Report #: SR-OIAF/2005-02 Released Date: April 2005 Next Release Date: One-Time

Impacts of Recommendations of the National Commission on Energy Policy

Table 1. Study Cases and Descriptions

Case Name	Description
	Reference Case Technology
Reference ^a	AEO2005 reference case
NCEP	Reference case plus the tax incentives and deployments, CAFE standards, buildings efficiency standards, and Commission's GHG policy
Cap-Trade	Reference case plus the Commission's GHG Cap and Trade policy
No-Safety	Reference case plus the Commission's GHG policy with no safety-valve price
CAFE	Reference case plus the higher CAFE standard, a 10-miles-per-gallon increase for cars with an equivalent percentage increase for light trucks
Bldg-Std	Reference case plus the buildings efficiency standards
Incent	Reference case plus the tax incentives and deployments, including incentives to construct the Alaska natural gas pipeline
ICE	Reference case plus the tax incentives and deployments, CAFE standards, and buildings efficiency standards
	High Technology for End-Use Demand and PowerGeneration
HiTech ^a	AEO2005 high integrated technology case for demand and power generation
NCEP-HiTech	NCEP plus AEO2005 high integrated technology case for demand and power generation
HiTech-IC	HiTech plus the tax incentives and deployments and CAFE standards
	Rapid Oil and Gas Supply Technology Progress
RTP ^a	AEO2005 rapid oil and gas supply technology progress case
RTP-IC-ETH	RTP plus the tax incentives and deployments, CAFE standards, and ethanol R&D

^aThese cases appeared in EIA's *Annual Energy Outlook 2005*.

Notes: Italicized cases represent analysis of specific policies or groups of policies but do not simulate the combined impacts of all the NCEP recommendations. Summary results of key cases are provided in Appendix B. Detailed spreadsheet tables for each of the runs are available on EIA's web site.

Table 2. Assumed Emissions Abatement Opportunities for Non-CO $_2$ Covered Greenhouse Gases by Permit Price and Year

Permit Price (2003 Dollars per Metric Ton	Emission Reductions (Million Metric Tons Carbon Dioxide Equivalent)							
Carbon Dioxide Equivalent)	2010	2015	2020	2025				
0.3	45	54	66	78				
2.9	112	138	174	222				
5.8	159	199	257	337				
8.7	165	203	260	340				
11.6	180	224	289	381				
14.5	187	233	300	395				
21.7	196	244	316	416				
28.9	196	245	316	417				
36.1	199	248	321	423				
43.4	204	256	331	438				
50.6	210	263	341	451				
57.8	210	263	341	451				

Source: Calculated using EPA sources. See footnotes 17-19.

