</b>	<b>18.12</b>	<b>18.12</b>	<b>26.35</b>	<b>26.33</b>
<b>Generation (billion kilowatt-hours)</b>							
<b>Electric Power Sector<sup>1</sup></b>							
Coal	2002	2038	2039	2125	2137	2367	2360
Petroleum	61	43	43	45	45	46	46
Natural Gas	814	737	727	801	767	880	876
<b>Total Fossil</b>	<b>2877</b>	<b>2818</b>	<b>2809</b>	<b>2970</b>	<b>2948</b>	<b>3293</b>	<b>3283</b>
Conventional Hydropower	245.86	268.05	268.05	296.29	296.26	298.97	298.29
Geothermal	14.84	17.78	17.78	19.11	18.91	21.80	19.58
Municipal Waste <sup>7</sup>	14.42	19.30	17.48	19.95	19.65	20.17	20.11
Wood and Other Biomass <sup>4</sup>	10.38	28.07	26.51	117.82	97.83	140.44	138.81
Dedicated Plants	8.41	12.85	12.81	28.74	31.42	62.27	64.28
Cofiring	1.97	15.22	13.70	89.08	66.41	78.17	74.54
Solar Thermal	0.60	0.99	0.99	1.88	1.88	2.02	2.02
Solar Photovoltaic	0.01	0.14	0.14	0.49	0.49	0.94	0.94
Wind	32.14	80.50	93.73	92.45	149.09	129.38	157.85
<b>Total Renewable</b>	<b>318.25</b>	<b>414.82</b>	<b>424.68</b>	<b>547.99</b>	<b>584.11</b>	<b>613.71</b>	<b>637.60</b>
<b>End-Use Sector<sup>5</sup></b>							
Total Fossil	101	110	110	141	141	194	193
Conventional Hydropower <sup>8</sup>	2.45	2.45	2.45	2.45	2.45	2.45	2.45
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal Waste <sup>6</sup>	2.01	2.75	2.75	2.75	2.75	2.75	2.75
Wood and Other Biomass	28.13	28.20	28.20	47.17	47.18	90.81	90.86
Solar Photovoltaic	0.68	2.78	2.78	16.02	16.01	19.49	19.46
Wind	0.06	0.06	0.06	0.12	0.12	0.45	0.44
<b>Total Renewable</b>	<b>33.33</b>	<b>36.24</b>	<b>36.24</b>	<b>68.51</b>	<b>68.52</b>	<b>115.95</b>	<b>115.96</b>
<b>Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)<sup>1</sup></b>							
Coal	1979.7	1995.0	1995.4	2088.5	2098.8	2299.0	2292.5
Petroleum	65.7	38.0	38.0	39.5	39.4	40.9	40.8
Natural Gas	376.5	340.7	336.9	356.9	343.3	377.9	376.2
Other <sup>9</sup>	11.6	11.6	11.6	11.7	11.7	11.7	11.7
<b>Total</b>	<b>2433.4</b>	<b>2385.4</b>	<b>2381.9</b>	<b>2496.6</b>	<b>2493.2</b>	<b>2729.5</b>	<b>2721.1</b>

<sup>1</sup>Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>2</sup>Includes hydrothermal resources only (hot water and steam).

<sup>3</sup>Includes all municipal waste, landfill gas, and municipal sewage sludge. Incremental growth is assumed to be for landfill gas facilities. All municipal waste is included, although a portion of the municipal waste stream contains petroleum-derived plastics and other non-renewable sources.

<sup>4</sup>Includes projections for energy crops after 2010.

<sup>5</sup>Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors; and small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid. Excludes off-grid photovoltaics and other generators not connected to the distribution or transmission systems.

<sup>6</sup>Includes municipal waste, landfill gas, and municipal sewage sludge. All municipal waste is included, although a portion of the municipal waste stream contains petroleum-derived plastics and other non-renewable sources.

<sup>7</sup>Includes biogenic municipal waste, landfill gas, and municipal sewage sludge. Incremental growth is assumed to be for landfill gas facilities.

<sup>8</sup>Represents own-use industrial hydroelectric power.

<sup>9</sup>Includes emissions from geothermal power and nonbiogenic emissions from municipal solid waste.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2009 National Energy Modeling System runs AEO2009.D120908A, and PTC09.D010709A.

## Results from Side Cases

**Table D12. Natural Gas Supply and Disposition, Oil and Gas Technological Progress Cases**  
(Trillion Cubic Feet per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	2010			2020			2030		
		Slow Technology	Reference	Rapid Technology	Slow Technology	Reference	Rapid Technology	Slow Technology	Reference	Rapid Technology
<b>Natural Gas Prices</b>										
<b>(2007 dollars per million Btu)</b>										
Henry Hub Spot Price .....	6.96	6.68	6.66	6.57	7.96	7.43	7.04	10.27	9.25	8.60
Average Lower 48 Wellhead Price <sup>1</sup> ..	6.22	5.90	5.88	5.81	7.03	6.56	6.22	9.07	8.17	7.59
<b>(2007 dollars per thousand cubic feet)</b>										
Average Lower 48 Wellhead Price <sup>1</sup> ..	6.39	6.06	6.05	5.97	7.23	6.75	6.39	9.33	8.40	7.81
<b>Dry Gas Production<sup>2</sup></b> .....	<b>19.30</b>	<b>20.36</b>	<b>20.38</b>	<b>20.41</b>	<b>20.76</b>	<b>21.48</b>	<b>21.94</b>	<b>22.06</b>	<b>23.60</b>	<b>25.03</b>
Lower 48 Onshore .....	15.91	16.74	16.75	16.75	15.63	16.11	16.41	15.22	16.76	17.91
Associated-Dissolved .....	1.39	1.41	1.41	1.41	1.32	1.37	1.40	1.22	1.32	1.35
Non-Associated .....	14.51	15.33	15.34	15.34	14.30	14.74	15.00	14.00	15.44	16.56
Conventional .....	5.36	4.72	4.70	4.69	3.46	3.36	3.30	2.31	2.18	2.15
Unconventional .....	9.15	10.62	10.64	10.65	10.84	11.38	11.70	11.70	13.26	14.41
Gas Shale .....	1.17	2.26	2.31	2.31	2.54	2.97	3.05	3.36	4.15	4.48
Coalbed Methane .....	1.84	1.80	1.79	1.80	1.73	1.78	1.88	1.76	2.01	2.23
Tight Gas .....	6.15	6.56	6.54	6.54	6.57	6.62	6.78	6.57	7.10	7.70
Lower 48 Offshore .....	2.97	3.25	3.26	3.28	3.99	4.23	4.39	4.87	4.88	5.15
Associated-Dissolved .....	0.62	0.71	0.72	0.72	0.98	1.00	1.06	1.06	1.16	1.23
Non-Associated .....	2.35	2.53	2.55	2.56	3.01	3.23	3.34	3.81	3.72	3.92
Alaska .....	0.42	0.37	0.37	0.37	1.14	1.14	1.14	1.96	1.96	1.96
Supplemental Natural Gas <sup>3</sup> .....	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
<b>Net Imports</b> .....	<b>3.79</b>	<b>2.51</b>	<b>2.50</b>	<b>2.49</b>	<b>2.01</b>	<b>1.86</b>	<b>1.83</b>	<b>0.91</b>	<b>0.66</b>	<b>0.84</b>
Pipeline <sup>4</sup> .....	3.06	2.03	2.02	2.02	0.56	0.48	0.50	-0.01	-0.18	0.03
Liquefied Natural Gas .....	0.73	0.48	0.47	0.47	1.46	1.38	1.33	0.92	0.85	0.80
<b>Total Supply</b> .....	<b>23.15</b>	<b>22.93</b>	<b>22.94</b>	<b>22.96</b>	<b>22.84</b>	<b>23.40</b>	<b>23.84</b>	<b>23.03</b>	<b>24.33</b>	<b>25.93</b>
<b>Consumption by Sector</b>										
Residential .....	4.72	4.78	4.79	4.79	4.92	4.96	4.99	4.86	4.93	4.97
Commercial .....	3.01	3.05	3.06	3.06	3.21	3.25	3.28	3.37	3.44	3.49
Industrial <sup>5</sup> .....	6.63	6.56	6.59	6.58	6.58	6.65	6.69	6.67	6.85	6.94
Electric Power <sup>6</sup> .....	6.87	6.26	6.25	6.27	6.16	6.54	6.85	6.04	6.93	8.25
Transportation <sup>7</sup> .....	0.02	0.03	0.03	0.03	0.07	0.07	0.07	0.09	0.09	0.09
Pipeline Fuel .....	0.62	0.62	0.62	0.62	0.66	0.67	0.68	0.67	0.70	0.73
Lease and Plant Fuel <sup>8</sup> .....	1.17	1.24	1.24	1.24	1.27	1.29	1.32	1.36	1.43	1.49
<b>Total</b> .....	<b>23.05</b>	<b>22.55</b>	<b>22.57</b>	<b>22.59</b>	<b>22.87</b>	<b>23.43</b>	<b>23.87</b>	<b>23.06</b>	<b>24.36</b>	<b>25.96</b>
<b>Discrepancy<sup>9</sup></b> .....	<b>0.09</b>	<b>0.38</b>	<b>0.37</b>	<b>0.38</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>
<b>Lower 48 End of Year Reserves</b> .....	<b>225.18</b>	<b>229.03</b>	<b>230.11</b>	<b>231.42</b>	<b>200.96</b>	<b>213.14</b>	<b>222.92</b>	<b>184.54</b>	<b>211.98</b>	<b>233.91</b>

<sup>1</sup>Represents lower 48 onshore and offshore supplies.

<sup>2</sup>Marketed production (wet) minus extraction losses.

<sup>3</sup>Synthetic natural gas, propane air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas commingled and distributed with natural gas.

<sup>4</sup>Includes any natural gas regasified in the Bahamas and transported via pipeline to Florida.

<sup>5</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>6</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>7</sup>Compressed natural gas used as a vehicle fuel.

<sup>8</sup>Represents natural gas used in field gathering and processing plant machinery.

<sup>9</sup>Balancing item. Natural gas lost as a result of converting flow data measured at varying temperatures and pressures to a standard temperature and pressure and the merger of different data reporting systems which vary in scope, format, definition, and respondent type. In addition, 2007 values include net storage injections.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2007 consumption based on: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). Projections: EIA, AEO2009 National Energy Modeling System runs OGLTEC09.D121408A, AEO2009.D120908A, and OGHTEC09.D121408A.

## Results from Side Cases

**Table D13. Liquid Fuels Supply and Disposition, Oil and Gas Technological Progress Cases**  
(Million Barrels per Day, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	2010			2020			2030		
		Slow Technology	Reference	Rapid Technology	Slow Technology	Reference	Rapid Technology	Slow Technology	Reference	Rapid Technology
<b>Prices (2007 dollars per barrel)</b>										
Imported Low Sulfur Light Crude Oil <sup>1</sup>	72.33	78.19	80.16	78.00	115.61	115.45	114.58	132.28	130.43	129.33
Imported Crude Oil <sup>1</sup>	63.83	75.49	77.56	75.23	112.58	112.05	109.31	126.43	124.60	119.51
<b>Crude Oil Supply</b>										
Domestic Crude Oil Production <sup>2</sup>	5.07	5.58	5.62	5.65	6.12	6.48	6.73	6.65	7.37	7.71
Alaska	0.72	0.69	0.69	0.69	0.71	0.72	0.72	0.57	0.57	0.58
Lower 48 Onshore	2.91	2.90	2.92	2.94	3.16	3.37	3.52	3.47	4.06	4.18
Lower 48 Offshore	1.44	1.99	2.01	2.02	2.24	2.39	2.49	2.61	2.74	2.94
Net Crude Oil Imports	10.00	8.14	8.10	8.07	7.68	7.29	7.17	7.60	6.95	6.64
Other Crude Oil Supply	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total Crude Oil Supply</b>	<b>15.16</b>	<b>13.72</b>	<b>13.72</b>	<b>13.73</b>	<b>13.80</b>	<b>13.77</b>	<b>13.90</b>	<b>14.26</b>	<b>14.32</b>	<b>14.34</b>
<b>Other Petroleum Supply</b>										
Natural Gas Plant Liquids	1.78	1.91	1.91	1.91	1.86	1.91	1.94	1.82	1.92	2.03
Net Petroleum Product Imports <sup>3</sup>	2.09	1.68	1.66	1.67	1.52	1.49	1.42	1.40	1.40	1.37
Refinery Processing Gain <sup>4</sup>	1.00	0.98	0.97	0.98	0.93	0.93	0.93	0.89	0.86	0.85
Other Supply <sup>5</sup>	0.74	1.22	1.22	1.22	1.97	1.98	1.98	3.10	3.08	3.07
<b>Total Primary Supply<sup>6</sup></b>	<b>20.77</b>	<b>19.50</b>	<b>19.48</b>	<b>19.51</b>	<b>20.07</b>	<b>20.08</b>	<b>20.16</b>	<b>21.46</b>	<b>21.59</b>	<b>21.67</b>
<b>Refined Petroleum Products Supplied</b>										
Residential and Commercial	1.11	1.05	1.05	1.05	0.99	0.99	1.00	0.97	0.97	0.98
Industrial <sup>7</sup>	5.26	4.47	4.46	4.47	4.34	4.34	4.37	4.29	4.28	4.31
Transportation	14.25	13.97	13.96	13.98	14.64	14.65	14.70	16.08	16.18	16.21
Electric Power <sup>8</sup>	0.30	0.22	0.22	0.22	0.23	0.23	0.23	0.23	0.23	0.23
<b>Total</b>	<b>20.65</b>	<b>19.71</b>	<b>19.69</b>	<b>19.71</b>	<b>20.20</b>	<b>20.21</b>	<b>20.28</b>	<b>21.57</b>	<b>21.67</b>	<b>21.73</b>
<b>Discrepancy<sup>9</sup></b>	<b>0.12</b>	<b>-0.21</b>	<b>-0.20</b>	<b>-0.21</b>	<b>-0.13</b>	<b>-0.13</b>	<b>-0.12</b>	<b>-0.11</b>	<b>-0.08</b>	<b>-0.06</b>
<b>Lower 48 End of Year Reserves</b>										
(billion barrels) <sup>2</sup>	18.62	18.96	19.21	19.41	21.16	22.50	23.48	22.70	25.38	26.45

<sup>1</sup>Weighted average price delivered to U.S. refiners.

<sup>2</sup>Includes lease condensate.

<sup>3</sup>Includes net imports of finished petroleum products, unfinished oils, other hydrocarbons, alcohols, ethers, and blending components.

<sup>4</sup>The volumetric amount by which total output is greater than input due to the processing of crude oil into products which, in total, have a lower specific gravity than the crude oil processed.

<sup>5</sup>Includes ethanol (including imports), alcohols, ethers, petroleum product stock withdrawals, domestic sources of blending components, other hydrocarbons, biodiesel (including imports), natural gas converted to liquid fuel, coal converted to liquid fuel, and biomass converted to liquid fuel.

<sup>6</sup>Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.

<sup>7</sup>Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.

<sup>8</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>9</sup>Balancing item. Includes unaccounted for supply, losses and gains.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 product supplied data and imported crude oil price based on: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2007 imported low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2007 data: EIA, *Petroleum Supply Annual 2007*, DOE/EIA-0340(2007)/1 (Washington, DC, July 2008). Projections: EIA, AEO2009 National Energy Modeling System runs OGLTEC09.D121408A, AEO2009.D120908A, and OGHTEC09.D121408A.

