DOE/EIA-0571
Distribution Category UC-950

Energy Policy Act Transportation Rate Study

Availability of Data and Studies

October 1993

Energy Information Administration
Office of Coal, Nuclear, Electric and Alternate Fuels
U.S. Department of Energy
Washington, DC 20585

This report was prepared by the Energy Information Administration, the independent statistical and analytical agency within the Department of Energy.

Contacts

This report, *Energy Policy Act Transportation Rate Study: Availability of Data and Studies*, has been prepared by the Energy Information Administration (EIA), Office of Coal, Nuclear, Electric and Alternate Fuels (CNEAF) and Office of Oil and Gas (OOG). General Questions concerning this report may be addressed to John Geidl (202/586-5570), Director of CNEAF, for coal, and Jimmie L. Petersen (202/586-6401), Director of OOG, for oil and natural gas, or Robert M. Schnapp (202/254-5392), Director of CNEAF's Analysis and Systems Division, who coordinated the preparation of this report.

Detailed questions about the report may be addressed to the following:

Coal ..... Ernest R. Pantos (202/254-5372)
Thelda McMillian (202/254-5414)

B.D. Hong (202/254-5365)

Oil ..... Charles C. Heath (202/586-6860)

Natural Gas . Barbara Mariner-Volpe (202/586-5878)

Preface

This report is prepared in response to the requirements of the Energy Policy Act of 1992 (Public Law 102-486), Title XIII, Section 1340, "Establishment of Data Base and Study of Transportation Rates."

Section 1340 states:

(a) Data Base. — The Secretary [of Energy] shall review the information currently collected by the Federal Government and shall determine whether information on transportation rates for rail and pipeline transport of domestic coal, oil, and gas during the period of January 1, 1988, through December 31, 1997, is reasonably available. If he determines that such information is not reasonably available, the Secretary shall establish a data base containing, to the maximum extent practicable, information on all such rates. The confidentiality of contract rates shall be preserved. To obtain data pertaining to rail contract rates, the Secretary shall acquire such data in aggregate form only from the Interstate Commerce Commission, under terms and conditions that maintain the confidentiality of such rates.

(b) Study. — The Energy Information Administration shall determine the extent to which any agency of the Federal Government is studying the rates and distribution patterns of domestic coal, oil, and gas to determine the impact of the Clean Air Act as amended by the Act entitled "An Act to amend the Clean Air Act to provide for attainment and maintenance of health protective national ambient air quality standards, and for other purposes," enacted November 15, 1990 (Public Law 101-549), and other Federal policies on such rates and distribution patterns. If the Energy Information Administration finds that no such study is underway, or that reports of the results of such study will not be available to the Congress providing the information specified in this subsection and subsection (a) by the dates established in subsection (c), the Energy Information Administration shall initiate such a study.

(c) Reports to Congress. — Within one year after the date of enactment of this Act, the Secretary shall report to the Congress on the determination the Energy Information Administration is required to make under subsection (b). Within three years after the date of enactment of this Act, the Secretary shall submit reports on any data base or study developed under this section. Any such reports shall be updated and resubmitted to the Congress within eight years after such date of enactment. If the Energy Information Administration has determined pursuant to subsection (b) that another study or studies will provide all or part of the information called for in this section, the Secretary shall transmit the results of that study by the dates established in this subsection, together with his comments.

(d) Consultation with Other Agencies. — The Secretary and the Energy Information Administration shall consult with the Chairmen of the Federal Energy Regulatory Commission and the Interstate Commerce Commission in implementing this section.

Contents

Contents (Continued)

Page

Tables

Figures

Executive Summary

Pursuant to Section 1340(c) of the Energy Policy Act of 1992 (EPACT), this report presents the Secretary of Energy's review of data collected by the Federal Government on rates for rail and pipeline transportation of domestic coal, oil, and gas for the years 1988 through 1997, and proposals to develop an adequate data base for each of the fuels, based on the data availability review. This report also presents the Energy Information Administration's findings regarding the extent to which any Federal agency is studying the impacts of the Clean Air Act Amendments of 1990 (CAAA90) and other Federal policies on the transportation rates and distribution patterns of domestic coal, oil, and gas.

Studies

Regarding the availability of studies, no Federal agency has conducted a study of the impacts of CAAA90 and other Federal policies on the distribution patterns and railroad or pipeline transportation rates for coal and natural gas. For oil, however, a study has recently been concluded by the National Petroleum Council (NPC), an advisory council to the Secretary of Energy, which addresses petroleum refining issues including the pipeline transportation of petroleum products. Though not specific to analysis of the impacts of CAAA90 or other Federal policies, there have been related studies on coal and natural gas. Information on these studies is provided in the body of the report.

Based on these findings, the Energy Information Administration (EIA) will forward the NPC study to Congress when published and the EIA will initiate analytic studies for coal and natural gas to satisfy the requirements of EPACT's Section 1340(b). These new studies are, however, subject to availability of data, which is summarized below.