Table 3. Summary of Greenhouse Gas Emission Scenarios, 2015 and 2025

		2015				20	2025				
Projection	2003	Refer- ence	NCEP	Cap- Trade	No- Safety	Refer- ence	NCEP	Cap- Trade	No- Safety		
Net Petroleum Imports (Million Barrels per Day)	11.24	15.40	14.60	15.24	15.03	19.11	17.29	18.77	18.04		
Net Natural Gas Imports (Trillion Cubic Feet)	3.24	7.02	5.92	6.99	6.86	8.66	8.53	9.25	8.19		
Total Fossil Consumption (Quadrillion Btu)	84.34	102.47	99.96	101.49	100.37	116.37	108.29	113.28	105.67		
Petroleum	39.09	48.07	46.46	47.78	47.42	54.42	50.44	53.70	52.25		
Natural Gas	22.54	28.69	28.24	28.63	28.81	31.47	30.34	31.84	30.71		
Coal	22.71	25.71	25.25	25.08	24.14	30.48	27.51	27.74	22.72		
Average Electricity Price (2003 Dollars per Kilowatthour)	7.4	6.9	6.9	7.1	7.3	7.3	7.7	7.6	8.1		
Wellhead Gas Price (2003 Dollars per Thousand Cubic Feet)	4.98	4.16	3.66	4.13	4.02	4.79	4.86	4.90	4.54		
Covered GHG Emissions (Million Metric Tons CO ₂ Equivalent)	6,032	7,501	7,108	7,220	7,077	8,794	7,829	8,172	7,428		
Energy-Related CO ₂	5.789	7,052	6,733	6.971	6.864	8.062	7,438	7,781	7,119		
GHG Emissions Price (2003 Dollars per Metric Ton CO ₂ Equivalent)	0.00	0.00	5.72	6.50	15.55	0.00	8.50	8.50	35.15		
Covered GHG Emissions Intensity	581.1	492.9	467.8	475.1	466.6	433.3	387.3	403.3	367.5		
Total Electricity Generation (Billion Kilowatthours)	3,852	4,890	4,786	4,860	4,827	5,770	5,507	5,706	5,624		
Coal	1,970	2,305	2,285	2,248	2,174	2,890	2,584	2,577	2,080		
Natural Gas	632	1,173	1,075	1,189	1,215	1,406	1,325	1,542	1,449		
Nuclear	764	826	834	826	826	830	838	830	944		
Renewable	359	447	465	460	477	489	603	608	1,023		
Primary Energy Consumption (Quadrillion Btu)	98.22	118.29	116.03	117.63	116.71	133.18	126.45	131.57	129.40		
Buildings	38.78	46.76	45.63	46.44	45.86	53.36	50.89	52.72	51.78		
Total Transportation	27.24	34.96	33.72	34.78	34.63	40.28	36.80	39.89	39.16		
Industrial	32.21	36.58	36.67	36.41	36.22	39.53	38.75	38.96	38.46		

Source: National Energy Modeling System, runs AEO2005.D10204, BING_CAP.D021005A, BING_NOCAP.D020805A, and BING_ICE_CAP.D021005C.

Table 4. Comparison of Oil, Natural Gas, and Ethanol Results for Selected Cases, 2015 and 2025

		2015			2025						
Projection	2003	Refer- ence	NCEP	Bldg- Std	CAFE	Incent	Refer- ence	NCEP	Bldg- Std	CAFE	Incent
Domestic Oil Production (Million Barrels per Day)	5.68	5.49	5.49	5.49	5.49	5.49	4.73	4.69	4.71	4.71	4.70
Domestic Dry Natural Gas Production											
(Trillion Cubic Feet)	19.07	20.77	21.44	20.69	20.74	21.49	21.83	20.85	21.72	21.71	21.07
Net Petroleum Imports (Million Barrels per Day)	11.24	15.40	14.60	15.39	14.82	15.38	19.11	17.29	19.07	17.65	19.15
Net Natural Gas Imports (Trillion Cubic Feet)	3.24	7.02	5.92	6.64	7.00	6.43	8.66	8.53	8.23	8.65	8.72
Liquefied Natural Gas	0.44	4.33	3.72	4.11	4.32	4.08	6.37	6.36	6.12	6.38	6.48
Canadian Pipeline Gas	3.13	2.98	2.51	2.83	2.98	2.66	2.55	2.55	2.45	2.52	2.53
Exports to Mexico	-0.33	-0.29	-0.32	-0.30	-0.29	-0.31	-0.26	-0.37	-0.34	-0.26	-0.29
Oil Import Dependence (Percent)	56.2	62.4	61.3	62.4	61.6	62.4	68.4	66.8	68.4	67.1	68.6
Natural Gas Import Dependence (Percent)	14.7	25.1	21.5	24.1	25.1	22.9	28.2	28.9	27.3	28.3	29.1
Fossil Fuel Consumption (Quadrillion Btu)	84.34	102.47	99.96	101.90	101.28	102.88	116.37	108.29	114.88	112.88	115.61
Petroleum	39.09	48.07	46.46	48.04	46.93	48.01	54.42	50.44	54.31	51.34	54.34
Natural Gas	22.54	28.69	28.24	28.22	28.64	28.83	31.47	30.34	30.92	31.34	30.76
Coal	22.71	25.71	25.25	25.65	25.71	26.04	30.48	27.51	29.65	30.20	30.51
Ethanol Consumption (Quadrillion Btu)	0.24	0.33	0.33	0.33	0.31	0.33	0.38	0.34	0.38	0.33	0.38
Average Electricity Price (2003 Dollars per Kilowatthour)	7.4	6.9	6.9	6.8	6.9	6.7	7.3	7.7	7.3	7.3	7.2
Wellhead Natural Gas Price (2003 Dollars per Thousand Cubic Feet)	4.98	4.16	3.66	4.01	4.14	3.78	4.79	4.86	4.79	4.84	4.82
Motor Gasoline Delivered Price (2003 Dollars per Gallon)	1.60	1.51	1.54	1.51	1.50	1.51	1.58	1.62	1.58	1.55	1.58
Ethanol (E-85) Delivered Price (2003 Dollars per Gallon)	1.52	1.63	1.59	1.63	1.59	1.61	1.70	1.70	1.70	1.69	1.71
Total Emissions of Covered Greenhouse Gases (Million Metric Tons Carbon Dioxide Equivalent)	6,032	7.501	7,108	7,467	7,421	7,516	8,794	7,829	8,678	8,552	8,735
Energy-Related Carbon Dioxide	5,789	7,052	6,857	7.018	6,973	7,068	8,062	7,438	7.947	7,820	8,004
Alaska Natural Gas Pipeline Online Date		2016	2014	2016	2016	2014	2016	2014	2016	2016	2014

