

Appendix B

Comparison of *AEO2004* and Restricted Natural Gas Supply Cases

Table B1. Electricity Supply, Disposition, Prices, and Emissions
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	2015					2020					2025				
	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined
	Generation by Fuel Type														
Electric Power Sector¹															
Power Only²															
Coal	2318	2312	2314	2313	2334	2560	2557	2584	2581	2638	2975	2999	3073	3073	3199
Petroleum	103	103	138	123	201	82	105	124	134	284	77	83	112	108	191
Natural Gas ³	814	816	769	771	640	972	939	871	845	598	969	926	813	818	564
Nuclear Power	812	812	812	812	812	816	816	816	816	816	816	816	816	816	816
Pumped Storage/Other	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Renewable Sources ⁴	420	424	422	437	437	442	440	459	472	491	460	464	493	489	528
Distributed Generation (Natural Gas)	1	1	1	1	1	3	3	3	3	2	5	5	5	5	3
Non-Utility Generation for Own Use	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37
Total	4423	4421	4409	4411	4378	4829	4814	4811	4806	4784	5257	5247	5266	5263	5256
Combined Heat and Power⁵															
Coal	34	34	34	34	34	33	34	33	34	33	33	33	33	33	33
Petroleum	5	5	7	5	12	2	4	5	5	14	2	3	4	4	9
Natural Gas	165	166	164	168	154	159	159	155	140	149	148	141	142	131	
Renewable Sources	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Non-Utility Generation for Own Use	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24
Total	183	184	184	187	180	175	176	177	174	167	164	164	159	159	153
Net Available to the Grid	4606	4606	4592	4597	4558	5004	4990	4988	4980	4951	5421	5410	5424	5422	5409
End-Use Sector Generation															
Combined Heat and Power⁶															
Coal	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Petroleum	15	15	16	15	18	17	18	18	18	19	18	18	18	18	19
Natural Gas	129	128	127	124	121	153	152	148	146	135	181	179	171	168	150
Other Gaseous Fuels ⁷	11	11	11	11	11	12	12	12	12	12	13	13	13	13	13
Renewable Sources ⁴	45	45	45	45	45	50	50	50	50	49	54	54	54	54	54
Other ⁸	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Total	231	231	232	227	227	264	263	260	258	248	299	296	288	286	268
Other End-Use Generators ⁹	5	5	5	5	5	5	5	5	5	6	7	7	7	7	7
Generation for Own Use	-173	-173	-172	-171	-169	-190	-189	-188	-186	-182	-210	-209	-205	-203	-196
Total Sales to the Grid	63	64	64	61	63	80	80	78	77	72	95	94	90	89	80
Total Electricity Generation	4904	4903	4891	4891	4851	5335	5321	5315	5304	5266	5787	5775	5780	5775	5746
Net Imports	32	32	33	33	36	21	23	21	23	27	8	7	7	7	7
Electricity Sales by Sector															
Residential	1531	1531	1527	1528	1518	1641	1638	1635	1633	1622	1747	1744	1744	1744	1735
Commercial	1653	1653	1648	1645	1634	1828	1823	1819	1815	1799	2003	1998	1999	1995	1979
Industrial	1216	1216	1214	1217	1205	1310	1306	1308	1306	1306	1422	1418	1426	1426	1428
Transportation	29	29	29	29	29	32	32	32	32	32	35	35	35	35	35
Total	4429	4428	4418	4419	4387	4811	4799	4794	4786	4759	5207	5195	5204	5201	5177
End-Use Prices¹⁰ (2002 cents per kilowatthour)															
Residential	8.1	8.1	8.2	8.2	8.4	8.1	8.2	8.3	8.3	8.6	8.1	8.2	8.2	8.2	8.4
Commercial	7.2	7.2	7.3	7.3	7.5	7.2	7.4	7.5	7.4	7.8	7.3	7.4	7.4	7.4	7.6
Industrial	4.7	4.7	4.8	4.8	5.0	4.8	4.9	4.9	4.9	5.2	4.8	4.8	4.8	4.8	5.0
Transportation	6.9	6.9	7.0	7.0	7.2	6.8	7.0	7.0	7.0	7.2	6.8	6.8	6.8	6.8	7.0
All Sectors Average	6.8	6.8	6.9	6.9	7.1	6.9	7.0	7.0	7.0	7.3	6.9	6.9	6.9	6.9	7.1
Prices by Service Category¹⁰ (2002 cents per kilowatthour)															
Generation	4.4	4.4	4.5	4.4	4.7	4.5	4.6	4.6	4.6	4.9	4.5	4.6	4.6	4.6	4.7
Transmission	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Distribution	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7