Data

Separate from the impact studies is the requirement for a transportation rate data base for each of the fuels—coal, oil, and natural gas. While the availability of data differs considerably among the fuels, existing data are found to be generally inadequate to satisfy the requirements of EPACT's Section 1340(a). The inadequacy of data thus necessitates collection of additional data, as proposed below.

Coal

No existing data base on rail transportation rates for coal is adequate for an analysis of the effects of CAAA90 on coal distribution patterns and rail trans-portation rates. Optimally, such a data base would contain information on all coal moved in the United States by rail. The data base would include, for each coal shipment, data on origin and destination, the tonnage shipped, the distance shipped, the mode of transportation, the average transportation rate per ton, the average rate per ton-mile, the average sulfur content, and the average Btu content of coal. None of the data bases currently maintained by the Interstate Commerce Commission (ICC), the EIA, or the Federal Energy Regulatory Commission (FERC) includes all of these data elements.

The following options have been developed to meet the requirements of EPACT's Section 1340(a). They vary in scope, limitations, and resource requirements.

Option 1: Obtain Non-Public Use File Data from FERC Form 580

The EIA maintains the Coal Transportation Rate Data Base (CTRDB), which contains coal transportation data drawn from the FERC Form 580, “Interrogatory on Fuel and Energy Purchase Practices,” a biennial survey of interstate, investor-owned electric utilities for coal, oil and gas purchased under contract. The coal shipments covered under this survey account for about 58 percent of all coal shipped to all utilities that have coal-fired plants with a nameplate capacity of 50 megawatts or more. The CTRDB currently contains data for the years 1979 through 1991 and is updated biennially.

Although the CTRDB contains all the data elements needed for a study of coal transportation rates for electric utilities, it excludes many of the data observations because the data for some interstate, investor-owned electric utilities are withheld by the FERC at the request of the

respondent utilities to maintain confidentiality. However, these confidential data could be obtained under a data sharing agreement with the FERC and added to the CTRDB. The data sharing agreement would assure that the data would be aggregated in such a way that their confidentiality will be maintained before they are made publicly available. This option is estimated to cost a total of $210,000 to develop a data base for the years 1988 through 1997 and would place no additional respondent burden on any industry.

Option 2: Modify FERC Form 423

FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants," covers both contract and spot coal shipments to coal-fired steam plants of 50 megawatts or more that are owned by all electric utilities whether they are investor-owned, publicly owned, interstate, or intrastate. However, FERC Form 423 does not separately identify information on transportation cost or minemouth coal price and does not collect information on the mode of transportation and distance of shipments. The form could be modified to obtain these data elements, provided that doing so would not raise the issue of the confidentiality of overall FERC Form 423 data. This option is estimated to cost a total of $460,000 to the Government and a total of 20,000 hours of respondent burden to collect 1988-1997 data.

Option 3: Modify All Coal Consumer Survey Forms

In addition to modifying FERC Form 423, the EIA annual surveys of manufacturing plants (Form EIA-3A) and coke plants (Form EIA-5A) could be modified to include the necessary data elements on coal transportation. It is estimated to cost $815,000 to the Government and a total of 25,000 hours of respondent burden to develop a data base for the years 1988 through 1997.

Recommendation

Option 1 is recommended, because it provides adequate data at the lowest cost to the Federal Government and with no additional respondent burden. It would improve considerably the coverage of an existing data base on the transportation of contract coal to electric utilities.

Petroleum

At the request of the Secretary of Energy, the National Petroleum Council (NPC), an advisory committee to the Secretary, conducted a study of the impact of the CAAA90 on petroleum refining and related industries, among other issues. The NPC study, *U.S. Petroleum Refining—Meeting Requirements for Cleaner Fuels and Refineries*, was completed and presented to the Secretary on August 31, 1993. Copies of the report are available from the NPC. The report includes historical pipeline transportation costs for 1987 and 1989 and projected costs for 1995, 2000, and 2010. The study projects that the cost of transporting petroleum products through pipelines in 2010 will be about $0.0025 per gallon higher than current costs.

The EIA does not collect data on petroleum transportation rates. Also, the petroleum transportation rate data as currently collected by the ICC and the FERC would not be adequate for the study requested under Section 1340(b) of EPACT. A new data survey by the EIA is an option to develop an adequate petroleum transportation rate data base. However, this option would be very costly, requiring an investment of $450,000 in FY94 and $450,000 in each fiscal year thereafter.

Recommendation

It is recommended that the NPC's data base be provided as needed to satisfy the petroleum transportation data requirements of Section 1340(a) and that the NPC study be accepted in lieu of a study by a Federal agency. The Secretary of Energy will forward this study to the Congress in early 1994.

Natural Gas

Data required by EPACT on actual rates for natural gas pipeline transportation are not available from the ICC, FERC, EIA, or any other Federal agency. Some information is available on interstate pipelines from FERC forms (described below and in Appendix B), but it is very general and coverage is not consistent. Other sources provide information on posted rates but not on the volumes that flow under those posted rates. In summary, the data required to satisfy the requirement of EPACT are not available. To satisfy the requirement, three options to obtain data for the 1988 to 1992 period and five options for the 1993 to 1997 period have been developed. These options vary in scope, limitations, and resource requirements.