Note: Totals may not equal sum of components due to independent rounding.

Source: National Energy Modeling System, runs AEO2005.D102004A, BING_ICE_CAP.D021005C, BING_EFF.D020905A, BING_CAFE.D021005A, and BING_INCENT.D020805A.

Table 5. Buildings Energy Consumption by Sector and Source in the Reference and NCEP Cases, 2015 and 2025

(Quadrillion Btu)

		Projections						
Sector and Source		20	15	2025				
	2003	Reference	NCEP	Reference	NCEP			
Residential	•							
Petroleum	1.58	1.58	1.56	1.53	1.49			
Natural Gas	5.25	5.90	5.86	6.17	5.94			
Electricity	4.37	5.10	5.21	6.18	5.75			
Other ^a	0.41	0.40	0.40	0.39	0.38			
Delivered Energy	11.61	13.29	13.03	14.26	13.56			
Electricity Related Losses	9.71	11.29	10.84	12.35	11.60			
Total	21.31	24.58	23.88	26.62	25.16			
Commercial								
Petroleum	0.75	0.91	0.89	1.02	0.98			
Natural Gas	3.22	3.69	3.69	4.17	4.09			
Electricity	4.13	5.63	5.51	7.12	6.79			
Other ^b	0.18	0.18	0.18	0.18	0.18			
Delivered Energy	8.29	10.41	10.28	12.49	12.04			
Electricity Related Losses	9.18	11.77	11.48	14.25	13.69			
Total	17.46	22.18	21.75	26.74	25.73			

^aIncludes coal and wood used for residential heating. Does not include estimates of nonmarketed renewable energy consumption for geothermal heat pumps, solar thermal hot water heating, and solar photovoltaic electricity generation.

Notes: Totals may not equal sum of components due to independent rounding. Data for 2003 are model results and may differ slightly from official EIA data reports.

Sources: 2003 consumption based on Energy Information Administration, *Annual Energy Review 2003*, DOE/EIA-0384(2003) (Washington, DC, September 2004). Projections: National Energy Modeling System, runs AEO2005.D102004A and BING_ICE_CAP.D021005C.

generation.

blincludes commercial sector consumption of coal, wood and wood waste, landfill gas, municipal solid waste, and other biomass for combined heat and power. Does not include estimates of nonmarketed renewable energy consumption for solar thermal hot water heating and solar photovoltaic electricity generation.