Table B1. Electricity Supply, Disposition, Prices, and Emissions (Continued)
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	2015															2020					2025				
	2015					2020					2025					2025									
	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined					
Electric Power Sector Emissions¹																									
Sulfur Dioxide (million tons)	8.95	8.95	8.99	9.04	9.03	8.94	8.95	8.94	8.93	8.95	8.95	8.94	8.96	8.95	8.94	8.94	8.96	8.95	8.94	8.94					
Nitrogen Oxide (million tons)	3.60	3.60	3.60	3.60	3.61	3.67	3.67	3.67	3.65	3.67	3.75	3.75	3.73	3.72	3.75	3.75	3.73	3.72	3.73	3.73					
Mercury (tons)	52.65	52.35	52.95	52.93	53.40	53.59	53.34	53.77	53.94	54.77	54.37	54.48	54.83	54.83	54.37	54.48	54.83	54.83	54.83	56.28					

¹Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
²Includes plants that only produce electricity.
³Includes electricity generation from fuel cells.
⁴Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power.
⁵Includes combined heat and power plants whose primary business is to sell electricity and heat to the public (i.e., those that report NAICS code 22).
⁶Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors.
⁷Other gaseous fuels include refinery and still gas.
⁸Other includes batteries, chemicals, hydrogen, pitch, purchased steam, sulfur and miscellaneous technologies.
⁹Other end-use generators include 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.
¹⁰Prices represent average revenue per kilowatthour.
 Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
 Source: 2002 power only and combined heat and power generation, sales to utilities, net imports, residential, industrial, and total electricity sales, and emissions: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002), and supporting databases. 2002 commercial and transportation electricity sales: EIA estimates based on Oak Ridge National Laboratory, *Transportation Energy Data Book 21* (Oak Ridge, TN, September 2001). 2002 prices: EIA, National Energy Modeling System run AEO2004.D101703E. **Projections:** EIA, AEO2004 National Energy Modeling System runs AEO2004.D101703E, NOAK.D012604B, LOWLNG.D020404A, UG0TEC03.D020404B, and LOWGAS01.D020404A.

Table B2. Natural Gas Supply and Disposition
(Trillion Cubic Feet per Year)

Supply and Disposition	2015					2020					2025				
	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined
	Production														
Dry Gas Production ¹	21.62	21.64	22.23	20.72	20.30	23.79	22.46	24.71	21.26	20.60	23.99	22.66	24.86	20.81	20.18
Supplemental Natural Gas ²	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Net Imports	6.24	6.24	5.20	6.74	5.48	6.47	7.19	4.67	7.46	5.50	7.24	7.87	4.95	8.67	6.52
Canada	3.17	3.16	3.25	3.11	3.41	2.51	2.65	2.70	2.59	3.07	2.56	2.75	2.84	2.85	3.54
Mexico	-0.15	-0.15	-0.13	-0.06	-0.01	-0.18	-0.16	-0.11	0.01	0.36	-0.12	-0.00	0.03	0.39	0.90
Liquefied Natural Gas	3.22	3.22	2.08	3.68	2.08	4.14	4.70	2.08	4.87	2.08	4.80	5.12	2.08	5.43	2.08
Total Supply	27.95	27.97	27.52	27.56	25.87	30.36	29.74	29.48	28.82	26.20	31.33	30.62	29.90	29.58	26.80
Consumption by Sector															
Residential	5.68	5.68	5.63	5.64	5.53	5.92	5.86	5.85	5.81	5.67	6.09	6.06	6.02	6.02	5.87
Commercial	3.62	3.62	3.58	3.58	3.49	3.83	3.79	3.77	3.74	3.60	4.04	4.01	3.97	3.96	3.81
Industrial ³	8.87	8.87	8.81	8.82	8.64	9.57	9.47	9.41	9.36	9.02	10.29	10.18	10.07	10.05	9.62
Electric Generators ⁴	7.64	7.66	7.31	7.36	6.19	8.61	8.38	7.92	7.66	5.82	8.39	8.08	7.25	7.29	5.38
Transportation ⁵	0.08	0.08	0.08	0.08	0.08	0.10	0.10	0.10	0.09	0.09	0.11	0.11	0.11	0.11	0.11
Pipeline Fuel	0.70	0.70	0.72	0.72	0.66	0.81	0.72	0.85	0.74	0.67	0.84	0.73	0.87	0.73	0.67
Lease and Plant Fuel ⁶	1.44	1.44	1.47	1.44	1.38	1.61	1.50	1.66	1.50	1.42	1.65	1.53	1.69	1.50	1.42
Total	28.03	28.04	27.60	27.63	25.96	30.44	29.82	29.56	28.89	26.29	31.41	30.71	29.98	29.66	26.88
Natural Gas to Liquids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discrepancy⁷	-0.07	-0.07	-0.07	-0.07	-0.09	-0.08	-0.08	-0.08	-0.08	-0.08	-0.09	-0.09	-0.09	-0.08	-0.08

¹Marketed production (wet) minus extraction losses.

²Synthetic 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.

³Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.

⁴Includes consumption of energy by electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

⁵Compressed natural gas used as vehicle fuel.

⁶Represents natural gas used in the field gathering and processing plant machinery.

⁷Balancing 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, 2002 values include net storage injections.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.