## Results from Side Cases

**Table D14. Natural Gas Supply and Disposition, OCS Limited Case**  
(Trillion Cubic Feet per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	2010		2020		2030	
		Reference	OCS Limited	Reference	OCS Limited	Reference	OCS Limited
<b>Natural Gas Prices</b>							
<b>(2007 dollars per million Btu)</b>							
Henry Hub Spot Price .....	6.96	6.66	6.62	7.43	7.52	9.25	9.48
Average Lower 48 Wellhead Price <sup>1</sup> .....	6.22	5.88	5.85	6.56	6.64	8.17	8.38
<b>(2007 dollars per thousand cubic feet)</b>							
Average Lower 48 Wellhead Price <sup>1</sup> .....	6.39	6.05	6.01	6.75	6.83	8.40	8.61
<b>Dry Gas Production<sup>2</sup></b> .....	<b>19.30</b>	<b>20.38</b>	<b>20.39</b>	<b>21.48</b>	<b>21.27</b>	<b>23.60</b>	<b>23.00</b>
Lower 48 Onshore .....	15.91	16.75	16.76	16.11	16.14	16.76	16.93
Associated-Dissolved .....	1.39	1.41	1.41	1.37	1.37	1.32	1.33
Non-Associated .....	14.51	15.34	15.35	14.74	14.77	15.44	15.60
Conventional .....	5.36	4.70	4.70	3.36	3.38	2.18	2.25
Unconventional .....	9.15	10.64	10.64	11.38	11.39	13.26	13.35
Gas Shale .....	1.17	2.31	2.31	2.97	2.97	4.15	4.22
Coalbed Methane .....	1.84	1.79	1.80	1.78	1.79	2.01	2.02
Tight Gas .....	6.15	6.54	6.54	6.62	6.63	7.10	7.11
Lower 48 Offshore .....	2.97	3.26	3.26	4.23	3.99	4.88	4.11
Associated-Dissolved .....	0.62	0.72	0.72	1.00	0.95	1.16	0.93
Non-Associated .....	2.35	2.55	2.55	3.23	3.04	3.72	3.18
Alaska .....	0.42	0.37	0.37	1.14	1.14	1.96	1.96
Supplemental Natural Gas <sup>3</sup> .....	0.06	0.06	0.06	0.06	0.06	0.06	0.06
<b>Net Imports</b> .....	<b>3.79</b>	<b>2.50</b>	<b>2.50</b>	<b>1.86</b>	<b>1.94</b>	<b>0.66</b>	<b>0.90</b>
Pipeline <sup>4</sup> .....	3.06	2.02	2.02	0.48	0.55	-0.18	0.04
Liquefied Natural Gas .....	0.73	0.47	0.47	1.38	1.40	0.85	0.86
<b>Total Supply</b> .....	<b>23.15</b>	<b>22.94</b>	<b>22.95</b>	<b>23.40</b>	<b>23.28</b>	<b>24.33</b>	<b>23.97</b>
<b>Consumption by Sector</b>							
Residential .....	4.72	4.79	4.79	4.96	4.95	4.93	4.91
Commercial .....	3.01	3.06	3.06	3.25	3.25	3.44	3.42
Industrial <sup>5</sup> .....	6.63	6.59	6.57	6.65	6.63	6.85	6.76
Electric Power <sup>6</sup> .....	6.87	6.25	6.27	6.54	6.47	6.93	6.74
Transportation <sup>7</sup> .....	0.02	0.03	0.03	0.07	0.07	0.09	0.09
Pipeline Fuel .....	0.62	0.62	0.62	0.67	0.67	0.70	0.71
Lease and Plant Fuel <sup>8</sup> .....	1.17	1.24	1.24	1.29	1.28	1.43	1.37
<b>Total</b> .....	<b>23.05</b>	<b>22.57</b>	<b>22.57</b>	<b>23.43</b>	<b>23.31</b>	<b>24.36</b>	<b>24.00</b>
<b>Discrepancy<sup>9</sup></b> .....	<b>0.09</b>	<b>0.37</b>	<b>0.38</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>
<b>Lower 48 End of Year Reserves</b> .....	<b>225.18</b>	<b>230.11</b>	<b>230.00</b>	<b>213.14</b>	<b>211.41</b>	<b>211.98</b>	<b>209.17</b>

<sup>1</sup>Represents lower 48 onshore and offshore supplies.

<sup>2</sup>Marketed production (wet) minus extraction losses.

<sup>3</sup>Synthetic natural gas, propane air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas commingled and distributed with natural gas.

<sup>4</sup>Includes any natural gas regasified in the Bahamas and transported via pipeline to Florida.

<sup>5</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>6</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>7</sup>Compressed natural gas used as a vehicle fuel.

<sup>8</sup>Represents natural gas used in field gathering and processing plant machinery.

<sup>9</sup>Balancing item. Natural gas lost as a result of converting flow data measured at varying temperatures and pressures to a standard temperature and pressure and the merger of different data reporting systems which vary in scope, format, definition, and respondent type. In addition, 2007 values include net storage injections.

OCS = Outer continental shelf.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2007 consumption based on: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). Projections: EIA, AEO2009 National Energy Modeling System runs AEO2009.D120908A and OCSLIMITED.D120908A.

## Results from Side Cases

**Table D15. Liquid Fuels Supply and Disposition, OCS Limited Case**  
(Million Barrels per Day, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	2010		2020		2030	
		Reference	OCS Limited	Reference	OCS Limited	Reference	OCS Limited
<b>Prices (2007 dollars per barrel)</b>							
Imported Low Sulfur Light Crude Oil <sup>1</sup> .....	72.33	80.16	78.10	115.45	115.56	130.43	131.76
Imported Crude Oil <sup>1</sup> .....	63.83	77.56	75.40	112.05	112.90	124.60	126.08
<b>Crude Oil Supply</b>							
Domestic Crude Oil Production <sup>2</sup> .....	5.07	5.62	5.61	6.48	6.21	7.37	6.83
Alaska .....	0.72	0.69	0.69	0.72	0.72	0.57	0.58
Lower 48 Onshore .....	2.91	2.92	2.92	3.37	3.36	4.06	4.07
Lower 48 Offshore .....	1.44	2.01	2.01	2.39	2.12	2.74	2.17
Net Crude Oil Imports .....	10.00	8.10	8.11	7.29	7.58	6.95	7.44
Other Crude Oil Supply .....	0.09	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total Crude Oil Supply</b> .....	<b>15.16</b>	<b>13.72</b>	<b>13.72</b>	<b>13.77</b>	<b>13.78</b>	<b>14.32</b>	<b>14.27</b>
<b>Other Petroleum Supply</b>							
Natural Gas Plant Liquids .....	1.78	1.91	1.91	1.91	1.90	1.92	1.92
Net Petroleum Product Imports <sup>3</sup> .....	2.09	1.66	1.67	1.49	1.51	1.40	1.40
Refinery Processing Gain <sup>4</sup> .....	1.00	0.97	0.98	0.93	0.93	0.86	0.86
Other Supply <sup>5</sup> .....	0.74	1.22	1.22	1.98	1.97	3.08	3.07
<b>Total Primary Supply<sup>6</sup></b> .....	<b>20.77</b>	<b>19.48</b>	<b>19.50</b>	<b>20.08</b>	<b>20.09</b>	<b>21.59</b>	<b>21.51</b>
<b>Refined Petroleum Products Supplied</b>							
Residential and Commercial .....	1.11	1.05	1.05	0.99	0.99	0.97	0.97
Industrial <sup>7</sup> .....	5.26	4.46	4.47	4.34	4.34	4.28	4.29
Transportation .....	14.25	13.96	13.97	14.65	14.66	16.18	16.10
Electric Power <sup>8</sup> .....	0.30	0.22	0.22	0.23	0.23	0.23	0.23
<b>Total</b> .....	<b>20.65</b>	<b>19.69</b>	<b>19.71</b>	<b>20.21</b>	<b>20.22</b>	<b>21.67</b>	<b>21.59</b>
<b>Discrepancy<sup>9</sup></b> .....	<b>0.12</b>	<b>-0.20</b>	<b>-0.21</b>	<b>-0.13</b>	<b>-0.13</b>	<b>-0.08</b>	<b>-0.08</b>
<b>Lower 48 End of Year Reserves</b>							
<b>(billion barrels)<sup>2</sup></b> .....	<b>18.62</b>	<b>19.21</b>	<b>19.18</b>	<b>22.50</b>	<b>21.32</b>	<b>25.38</b>	<b>23.32</b>

<sup>1</sup>Weighted average price delivered to U.S. refiners.

<sup>2</sup>Includes lease condensate.

<sup>3</sup>Includes net imports of finished petroleum products, unfinished oils, other hydrocarbons, alcohols, ethers, and blending components.

<sup>4</sup>The volumetric amount by which total output is greater than input due to the processing of crude oil into products which, in total, have a lower specific gravity than the crude oil processed.

<sup>5</sup>Includes ethanol (including imports), alcohols, ethers, petroleum product stock withdrawals, domestic sources of blending components, other hydrocarbons, biodiesel (including imports), natural gas converted to liquid fuel, coal converted to liquid fuel, and biomass converted to liquid fuel.

<sup>6</sup>Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.

<sup>7</sup>Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.

<sup>8</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>9</sup>Balancing item. Includes unaccounted for supply, losses and gains.

OCS = Outer continental shelf.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 product supplied data and imported crude oil price based on: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2007 imported low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2007 data: EIA, *Petroleum Supply Annual 2007*, DOE/EIA-0340(2007)/1 (Washington, DC, July 2008). Projections: EIA, AEO2009 National Energy Modeling System runs AEO2009.D120908A and OCSLIMITED.D120908A.

# Results from Side Cases

**Table D16. Natural Gas Supply and Disposition, Liquefied Natural Gas Supply Cases**  
(Trillion Cubic Feet per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	2010			2020			2030		
		Low LNG	Reference	High LNG	Low LNG	Reference	High LNG	Low LNG	Reference	High LNG
<b>Dry Gas Production<sup>1</sup></b> .....	<b>19.30</b>	<b>20.46</b>	<b>20.38</b>	<b>20.39</b>	<b>21.93</b>	<b>21.48</b>	<b>19.92</b>	<b>23.84</b>	<b>23.60</b>	<b>22.00</b>
Lower 48 Onshore .....	15.91	16.81	16.75	16.76	16.46	16.11	14.92	16.93	16.76	15.35
Associated-Dissolved .....	1.39	1.41	1.41	1.41	1.37	1.37	1.37	1.32	1.32	1.32
Non-Associated .....	14.51	15.40	15.34	15.34	15.10	14.74	13.55	15.61	15.44	14.02
Conventional .....	5.36	4.72	4.70	4.70	3.44	3.36	3.10	2.17	2.18	2.09
Unconventional .....	9.15	10.67	10.64	10.64	11.66	11.38	10.45	13.43	13.26	11.94
Gas Shale .....	1.17	2.32	2.31	2.31	3.08	2.97	2.66	4.25	4.15	3.43
Coalbed Methane .....	1.84	1.80	1.79	1.79	1.81	1.78	1.67	2.02	2.01	1.92
Tight Gas .....	6.15	6.56	6.54	6.54	6.77	6.62	6.13	7.16	7.10	6.58
Lower 48 Offshore .....	2.97	3.28	3.26	3.27	4.32	4.23	3.86	4.94	4.88	4.69
Associated-Dissolved .....	0.62	0.72	0.72	0.72	1.02	1.00	1.00	1.17	1.16	1.03
Non-Associated .....	2.35	2.56	2.55	2.55	3.30	3.23	2.86	3.78	3.72	3.66
Alaska .....	0.42	0.37	0.37	0.37	1.14	1.14	1.14	1.96	1.96	1.96
Supplemental Natural Gas <sup>2</sup> .....	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
<b>Net Imports</b> .....	<b>3.79</b>	<b>2.41</b>	<b>2.50</b>	<b>2.50</b>	<b>1.17</b>	<b>1.86</b>	<b>4.14</b>	<b>0.39</b>	<b>0.66</b>	<b>3.65</b>
Pipeline <sup>3</sup> .....	3.06	2.03	2.02	2.03	0.76	0.48	-0.02	-0.02	-0.18	-0.57
Liquefied Natural Gas .....	0.73	0.37	0.47	0.47	0.41	1.38	4.15	0.41	0.85	4.22
<b>Total Supply</b> .....	<b>23.15</b>	<b>22.93</b>	<b>22.94</b>	<b>22.95</b>	<b>23.16</b>	<b>23.40</b>	<b>24.13</b>	<b>24.30</b>	<b>24.33</b>	<b>25.71</b>
<b>Consumption by Sector</b>										
Residential .....	4.72	4.79	4.79	4.79	4.94	4.96	5.03	4.93	4.93	4.98
Commercial .....	3.01	3.06	3.06	3.06	3.23	3.25	3.33	3.44	3.44	3.48
Industrial <sup>4</sup> .....	6.63	6.55	6.59	6.57	6.55	6.65	6.83	6.81	6.85	7.06
Electric Power <sup>5</sup> .....	6.87	6.26	6.25	6.27	6.43	6.54	7.00	6.93	6.93	8.08
Transportation <sup>6</sup> .....	0.02	0.03	0.03	0.03	0.07	0.07	0.07	0.09	0.09	0.09
Pipeline Fuel .....	0.62	0.62	0.62	0.62	0.66	0.67	0.66	0.69	0.70	0.70
Lease and Plant Fuel <sup>7</sup> .....	1.17	1.24	1.24	1.24	1.32	1.29	1.23	1.44	1.43	1.35
<b>Total</b> .....	<b>23.05</b>	<b>22.55</b>	<b>22.57</b>	<b>22.57</b>	<b>23.19</b>	<b>23.43</b>	<b>24.16</b>	<b>24.33</b>	<b>24.36</b>	<b>25.74</b>
<b>Discrepancy<sup>8</sup></b> .....	<b>0.09</b>	<b>0.38</b>	<b>0.37</b>	<b>0.38</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>	<b>-0.03</b>
<b>Lower 48 End of Year Reserves</b> .....	<b>225.18</b>	<b>229.99</b>	<b>230.11</b>	<b>229.92</b>	<b>215.76</b>	<b>213.14</b>	<b>207.10</b>	<b>214.22</b>	<b>211.98</b>	<b>195.62</b>
<b>Natural Gas Prices</b>										
<b>(2007 dollars per million Btu)</b>										
Henry Hub Spot Price .....	6.96	6.64	6.66	6.62	7.65	7.43	6.44	9.18	9.25	8.84
Average Lower 48 Wellhead Price <sup>11</sup> ..	6.22	5.87	5.88	5.85	6.76	6.56	5.69	8.11	8.17	7.80
<b>(2007 dollars per thousand cubic feet)</b>										
Average Lower 48 Wellhead Price <sup>11</sup> ..	6.39	6.03	6.05	6.01	6.94	6.75	5.85	8.33	8.40	8.02
<b>Delivered Prices</b>										
<b>(2007 dollars per thousand cubic feet)</b>										
Residential .....	13.05	12.42	12.43	12.40	13.04	12.85	11.91	14.64	14.71	14.30
Commercial .....	11.30	10.83	10.84	10.81	11.63	11.44	10.50	13.24	13.32	12.90
Industrial <sup>4</sup> .....	7.73	7.10	7.10	7.07	7.87	7.69	6.76	9.27	9.33	8.96
Electric Power <sup>5</sup> .....	7.22	6.76	6.77	6.74	7.53	7.35	6.52	8.90	8.94	8.73
Transportation <sup>10</sup> .....	15.89	15.31	15.32	15.29	15.51	15.31	14.45	16.62	16.70	16.33
<b>Average<sup>11</sup></b> .....	<b>9.26</b>	<b>8.79</b>	<b>8.80</b>	<b>8.76</b>	<b>9.57</b>	<b>9.37</b>	<b>8.43</b>	<b>10.99</b>	<b>11.05</b>	<b>10.61</b>

<sup>1</sup>Marketed production (wet) minus extraction losses.

<sup>2</sup>Synthetic natural gas, propane air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas commingled and distributed with natural gas.

<sup>3</sup>Includes any natural gas regasified in the Bahamas and transported via pipeline to Florida.

<sup>4</sup>Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>5</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>6</sup>Compressed natural gas used as vehicle fuel.

<sup>7</sup>Represents natural gas used in field gathering and processing plant machinery.

<sup>8</sup>Balancing item. Natural gas lost as a result of converting flow data measured at varying temperatures and pressures to a standard temperature and pressure and the merger of different data reporting systems which vary in scope, format, definition, and respondent type. In addition, 2007 values include net storage injections.

<sup>9</sup>Represents lower 48 onshore and offshore supplies.

<sup>10</sup>Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes and estimated dispensing costs or charges.

<sup>11</sup>Weighted average prices. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.

