Coal Transportation Rate Sensitivity Analysis
Energy Information Administration
January 25, 2005

Background

On December 21, 2004, the Surface Transportation Board (STB) requested that the Energy Information Administration (EIA) analyze the impact of changes in coal transportation rates on projected levels of electric power sector energy use and emissions. Specifically, the STB requested an analysis of changes in national and regional coal consumption and emissions resulting from adjustments in railroad transportation rates for Wyoming's Powder River Basin (PRB) coal using the National Energy Modeling System (NEMS). However, because NEMS operates at a relatively aggregate regional level and does not represent the costs of transporting coal over specific rail lines, this analysis reports on the impacts of interregional changes in transportation rates from those used in the *Annual Energy Outlook 2005 (AEO2005)* reference case.

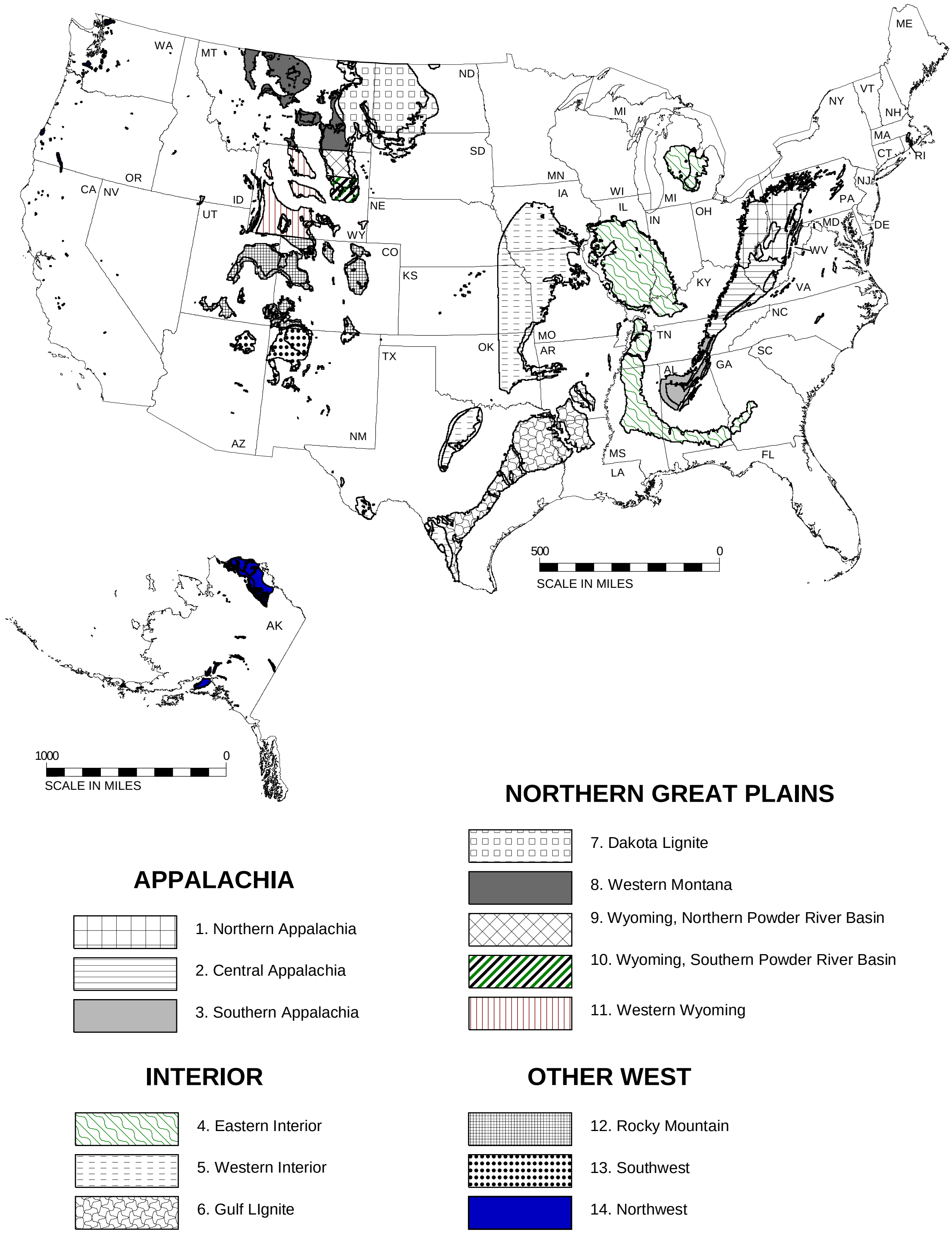
The variations in transportation rates used were provided by STB. STB staff identified the relevant NEMS coal supply and coal demand region transportation pairs and the corresponding percent changes in the rates from those used in the *AEO2005* reference case.