Table 6. Residential Sector Energy Consumption by End Use in the Reference and NCEP Cases, 2015 and 2025

(Quadrillion Btu)

		Projections				
		201	15	202	5	
Key Indicators and Consumption	2003	Reference	NCEP	Reference	NCEP	
Delivered Energy Consumption by End Use		1		1		
Space Heating	5.72	6.19	6.12	6.29	6.02	
Space Cooling	0.65	0.73	0.73	0.80	0.77	
Water Heating	1.71	1.83	1.83	1.85	1.72	
Refrigeration	0.40	0.35	0.35	0.36	0.35	
Cooking	0.34	0.39	0.39	0.44	0.44	
Clothes Dryers	0.31	0.37	0.36	0.40	0.40	
Freezers	0.13	0.12	0.12	0.13	0.13	
Lighting	0.78	0.99	0.93	1.13	1.04	
Clothes Washers	0.03	0.05	0.05	0.06	0.06	
Dishwashers	0.02	0.03	0.03	0.03	0.03	
Color Televisions	0.13	0.23	0.23	0.28	0.28	
Personal Computers	0.07	0.12	0.12	0.15	0.15	
Furnace Fans	0.08	0.10	0.10	0.12	0.12	
Other Uses ^a	1.22	1.79	1.68	2.23	2.06	
Total Delivered Energy Consumption	11.61	13.29	13.03	14.26	13.56	
Electricity-Related Losses	9.71	11.29	10.84	12.35	11.60	
Total Energy Consumption by End Use						
Space Heating	6.61	7.13	7.04	7.22	6.92	
Space Cooling	2.11	2.27	2.24	2.41	2.33	
Water Heating	2.53	2.63	2.63	2.60	2.28	
Refrigeration	1.30	1.08	1.07	1.08	1.06	
Cooking	0.57	0.64	0.64	0.70	0.70	
Clothes Dryers	0.85	0.92	0.91	0.97	0.96	
Freezers	0.42	0.37	0.37	0.38	0.38	
Lighting	2.51	3.07	2.87	3.39	3.14	
Clothes Washers	0.10	0.15	0.15	0.19	0.20	
Dishwashers	0.08	0.09	0.08	0.09	0.08	
Color Televisions	0.43	0.70	0.70	0.85	0.84	
Personal Computers	0.23	0.37	0.36	0.45	0.45	
Furnace Fans	0.27	0.32	0.32	0.35	0.35	
Other Uses ^a	3.32	4.83	4.50	5.93	5.47	
Total Energy Consumption	21.31	24.58	23.88	26.62	25.16	

^aIncludes small electric devices, heating elements, and motors not listed above and such appliances as swimming

Sources: 2003 consumption based on Energy Information Administration, Annual Energy Review 2003, DOE/EIA-0384(2003) (Washington, DC, September 2004). Projections: National Energy Modeling System, runs AEO2005.D102004A and BING_ICE_CAP.D021005C.

pool and spa heaters, outdoor grills, and outdoor lighting (natural gas).

Notes: Totals may not equal sum of components due to independent rounding. Data for 2003 are model results and may differ slightly from official EIA data reports.

Table 7. Commercial Sector Energy Consumption by End Use in the Reference and NCEP Cases, 2015 and 2025

(Quadrillion Btu)

		Projections					
		20	15	202	25		
Key Indicators and Consumption	2003	Reference	NCEP	Reference	NCEP		
Delivered Energy Consumption by End Use							
Space Heating ^a	1.73	2.00	1.98	2.20	2.13		
Space Cooling ^a	0.43	0.49	0.47	0.57	0.51		
Water Heating ^a	0.78	0.94	0.94	1.09	1.06		
Ventilation	0.16	0.18	0.18	0.20	0.19		
Cooking	0.29	0.37	0.37	0.43	0.42		
Lighting	1.10	1.37	1.33	1.52	1.35		
Refrigeration	0.20	0.24	0.22	0.28	0.24		
Office Equipment (PC)	0.14	0.29	0.29	0.36	0.36		
Office Equipment (non-PC)	0.31	0.57	0.54	0.87	0.84		
Other Uses ^b	3.15	3.96	3.95	4.98	4.94		
Total Delivered Energy Consumption	8.29	10.41	10.28	12.49	12.04		
Electricity Related Losses	9.18	11.77	11.48	14.25	13.69		
Total Energy Consumption by End Use							
Space Heating ^a	2.06	2.32	2.31	2.52	2.44		
Space Cooling ^a	1.37	1.49	1.42	1.66	1.48		
Water Heating ^a	1.08	1.26	1.26	1.41	1.38		
Ventilation	0.52	0.55	0.55	0.59	0.58		
Cooking	0.36	0.43	0.43	0.49	0.48		
Lighting	3.55	4.23	4.09	4.56	4.07		
Refrigeration	0.65	0.75	0.69	0.85	0.73		
Office Equipment (PC)	0.44	0.90	0.89	1.08	1.07		
Office Equipment (non-PC)	1.00	1.75	1.68	2.61	2.54		
Other Uses ^b	6.44	8.49	8.44	10.98	10.95		
Total Energy Consumption	17.46	22.18	21.75	26.74	25.73		