LNG = Liquefied natural gas.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2008/08) (Washington, DC, August 2008). 2007 consumption based on: EIA, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). Projections: EIA, AEO2009 National Energy Modeling System runs LOLNG09.D121408A, AEO2009.D120908A, and HILNG09.D121408A.

## Results from Side Cases

**Table D17. Petroleum Supply and Disposition, ANWR Drilling Case**  
(Million Barrels per Day, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	2010		2020		2030	
		Reference	ANWR	Reference	ANWR	Reference	ANWR
<b>Crude Oil</b>							
Domestic Crude Production <sup>1</sup> .....	5.07	5.62	5.61	6.48	6.57	7.37	8.08
Alaska .....	0.72	0.69	0.69	0.72	0.83	0.57	1.30
Lower 48 States .....	4.35	4.93	4.93	5.76	5.74	6.80	6.78
Net Imports .....	10.00	8.10	8.11	7.29	7.22	6.95	6.22
Other Crude Supply <sup>2</sup> .....	0.09	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total Crude Supply .....</b>	<b>15.16</b>	<b>13.72</b>	<b>13.72</b>	<b>13.77</b>	<b>13.80</b>	<b>14.32</b>	<b>14.31</b>
<b>Other Supply</b>							
Natural Gas Plant Liquids .....	1.78	1.91	1.91	1.91	1.91	1.92	1.97
Net Product Imports <sup>3</sup> .....	2.09	1.66	1.68	1.49	1.50	1.40	1.38
Refinery Processing Gain <sup>4</sup> .....	1.00	0.97	0.98	0.93	0.93	0.86	0.89
Ethanol <sup>5</sup> .....	0.45	0.84	0.84	1.28	1.28	1.91	1.91
Biodiesel <sup>5</sup> .....	0.03	0.06	0.06	0.10	0.10	0.13	0.13
Liquids from Coal .....	0.00	0.00	0.00	0.10	0.10	0.26	0.26
Liquids from Biomass .....	0.00	0.00	0.00	0.07	0.07	0.33	0.33
Other <sup>6</sup> .....	0.26	0.32	0.32	0.42	0.41	0.45	0.45
<b>Total Primary Supply<sup>7</sup> .....</b>	<b>20.77</b>	<b>19.48</b>	<b>19.50</b>	<b>20.08</b>	<b>20.12</b>	<b>21.59</b>	<b>21.62</b>
<b>Refined Petroleum Products Supplied</b>							
<b>by Fuel</b>							
Liquefied Petroleum Gases .....	2.09	1.99	2.00	1.82	1.82	1.74	1.75
E85 <sup>8</sup> .....	0.00	0.00	0.00	0.58	0.58	1.50	1.50
Motor Gasoline <sup>9</sup> .....	9.29	9.34	9.35	8.60	8.61	8.04	8.01
Jet Fuel <sup>10</sup> .....	1.62	1.45	1.45	1.65	1.65	1.99	1.99
Distillate Fuel Oil <sup>11</sup> .....	4.20	4.08	4.09	4.62	4.62	5.42	5.43
Residual Fuel Oil .....	0.72	0.63	0.63	0.70	0.70	0.72	0.72
Other <sup>12</sup> .....	2.74	2.19	2.19	2.24	2.25	2.25	2.26
<b>by Sector</b>							
Residential and Commercial .....	1.11	1.05	1.05	0.99	1.00	0.97	0.98
Industrial <sup>13</sup> .....	5.26	4.46	4.47	4.34	4.35	4.28	4.30
Transportation .....	14.25	13.96	13.97	14.65	14.67	16.18	16.16
Electric Power <sup>14</sup> .....	0.30	0.22	0.22	0.23	0.23	0.23	0.23
<b>Total .....</b>	<b>20.65</b>	<b>19.69</b>	<b>19.71</b>	<b>20.21</b>	<b>20.24</b>	<b>21.67</b>	<b>21.66</b>
<b>Discrepancy<sup>15</sup> .....</b>	<b>0.12</b>	<b>-0.20</b>	<b>-0.21</b>	<b>-0.13</b>	<b>-0.12</b>	<b>-0.08</b>	<b>-0.04</b>
Imported Low Sulfur Light Crude Oil Price (2007 dollars per barrel) <sup>16</sup> .....	72.33	80.16	78.10	115.45	115.06	130.43	128.31
Imported Crude Oil Price (2007 dollars per barrel) <sup>16</sup> .....	63.83	77.56	75.41	112.05	111.60	124.60	121.74
Import Share of Product Supplied (percent) .....	58.3	50.1	50.1	44.0	43.6	40.9	37.4
Net Expenditures for Imported Crude Oil and Petroleum Products (billion 2007 dollars) .....	280.13	261.60	254.68	344.32	340.35	376.65	336.39

<sup>1</sup>Includes lease condensate.

<sup>2</sup>Strategic petroleum reserve stock additions plus unaccounted for crude oil and crude stock withdrawals minus crude product supplied.

<sup>3</sup>Includes other hydrocarbons and alcohols.

<sup>4</sup>The volumetric amount by which total output is greater than input due to the processing of crude oil into products which, in total, have a lower specific gravity than the crude oil processed.

<sup>5</sup>Includes net imports.

<sup>6</sup>Includes petroleum product stock withdrawals; domestic sources of blending components, other hydrocarbons, alcohols, and ethers.

<sup>7</sup>Total crude supply plus all components of Other Supply.

<sup>8</sup>E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

<sup>9</sup>Includes ethanol and ethers blended into gasoline.

<sup>10</sup>Includes only kerosene type.

<sup>11</sup>Includes distillate and kerosene.

<sup>12</sup>Includes aviation gasoline, petrochemical feedstocks, lubricants, waxes, asphalt, road oil, still gas, special naphthas, petroleum coke, crude oil product supplied, and miscellaneous petroleum products.

<sup>13</sup>Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.

<sup>14</sup>Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

<sup>15</sup>Balancing item. Includes unaccounted for supply, losses, and gains.

<sup>16</sup>Weighted average price delivered to U.S. refiners.

ANWR = Arctic National Wildlife Refuge.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 imported crude oil price and petroleum product supplied based on: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008). 2007 imported low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2007 data: EIA, *Petroleum Supply Annual 2007*, DOE/EIA-0340(2007)/1 (Washington, DC, July 2008). Projections: EIA, AEO2009 National Energy Modeling System runs AEO2009.D120908A and ANWR2009.D120908A.

## Results from Side Cases

**Table D18. Key Results for Coal Cost Cases**  
(Million Short Tons per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	2015			2030			Growth Rate, 2007-2030		
		Low Coal Cost	Reference	High Coal Cost	Low Coal Cost	Reference	High Coal Cost	Low Coal Cost	Reference	High Coal Cost
<b>Production<sup>1</sup></b>	<b>1147</b>	<b>1218</b>	<b>1206</b>	<b>1172</b>	<b>1482</b>	<b>1341</b>	<b>1076</b>	<b>1.1%</b>	<b>0.7%</b>	<b>-0.3%</b>
Appalachia	378	350	343	341	403	353	344	0.3%	-0.3%	-0.4%
Interior	147	185	192	211	229	252	267	1.9%	2.4%	2.6%
West	621	682	671	619	849	735	464	1.4%	0.7%	-1.3%
<b>Waste Coal Supplied<sup>2</sup></b>	<b>14</b>	<b>13</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>13</b>	<b>20</b>	<b>-0.9%</b>	<b>-0.4%</b>	<b>1.5%</b>
<b>Net Imports<sup>3</sup></b>	<b>-25</b>	<b>-36</b>	<b>-28</b>	<b>-15</b>	<b>-38</b>	<b>10</b>	<b>75</b>	<b>1.9%</b>	<b>--</b>	<b>--</b>
<b>Total Supply<sup>4</sup></b>	<b>1136</b>	<b>1195</b>	<b>1192</b>	<b>1170</b>	<b>1455</b>	<b>1363</b>	<b>1171</b>	<b>1.1%</b>	<b>0.8%</b>	<b>0.1%</b>
<b>Consumption by Sector</b>										
Residential and Commercial	4	3	3	3	3	3	3	-0.4%	-0.4%	-0.4%
Coke Plants	23	20	20	20	19	18	18	-0.8%	-1.0%	-1.0%
Other Industrial <sup>5</sup>	57	56	56	56	56	57	55	-0.0%	-0.0%	-0.1%
Coal-to-Liquids Heat and Power	0	10	9	9	40	38	35	--	--	--
Coal-to-Liquids Liquids Production	0	8	8	8	34	32	29	--	--	--
Electric Power <sup>6</sup>	1046	1097	1096	1074	1303	1215	1030	1.0%	0.7%	-0.1%
<b>Total Coal Use</b>	<b>1129</b>	<b>1195</b>	<b>1192</b>	<b>1170</b>	<b>1455</b>	<b>1363</b>	<b>1170</b>	<b>1.1%</b>	<b>0.8%</b>	<b>0.2%</b>
<b>Average Minemouth Price<sup>7</sup></b>										
(2007 dollars per short ton)	25.82	24.18	28.71	35.11	15.63	29.10	60.12	-2.2%	0.5%	3.7%
(2007 dollars per million Btu)	1.27	1.19	1.42	1.73	0.78	1.46	2.92	-2.1%	0.6%	3.7%
<b>Delivered Prices<sup>8</sup></b>										
<b>(2007 dollars per short ton)</b>										
Coke Plants	94.97	101.37	115.38	129.63	76.98	115.57	196.08	-0.9%	0.9%	3.2%
Other Industrial <sup>5</sup>	54.42	49.65	55.54	62.83	37.90	57.22	88.60	-1.6%	0.2%	2.1%
Coal to Liquids	--	14.57	17.14	20.87	8.94	20.96	47.60	--	--	--
Electric Power <sup>6</sup>										
(2007 dollars per short ton)	35.45	33.56	38.47	45.12	25.52	40.61	70.73	-1.4%	0.6%	3.0%
(2007 dollars per million Btu)	1.78	1.69	1.94	2.27	1.28	2.04	3.42	-1.4%	0.6%	2.9%
<b>Average</b>	<b>37.60</b>	<b>35.21</b>	<b>40.30</b>	<b>47.09</b>	<b>25.83</b>	<b>41.30</b>	<b>72.24</b>	<b>-1.6%</b>	<b>0.4%</b>	<b>2.9%</b>
Exports <sup>9</sup>	70.25	78.99	88.70	97.22	63.79	80.02	150.83	-0.4%	0.6%	3.4%
<b>Cumulative Electricity Generating Capacity Additions (gigawatts)<sup>10</sup></b>										
Coal	0.0	17.8	17.8	17.8	75.5	47.5	22.6	--	--	--
Conventional	0.0	15.6	15.6	15.6	61.3	37.2	15.6	--	--	--
Advanced without Sequestration	0.0	2.2	2.2	2.2	13.2	9.3	6.0	--	--	--
Advanced with Sequestration	0.0	0.0	0.0	0.0	1.0	1.0	1.0	--	--	--
Petroleum	0.0	1.3	1.3	1.3	1.4	1.4	1.4	--	--	--
Natural Gas	0.0	30.5	30.4	29.9	125.3	136.9	146.2	--	--	--
Nuclear	0.0	1.2	1.2	1.2	5.4	13.1	16.7	--	--	--
Renewables <sup>11</sup>	0.0	24.0	23.5	23.9	58.0	57.6	56.5	--	--	--
Other	0.0	2.3	2.2	2.3	2.3	2.3	2.3	--	--	--
<b>Total</b>	<b>0.0</b>	<b>77.1</b>	<b>76.5</b>	<b>76.4</b>	<b>267.9</b>	<b>258.7</b>	<b>245.8</b>			
Liquids from Coal (million barrels per day)	0.00	0.06	0.06	0.06	0.26	0.26	0.26	--	--	--

## Results from Side Cases

**Table D18. Key Results for Coal Cost Cases (Continued)**  
(Million Short Tons per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2007	2015			2030			Growth Rate, 2007-2030		
		Low Coal Cost	Reference	High Coal Cost	Low Coal Cost	Reference	High Coal Cost	Low Coal Cost	Reference	High Coal Cost
<b>Cost Indices</b> (constant dollar index, 2007=1.000)										
Transportation Rate Multipliers										
Eastern Railroads .....	1.000	0.990	1.064	1.140	0.780	1.044	1.300	-1.1%	0.2%	1.1%
Western Railroads .....	1.000	1.010	1.082	1.160	0.890	1.183	1.480	-0.5%	0.7%	1.7%
Mine Equipment Costs										
Underground .....	1.000	1.008	1.071	1.136	0.867	1.071	1.319	-0.6%	0.3%	1.2%
Surface .....	1.000	0.948	1.007	1.069	0.815	1.007	1.241	-0.9%	0.0%	0.9%
Other Mine Supply Costs										
East of the Mississippi: All Mines ....	1.000	1.130	1.201	1.275	0.902	1.114	1.373	-0.4%	0.5%	1.4%
West of the Mississippi: Underground	1.000	1.130	1.201	1.275	0.902	1.114	1.373	-0.4%	0.5%	1.4%
West of the Mississippi: Surface .....	1.000	0.962	1.022	1.085	0.768	0.948	1.168	-1.1%	-0.2%	0.7%
Coal Mining Labor Productivity										
(short tons per miner per hour) .....	6.27	7.66	6.25	4.89	12.61	6.02	2.33	3.1%	-0.2%	-4.2%
Average Coal Miner Wage										
(2007 dollars per hour) .....	21.96	20.66	21.96	23.32	17.79	21.96	27.05	-0.9%	0.0%	0.9%

<sup>1</sup>Includes anthracite, bituminous coal, subbituminous coal, and lignite.

<sup>2</sup>Includes waste coal consumed by the electric power and industrial sectors. Waste coal supplied is counted as a supply-side item to balance the same amount of waste coal included in the consumption data.

<sup>3</sup>Excludes imports to Puerto Rico and the U.S. Virgin Islands.

<sup>4</sup>Production plus waste coal supplied plus net imports.

<sup>5</sup>Includes consumption for combined heat and power plants, except those plants whose primary business is to sell electricity, or electricity and heat, to the public. Excludes all coal use in the coal to liquids process.

<sup>6</sup>Includes all electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>7</sup>Includes reported prices for both open market and captive mines.

<sup>8</sup>Prices weighted by consumption tonnage; weighted average excludes residential and commercial prices, and export free-alongside-ship (f.a.s.) prices.

<sup>9</sup>F.a.s. price at U.S. port of exit.

<sup>10</sup>Cumulative additions after December 31, 2007. Includes all additions of electricity only and combined heat and power plants projected for the electric power, industrial, and commercial sectors.

<sup>11</sup>Includes conventional hydroelectric, geothermal, wood, wood waste, municipal waste, landfill gas, other biomass, solar, and wind power. Facilities co-firing biomass and coal are classified as coal.

-- Not applicable.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2007 are model results and may differ slightly from official EIA data reports.

Sources: 2007 data based on: Energy Information Administration (EIA), *Annual Coal Report 2007*, DOE/EIA-0584(2007) (Washington, DC, September 2008); EIA, *Quarterly Coal Report, October-December 2007*, DOE/EIA-0121(2007/4Q) (Washington, DC, March 2008); U.S. Department of Labor, Bureau of Labor Statistics, *Average Hourly Earnings of Production Workers: Coal Mining*, Series ID: ceu1021210008; and EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A. Projections: EIA, AEO2009 National Energy Modeling System runs LCCST09.D121608A, AEO2009.D120908A, and HCCST09.D121608A.



# NEMS Overview and Brief Description of Cases

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## The National Energy Modeling System

The projections in the *Annual Energy Outlook 2009* (AEO2009) are generated from the National Energy Modeling System (NEMS) [1], developed and maintained by the Office of Integrated Analysis and Forecasting (OIAF) of the Energy Information Administration (EIA). In addition to its use in developing the *Annual Energy Outlook* (AEO) projections, NEMS is also used in analytical studies for the U.S. Congress, the Executive Office of the President, other offices within the U.S. Department of Energy (DOE), and other Federal agencies. The AEO projections are also used by analysts and planners in other government agencies and nongovernment organizations.