Description of Cases & Methodology

This analysis was prepared using the NEMS as configured for the *AEO2005* reference case. Other than the transportation rate changes specified by STB, all other assumptions are the same as those in the *AEO2005*. In accordance with EIA practice, only current laws and regulations are incorporated into the *AEO2005* projections. Proposed rules or regulations that have not been finalized are not included. Of particular importance for this analysis, EPA's proposed Clean Air Interstate and Clean Air Mercury Rules are not included in the *AEO2005*. The enactment of these rules would have a significant impact on future power plant emissions and this should be kept in mind when reviewing the results of this analysis.

At the request of the STB, four different transportation rates sensitivity cases were analyzed (Table 1). In these cases, the electric power sector transportation rates for Wyoming's PRB coal, represented by the NEMS Coal Market Module's (CMM's) Wyoming, Northern Powder River Basin (NW) and Wyoming, Southern Powder River Basin (SW) supply regions (Figure 1), going to specific coal demand regions (Figure 2), were adjusted.

Figure 1. Coal Supply Regions

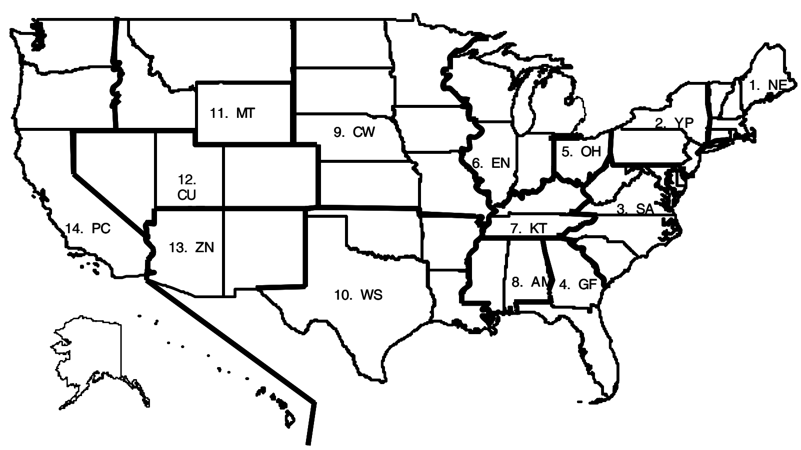


Source: Energy Information Administration, Office of Integrated Analysis and Forecasting

Table 1. Description of Scenarios

Scenario	Coal Demand Region	Coal Demand Region States	STB-Provided Percentage Change From *AEO2005* Coal Transportation Rates
Low7pct	OH	OH	-7.2%
	EN	IN, IL, MI, WI	-7.2%
	KT	KY, TN	-3.8%
	CW	MN, IA, ND, SD, NE, MO, KS	-7.2%
Low4pct	OH	OH	-3.6%
	EN	IN, IL, MI, WI	-3.6%
	KT	KY, TN	-1.9%
	CW	MN, IA, ND, SD, NE, MO, KS	-3.6%
High4pct	OH	OH	3.6%
	EN	IN, IL, MI, WI	3.6%
	KT	KY, TN	1.9%
	CW	MN, IA, ND, SD, NE, MO, KS	3.6%
High7pct	OH	OH	7.2%
	EN	IN, IL, MI, WI	7.2%
	KT	KY, TN	3.8%
	CW	MN, IA, ND, SD, NE, MO, KS	7.2%

Figure 2. 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

Key Findings

The following section and tables provide a summary of the national and regional changes in coal production, consumption, coal-fired electricity generation, and emissions projected for the electric power sector for the four STB transportation rate sensitivity cases. The regional results are highlighted for the four NEMS Electricity Market Module (EMM) regions (Figure 3) that align most closely with the Wyoming PRB transportation rates that are modified (see Table 2). These regions are: 1) the East Central Area Reliability Coordination Agreement (ECAR) region; 2) the Mid-America Interconnected Network (MAIN) region; 3) the Mid-Continent Area Power Pool (MAPP) region; and Southeastern Electric Reliability Council (SERC) region. References to the Mid-Atlantic Area Council (MAAC) region are also provided as part of the review of regional patterns of projected mercury emissions.