Notes: Totals may not equal sum of components due to independent rounding. Data for 2003 are model results and may differ slightly from official EIA data reports.

Sources: 2003 based on Energy Information Administration, *Annual Energy Review 2003*, DOE/EIA-0384(2003)

(Washington, DC, September 2004). Projections: National Energy Modeling System, runs AEO2005.D102004A and BING_ICE_CAP.D021005C.

^aIncludes fuel consumption for district services.

^bIncludes miscellaneous uses, such as service station equipment, automated teller machines, telecommunications equipment, medical equipment, pumps, emergency electric generators, combined heat and power in commercial buildings, manufacturing performed in commercial buildings, and cooking (distillate), plus residual fuel oil, liquefied petroleum gas, coal, motor gasoline, and kerosene.

PC = Personal computer.

Table 8. Summary Comparisons for Reference, NCEP, HiTech, and NCEP-HiTech Cases

		2015					20	125	
Projection	2003	Refer- ence	NCEP	HiTech	NCEP- HiTech	Refer- ence	NCEP	HiTech	NCEP- HiTech
Domestic Oil Production (Million Barrels per Day)	5.68	5.49	5.49	5.50	5.49	4.73	4.69	4.72	4.65
Domestic Dry Gas Production (Trillion Cubic Feet)	19.07	20.77	21.44	20.45	21.21	21.83	20.85	21.65	20.35
Net Petroleum Imports (Million Barrels per Day)	11.24	15.40	14.60	14.79	14.18	19.11	17.29	17.66	16.48
Oil Import Dependence (Percent)	56.2	62.4	61.3	61.6	60.6	68.4	66.8	66.9	66.1
Total Fossil Fuel Consumption (Quadrillion Btu)	84.34	102.47	99.96	99.39	97.93	116.37	108.29	108.60	104.12
Petroleum	39.09	48.07	46.46	46.79	45.56	54.42	50.44	51.42	48.55
Natural Gas	22.54	28.69	28.24	27.56	27.42	31.47	30.34	30.50	28.90
Coal	22.71	25.71	25.25	25.04	24.95	30.48	27.51	26.68	26.67
Average Electricity Price (2003 Dollars per Kilowatthour)	7.4	6.9	6.9	6.7	6.5	7.3	7.7	7.0	7.0
Wellhead Natural Gas Price (2003 Dollars per Thousand Cubic Feet)	4.98	4.16	3.66	3.93	3.54	4.79	4.86	4.66	4.60
Delivered Price of Motor Gasoline (2003 Dollars per Gallon)	1.60	1.51	1.54	1.51	1.48	1.58	1.62	1.59	1.57
Household Energy Expenditures (2003 Dollars per Household)	1,582	1,496	1,459	1,436	1,392	1,571	1,565	1,479	1,455
Covered GHG Emissions (Million Metric Tons CO ₂ Equivalent)	6,032	7,501	7,108	7,302	7,048	8,794	7,829	8,203	7,564
Energy-related CO ₂ Emissions	5,789	7,052	6,857	6,854	6,733	7,820	7,438	7,471	7,171
GHG Emission Price (2003 Dollars per Metric Ton CO ₂ Equivalent)	0.00	0.00	5.72	0.00	2.77	0.00	8.50	0.00	6.27
Covered GHG Emissions Intensity (Metric Tons CO ₂ Equivalent per Million 2000 Dollars of GDP)	581.1	492.9	467.8	480.0	462.7	433.3	387.3	404.8	373.5
Total Electricity Generation (Billion Kilowatthours)	3,852	4,890	4,786	4,783	4,748	5,770	5,507	5,558	5,422
Coal	1,970	2,305	2,285	2,256	2,273	2,890	2,584	2,494	2,527
Natural Gas	632	1,173	1,075	1,120	1,048	1,406	1,325	1,577	1,364
Nuclear	764	826	834	826	834	830	838	834	846
Renewable	359	447	465	447	466	489	603	511	546
Delivered Energy Consumption by Sector (Quadrillion Btu)	98.22	118.29	116.03	115.27	114.09	133.18	126.45	126.16	122.24
Buildings	19.89	23.70	23.31	23.35	23.24	26.75	25.60	25.88	25.32
Total Transportation	27.07	34.75	33.52	34.03	33.04	40.04	36.56	38.20	35.50
Light-Duty Vehicles	16.33	20.93	19.63	20.35	19.45	24.51	21.15	23.27	20.86
Industrial	24.86	28.27	28.39	27.25	27.45	30.76	30.07	28.79	28.45
Fossil Fuels for Electricity Generation	26.68	33.52	32.21	32.35	31.67	39.59	35.96	36.23	34.91
Light-Duty Vehicle Sales (Thousands)	15,902	17,658	16,788	17,655	17,290	20,157	19,201	20,104	19,690
Hybrids Plus Advanced Diesel	392	1,634	2,798	1,555	1,395	2,099	3,200	1,988	1,780
Average New Car Miles per Gallon	29.5	30.3	37.9	32.1	39.0	31.0	38.0	33.4	39.8
Average New Light Truck Miles per Gallon	21.8	23.4	29.7	24.3	29.9	24.6	30.6	26.3	31.2