The projections in NEMS are developed with the use of a market-based approach to energy analysis. For each fuel and consuming sector, NEMS balances energy supply and demand, accounting for economic competition among the various energy fuels and sources. The time horizon of NEMS is the period through 2030, approximately 25 years into the future [2]. In order to represent regional differences in energy markets, the component modules of NEMS function at the regional level: the nine Census divisions for the end-use demand modules; production regions specific to oil, natural gas, and coal supply and distribution; the North American Electric Reliability Council regions and subregions for electricity; and the Petroleum Administration for Defense Districts (PADDs) for refineries.

NEMS is organized and implemented as a modular system. The modules represent each of the fuel supply markets, conversion sectors, and end-use consumption sectors of the energy system. NEMS also includes macroeconomic and international modules. The primary flows of information among the modules are the delivered prices of energy to end users and the quantities consumed, by product, region, and sector. The delivered fuel prices encompass all the activities necessary to produce, import, and transport fuels to end users. The information flows also include other data on such areas as economic activity, domestic production, and international petroleum supply.

The Integrating Module controls the execution of each of the component modules. To facilitate modularity, the components do not pass information to

each other directly but communicate through a central data structure. This modular design provides the capability to execute modules individually, thus allowing decentralized development of the system and independent analysis and testing of individual modules. The modular design also permits the use of the methodology and level of detail most appropriate for each energy sector. NEMS calls each supply, conversion, and end-use demand module in sequence until the delivered prices of energy and the quantities demanded have converged within tolerance, thus achieving an economic equilibrium of supply and demand in the consuming sectors. A solution is reached annually through the projection horizon. Other variables, such as petroleum product imports, crude oil imports, and several macroeconomic indicators, also are evaluated for convergence.

Each NEMS component represents the impacts and costs of legislation and environmental regulations that affect that sector. NEMS accounts for all combustion-related carbon dioxide (CO<sub>2</sub>) emissions, as well as emissions of sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and mercury from the electricity generation sector.

The version of NEMS used for AEO2009 represents current legislation and environmental regulations as of November 2008 (such as the Energy Independence and Security Act of 2007 [EISA2007], which was signed into law on December 19, 2007; the Energy Policy Act of 2005 [EPACT2005]; the Working Families Tax Relief Act of 2004; and the American Jobs Creation Act of 2004), and the costs of compliance with regulations (such as the new stationary diesel regulations issued by the U.S. Environmental Protection Agency [EPA] in July 2006). It does not include representation of the American Recovery and Reinvestment Act, which was enacted in February 2009. The AEO2009 models do not represent the Clean Air Mercury Rule (CAMR), which was vacated and remanded by the D.C. Circuit Court of the U.S. Court of Appeals on February 8, 2008, but they do represent State requirements for reduction of mercury emissions.

The AEO2009 reference case also reflects the recent decision by the D.C. Circuit Court on July 11, 2008, to vacate and remand the NO<sub>x</sub> and SO<sub>2</sub> cap-and-trade programs included in the Clean Air Interstate Rule (CAIR), but not the temporary reinstatement in a

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more recent ruling (issued on December 23, 2008, well after the cutoff date for inclusion in *AEO2009*). It is assumed, however, that electricity generators will continue to retrofit existing capacity with emissions control equipment to comply with the revised National Ambient Air Quality Standards (NAAQS), even without the CAIR regulations. Also, it is assumed that plants not equipped with scrubbers ultimately will be required to use low-sulfur coal in order to comply with the NAAQS. The potential impacts of pending or proposed Federal and State legislation, regulations, or standards—or of sections of legislation that have been enacted but require funds or implementing regulations that have not been provided or specified—are not reflected in NEMS.

In general, the historical data used for the *AEO2009* projections are based on EIA's *Annual Energy Review 2007*, published in June 2008 [3]; however, data were taken from multiple sources. In some cases, only partial or preliminary data were available for 2007. CO<sub>2</sub> emissions were calculated by using CO<sub>2</sub> coefficients from the EIA report, *Emissions of Greenhouse Gases in the United States 2007*, published in December 2008 [4]. Historical numbers are presented for comparison only and may be estimates. Source documents should be consulted for the official data values. Footnotes to the *AEO2009* appendix tables indicate the definitions and sources of historical data.

The *AEO2009* projections for 2008 and 2009 incorporate short-term projections from EIA's November 2008 *Short-Term Energy Outlook (STEO)*. For short-term energy projections, readers are referred to monthly updates of the *STEO* [5].

### Component Modules

The component modules of NEMS represent the individual supply, demand, and conversion sectors of domestic energy markets and also include international and macroeconomic modules. In general, the modules interact through values representing the prices or expenditures for energy delivered to the consuming sectors and the quantities of end-use energy consumption.

#### *Macroeconomic Activity Module*

The Macroeconomic Activity Module (MAM) provides a set of macroeconomic drivers to the energy modules, and there is a macroeconomic feedback mechanism within NEMS. Key macroeconomic variables used in the energy modules include gross domestic product

(GDP), disposable income, value of industrial shipments, new housing starts, sales of new light-duty vehicles (LDVs), interest rates, and employment. The MAM uses the following models from IHS Global Insight: Macroeconomic Model of the U.S. Economy, National Industry Model, and National Employment Model. In addition, EIA has constructed a Regional Economic and Industry Model to project regional economic drivers, and a Commercial Floorspace Model to project 13 floorspace types in 9 Census divisions. The accounting framework for industrial value of shipments uses the North American Industry Classification System (NAICS).

#### *International Module*

The International Module represents the response of world oil markets (supply and demand) to assumed world oil prices. The results/outputs of the module are international liquids consumption and production by region and a crude oil supply curve representing international crude oil similar in quality to the West Texas Intermediate crude that is available to U.S. markets through the Petroleum Market Module (PMM) of NEMS. The supply-curve calculations are based on historical market data and a world oil supply/demand balance, which is developed from reduced-form models of international liquids supply and demand, current investment trends in exploration and development, and long-term resource economics for 221 countries/territories. The oil production estimates include both conventional and unconventional supply recovery technologies.

#### *Residential and Commercial Demand Modules*

The Residential Demand Module projects energy consumption in the residential sector by housing type and end use, based on delivered energy prices, the menu of equipment available, the availability of renewable sources of energy, and housing starts. The Commercial Demand Module projects energy consumption in the commercial sector by building type and nonbuilding uses of energy and by category of end use, based on delivered prices of energy, availability of renewable sources of energy, and macroeconomic variables representing interest rates and floorspace construction.

Both modules estimate the equipment stock for the major end-use services, incorporating assessments of advanced technologies, including representations of renewable energy technologies; and the effects of both building shell and appliance standards,

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including the recently enacted provisions of the Energy Independence and Security Act of 2007 (EISA2007). The Commercial Demand Module incorporates combined heat and power (CHP) technology. The modules also include projections of distributed generation. Both modules incorporate changes to “normal” heating and cooling degree-days by Census division, based on a 10-year average and on State-level population projections. The Residential Demand Module projects an increase in the average square footage of both new construction and existing structures, based on trends in the size of new construction and the remodeling of existing homes.

### ***Industrial Demand Module***

The Industrial Demand Module projects the consumption of energy for heat and power and for feedstocks and raw materials in each of 21 industries, subject to the delivered prices of energy and macroeconomic variables representing employment and the value of shipments for each industry. As noted in the description of the MAM, the value of shipments is based on NAICS. The industries are classified into three groups—energy-intensive manufacturing, non-energy-intensive manufacturing, and nonmanufacturing. Of the eight energy-intensive industries, seven are modeled in the Industrial Demand Module, with components for boiler/steam/cogeneration, buildings, and process/assembly use of energy. Bulk chemicals are further disaggregated to organic, inorganic, resins, and agricultural chemicals. A generalized representation of cogeneration and a recycling component also are included. The use of energy for petroleum refining is modeled in the PMM, and the projected consumption is included in the industrial totals.

### ***Transportation Demand Module***

The Transportation Demand Module projects consumption of fuels in the transportation sector, including petroleum products, electricity, methanol, ethanol, compressed natural gas, and hydrogen, by transportation mode, vehicle vintage, and size class, subject to delivered prices of energy fuels and macroeconomic variables representing disposable personal income, GDP, population, interest rates, and industrial shipments. Fleet vehicles are represented separately to allow analysis of the Energy Policy Act of 1992 (EPACT1992) and other legislation and legislative proposals. The transportation demand module also includes a component to assess the penetration of

alternative-fuel vehicles (AFVs). EPACT2005 and the Energy Improvement and Extension Act of 2008 (EIEA2008) are reflected in the assessment of the impacts of tax credits on the purchase of hybrid gas-electric, alternative-fuel, and fuel-cell vehicles. The corporate average fuel economy (CAFE) and biofuel representation in the module reflect standards proposed by the National Highway Traffic Safety Administration (NHTSA) and provisions in EISA2007.

The air transportation component of the Transportation Demand Module explicitly represents air travel in domestic and foreign markets and includes the industry practice of parking aircraft in both domestic and international markets to reduce operating costs, as well as the movement of aging aircraft from passenger to cargo markets [6]. For passenger travel and air freight shipments, the module represents regional fuel use in regional, narrow-body, and wide-body aircraft. An infrastructure constraint, which is also modeled, can potentially limit overall growth in passenger and freight air travel to levels commensurate with industry-projected infrastructure expansion and capacity growth.

### ***Electricity Market Module***

The Electricity Market Module represents generation, transmission, and pricing of electricity, subject to delivered prices for coal, petroleum products, natural gas, and biofuels; costs of generation by all generating plants, including capital costs and macroeconomic variables for costs of capital and domestic investment; environmental emissions laws and regulations; and electricity load shapes and demand. There are three primary submodules—capacity planning, fuel dispatching, and finance and pricing.

All specifically identified options promulgated by the EPA for compliance with the Clean Air Act Amendments of 1990 (CAAA90) are explicitly represented in the capacity expansion and dispatch decisions; those that have not been promulgated (e.g., fine particulate proposals) are not incorporated. All financial incentives for power generation expansion and dispatch specifically identified in EPACT2005 have been implemented. Several States, primarily in the Northeast, have recently enacted air emission regulations for CO<sub>2</sub> that affect the electricity generation sector, and those regulations are represented in *AEO2009*.

Although currently there is no Federal legislation in place that restricts greenhouse gas (GHG) emissions,

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regulators and the investment community are beginning to push energy companies to invest in technologies that are less GHG-intensive. The trend is captured in the *AEO2009* reference case through a 3-percentage-point increase in the cost of capital when investments in new coal-fired power plants without carbon control and sequestration (CCS) and new coal-to-liquids (CTL) plants are evaluated.

### **Renewable Fuels Module**

The Renewable Fuels Module (RFM) includes sub-modules representing renewable resource supply and technology input information for central-station, grid-connected electricity generation technologies, including conventional hydroelectricity, biomass (Dedicated biomass plants and co-firing in existing coal plants), geothermal, landfill gas, solar thermal electricity, solar photovoltaics (PV), and wind energy. The RFM contains renewable resource supply estimates representing the regional opportunities for renewable energy development. Investment tax credits (ITCs) for renewable fuels are incorporated, as currently enacted, including a permanent 10-percent ITC for business investment in solar energy (thermal nonpower uses as well as power uses) and geothermal power (available only to those projects not accepting the production tax credit [PTC] for geothermal power). In addition, the module reflects the increase in the ITC to 30 percent for solar energy systems installed before January 1, 2017, and the extension of the credit to individual homeowners under EIEA2008.

PTCs for wind, geothermal, landfill gas, and some types of hydroelectric and biomass-fueled plants also are represented. They provide a credit of up to 2.0 cents per kilowatthour for electricity produced in the first 10 years of plant operation. For *AEO2009*, new plants coming on line before January 1, 2010, are eligible to receive the ITC. *AEO2009* also accounts for new renewable energy capacity resulting from State renewable portfolio standard (RPS) programs, mandates, and goals, as described in *Assumptions to the Annual Energy Outlook 2009* [7].

### **Oil and Gas Supply Module**

The Oil and Gas Supply Module represents domestic crude oil and natural gas supply within an integrated framework that captures the interrelationships among the various sources of supply: onshore, offshore, and Alaska by both conventional and unconventional techniques, including natural gas recovery

from coalbeds and low-permeability formations of sandstone and shale. The framework analyzes cash flow and profitability to compute investment and drilling for each of the supply sources, based on the prices for crude oil and natural gas, the domestic recoverable resource base, and the state of technology. Oil and natural gas production activities are modeled for 12 supply regions, including 3 offshore and 3 Alaskan regions.

Crude oil production quantities are used as inputs to the PMM in NEMS for conversion and blending into refined petroleum products. Supply curves for natural gas are used as inputs to the Natural Gas Transmission and Distribution Module for determining natural gas prices and quantities.

### **Natural Gas Transmission and Distribution Module**

The Natural Gas Transmission and Distribution Module represents the transmission, distribution, and pricing of natural gas, subject to end-use demand for natural gas and the availability of domestic natural gas and natural gas traded on the international market. The module tracks the flows of natural gas and determines the associated capacity expansion requirements in an aggregate pipeline network, connecting the domestic and foreign supply regions with 12 U.S. demand regions. The flow of natural gas is determined for both a peak and off-peak period in the year. Key components of pipeline and distributor tariffs are included in separate pricing algorithms. The module also represents foreign sources of natural gas, including pipeline imports and exports to Canada and Mexico, and LNG imports and exports.

### **Petroleum Market Module**

The PMM projects prices of petroleum products, crude oil and product import activity, and domestic refinery operations (including fuel consumption), subject to the demand for petroleum products, the availability and price of imported petroleum, and the domestic production of crude oil, natural gas liquids, and biofuels (ethanol, biodiesel, and biomass-to-liquids [BTL]). The module represents refining activities in the five PADDs, as well as a less detailed representation of refining activities in the rest of the world. It explicitly models the requirements of EISA2007 and CAAA90 and the costs of automotive fuels, such as conventional and reformulated gasoline, and includes the production of biofuels for blending in gasoline and diesel.

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*AEO2009* represents regulations that limit the sulfur content of all nonroad and locomotive/marine diesel to 15 parts per million (ppm) by mid-2012. The module also reflects the new renewable fuels standard (RFS) in EISA2007 that requires the use of 36 billion gallons per year of biofuels by 2022 if achievable, with corn ethanol limited to 15 billion gallons per year. Demand growth and regulatory changes necessitate capacity expansion for refinery processing units. U.S. end-use prices are based on the marginal costs of production, plus markups representing the costs of product marketing, importing, transportation, and distribution, as well as applicable State and Federal taxes [8]. Refinery capacity expansion at existing sites is permitted in each of the five refining regions modeled.

Fuel ethanol and biodiesel are included in the PMM, because they are commonly blended into petroleum products. The module allows ethanol blending into gasoline at 10 percent or less by volume (E10) and up to 85 percent by volume (E85). For *AEO2009*, the level of allowable non-E85 ethanol blending in California has been raised from 5.7 percent to 10 percent in recent regulatory changes [9] that have set a framework for E10 emissions standards.

Ethanol is produced primarily in the Midwest from corn or other starchy crops, and in the future it may be produced from cellulosic material, such as switchgrass and poplar. Biodiesel (diesel-like fuel made in a trans-esterification process) is produced from seed oil, imported palm oil, animal fats, or yellow grease (primarily, recycled cooking oil). Renewable or “green” diesel is also modeled as a blending component in petroleum diesel. Unlike the more common biodiesel, renewable diesel is made by hydrogenation of vegetable oils and is completely fungible with petroleum diesel. Imports and limited exports of these biofuels are modeled in the PMM.

Both domestic and imported ethanol count toward the RFS. Domestic ethanol production from two feedstocks, corn and cellulosic materials, is modeled. Corn-based ethanol plants are numerous (more than 150 are now in operation, with a total production capacity of more than 10 billion gallons annually) and are based on a well-known technology that converts sugar into ethanol. Ethanol from cellulosic sources is a new technology with no pilot plants in operation; however, DOE awarded grants (up to \$385 million) in 2007 to construct capacity totaling 147 million gallons per year, which *AEO2009* assumes will begin

operating in 2012. Imported ethanol may be produced from cane sugar or bagasse, the cellulosic byproduct of sugar milling. The sources of ethanol are modeled to compete on an economic basis and to meet the EISA2007 renewable fuels mandate.