Table 2. Coal Demand Region and Electricity Region Mapping

Coal Demand Regions	Coal Demand Region States	Electricity Regions*
OH	OH	ECAR
EN	IN, IL, MI, WI	ECAR, MAIN, MAPP
KT	KY, TN	ECAR, SERC
CW	MN, IA, ND, SD, NE, MO, KS	MAPP, MAIN, NWP (part of SD only), SPP (KS only), SERC (a portion of MO)

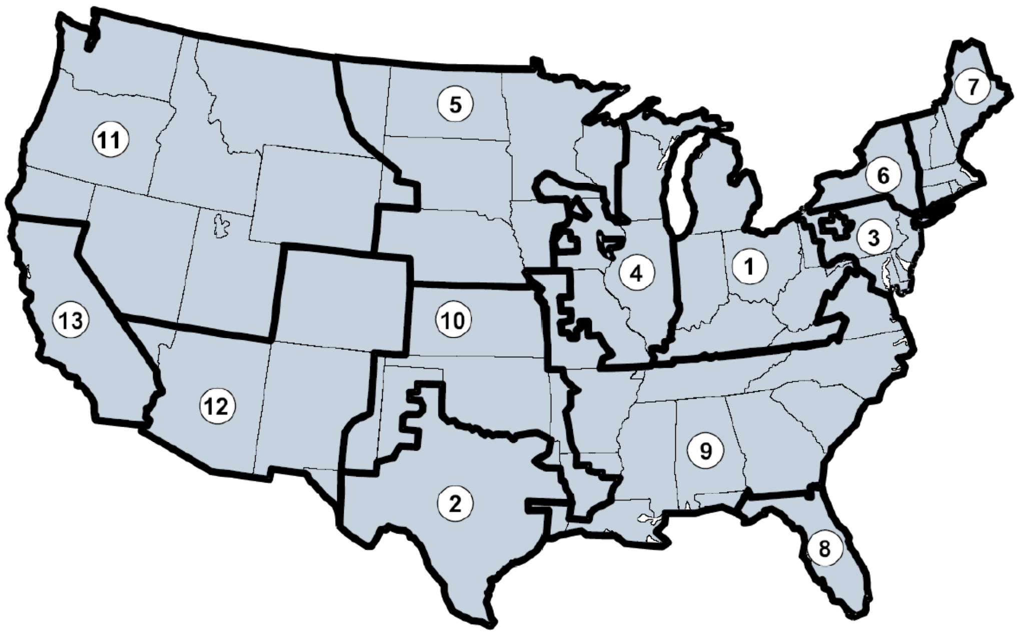
* MAIN: Mid-America Interconnected Network; MAPP: Mid-Continent Area Power Pool; ECAR: East Central Area Reliability Coordination Agreement; SERC: Southeastern Electric Reliability Council; NWP: Northwest Power Pool; SPP: Southwest Power Pool

Given the transportation rate sensitivities specified by STB, the resulting changes in coal consumption, electricity generation and emissions associated with the combustion of coal at electric power plants are generally small. The attached Tables 3, 4, and 5 summarize the national and regional results for 2010, 2015, and 2025, respectively, as requested by STB.

Impact on Coal Markets and Electricity Generation

In all of the scenarios, coal maintains its share of overall U.S. electricity generation and generation capacity, relative to the *AEO2005* reference case. The main impact of reducing the transportation costs of some coals is to slightly change the mix of coals used, but there is little change in the overall use of coal or other fuels. Average delivered coal prices to the electricity sector are lower or higher depending on whether transportation rates have been lowered or raised, respectively. For Wyoming's PRB region, changes are in the expected direction with lower transportation rates for Wyoming coal leading to increased production of this coal while higher transportation rates result in lower levels of Wyoming PRB production. In the High7pct case, Wyoming PRB production in 2010 is projected to be 14 million tons (2.8 percent) lower

Figure 3. 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 KYork (NY)
7. New England (NE)
8 Florida Reliability Coordinating Council (FL)
9 Southeastern Electric Reliability Council (SERC)
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

than in the reference case forecast, and in the Low7pct case, Wyoming PRB production in 2010 is projected to be 13 million tons (2.5 percent) higher than in the reference case.

Total national coal consumption for electricity use, both on a British thermal unit (Btu) basis as well as on a ton basis, does not change significantly across the sensitivity cases. In 2010, in the High7pct case, total U.S. coal consumption in the electricity sector is projected to be only 3 million tons (0.3 percent) lower than in the *AEO2005* reference case, and in the Low7pct case, it is projected to be 3 million tons (0.2 percent) higher than in the reference case. The projected changes in Wyoming PRB production in the sensitivity cases lead to minor changes in production in several other NEMS coal supply regions, including, but not limited to, Northern Appalachia, Central Appalachia, Eastern Interior, Western Montana, Rocky Mountain and Arizona/New Mexico.

Little variation in the regional-level quantities of coal-fired generation or coal consumption in the electric power sector is projected across the four STB rate sensitivity cases. Changes in the delivered price of Wyoming PRB coal across the cases, primarily lead to a switch to coal from other NEMS supply regions, rather than a switch to other fuels such as natural gas or renewable energy.

Across the cases, electricity power generation from coal is never projected to vary from the AEO2005 reference case by more than 6 billion kilowatthours (0.2 percent) nationally for 2010, 2015, and 2025. Regionally, the largest change is a 3-billion-kilowatthour (0.5 percent) increase in generation compared to the reference case for the SERC region in the High4pct case in 2025.