Source: National Energy Modeling System, runs AEO2005.D102004A, BING_ICE_CAP.D021005C, HTRKITEN.D111604A, and BING_HDTICECAP.D020905A.

Table 9. Buildings Energy Consumption by Sector and Source

(Quadrillion Btu per Year, Unless Otherwise Noted)

		Projections						
			2015		2025			
Sector and Source	2003	HiTech	NCEP-HiTech	HiTech	NCEP-HiTech			
Residential								
Petroleum	1.58	1.56	1.56	1.47	1.47			
Natural Gas	5.25	5.78	5.81	5.80	5.76			
Electricity	4.37	5.30	5.22	6.02	5.77			
Other ^a	0.41	0.39	0.40	0.37	0.37			
Delivered Energy	11.61	13.03	12.98	13.66	13.37			
Electricity-Related Losses	9.71	11.02	10.83	11.70	11.39			
Total	21.31	24.05	23.81	25.36	24.76			
Commercial								
Petroleum ^b	0.75	0.89	0.89	0.99	0.97			
Natural Gas	3.22	3.71	3.72	4.18	4.10			
Electricity	4.13	5.53	5.46	6.87	6.69			
Other ^c	0.18	0.18	0.18	0.18	0.18			
Delivered Energy	8.29	10.32	10.26	12.22	11.95			
Electricity-Related Losses	9.18	11.49	11.34	13.36	13.21			
Total	17.46	21.80	21.60	25.58	25.16			

^aIncludes coal and wood used for residential heating. Does not include estimates of nonmarketed renewable energy consumption for geothermal heat pumps, solar thermal hot water heating, and solar photovoltaic electricity generation.

Notes: Totals may not equal sum of components due to independent rounding. Data for 2003 are model results and may differ slightly from official EIA data reports.

Sources: **2003 consumption:** Based on Energy Information Administration, *Annual Energy Review 2003*, DOE/EIA-0384(2003) (Washington, DC, September 2004). **Projections:** National Energy Modeling System, runs HTRKITEN.D111604A and BING_HDTICECAP.D020905A.

^bIncludes ethanol (blends of 10 percent or less) and ethers blended into gasoline.

^cIncludes commercial sector consumption of coal, wood and wood waste, landfill gas, municipal solid waste, and other biomass for combined heat and power. Does not include estimates of nonmarketed renewable energy consumption for solar thermal hot water heating and solar photovoltaic electricity generation.