Fuels produced by gasification and Fischer-Tropsch synthesis are also modeled in the PMM, based on their economics relative to competing feedstocks and products. The three processes modeled are coal-to-liquids (CTL), gas-to-liquids (GTL), and BTL. CTL facilities are likely to be built at locations close to coal supplies and water sources, where liquid products and surplus electricity could also be distributed to nearby demand regions. GTL facilities may be built in Alaska, but they would compete with the Alaska Natural Gas Transportation System for available natural gas resources. BTL facilities are likely to be built where there are large supplies of biomass, such as crop residues and forestry waste. Because the BTL process uses cellulosic feedstocks, it is also modeled as a choice to meet the EISA2007 cellulosic biofuels requirement.

### **Coal Market Module**

The Coal Market Module (CMM) simulates mining, transportation, and pricing of coal, subject to end-use demand for coal differentiated by heat and sulfur content. U.S. coal production is represented in the CMM by 40 separate supply curves—differentiated by region, mine type, coal rank, and sulfur content. The coal supply curves include a response to capacity utilization of mines, mining capacity, labor productivity, and factor input costs (mining equipment, mining labor, and fuel requirements). Projections of U.S. coal distribution are determined by minimizing the cost of coal supplied, given coal demands by demand region and sector, environmental restrictions, and accounting for minemouth prices, transportation costs, and coal supply contracts. Over the projection horizon, coal transportation costs in the CMM vary in response to changes in the cost of rail investments.

The CMM produces projections of U.S. steam and metallurgical coal exports and imports in the context of world coal trade, determining the pattern of world coal trade flows that minimizes the production and transportation costs of meeting a specified set of regional world coal import demands, subject to constraints on export capacities and trade flows. The international coal market component of the module computes trade in 3 types of coal for 17 export regions

## NEMS Overview and Brief Description of Cases

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and 20 import regions. U.S. coal production and distribution are computed for 14 supply regions and 14 demand regions.

### **Annual Energy Outlook 2009 Cases**

Table E1 provides a summary of the cases produced as part of the *AEO2009*. For each case, the table gives the name used in this report, a brief description of the major assumptions underlying the projections, the mode in which the case was run in NEMS (either fully integrated, partially integrated, or standalone), and a reference to the pages in the body of the report and in this appendix where the case is discussed. The text sections following Table E1 describe the various cases. The reference case assumptions for each sector are described in *Assumptions to the Annual Energy Outlook 2009* [10]. Regional results and other details of the projections are available at web site [www.eia.doe.gov/oiaf/aeo/supplement](http://www.eia.doe.gov/oiaf/aeo/supplement).

### **Macroeconomic Growth Cases**

In addition to the *AEO2009* reference case, the low economic growth and high economic growth cases were developed to reflect the uncertainty in projections of economic growth. The alternative cases are intended to show the effects of alternative growth assumptions on energy market projections. The cases are described as follows:

- The *low economic growth case* assumes lower growth rates for population (0.6 percent per year), nonfarm employment (0.5 percent per year), and labor productivity (1.5 percent per year), resulting in higher prices and interest rates and lower growth in industrial output. In the low economic growth case, economic output as measured by real GDP increases by 1.8 percent per year from 2007 through 2030, and growth in real disposable income per capita averages 1.5 percent per year.
- The *high economic growth case* assumes higher growth rates for population (1.3 percent per year), nonfarm employment (1.3 percent per year), and labor productivity (2.4 percent per year). With higher productivity gains and employment growth, inflation and interest rates are lower than in the reference case, and consequently economic output grows at a higher rate (3.0 percent per year) than in the reference case (2.5 percent). Disposable income per capita grows by 1.7 percent per year, compared with 1.6 percent in the reference case.

### **Oil Price Cases**

The world oil price in *AEO2009* is defined as the average price of light, low-sulfur crude oil delivered in Cushing, Oklahoma, and is similar to the price for light, sweet crude oil traded on the New York Mercantile Exchange. *AEO2009* also includes a projection of the U.S. annual average refiners' acquisition cost of imported crude oil, which is more representative of the average cost of all crude oils used by refiners.

The historical record shows substantial variability in world oil prices, and there is arguably even more uncertainty about future prices in the long term. *AEO2009* considers three price cases (reference, low oil price, and high oil price) to allow an assessment of alternative views on the course of future oil prices. The low and high oil price cases define a wide range of potential price paths, reflecting different assumptions about decisions by OPEC members regarding the preferred rate of oil production and about the future finding and development costs and accessibility of conventional oil resources outside the United States. Because the low and high oil price cases are not fully integrated with a world economic model, the impact of world oil prices on international economies is not accounted for directly.

- In the *reference case*, real world oil prices rise from a low of \$61 per barrel (2007 dollars) in 2009 to \$110 per barrel in 2015, then increase more slowly to \$130 per barrel in 2030. The reference case represents EIA's current judgment regarding exploration and development costs and accessibility of oil resources outside the United States. It also assumes that OPEC producers will choose to maintain their share of the market and will schedule investments in incremental production capacity so that OPEC's conventional oil production will represent about 40 percent of the world's total liquids production.
- In the *low oil price case*, real world oil prices are only \$50 per barrel (2007 dollars) in 2030, compared with \$130 per barrel in the reference case. The low oil price case assumes that OPEC countries will increase their conventional oil production to obtain approximately a 44-percent share of total world liquids production, and that oil resources outside the U.S. will be more accessible and/or less costly to produce (as a result of technology advances, more attractive fiscal regimes, or both) than in the reference case. With these assumptions, conventional oil production outside

## NEMS Overview and Brief Description of Cases

**Table E1. Summary of the AEO2009 cases**

Case name	Description	Integration mode	Reference in text	Reference in Appendix E
Reference	Baseline economic growth (2.5 percent per year from 2007 through 2030), world oil price, and technology assumptions. Complete projection tables in Appendix A.	Fully integrated	-	-
Low Economic Growth	Real GDP grows at an average annual rate of 1.8 percent from 2007 to 2030. Other energy market assumptions are the same as in the reference case. Partial projection tables in Appendix B.	Fully integrated	p. 58	p. 202
High Economic Growth	Real GDP grows at an average annual rate of 3.0 percent from 2007 to 2030. Other energy market assumptions are the same as in the reference case. Partial projection tables in Appendix B.	Fully integrated	p. 58	p. 202
Low Oil Price	More optimistic assumptions for economic access to non-OPEC resources and OPEC behavior than in the reference case. World light, sweet crude oil prices are \$50 per barrel in 2030, compared with \$130 per barrel in the reference case (2007 dollars). Other assumptions are the same as in the reference case. Partial projection tables in Appendix C.	Fully integrated	p. 60	p. 202
High Oil Price	More pessimistic assumptions for economic access to non-OPEC resources and OPEC behavior than in the reference case. World light, sweet crude oil prices are about \$200 per barrel (2007 dollars) in 2030. Other assumptions are the same as in the reference case. Partial projection tables in Appendix C.	Fully integrated	p. 60	p. 202
Residential: 2009 Technology	Future equipment purchases based on equipment available in 2009. Existing building shell efficiencies fixed at 2009 levels. Partial projection tables in Appendix D.	With commercial	p. 63	p. 206
Residential: High Technology	Earlier availability, lower costs, and higher efficiencies assumed for more advanced equipment. Building shell efficiencies for new construction meet ENERGY STAR requirements after 2016. Partial projection tables in Appendix D.	With commercial	p. 63	p. 206
Residential: Best Available Technology	Future equipment purchases and new building shells based on most efficient technologies available by fuel. Building shell efficiencies for new construction meet the criteria for most efficient components after 2009. Partial projection tables in Appendix D.	With commercial	p. 64	p. 206
Commercial: 2009 Technology	Future equipment purchases based on equipment available in 2009. Building shell efficiencies fixed at 2009 levels. Partial projection tables in Appendix D.	With residential	p. 65	p. 206
Commercial: High Technology	Earlier availability, lower costs, and higher efficiencies for more advanced equipment. Building shell efficiencies for new and existing buildings increase by 8.8 and 6.3 percent, respectively, from 2003 values by 2030. Partial projection tables in Appendix D.	With residential	p. 65	p. 206
Commercial: Best Available Technology	Future equipment purchases based on most efficient technologies available by fuel. Building shell efficiencies for new and existing buildings increase by 10.5 and 7.5 percent, respectively, from 2003 values by 2030. Partial projection tables in Appendix D.	With residential	p. 66	p. 206

## NEMS Overview and Brief Description of Cases

**Table E1. Summary of the AEO2008 cases (continued)**

Case name	Description	Integration mode	Reference in text	Reference in Appendix E
Industrial: 2009 Technology	Efficiency of plant and equipment fixed at 2009 levels. Partial projection tables in Appendix D.	Standalone	p. 178	p. 207
Industrial: High Technology	Earlier availability, lower costs, and higher efficiencies for more advanced equipment. Partial projection tables in Appendix D.	Standalone	p. 178	p. 207
Transportation: Low Technology	Advanced technologies are more costly and less efficient than in the reference case. Partial projection tables in Appendix D.	Standalone	p. 69	p. 207
Transportation: High Technology	Advanced technologies are less costly and more efficient than in the reference case. Partial projection tables in Appendix D.	Standalone	p. 69	p. 207
Electricity: Low Nuclear Cost	New nuclear capacity has 25 percent lower capital and operating costs in 2030 than in the reference case. Partial projection tables in Appendix D.	Fully integrated	p. 181	p. 207
Electricity: High Nuclear Cost	Costs for new nuclear technology do not improve from 2009 levels in the reference case. Existing nuclear plants are retired after 55 years of service. Partial projection tables in Appendix D.	Fully integrated	p. 181	p. 208
Electricity: Low Fossil Technology Cost	Capital and operating costs for all new fossil-fired generating technologies improve by 25 percent in 2030 from reference case values. Partial projection tables in Appendix D.	Fully integrated	p. 182	p. 208
Electricity: High Fossil Technology Cost	Costs for new advanced fossil-fired generating technologies do not improve over time from 2009. Partial projection tables in Appendix D.	Fully integrated	p. 182	p. 208
Electricity: Frozen Plant Capital Costs	Base overnight costs for all new electric generating technologies are frozen at 2013 levels. Cost decreases due to learning still occur, but no declines in costs due to commodity price changes are assumed.	Fully integrated	p. 45	p. 208
Electricity: High Plant Capital Costs	Base overnight costs for all new electric generating technologies continue increasing throughout the projection, through a cost factor in 2030 that is 25 percentage points above the 2013 factor. Cost decreases due to learning can still occur and may partially offset the increases.	Fully integrated	p. 45	p. 208
Electricity: Falling Plant Capital Costs	Base overnight costs for all new electric generating technologies fall more rapidly than in the reference case, by assuming a cost factor 25 percentage points below the reference case cost factor in 2030.	Fully integrated	p. 45	p. 208
Renewable Fuels: High Renewable Technology Cost	New renewable generating technologies do not improve over time from 2009. Partial projection tables in Appendix D.	Fully integrated	p. 75	p. 208
Renewable Fuels: Low Renewable Technology Cost	Levelized cost of energy for nonhydropower renewable generating technologies declines by 25 percent in 2030 from reference case values. Partial projection tables in Appendix D.	Fully integrated	p. 75	p. 209
Renewable Fuels: Production Tax Credit Extension	Production Tax Credit for certain renewable generation is extended to projects constructed through 2019.	Fully integrated	p. 47	p. 209

## NEMS Overview and Brief Description of Cases

**Table E1. Summary of the AEO2008 cases (continued)**

Case name	Description	Integration mode	Reference in text	Reference in Appendix E
Oil and Gas: Rapid Technology	Cost, finding rate, and success rate parameters are adjusted for 50 percent more rapid improvement than in the reference case. Partial projection tables in Appendix D.	Fully integrated	p. 76	p. 209
Oil and Gas: Slow Technology	Cost, finding rate, and success rate parameters are adjusted for 50 percent slower improvement than in the reference case. Partial projection tables in Appendix D.	Fully Integrated	p. 76	p. 209
Oil and Gas: High LNG Supply	LNG imports are set exogenously to a factor times the reference case levels from 2010 forward, with the remaining assumptions unchanged from the reference case. The factor starts at 1.0 in 2010 and increases linearly to 5.0 in 2030. Partial projection tables in Appendix D.	Fully integrated	p. 192	p. 209
Oil and Gas: Low LNG Supply	LNG imports held constant at 2009 levels, with the remaining assumptions unchanged from the reference case. Partial projection tables in Appendix D.	Fully integrated	p. 192	p. 209
Oil and Gas: ANWR	The Arctic National Wildlife Refuge (ANWR) in Alaska is opened to Federal oil and natural gas leasing, with the remaining assumptions unchanged from the reference case. Partial projection tables in Appendix D.	Fully integrated	p. 193	p. 209
Oil and Gas: No Alaska Pipeline	A natural gas pipeline from the North Slope of Alaska to the lower 48 States is not built during the projection period.	Fully integrated	p. 78	p. 210
Oil and Gas: OCS Limited	Access to the Atlantic , Pacific , and Gulf of Mexico Outer Continental Shelf (OCS) is limited by reinstatement of leasing moratoria that lapsed in 2008.	Fully integrated	p. 35	p.210
Coal: Low Coal Cost	Productivity growth rates for coal mining are higher than in the reference case, and coal mining wages, mine equipment, and coal transportation rates are lower. Partial projection tables in Appendix D.	Fully integrated	p. 83	p. 210
Coal: High Coal Cost	Productivity growth rates for coal mining are lower than in the reference case, and coal mining wages, mine equipment, and coal transportation rates are higher. Partial projection tables in Appendix D.	Fully integrated	p. 83	p. 210
Integrated 2009 Technology	Combination of the residential, commercial, and industrial 2009 technology cases and the electricity high fossil technology cost, high renewable technology cost, and high nuclear cost cases. Partial projection tables in Appendix D.	Fully integrated	p. 176	p. 210
Integrated High Technology	Combination of the residential, commercial, industrial, and transportation high technology cases and the electricity low fossil technology cost, low renewable technology cost, and low nuclear cost cases. Partial projection tables in Appendix D.	Fully integrated	p. 176	p. 210
No GHG Concern	No greenhouse gas emissions reduction policy is enacted, and market investment decisions are not altered in anticipation of such a policy.	Fully integrated	p. 50	p. 211
LW110	Based on the greenhouse gas emissions reduction policy proposed by Senators Lieberman and Warner in the 110th Congress (S. 2191).	Fully integrated	p. 50	p. 211
No 2008 Tax Legislation	EIEA2008 tax legislation is removed from the reference case.	Fully integrated	p. 66	p. 211

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the U.S. is higher in the low oil price case than in the reference case.

- In the *high oil price case*, real world oil prices reach about \$200 per barrel (2007 dollars) in 2030. The high oil price case assumes that OPEC countries will reduce their production from the current rate, sacrificing market share as global liquids production increases, and that oil resources outside the United States will be less accessible and/or more costly to produce than assumed in the reference case.

### **Buildings Sector Cases**

In addition to the *AEO2009* reference case, three standalone technology-focused cases using the Residential and Commercial Demand Modules of NEMS were developed to examine the effects of changes in equipment and building shell efficiencies.

For the residential sector, the three technology-focused cases are as follows:

- The *2009 technology case* assumes that all future equipment purchases are based only on the range of equipment available in 2009. Existing building shell efficiencies are assumed to be fixed at 2009 levels (no further improvements). For new construction, building shell technology options are constrained to those available in 2009.
- The *high technology case* assumes earlier availability, lower costs, and higher efficiencies for more advanced equipment [11]. For new construction, building shell efficiencies are assumed to meet ENERGY STAR requirements after 2016.
- The *best available technology case* assumes that all future equipment purchases are made from a menu of technologies that includes only the most efficient models available in a particular year for each fuel, regardless of cost. For new construction, building shell efficiencies are assumed to meet the criteria for the most efficient components after 2009.