Electric Power Sector Emissions

The small changes in overall coal consumption are projected to lead to commensurately small changes in expected power sector emissions of nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon dioxide (CO_2) and mercury. The existing control programs enacted as a result of the Clean Air Act Amendments of 1990 dampen changes in NO_x and SO_2 emissions since power plants must comply with mandated emissions limits even if they change their coal use. In the electric power sector, NO_x emissions are capped for 19 Midwestern and Eastern States during the 5-month summer season, and annual SO_2 emissions are capped at the national level. For $CO_{2,}$ emission rates differ little across coal types, and, therefore, the percent changes in CO_2 emissions between the reference and the sensitivity cases correspond closely with the projected changes in coal consumption.

Sulfur Dioxide

The CAAA90 limits annual SO_2 emissions in the electric power sector to 9.48 million tons per year from 2000 to 2009, and 8.95 million tons per year thereafter. Because companies can bank allowances for future use, however, 2015 represents the earliest year for which the long-term cap of 8.95 million tons per year is projected to be reached in the forecast cases evaluated in this study. Until the bank of SO2 emission allowances is depleted in all cases, there can be slight differences in the quantities of national-level emissions projected across the forecast scenarios. For the years evaluated, the biggest variation in SO_2 emissions at the national level is an increase of 0.08 million tons (0.8 percent) in the High7Pct case in 2010. Regionally, the largest change is a 0.09-million-ton (3.5 percent) decrease in SO_2 emissions compared to the reference case for the ECAR region in the Low7pct case in 2025.

Nitrogen Oxide

To reduce the formation of ground-level ozone, under the Ozone Transfer Rule, NO_x emissions are capped for 19 Midwestern and Eastern states for the 5-month summer season beginning in 2004. Since western states are not subject to the Ozone Transport Rule, national emissions increase gradually after 2004 in all of the scenarios discussed. Across the cases, national-level NO_x emissions are never projected to vary from the *AEO2005* reference case by more than 0.1 percent for 2010, 2015, and 2025. Regionally, the largest absolute change in any of the regions is 0.01 million tons (0.9 percent).

Mercury

Mercury emissions in the electric power sector are not currently regulated, and, therefore, are unconstrained in both the reference and transportation rate sensitivity cases. Also, the mercury content of coal varies considerably across U.S. coal basins, and mercury removal rates at power plants vary considerably based on plant equipment used and the type of coal burned. The average mercury content of coal represented in NEMS ranges from a low of 2.04 pounds of mercury per trillion Btu for low-sulfur subbituminous coal originating from mines in the Rocky Mountain supply region, to a high of 63.90 pounds of mercury per trillion Btu for waste coal.

For the specific forecast years evaluated in this study (i.e., 2010, 2015 and 2025), national mercury emissions for the electric power sector are projected to be as much as 1.6 percent lower or as much as 0.7 percent higher than those projected in the *AEO2005* reference case forecast. Of the regions evaluated for this study, SERC and ECAR show the largest changes in mercury emissions compared to the reference forecast. Most of the change in mercury emissions for SERC can be explained by the type of plant consuming high-mercury waste coal rather than variability in subbituminous coal consumption. Since mercury emissions are currently unconstrained, NEMS is free to use high mercury waste coal in different plants and it is choosing to do so in the various sensitivity cases. However, in 2003 most of the waste coal was consumed at dedicated plants utilizing circulating fluidized bed (CFB) combustion technology, which can remove 95 percent of the mercury in the coal used. While different types of plants could use this fuel, it is expected that the CFB plants now using it will generally continue to do so. As a result, the variability in mercury emissions due to changes in waste coal use may be overstated. When waste coal emissions are excluded from the totals, the national mercury emissions across the sensitivity cases are smaller, ranging from 0.8 percent lower to 0.4 percent higher (for the same years) than the reference case.

In ECAR, variations in mercury emissions across the cases are also largely due to changes in the projected use of high-mercury waste coal. In the Low4pct case, increased consumption of waste coal in ECAR in 2010, leads to higher projected mercury emissions in this region. However, the 1.1-ton (8.9 percent) increase in ECAR's mercury emissions in the Low4pct case in 2010 is nearly offset by a projected decrease in mercury emissions of 1.0 tons (19.4 percent) in the adjacent MAAC region. Overall, nearly the same amount of high mercury waste coal is being used, but in one case it is being used by plants in ECAR, while in another it is being used by plants in MAAC. In aggregate, mercury emissions for the ECAR and MAAC regions in 2010 are 0.1 tons higher in the Low4pct than in the *AEO2005* reference case.