Sources: 2002 supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2002 consumption based on: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). Projections: EIA, AEO2004 National Energy Modeling System runs AEO2004.D101703E, NOAK.D012604B, LOWLNG.D020404A, UG0TEC03.D020404B, and LOWGAS01.D020404A.

Table B3. Oil and Gas Supply

Production and Supply	2015					2020					2025				
	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined	AEO2004	No Alaska Pipeline	Low LNG	Low UGR	Combined
	Crude Oil														
Lower 48 Average Wellhead Price¹ (2002 dollars per barrel)	24.56	24.56	24.60	24.58	24.74	25.82	25.57	25.81	25.80	25.52	26.72	26.76	26.79	26.77	26.76
Production (million barrels per day)²															
U.S. Total	5.53	5.53	5.54	5.59	5.60	4.95	4.96	4.97	4.95	4.99	4.61	4.65	4.69	4.68	4.78
Lower 48 Onshore	2.38	2.38	2.38	2.39	2.39	2.20	2.20	2.20	2.21	2.22	2.04	2.04	2.05	2.05	2.06
Lower 48 Offshore	2.21	2.21	2.22	2.27	2.27	2.03	2.04	2.04	2.02	2.05	2.06	2.10	2.13	2.12	2.21
Alaska	0.93	0.93	0.93	0.93	0.93	0.72	0.72	0.72	0.72	0.72	0.51	0.51	0.51	0.51	0.51
Lower 48 End of Year Reserves (billion barrels)²	17.13	17.13	17.16	17.32	17.35	16.20	16.19	16.24	16.29	16.19	14.98	15.07	15.18	15.16	15.32
Natural Gas															
Lower 48 Average Wellhead Price¹ (2002 dollars per thousand cubic feet)	4.19	4.20	4.49	4.28	5.02	4.28	4.52	4.61	4.79	5.53	4.40	4.60	4.74	4.85	5.61
Dry Production (trillion cubic feet)³															
U.S. Total	21.62	21.64	22.23	20.72	20.30	23.79	22.46	24.71	21.26	20.61	23.99	22.66	24.86	20.81	20.18
Lower 48 Onshore	16.11	16.13	16.62	13.24	14.35	16.41	16.74	16.95	13.56	14.87	16.26	16.84	17.00	12.99	14.10
Associated-Dissolved ⁴	1.31	1.31	1.31	1.31	1.31	1.23	1.23	1.23	1.23	1.24	1.17	1.17	1.17	1.17	1.17
Non-Associated	14.81	14.82	15.31	11.93	13.04	15.18	15.51	15.72	12.32	13.63	15.09	15.67	15.83	11.83	12.93
Conventional	6.13	6.14	6.31	6.40	6.88	6.07	6.14	6.35	6.50	7.02	5.92	6.07	6.21	6.12	6.65
Unconventional	8.67	8.68	8.99	5.53	6.16	9.11	9.37	9.36	5.82	6.61	9.16	9.61	9.63	5.71	6.28
Lower 48 Offshore	4.87	4.87	4.97	5.23	5.31	5.09	5.04	5.10	5.04	5.06	5.03	5.11	5.15	5.11	5.37
Associated-Dissolved ⁴	1.33	1.33	1.33	1.35	1.35	1.34	1.34	1.34	1.34	1.33	1.43	1.43	1.44	1.44	1.52
Non-Associated	3.54	3.54	3.64	3.88	3.96	3.75	3.71	3.76	3.69	3.73	3.60	3.68	3.70	3.67	3.85
Alaska	0.64	0.64	0.64	2.25	0.64	2.29	0.68	2.67	2.67	0.68	2.71	0.71	2.71	2.71	0.72
Lower 48 End of Year Dry Reserves³ (trillion cubic feet)	203.74	203.58	203.74	172.08	173.62	200.97	200.56	201.18	164.77	169.56	193.51	193.36	192.72	155.78	156.53
Supplemental Gas Supplies (trillion cubic feet)⁵															
Total Lower 48 Wells (thousands)	26.80	26.83	27.66	25.41	27.96	26.83	27.26	27.49	26.56	28.51	26.00	26.73	26.96	25.89	28.19

¹Represents lower 48 onshore and offshore supplies.
²Includes lease condensate.
³Marketed production (wet) minus extraction losses.
⁴Gas which occurs in crude oil reserves either as free gas (associated) or as gas in solution with crude oil (dissolved).
⁵Synthetic 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 2002 are model results and may differ slightly from official EIA data reports.
 Sources: 2002 lower 48 onshore, lower 48 offshore, and Alaska crude oil production: Energy Information Administration (EIA), *Petroleum Supply Annual 2002*, DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). 2002 natural gas lower 48 average wellhead price, Alaska and total natural gas production, and supplemental gas supplies: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). Other 2002 values: EIA, Office of Integrated Analysis and Forecasting.
 Projections: EIA, AEO2004 National Energy Modeling System runs AEO2004.D101703E, NOAK.D012604B, LOWLNG.D020404A, UG0TEC03.D020404B, and LOWGAS01.D020404A.