For the commercial sector, the three technology-focused cases are as follows:

- The *2009 technology case* assumes that all future equipment purchases are based only on the range of equipment available in 2009. Building shell efficiencies are assumed to be fixed at 2009 levels.
- The *high technology case* assumes earlier availability, lower costs, and/or higher efficiencies for

more advanced equipment than in the reference case [12]. Building shell efficiencies for new and existing buildings in 2030 are assumed to be 8.8 percent and 6.3 percent higher, respectively, than their 2003 levels—a 25-percent improvement relative to the reference case.

- The *best available technology case* assumes that all future equipment purchases are made from a menu of technologies that includes only the most efficient models available in a particular year for each fuel, regardless of cost. Building shell efficiencies for new and existing buildings in 2030 are assumed to be 10.5 percent and 7.5 percent higher, respectively, than their 2003 values—a 50-percent improvement relative to the reference case.

The Residential and Commercial Demand Modules of NEMS were also used to complete the high and low renewable technology cost cases, which are discussed in more detail below in the Renewable Fuels Cases section. In combination with assumptions for electricity generation from renewable fuels in the electric power sector and industrial sector, these sensitivity cases analyze the impacts of changes in generating technologies that use renewable fuels and in the availability of renewable energy sources. For the Residential and Commercial Demand Modules:

- The *low renewable technology cost case* assumes greater improvements in residential and commercial PV and wind systems than in the reference case. The assumptions result in capital cost estimates for 2030 that are approximately 25 percent lower than reference case costs for distributed PV technologies.
- The *high renewable technology cost case* assumes that costs and performance levels for residential and commercial PV and wind systems remain constant at 2009 levels through 2030.

### **Industrial Sector Cases**

In addition to the *AEO2009* reference case, two standalone cases using the Industrial Demand Module of NEMS were developed to examine the effects of less rapid and more rapid technology change and adoption. Because they are standalone cases, the energy intensity changes discussed in this section exclude the refining industry. Energy use in the refining industry is estimated as part of the Petroleum Market Module in NEMS. The Industrial Demand Module also was used as part of the integrated low

## NEMS Overview and Brief Description of Cases

and high renewable technology cost cases. For the industrial sector:

- The *2009 technology case* holds the energy efficiency of plant and equipment constant at the 2009 level over the projection period. In this case, delivered energy intensity falls by 1.1 percent annually from 2007 to 2030, as compared with 1.5 percent annually in the reference case. Changes in aggregate energy intensity may result both from changing equipment and production efficiency and from changing composition of industrial output. Because the level and composition of industrial output are the same in the reference, 2009 technology, and high technology cases, any change in energy intensity in the two technology cases is attributable to efficiency changes.
- The *high technology case* assumes earlier availability, lower costs, and higher efficiency for more advanced equipment [13] and a more rapid rate of improvement in the recovery of biomass byproducts from industrial processes (0.7 percent per year, as compared with 0.4 percent per year in the reference case). The same assumption is incorporated in the integrated low renewable technology cost case, which focuses on electricity generation. Although the choice of the 0.7-percent annual rate of improvement in byproduct recovery is an assumption in the high technology case, it is based on the expectation that there would be higher recovery rates and substantially increased use of CHP in that case. Delivered energy intensity falls by 1.7 percent annually in the high technology case.

The 2009 technology case was run with only the Industrial Demand Module, rather than in fully integrated NEMS runs. Consequently, no potential feedback effects from energy market interactions are captured, and energy consumption and production in the refining industry, which are modeled in the PMM, are excluded.

### **Transportation Sector Cases**

In addition to the *AEO2009* reference case, two standalone cases using the NEMS Transportation Demand Module were developed to examine the effects of advanced technology costs and efficiency improvement on technology adoption and vehicle fuel economy [14]. For the transportation sector:

- In the *low technology case*, the characteristics of conventional technologies, advanced technologies, and alternative-fuel LDVs, heavy-duty

vehicles, and aircraft reflect more pessimistic assumptions about cost and efficiency improvements achieved over the projection. More pessimistic assumptions for fuel efficiency improvement are also reflected in the rail and shipping sectors.

- In the *high technology case*, the characteristics of conventional and alternative-fuel light-duty vehicles reflect more optimistic assumptions about incremental improvements in fuel economy and costs. In the freight truck sector, the high technology case assumes more rapid incremental improvement in fuel efficiency for engine and emissions control technologies. More optimistic assumptions for fuel efficiency improvements are also made for the air, rail, and shipping sectors.

The low technology and high technology cases were run with only the Transportation Demand Module rather than as fully integrated NEMS runs. Consequently, no potential macroeconomic feedback related to vehicles costs or travel demand was captured, nor were changes in fuel prices incorporated.

### **Electricity Sector Cases**

In addition to the reference case, several integrated cases with alternative electric power assumptions were developed to analyze uncertainties about the future costs and performance of new generating technologies. Two of the cases examine alternative assumptions for nuclear power technologies, and two examine alternative assumptions for fossil fuel technologies. Three additional cases examine alternative cost paths for all technologies, based on uncertainties in the underlying commodity prices that influence power plant construction costs. Reference case values for technology characteristics are determined in consultation with industry and government specialists; however, there is always uncertainty surrounding the major component costs. The electricity cases analyze what could happen if costs of new plants were either higher or lower than assumed in the reference case. The cases are fully integrated to allow feedback between the potential shifts in fuel consumption and fuel prices.

### **Nuclear Technology Cost Cases**

- The cost assumptions for the *low nuclear cost case* reflect a 25-percent reduction in the capital and operating costs for advanced nuclear technology in 2030, relative to the reference case. The reference case projects a 29-percent reduction in the

## NEMS Overview and Brief Description of Cases

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capital costs of nuclear power plants from 2009 to 2030; the low nuclear cost case assumes a 46-percent reduction from 2009 to 2030.

- The *high nuclear cost case* assumes that capital costs for the advanced nuclear technology do not decline during the projection period but remain fixed at the 2009 levels assumed in the reference case. This case also assumes that existing nuclear plants are retired after 55 years of operation, as compared with a maximum 60-year life in the reference case. There is considerable uncertainty surrounding the technical lifetime for some of the major components of older nuclear plants.

### *Fossil Cost Technology Cases*

- In the *low fossil technology cost case*, capital costs and operating costs for all coal- and natural-gas-fired generating technologies are assumed to be 25 percent lower than reference case levels in 2030. Because learning in the reference case reduces costs with manufacturing experience, costs in the low fossil cost case are reduced by 40 to 47 percent between 2009 and 2030, depending on the technology.
- In the *high fossil technology cost case*, capital costs for all coal- and natural-gas-fired generating technologies do not decline during the projection period but remain fixed at the 2009 values assumed in the reference case.

Additional details about annual capital costs, operating and maintenance costs, plant efficiencies, and other factors used in the high and low fossil technology cost cases will be provided in *Assumptions to the Annual Energy Outlook 2009* [15].

### *Electricity Plant Capital Cost Cases*

The costs to build new power plants have risen dramatically in the past few years, primarily as a result of significant increases in the costs of construction-related materials, such as cement, iron, steel, and copper. For the *AEO2009* reference case, initial overnight costs for all technologies were updated to be consistent with costs estimates in the early part of 2008. A cost adjustment factor based on the projected producer price index for metals and metal products was also implemented, allowing the overnight costs to fall in the future if the index drops, or to rise further if the index increases. Although there is significant correlation between commodity prices and power plant construction costs, other factors may influence future

costs, raising the uncertainties surrounding the future costs of building new power plants. For *AEO2009*, three additional cost cases focus on the uncertainties of future plant construction costs. The three cases use exogenous assumptions for the annual adjustment factors, rather than linking to the metals price index. The cases are discussed in “Electricity Plant Cost Uncertainties” in the Issues in Focus section of this report.

- In the *frozen plant capital costs case*, base overnight costs for all new generating technologies are assumed to be frozen at 2013 levels. Cost decreases still can occur with learning. In this case, costs do decline slightly over the projection, but capital costs are roughly 20 percent above reference case costs in 2030.
- In the *high plant capital costs case*, base overnight costs for all new generating technologies are assumed to continue increasing throughout the projection, with the cost factor increasing by 25 percentage points from 2013 to 2030. Cost decreases still can occur with learning, and they may partially offset the increases, but costs for most technologies in 2030 are above current costs and about 50 percent higher than projected costs in 2030 in the reference case.
- In the *falling plant capital costs case*, base overnight costs for all new generating technologies are assumed to fall more rapidly than in the reference case, starting in 2013. In 2030, the cost factor is assumed to be 25 percentage points below the reference case value.

### *Renewable Fuels Cases*

In addition to the *AEO2009* reference case, two integrated cases with alternative assumptions about renewable fuels were developed to examine the effects of less aggressive and more aggressive improvement in the cost of renewable technologies. The cases are as follows:

- In the *high renewable technology cost case*, capital costs, operating and maintenance costs, and performance levels for wind, solar, biomass, and geothermal resources are assumed to remain constant at 2009 levels through 2030. Although biomass prices are not changed from the reference case, this case assumes that dedicated energy crops (also known as “closed-loop” biomass fuel supply) do not become available.

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- In the *low renewable technology cost case*, the levelized costs of energy resources for generating technologies using renewable resources are assumed to decline to 25 percent below the reference case costs for the same resources in 2030. In general, lower costs are represented by reducing the capital costs of new plant construction. Biomass fuel supplies also are assumed to be 25 percent less expensive than in the reference case for the same resource quantities used in the reference case. Assumptions for other generating technologies are unchanged from those in the reference case. In the low renewable technology cost case, the rate of improvement in recovery of biomass byproducts from industrial processes is also increased.
- In the *production tax credit extension case*, an additional extension of the PTC is provided to all eligible resources modeled in *AEO2009*. In this case, plants entering service by December 31, 2019, are assumed to be eligible for the PTC. Under current law as of December 2008, the PTC for certain renewable generation technologies, including geothermal, biomass, hydroelectric, and landfill gas, will not be available for plants constructed after December 31, 2010. For wind, the PTC will not be available to plants constructed after December 31, 2009. This law has been renewed periodically, however, either before or within a several months after its expiration.

### Oil and Gas Supply Cases

The sensitivity of the projections to changes in the assumed rates of technological progress in oil and natural gas supply and LNG imports are examined in four cases:

- In the *rapid technology case*, the parameters representing the effects of technological progress on finding rates, drilling costs, lease equipment and operating costs, and success rates for conventional oil and natural gas drilling in the reference case are improved by 50 percent. Improvements in a number of key exploration and production technologies for unconventional natural gas also are increased by 50 percent in the rapid technology case. Key supply parameters for Canadian oil and natural gas also are modified to simulate the assumed impacts of more rapid oil and natural gas technology penetration on Canadian supply potential. All other parameters in the model are kept at the reference case values, including technology

parameters for other modules, parameters affecting foreign oil supply, and assumptions about imports and exports of LNG and natural gas trade between the United States and Mexico. Specific detail by region and fuel category is provided in *Assumptions to the Annual Energy Outlook 2009* [16].

- In the *slow technology case*, the parameters representing the effects of technological progress on finding rates, drilling, lease equipment and operating costs, and success rates for conventional oil and natural gas drilling are 50 percent less optimistic than those in the reference case. Improvements in a number of key exploration and production technologies for unconventional natural gas also are reduced by 50 percent in the slow technology case. Key Canadian supply parameters also are modified to simulate the assumed impacts of slow oil and natural gas technology penetration on Canadian supply potential. All other parameters in the model are kept at the reference case values.
- The *high LNG supply case* exogenously specifies LNG import levels for 2010 through 2030 equal to a factor times the reference case levels. The factor starts at 1 in 2010 and increases linearly to 5 in 2030. The intent is to project the potential impact on domestic natural gas markets if LNG imports turn out to be higher than projected in the reference case.
- The *low LNG supply case* exogenously specifies LNG imports at the 2009 levels projected in the reference case for the period 2010 through 2030. The intent is to project the potential impact on domestic natural gas markets if LNG imports turn out to be lower than projected in the reference case.

Additional cases show the potential impacts of lifting leasing restrictions in the Arctic National Wildlife Refuge (ANWR), of conditions that result in no construction of an Alaska pipeline before 2030, and of reinstating the Outer Continental Shelf (OCS) leasing moratoria that expired on September 30, 2008.

- The *ANWR case* assumes that Federal legislation passed during 2009 permits Federal oil and gas leasing in ANWR's 1002 area, and that oil and natural gas leasing will commence after 2009 in the State and Native lands that are either in or adjoining ANWR.

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- The *no Alaska pipeline case* examines the natural gas market impacts of assuming that a pipeline to move North Slope gas from Alaska to the lower 48 States is not constructed during the projection period. Currently, there are no specific prohibitions on the construction of such a pipeline; however, political, business, and/or economic factors could lead to indefinite postponement of the project.
- The *OCS limited case* assumes that the OCS leasing allowed by Congress to expire on September 30, 2008, does not expire and will continue to be renewed annually throughout the projection period, thus prohibiting offshore drilling for oil and natural gas in the Pacific, the Atlantic, most of the Eastern Gulf of Mexico, and a small area in the Central Gulf of Mexico OCS. In the OCS limited case, technically recoverable resources in the OCS total 75 billion barrels of oil and 380 trillion cubic feet of natural gas, as compared with 93 billion barrels and 456 trillion cubic feet in the reference case.

### Coal Market Cases

Two alternative coal cost cases examine the impacts on U.S. coal supply, demand, distribution, and prices that result from alternative assumptions about mining productivity, labor costs, mine equipment costs, and coal transportation rates. The alternative productivity and cost assumptions are applied in every year from 2010 through 2030. For the coal cost cases, adjustments to the reference case assumptions for coal mining productivity are based on variation in the average annual productivity growth of 3.6 percent observed since 1980. Transportation rates are lowered (in the low cost case) or raised (in the high cost case) from reference case levels to achieve a 25-percent change in rates relative to the reference case in 2030. The low and high coal cost cases represent fully integrated NEMS runs, with feedback from the macroeconomic activity, international, supply, conversion, and end-use demand modules.

- In the *low coal cost case*, the average annual growth rates for coal mining productivity are higher than those in the reference case and are applied at the supply curve level. As an example, the average annual growth rate for Wyoming's Southern Powder River Basin supply curve is increased from -0.5 percent in the reference case for the years 2010 through 2030 to 3.1 percent in the low coal cost case. Coal mining wages, mine equipment costs, and other mine supply costs all are

assumed to be about 20 percent lower in 2030 in real terms in the low coal cost case than in the reference case. Coal transportation rates, excluding the impact of fuel surcharges, are assumed to be 25 percent lower in 2030.

- In the *high coal cost case*, the average annual productivity growth rates for coal mining are lower than those in the reference case and are applied as described in the *low coal cost case*. Coal mining wages, mine equipment costs, and other mine supply costs in 2030 are assumed to be about 20 percent higher than in the reference case, and coal transportation rates in 2030 are assumed to be 25 percent higher.

Additional details about the productivity, wage, mine equipment cost, and coal transportation rate assumptions for the reference and alternative coal cost cases are provided in Appendix D.

### Cross-Cutting Integrated Cases

In addition to the sector-specific cases described above, a series of cross-cutting integrated cases are used in *AEO2009* to analyze specific scenarios with broader sectoral impacts. For example, two integrated technology progress cases combine the assumptions from the other technology progress cases to analyze the broader impacts of more rapid and slower technology improvement rates. In addition, two cases also were run with alternative assumptions about future regulation of GHG emissions.

#### Integrated Technology Cases

The *integrated 2009 technology case* combines the assumptions from the residential, commercial, and industrial 2009 technology cases and the electricity high fossil technology cost, high renewable technology cost, and high nuclear cost cases. The *integrated high technology case* combines the assumptions from the residential, commercial, industrial, and transportation high technology cases and the electricity high fossil technology cost, low renewable technology cost, and low nuclear cost cases.

#### Greenhouse Gas Uncertainty Cases

Although currently no legislation restricting GHG emissions is in place in the United States, regulators and the investment community are beginning to push energy companies to invest in less GHG-intensive technologies, as captured in the reference case by assuming a 3-percentage-point increase in the cost of capital for investments in new coal-fired power plants

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without CCS and new CTL plants. Those assumptions affect cost evaluations for the construction of new capacity but not the actual operating costs when a new plant begins operation.