Carbon Dioxide

Similar to mercury, CO_2 emissions are not currently regulated and, therefore, are unconstrained in the *AEO2005* reference and sensitivity cases. However, because CO_2 emission rates differ little across coal types, changes in emissions across the cases are primarily due to variations in the projected quantities of coal consumption rather than to shifts in coal distribution patterns. Across the cases, CO_2 emissions from the electric power sector are never projected to vary from the *AEO2005* reference case by more than 5 million metric tons (0.1 percent) nationally for 2010, 2015, and 2025. Regionally, the largest percentage change projected is 0.4 percent compared to the *AEO2005* reference case forecast.

Uncertainty

As with any forecast, there is uncertainty associated with the preceding analysis. Laws and regulations present at the time a forecast is prepared are likely to be different from those that will actually be in effect in the future. For instance, as mentioned, implementation of EPA's proposed Clean Air Interstate and the Clean Air Mercury Rules will likely result in lower emissions of SO_2, NO_X**,** and mercury in all of the cases discussed. Actions taken to comply with these rules would likely further dampen the impacts of the changes in coal transportation rates proposed by STB.

Available pollution mitigation technologies as well as coal quality assumptions could also be different from what is assumed in this analysis. In particular, there is uncertainty with regards to mercury contents associated with various supply sources of coal. Mercury contents were assigned to the various coal supply curves based on a 1999 Information Collection Request conducted by the Environmental Protection Agency. Given the uncertainty inherent in this and any analysis, the forecasts provided here should not be interpreted as a definitive expectation of what the actual levels of coal production, consumption, and emissions will be, but as an indication of the order of magnitude and direction of change that might be expected.

Summary

At the national level, the projected changes in total coal production, consumption, coal-fired electricity generation and electric power sector emissions across the sensitivity cases designated by the STB are very small. Changes in the regional projections of coal consumption, coal-fired generation, and electric power sector emissions are similarly small. Regional projections of coal production, however, do vary some across the sensitivity cases evaluated in this study, with lower (higher) transportation rates for Wyoming PRB coal resulting in increased (decreased) production of this region's coal, accompanied by offsetting reductions (increases) in coal output projected for other supply regions. For the three years evaluated in this letter (2010, 2015 and 2025), the projected levels of Wyoming PRB coal production were typically about 1 percent different from the *AEO2005* reference case forecast in the Low4pct and High4pct sensitivity cases, and approximately 3 percent different than the *AEO2005* reference case forecast in the Low7pct and High7pct sensitivity cases.

Table 3. Coal Transportation Rate Sensitivity Cases Summary Table, 2010

Scenario:	LOW7PCT	LOW4PCT	AEO2005	HIGH4PCT	HIGH7PCT
Coal Production (million short tons)					
Appalachia	401	404	403	405	411
Interior	156	158	159	159	159
West	684	676	676	673	666
WY Powder River Basin	510	499	497	491	483
Other Western Regions	174	177	179	181	183
National Total	**1,241**	**1,239**	**1,238**	**1,237**	**1,235**
Electric Power Sector, Selected Statistics					
Coal Consumption					
Million Short Tons	1,141	1,139	1,139	1,138	1,135
Trillion Btu	22,826	22,823	22,812	22,813	22,812
Generation From Coal (billion kilowatthours)					
MAPP	142	142	142	142	142
MAIN	201	201	201	201	201
ECAR	573	573	572	573	572
MAAC	141	141	141	141	141
SERC	501	501	501	501	501
National Total	**2,204**	**2,204**	**2,203**	**2,203**	**2,202**
Cumulative Coal-Fired Generating Capacity Additions (gigawatts)					
MAPP	0.8	0.8	0.8	0.8	0.8
MAIN	0.1	0.1	0.1	0.1	0.1
ECAR	0.0	0.0	0.0	0.0	0.0
MAAC	0.5	0.5	0.5	0.5	0.5
SERC	0.0	0.0	0.0	0.0	0.0
National Total	**1.8**	**1.8**	**1.8**	**1.8**	**1.8**
Cumulative Coal-Fired Generating Capacity Retirements (gigawatts)					
MAPP	0.0	0.0	0.0	0.0	0.0
MAIN	0.1	0.0	0.1	0.1	0.1
ECAR	1.3	1.3	1.3	1.3	1.4
MAAC	0.0	0.0	0.0	0.0	0.0
SERC	0.0	0.0	0.0	0.0	0.0
National Total	**2.4**	**2.3**	**2.4**	**2.4**	**2.4**
Delivered Price of Coal (2003 dollars per million Btu, unless otherwise noted)					
MAPP	1.03	1.05	1.06	1.07	1.08
MAIN	1.20	1.22	1.23	1.23	1.24
ECAR	1.30	1.31	1.31	1.31	1.31
MAAC	1.43	1.43	1.43	1.43	1.45
SERC	1.43	1.43	1.43	1.43	1.43
National Average	**1.24**	**1.25**	**1.25**	**1.26**	**1.26**
National Average (2003 dollars per short ton)	**24.62**	**24.80**	**24.89**	**25.02**	**25.21**