Two alternative cases are used to provide a range of outcomes, from no concern about future GHG legislation to the imposition of a specific GHG limit. The *no GHG concern case*, which was run without any adjustment for concern about potential GHG regulations, is similar to the reference cases from previous AEOs (without the 3-percentage-point increase). In the no GHG concern case, the same cost of capital is used to evaluate all new capacity builds, regardless of type. The *LW110 case* assumes implementation of a GHG emissions reduction policy that affects both investment and operating costs. Assumptions for the LW110 case are based on S. 2191, the Lieberman-Warner Climate Security Act of 2007 in the 110th Congress, as modeled in an earlier EIA analysis [17]. Results from the LW110 case should be viewed as illustrative, because the impact of any policy to reduce GHG emissions will depend on its detailed specifications, which are likely to differ from those in the LW110 case.

### No 2008 Tax Legislation Case

Because the *AEO2009* reference case includes the tax provisions from EIEA2008 [18], a *no 2008 tax legislation case* is used to examine the impacts of those specific tax provisions.

### Endnotes

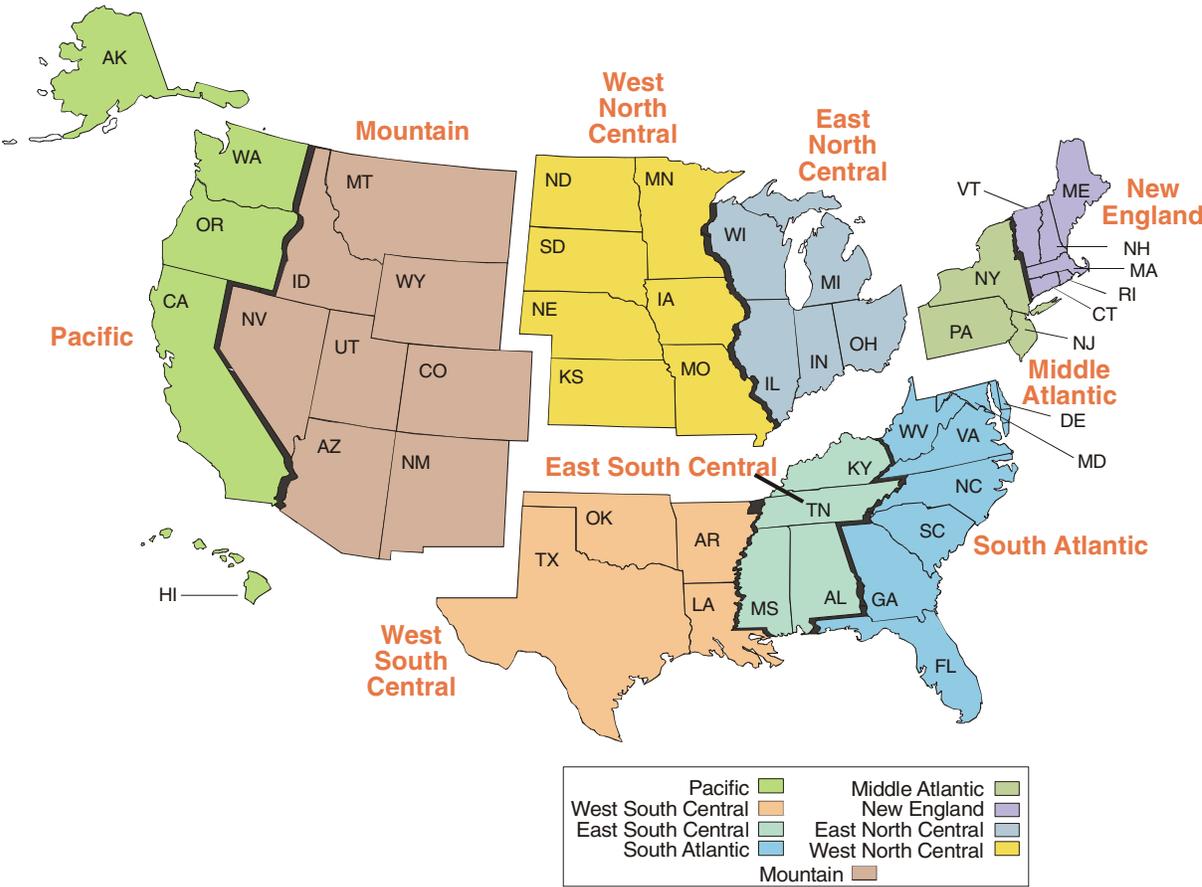
1. Energy Information Administration, *The National Energy Modeling System: An Overview 2003*, DOE/EIA-0581(2003) (Washington, DC, March 2003), web site [www.eia.doe.gov/oiaf/aeo/overview](http://www.eia.doe.gov/oiaf/aeo/overview).
2. For *AEO2010*, the projection period is expected to be extended to 2035.
3. Energy Information Administration, *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008), web site [www.eia.doe.gov/emeu/aer/contents.html](http://www.eia.doe.gov/emeu/aer/contents.html).
4. Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2007*, DOE/EIA-0573(2007) (Washington, DC, December, 2008), web site [www.eia.doe.gov/oiaf/1605/ggrpt/index.html](http://www.eia.doe.gov/oiaf/1605/ggrpt/index.html).
5. Energy Information Administration, *Short-Term Energy Outlook*, web site [www.eia.doe.gov/emeu/steo/pub/contents.html](http://www.eia.doe.gov/emeu/steo/pub/contents.html). Portions of the preliminary information were also used to initialize the NEMS Petroleum Market Module projection.
6. Jet Information Services, Inc., *World Jet Inventory Year-End 2006* (Utica, NY, March 2007); and personal communication from Stuart Miller (Jet Information Services).
7. Energy Information Administration, *Assumptions to the Annual Energy Outlook 2009*, DOE/EIA-0554 (2009) (Washington, DC, March 2009), web site [www.eia.doe.gov/oiaf/aeo/assumption](http://www.eia.doe.gov/oiaf/aeo/assumption).
8. For gasoline blended with ethanol, the tax credit of 51 cents (nominal) per gallon of ethanol is assumed to be available for 2008; however, it is reduced to 45 cents starting in 2009 (the year after annual U.S. ethanol consumption surpasses 7.5 billion gallons), as mandated by the Food, Conservation, and Energy Act of 2008 (the Farm Bill), and it is set to expire after 2010. In addition, modeling updates include the Farm Bill's mandated extension of the ethanol import tariff, at 54 cents per gallon, to December 31, 2010. Finally, again in accordance with the Farm Bill, a new cellulosic ethanol producer's tax credit of \$1.01 per gallon, valid through 2012, is implemented in the model; however, it is reduced by the amount of the blender's tax credit amount. Thus, in 2009 and 2010, the cellulosic ethanol producer's tax credit is modeled as  $\$1.01 - \$0.45 = \$0.56$  per gallon, and in 2011 and 2012 it is set at \$1.01 per gallon.
9. California Environmental Protection Agency, Air Resources Board, "Phase 3 California Reformulated Gasoline Regulations," web site [www.arb.ca.gov/regact/2007/carfg07/carfg07.htm](http://www.arb.ca.gov/regact/2007/carfg07/carfg07.htm).
10. Energy Information Administration, *Assumptions to the Annual Energy Outlook 2009*, DOE/EIA-0554 (2009) (Washington, DC, March 2009), web site [www.eia.doe.gov/oiaf/aeo/assumption](http://www.eia.doe.gov/oiaf/aeo/assumption).
11. High technology assumptions for the residential sector are based on Energy Information Administration, *EIA—Technology Forecast Updates—Residential and Commercial Building Technologies—Advanced Case Second Edition (Revised)* (Navigant Consulting, Inc., September 2007), and *EIA—Technology Forecast Updates—Residential and Commercial Building Technologies—Advanced Case: Residential and Commercial Lighting, Commercial Refrigeration, and Commercial Ventilation Technologies* (Navigant Consulting, Inc., September 2008).
12. High technology assumptions for the commercial sector are based on Energy Information Administration, *EIA—Technology Forecast Updates—Residential and Commercial Building Technologies—Advanced Case Second Edition (Revised)* (Navigant Consulting, Inc., September 2007), and *EIA—Technology Forecast Updates—Residential and Commercial Building Technologies—Advanced Case: Residential and Commercial Lighting, Commercial Refrigeration, and Commercial Ventilation Technologies* (Navigant Consulting, Inc., September 2008).

## NEMS Overview and Brief Description of Cases

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13. These assumptions are based in part on Energy Information Administration, *Industrial Technology and Data Analysis Supporting the NEMS Industrial Model* (FOCIS Associates, October 2005).
14. Energy Information Administration, *Documentation of Technologies Included in the NEMS Fuel Economy Model for Passenger Cars and Light Trucks* (Energy and Environmental Analysis, September 2003).
15. Energy Information Administration, *Assumptions to the Annual Energy Outlook 2009*, DOE/EIA-0554 (2009) (Washington, DC, March 2009), web site [www.eia.doe.gov/oiaf/aeo/assumption](http://www.eia.doe.gov/oiaf/aeo/assumption).
16. Energy Information Administration, *Assumptions to the Annual Energy Outlook 2009*, DOE/EIA-0554 (2009) (Washington, DC, March 2009), web site [www.eia.doe.gov/oiaf/aeo/assumption](http://www.eia.doe.gov/oiaf/aeo/assumption).
17. See Energy Information Administration, *Energy Market and Economic Impacts of S. 2191, the Lieberman-Warner Climate Security Act of 2007*, SR/OIAF/2008-01 (Washington, DC, April 2008), web site [www.eia.doe.gov/oiaf/servicerpt/s2191/pdf/sroiaf\(2008\)01.pdf](http://www.eia.doe.gov/oiaf/servicerpt/s2191/pdf/sroiaf(2008)01.pdf).
18. See pages 9-12 in the Legislation and Regulations section of this report.

**F1. United States Census Divisions**

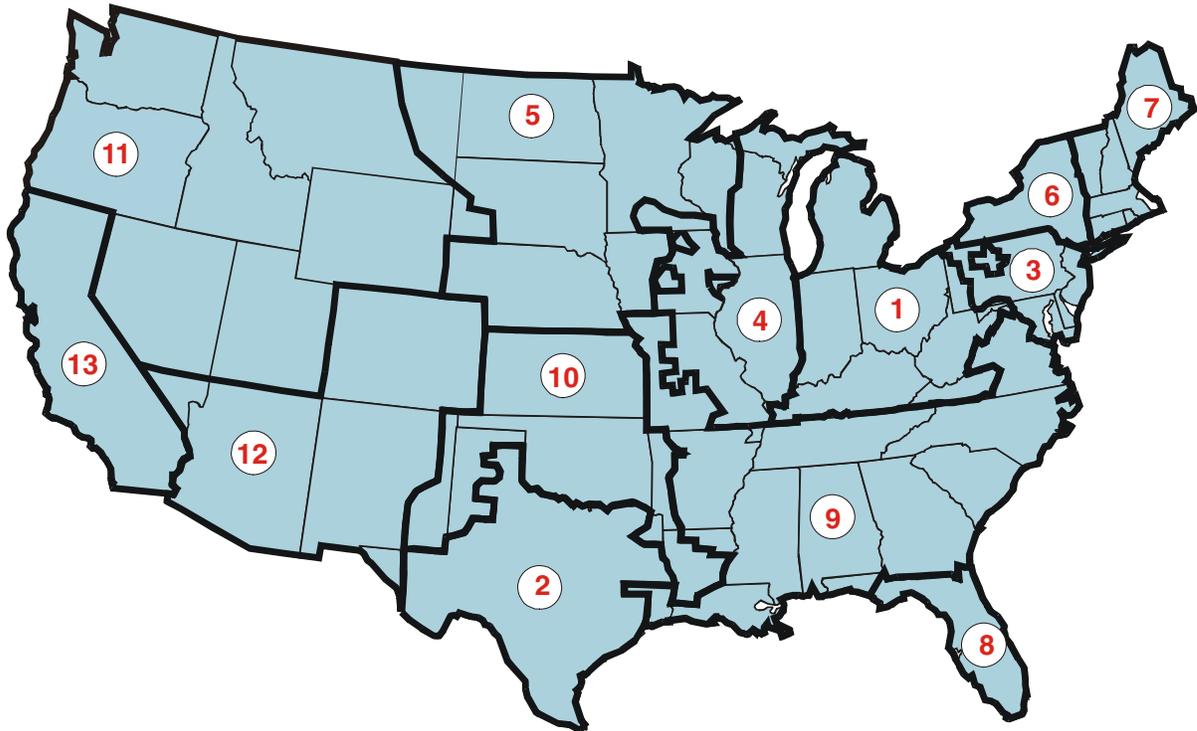


Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

## Regional Maps

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### F2. Electricity Market Module Regions



- 1 East Central Area Reliability Coordination Agreement (ECAR)
- 2 Electric Reliability Council of Texas (ERCOT)
- 3 Mid-Atlantic Area Council (MAAC)
- 4 Mid-America Interconnected Network (MAIN)
- 5 Mid-Continent Area Power Pool (MAPP)
- 6 New York (NY)
- 7 New England (NE)

- 8. Florida Reliability Coordinating Council (FL)
- 9. Southeastern Electric Reliability Council (SEF)
- 10. Southwest Power Pool (SPP)
- 11. Northwest Power Pool (NWP)
- 12. Rocky Mountain Power Area, Arizona, New Mexico, and Southern Nevada (RA)
- 13. California (CA)

Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

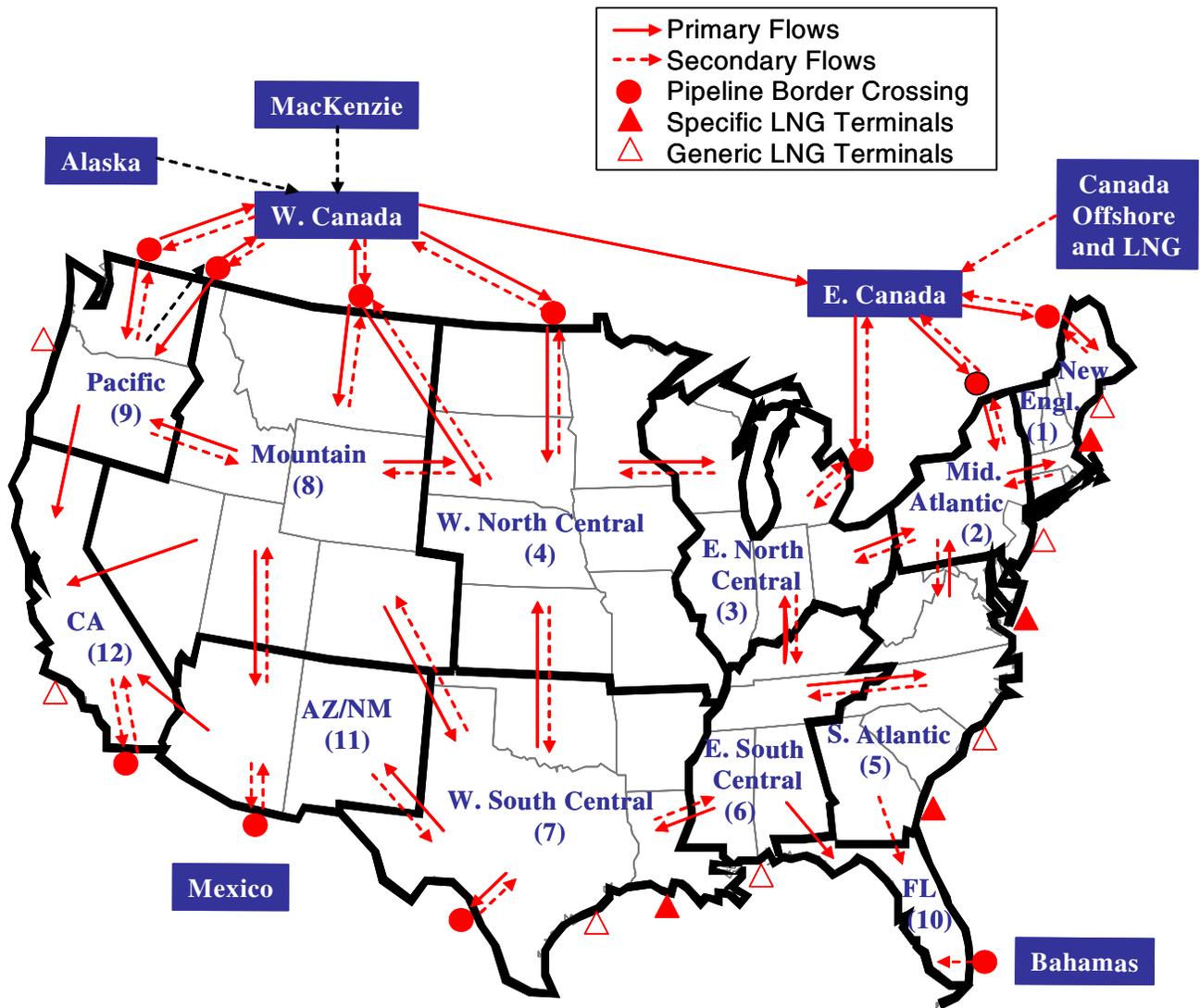
F3. Oil and Gas Supply Model Regions



Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

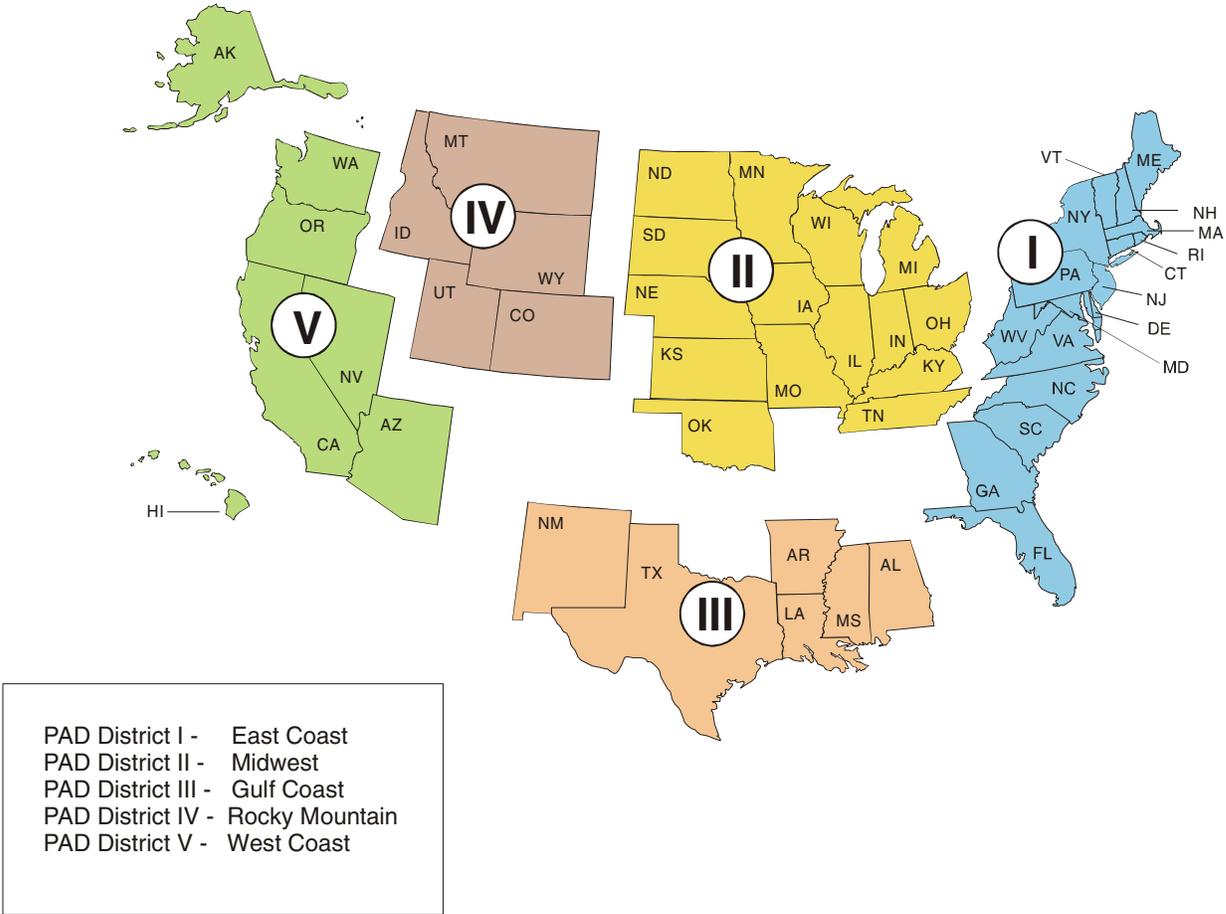
# Regional Maps

## F4. Natural Gas Transmission and Distribution Model Regions



Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

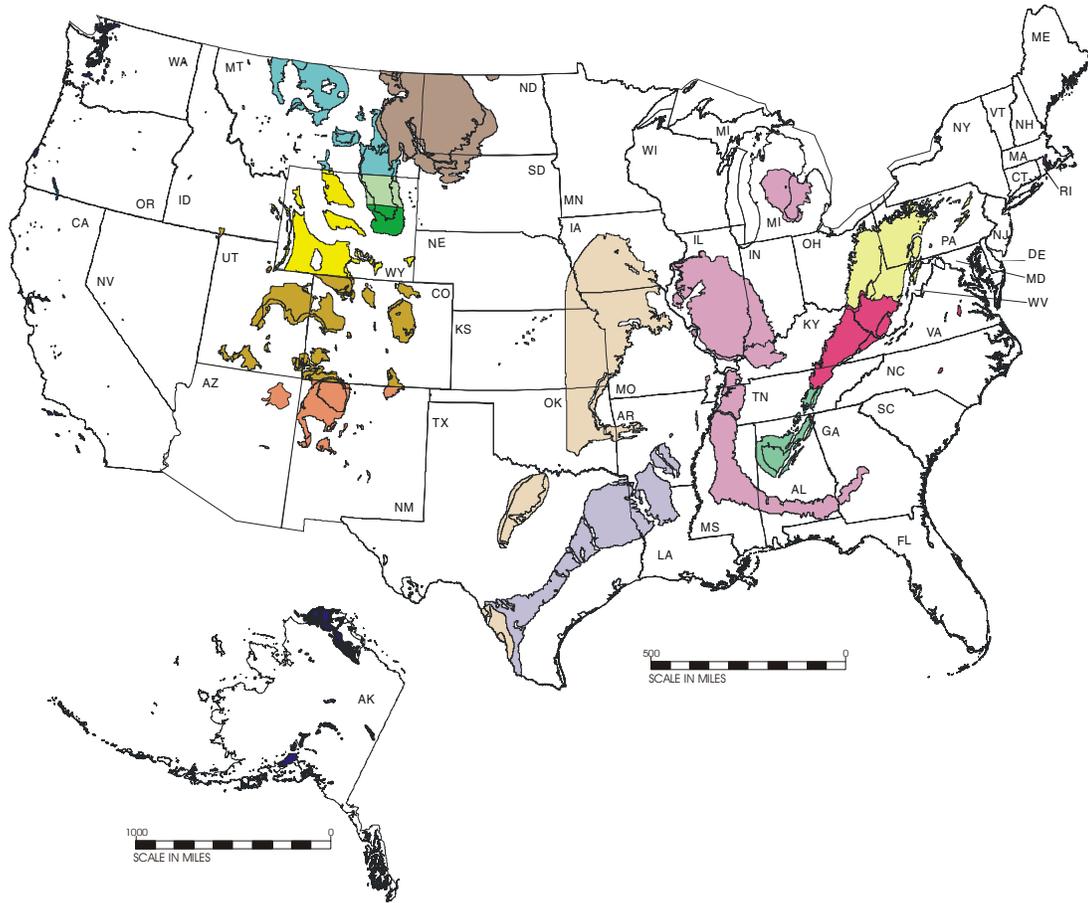
F5. Petroleum Administration for Defense Districts



Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

# Regional Maps

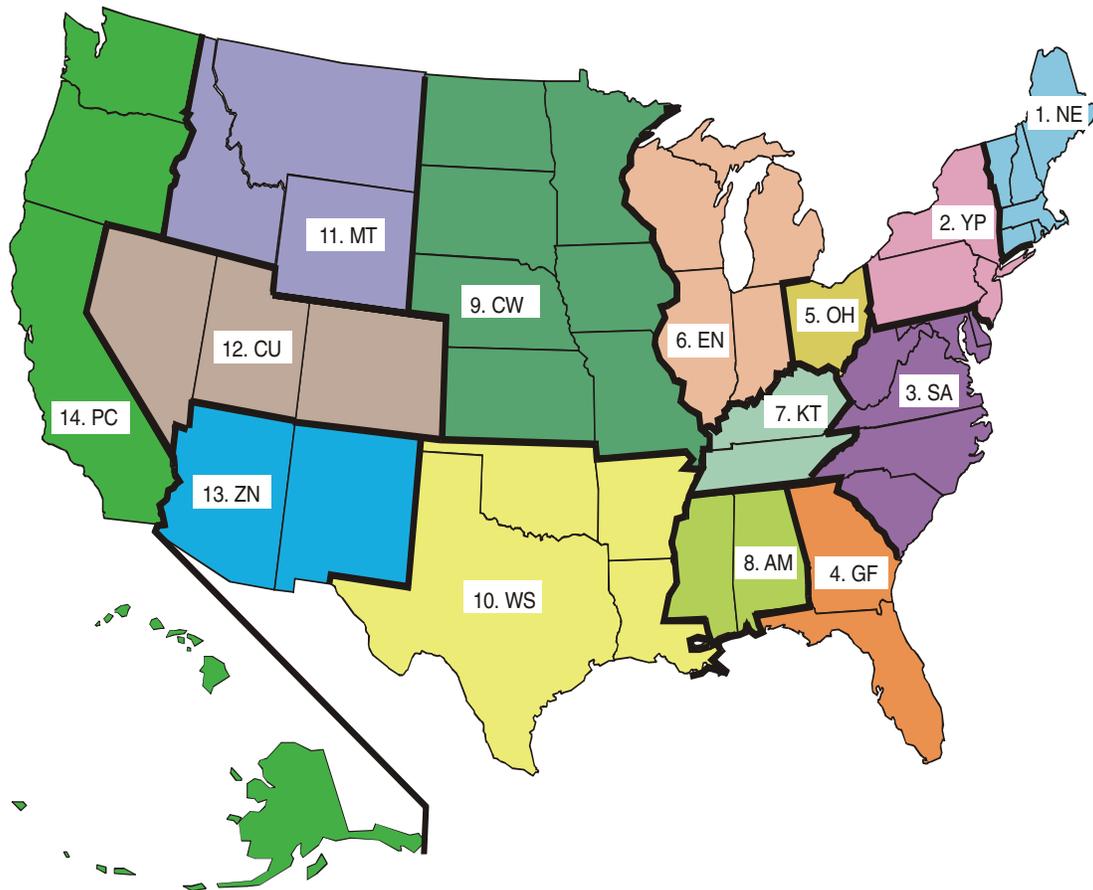
## F6. Coal Supply Regions



- |  |   |
|--|---|
| <p><b>APPALACHIA</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #ffffcc; border: 1px solid black; margin-right: 5px;"></span> Northern Appalachia</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #ff6666; border: 1px solid black; margin-right: 5px;"></span> Central Appalachia</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #99cc99; border: 1px solid black; margin-right: 5px;"></span> Southern Appalachia</li> </ul> | <p><b>NORTHERN GREAT PLAINS</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #a67c52; border: 1px solid black; margin-right: 5px;"></span> Dakota Lignite</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #4db6ac; border: 1px solid black; margin-right: 5px;"></span> Western Montana</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #c8e6c9; border: 1px solid black; margin-right: 5px;"></span> Wyoming, Northern Powder River Basin</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #43a047; border: 1px solid black; margin-right: 5px;"></span> Wyoming, Southern Powder River Basin</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #ffff00; border: 1px solid black; margin-right: 5px;"></span> Western Wyoming</li> </ul> |
| <p><b>INTERIOR</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #e1bee7; border: 1px solid black; margin-right: 5px;"></span> Eastern Interior</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #f5deb3; border: 1px solid black; margin-right: 5px;"></span> Western Interior</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #b39ddb; border: 1px solid black; margin-right: 5px;"></span> Gulf Lignite</li> </ul>               | <p><b>OTHER WEST</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #c4a33a; border: 1px solid black; margin-right: 5px;"></span> Rocky Mountain</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #e67e22; border: 1px solid black; margin-right: 5px;"></span> Southwest</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #2980b9; border: 1px solid black; margin-right: 5px;"></span> Northwest</li> </ul>  |

Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

F7. Coal Demand Regions



Region Code	Region Content
1. NE	CT,MA,ME,NH,RI,VT
2. YP	NY,PA,NJ
3. SA	WV,MD,DC,DE,VA,NC,SC
4. GF	GA,FL
5. OH	OH
6. EN	IN,IL,MI,WI
7. KT	KY,TN

Region Code	Region Content
8. AM	AL,MS
9. CW	MN,IA,ND,SD,NE,MO,KS
10. WS	TX,LA,OK,AR
11. MT	MT,WY,ID
12. CU	CO,UT,NV
13. ZN	AZ,NM
14. PC	AK,HI,WA,OR,CA

Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.



Appendix G  
**Conversion Factors**

**Table G1. Heat Rates**

Fuel	Units	Approximate Heat Content
<b>Coal<sup>1</sup></b>		
Production .....	million Btu per short ton	20.341
Consumption .....	million Btu per short ton	20.165
Coke Plants .....	million Btu per short ton	26.325
Industrial .....	million Btu per short ton	22.312
Residential and Commercial .....	million Btu per short ton	21.235
Electric Power Sector .....	million Btu per short ton	19.911
Imports .....	million Btu per short ton	25.066
Exports .....	million Btu per short ton	25.524
<b>Coal Coke</b> .....	million Btu per short ton	24.800
<b>Crude Oil</b>		
Production .....	million Btu per barrel	5.800
Imports <sup>1</sup> .....	million Btu per barrel	5.981
<b>Liquids</b>		
Consumption <sup>1</sup> .....	million Btu per barrel	5.337
Motor Gasoline <sup>1</sup> .....	million Btu per barrel	5.157
Jet Fuel .....	million Btu per barrel	5.670
Distillate Fuel Oil <sup>1</sup> .....	million Btu per barrel	5.780
Diesel Fuel <sup>1</sup> .....	million Btu per barrel	5.769
Residual Fuel Oil .....	million Btu per barrel	6.287
Liquefied Petroleum Gases <sup>1</sup> .....	million Btu per barrel	3.591
Kerosene .....	million Btu per barrel	5.670
Petrochemical Feedstocks <sup>1</sup> .....	million Btu per barrel	5.562
Unfinished Oils .....	million Btu per barrel	6.118
Imports <sup>1</sup> .....	million Btu per barrel	5.558
Exports <sup>1</sup> .....	million Btu per barrel	5.745
Ethanol .....	million Btu per barrel	3.539
Biodiesel .....	million Btu per barrel	5.376
<b>Natural Gas Plant Liquids</b>		
Production <sup>1</sup> .....	million Btu per barrel	3.701
<b>Natural Gas<sup>1</sup></b>		
Production, Dry .....	Btu per cubic foot	1,028
Consumption .....	Btu per cubic foot	1,028
End-Use Sectors .....	Btu per cubic foot	1,028
Electric Power Sector .....	Btu per cubic foot	1,028
Imports .....	Btu per cubic foot	1,025
Exports .....	Btu per cubic foot	1,009
<b>Electricity Consumption</b> .....	Btu per kilowatthour	3,412

<sup>1</sup>Conversion factor varies from year to year. The value shown is for 2007.

Btu = British thermal unit.

Sources: Energy Information Administration (EIA), *Annual Energy Review 2007*, DOE/EIA-0384(2007) (Washington, DC, June 2008), and EIA, AEO2009 National Energy Modeling System run AEO2009.D120908A.