Table 3. Coal Transportation Rate Sensitivity Cases Summary Table, 2010 (continued)

Electric Power Sector, Selected Environmental Statistics

Scenario:	LOW7PCT	LOW4PCT	AEO2005	HIGH4PCT	HIGH7PCT
Sulfur Dioxide Emissions (million short tons)					
MAPP	0.34	0.34	0.34	0.34	0.34
MAIN	0.82	0.82	0.81	0.82	0.82
ECAR	2.67	2.72	2.72	2.69	2.79
MAAC	1.08	1.04	1.03	1.05	1.03
SERC	2.48	2.47	2.48	2.48	2.48
National Total	**9.30**	**9.30**	**9.29**	**9.29**	**9.37**
Nitrogen Oxide Emissions (million short tons)					
MAPP	0.34	0.34	0.34	0.34	0.34
MAIN	0.82	0.82	0.81	0.82	0.82
ECAR	0.97	0.97	0.97	0.97	0.97
MAAC	0.24	0.24	0.24	0.24	0.24
SERC	0.86	0.86	0.86	0.86	0.86
National Total	**3.99**	**3.99**	**3.99**	**3.99**	**3.98**
Mercury Emissions (short tons)					
MAPP	3.74	3.74	3.74	3.74	3.74
MAIN	5.87	5.87	5.84	5.84	5.85
ECAR	13.57	13.97	12.83	12.65	13.10
MAAC	4.92	4.26	5.28	5.50	4.92
SERC	10.99	10.80	11.03	10.40	10.33
National Total	**54.45**	**53.92**	**54.08**	**53.29**	**53.40**
National Total (excluding waste coal)	**50.98**	**50.83**	**50.93**	**50.51**	**50.69**
Carbon Dioxide Emissions (million metric tons)					
MAPP	164.12	164.11	164.11	164.08	164.11
MAIN	249.31	249.17	248.55	248.42	248.39
ECAR	642.54	641.70	641.27	641.66	641.13
MAAC	178.00	178.32	178.24	178.20	178.13
SERC	590.14	590.00	590.02	589.84	590.00
National Total	**2,887.24**	**2,886.53**	**2,885.67**	**2,885.50**	**2,885.36**
Cumulative Retrofits of Flue Gas Desulfurization Equipment (gigawatts)					
National Total	21.7	22.3	22.3	23.5	22.8

Sources: Energy Information Administration, National Energy Modeling System runs: PRB_RATE_LL.D122904A; PRB_RATE_L.D122904A; AEO2005.D102004A; PRB_RATE_H.D123004A; and PRB_RATE_HH.D122904A

Table 4. Coal Transportation Rates Sensitivity Cases Summary Table, 2015

Scenario:	LOW7PCT	LOW4PCT	AEO2005	HIGH4PCT	HIGH7PCT
Coal Production (million short tons)					
Appalachia	380	382	385	386	386
Interior	152	154	157	158	159
West	742	738	727	727	726
WY Powder River Basin	556	550	538	537	534
Other Western Regions	186	188	189	190	192
National Total	**1,275**	**1,273**	**1,270**	**1,270**	**1,270**
Electric Power Sector, Selected Statistics					
Coal Consumption					
Million Short Tons	1,190	1,188	1,185	1,185	1,185
Trillion Btu	23,671	23,651	23,650	23,654	23,654
Generation From Coal (billion kilowatthours)					
MAPP	150	150	149	149	149
MAIN	207	207	207	207	207
ECAR	588	587	587	587	588
MAAC	144	144	144	144	144
SERC	509	509	509	509	509
National Total	**2,287**	**2,285**	**2,285**	**2,285**	**2,285**
Cumulative Coal-Fired Generating Capacity Additions (gigawatts)					
MAPP	1.8	1.8	1.7	1.7	1.7
MAIN	0.1	0.1	0.1	0.1	0.1
ECAR	0.0	0.0	0.0	0.0	0.0
MAAC	0.5	0.5	0.5	0.5	0.5
SERC	0.1	0.1	0.1	0.1	0.1
National Total	**8.4**	**8.3**	**8.3**	**8.3**	**8.3**
Cumulative Coal-Fired Generating Capacity Retirements (gigawatts)					
MAPP	0.0	0.0	0.0	0.0	0.0
MAIN	0.2	0.1	0.2	0.2	0.2
ECAR	1.7	1.7	1.7	1.7	1.7
MAAC	0.0	0.0	0.0	0.0	0.0
SERC	0.0	0.0	0.0	0.0	0.0
National Total	**3.0**	**2.9**	**3.0**	**3.0**	**3.0**
Delivered Price of Coal (2003 dollars per million Btu, unless otherwise noted)					
MAPP	1.02	1.05	1.06	1.08	1.08
MAIN	1.24	1.28	1.29	1.31	1.29
ECAR	1.34	1.36	1.36	1.37	1.36
MAAC	1.41	1.42	1.42	1.42	1.42
SERC	1.46	1.47	1.47	1.47	1.47
National Average	**1.22**	**1.23**	**1.23**	**1.24**	**1.25**
National Average (2003 dollars per short ton)	**24.07**	**24.23**	**24.42**	**24.52**	**24.65**

Table 4. Coal Transportation Rates Sensitivity Cases Summary Table, 2015 (continued)

Electric Power Sector, Selected Environmental Statistics

Scenario:	LOW7PCT	LOW4PCT	AEO2005	HIGH4PCT	HIGH7PCT
Sulfur Dioxide Emissions (million short tons)					
MAPP	0.34	0.33	0.33	0.33	0.33
MAIN	0.79	0.79	0.79	0.79	0.79
ECAR	2.52	2.54	2.59	2.57	2.58
MAAC	1.07	1.08	1.03	1.01	1.02
SERC	2.33	2.33	2.33	2.33	2.33
National Total	**8.95**	**8.96**	**8.97**	**8.93**	**8.96**
Nitrogen Oxide Emissions (million short tons)					
MAPP	0.34	0.33	0.33	0.33	0.33
MAIN	0.79	0.79	0.79	0.79	0.79
ECAR	0.98	0.98	0.98	0.98	0.98
MAAC	0.24	0.24	0.24	0.24	0.24
SERC	0.89	0.89	0.89	0.89	0.89
National Total	**4.10**	**4.09**	**4.09**	**4.09**	**4.09**
Mercury Emissions (short tons)					
MAPP	3.82	3.82	3.82	3.82	3.82
MAIN	6.19	6.18	6.16	6.15	6.16
ECAR	13.23	13.61	13.19	13.09	13.00
MAAC	5.27	4.90	5.07	5.12	5.32
SERC	11.17	11.17	11.31	10.73	10.59
National Total	**55.29**	**55.31**	**55.12**	**54.44**	**54.36**
National Total (excluding waste coal)	**52.04**	**52.12**	**52.02**	**51.80**	**51.65**
Carbon Dioxide Emissions (million metric tons)					
MAPP	173.24	173.04	172.93	172.76	172.48
MAIN	262.67	262.67	261.87	261.83	261.84
ECAR	668.48	667.83	666.89	667.33	667.47
MAAC	189.70	189.42	189.92	189.81	189.72
SERC	628.34	628.34	628.39	628.46	628.51
National Total	**3,078.73**	**3,076.92**	**3,075.81**	**3,076.48**	**3,076.34**
Cumulative Retrofits of Flue Gas Desulfurization Equipment (gigawatts)					
National Total	25.4	25.2	26.0	27.2	26.5

Sources: Energy Information Administration, National Energy Modeling System runs: PRB_RATE_LL.D122904A; PRB_RATE_L.D122904A; AEO2005.D102004A; PRB_RATE_H.D123004A; and PRB_RATE_HH.D122904A

Table 5. Coal Transportation Rates Sensitivity Cases Summary Table, 2025

Scenario:	LOW7PCT	LOW4PCT	AEO2005	HIGH4PCT	HIGH7PCT
Coal Production (million short tons)					
Appalachia	396	402	406	407	409
Interior	182	182	182	183	183
West	915	908	900	897	892
WY Powder River Basin	650	639	633	626	617
Other Western Regions	265	269	267	271	275
National Total	**1,494**	**1,492**	**1,488**	**1,487**	**1,484**
Electric Power Sector, Selected Statistics					
Coal Consumption					
Million Short Tons	1,430	1,428	1,425	1,423	1,420
Trillion Btu	28,558	28,590	28,544	28,545	28,520
Generation From Coal (billion kilowatthours)					
MAPP	164	165	164	164	164
MAIN	209	209	209	208	208
ECAR	596	595	595	595	595
MAAC	180	177	180	172	173
SERC	681	682	680	684	681
National Total	**2,871**	**2,876**	**2,869**	**2,870**	**2,867**
Cumulative Coal-Fired Generating Capacity Additions (gigawatts)					
MAPP	3.7	3.8	3.7	3.7	3.7
MAIN	0.1	0.1	0.1	0.1	0.1
ECAR	0.0	0.0	0.0	0.0	0.0
MAAC	5.6	5.2	5.5	4.3	4.5
SERC	23.8	23.9	23.8	24.2	23.9
National Total	**87.1**	**87.6**	**86.9**	**86.9**	**86.7**
Cumulative Coal-Fired Generating Capacity Retirements (gigawatts)					
MAPP	0.0	0.0	0.0	0.0	0.0
MAIN	0.2	0.1	0.2	0.2	0.2
ECAR	1.7	1.7	1.7	1.7	1.7
MAAC	0.0	0.0	0.0	0.0	0.0
SERC	0.0	0.0	0.0	0.0	0.0
National Total	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**
Delivered Price of Coal (2003 dollars per million Btu, unless otherwise noted)					
MAPP	0.99	1.01	1.03	1.04	1.06
MAIN	1.27	1.30	1.33	1.34	1.35
ECAR	1.39	1.41	1.42	1.42	1.43
MAAC	1.48	1.48	1.49	1.48	1.49
SERC	1.48	1.48	1.49	1.49	1.49
National Average	**1.29**	**1.31**	**1.31**	**1.31**	**1.33**
National Average (2003 dollars per short ton)	**25.58**	**26.02**	**25.95**	**26.12**	**26.47**

Table 5. Coal Transportation Rates Sensitivity Cases Summary Table, 2025 (continued)

Electric Power Sector, Selected Environmental Statistics

Scenario:	LOW7PCT	LOW4PCT	AEO2005	HIGH4PCT	HIGH7PCT
Sulfur Dioxide Emissions (million short tons)					
MAPP	0.33	0.33	0.33	0.33	0.33
MAIN	0.73	0.73	0.73	0.73	0.73
ECAR	2.45	2.48	2.54	2.56	2.56
MAAC	1.08	1.09	1.02	1.04	1.03
SERC	2.42	2.40	2.41	2.39	2.39
National Total	**8.96**	**8.95**	**8.95**	**8.95**	**8.95**
Nitrogen Oxide Emissions (million short tons)					
MAPP	0.33	0.33	0.33	0.33	0.33
MAIN	0.73	0.73	0.73	0.73	0.73
ECAR	0.98	0.98	0.98	0.98	0.98
MAAC	0.24	0.24	0.24	0.24	0.24
SERC	0.94	0.94	0.94	0.94	0.94
National Total	**4.29**	**4.29**	**4.29**	**4.29**	**4.28**
Mercury Emissions (short tons)					
MAPP	3.90	3.90	3.89	3.87	3.85
MAIN	6.30	6.30	6.29	6.26	6.26
ECAR	13.94	13.69	13.87	13.73	13.65
MAAC	3.94	3.93	3.76	3.77	3.78
SERC	12.11	12.23	12.24	11.76	11.78
National Total	**56.04**	**55.98**	**55.97**	**55.25**	**55.05**
National Total (excluding waste coal)	**54.48**	**54.30**	**54.25**	**54.18**	**54.09**
Carbon Dioxide Emissions (million metric tons)					
MAPP	187.53	188.35	187.77	187.44	187.28
MAIN	268.98	269.17	268.89	267.83	268.00
ECAR	700.15	699.13	697.95	697.65	697.31
MAAC	224.23	222.20	223.76	220.07	220.65
SERC	790.98	789.63	791.10	790.96	790.03
National Total	**3,653.88**	**3,653.11**	**3,652.15**	**3,649.51**	**3,646.78**
Cumulative Retrofits of Flue Gas Desulfurization Equipment (gigawatts)					
National Total	26.0	26.3	27.2	28.6	27.2

Sources: Energy Information Administration, National Energy Modeling System runs: PRB_RATE_LL.D122904A; PRB_RATE_L.D122904A; AEO2005.D102004A; PRB_RATE_H.D123004A; and PRB_RATE_HH.D122904A

Department of Energy
Washington, DC 20585

January 26, 2005

The Honorable Roger Nober
Chairman
Surface Transportation Board
1925 K Street, N.W.
Washington, D.C. 20423-0001

Dear Mr. Nober:

The enclosed analysis responds to your letter of December 21, 2004, requesting that the Energy Information Administration (EIA) use the National Energy Modeling System (NEMS) to run a sensitivity analysis of the impacts of specified changes in coal transportation rates on power plant emissions. Overall, using transportation rate adjustments provided by Surface Transportation Board staff, EIA found very small changes in total coal production, coal consumption, coal-fired electricity generation and electric power sector emissions. There were small changes in regional projections of coal production, but the aggregate amount of coal used and the emissions associated with its use in each consuming region were nearly unchanged from reference case levels.

The results of this analysis likely give a reasonable indication of the magnitude and direction of the expected emissions changes resulting from the specified transportation rate adjustments. However, NEMS operates at a relatively aggregate regional level and does not represent the costs of transporting coal over specific rail lines.

If you have further questions, please do not hesitate to contact me on (202) 586-4361. Alternatively, your staff can contact John J. Conti, Director, Office of Integrated Analysis and Forecasting, at (202) 586-2222.

Sincerely,

Guy F. Caruso
Administrator
Energy Information Administration

Enclosure