Historical Data for 1988-1992

Option 1: Uniform Statistical Report Data Maintained by the American Gas Association

The American Gas Association (AGA) has developed the Uniform Statistical Report (USR) survey, which contains annual data on gas volumes transported and the associated revenues. The AGA data base consists of general and statistical information collected from companies engaged in natural gas distribution and transmission, including interstate and intrastate pipeline companies and local distribution companies. The data are from the USR, which is prepared annually by AGA. Compared with EIA data for 1991, the USR survey represents approximately 80 percent of throughput volumes. This option is estimated to cost $25,000 to develop the data base for the years 1988 through 1992.

Option 2: Use Form EIA-176 to Collect the Data

A new schedule could be added to Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and Disposition," to collect annual data on transportation rates and services provided by interstate and intrastate pipeline companies, local distribution companies, and storage operators. This would be a one-time survey conducted to collect 1988-1992 data, at an estimated cost of about $75,000 and a total respondent burden of 275,000 hours.

Option 3: Use Data from Form FERC-2

The historical data collected on Form FERC-2, "Annual Report of Major Natural Gas Companies," for 1988 through 1992 would be used to analyze annual changes in transportation rates collected by interstate pipeline companies. This option is estimated to cost about $200,000.

Recommendation

Because of the extensive restructuring of the natural gas industry following the implementation of FERC Order 636 (issued in 1992), the historical data prior to 1993 may not be very useful, since they would not necessarily be comparable with post-Order 636 data. Therefore, it is recommended that data for 1988 through 1992 be obtained from the Uniform Statistical Report data base that has already been developed by the AGA (Option 1), although there are coverage limitations to these data. This option has the lowest cost and would impose no additional respondent burden.

Development of Data for 1993-1997

Option 1: Attach a New Schedule to Form EIA-176 to Collect Annual Data

In this option, a new schedule would be added to Form EIA-176 to collect annual data on transportation volumes and revenues by State, customer category, and type of service. This approach would permit State-to-State comparison of per-unit transportation payments by customer class on an annual basis. It is estimated to cost $140,000 for the 5-year data collection period. The associated respondent burden is estimated to be 24,000 hours per year.

Option 2: Attach a New Monthly Schedule to Form EIA-176

A new schedule could be added to the Form EIA-176 to collect monthly data on transportation volumes and revenues by State, customer category, and type of service. This option would provide a basis for analyzing seasonal fluctuations in transportation rates. This option would cost a total of approximately $160,000. The associated respondent burden is estimated to be 48,000 hours per year.

Option 3: Derive Tariff Information from Form FERC-2

Form FERC-2 could be used to analyze annual changes in rates charged by individual companies over time; however, the schedule does not always contain mileage information for each service, and comparisons of rates over time may, therefore not always be possible. Industry coverage is for the major interstate pipeline companies only (44 companies). The total cost for this option is estimated at $360,000.

Option 4: Derive Information from the Rate Cases Filed at FERC by the Interstate Pipeline Companies

This option would develop the EPACT data base from information filed by the interstate pipelines at the FERC when they request approval of new rates. Typically, the pipeline companies market information (including transportation rates) covering a period of time (test period). This option is estimated to cost $600,000.

Option 5: Obtain Data from Electronic Bulletin Boards

In this approach, information on released capacity would be obtained from the Electronic Bulletin Boards for each of the major interstate pipeline companies. This

option would enable the tracking of changes in posted rates and the rates for released capacity. Rough estimates indicate that the cost for this Option would be in excess of 1.0 million dollars.

Recommendation

Option 1 (collect annual data on Form EIA-176 for 1993 through 1997) would satisfy the EPACT requirements, and EIA recommends implementation of this Option at a minimum. Option 2 (collect monthly data on transportation rates on Form EIA-176) would provide more detailed data and permit a more thorough seasonal analysis of transportation rates.

EIA is currently consulting with its customers (including the U.S. Congress, the Department of Energy, and others) to determine if the additional information in Option 2 is required to satisfy their broader analytical requirements.

1. Introduction

This is the first of three reports to the Congress by the Secretary of Energy that are mandated by Section 1340(c) of the Energy Policy Act of 1992 (P.L. 102-486). This report has three primary purposes:

(a) to present the Energy Information Administration's determination of the extent to which any Federal agency is studying the impact of the Clean Air Act as amended in 1990 and other Federal policies on rail and pipeline transportation rates and distribution patterns of domestic coal, oil, and gas;

(b) to present the Secretary's review of data currently collected by the Federal Government determining whether information on transportation rates for rail and pipeline transport of domestic coal, oil, and gas for the years 1988 through 1997 is rea-sonably available; and

(c) if not available, to present the Secretary's proposals to develop an adequate data base on transportation rates for domestic coal, oil, and gas.

The report is organized by fuel—coal, oil, and natural gas. Chapter 2, "Coal Transportation," begins with background information on trends in coal distribution patterns and in coal transportation rates, followed by a brief discussion of Federal legislation that may affect those trends in the future. Chapter 2 then examines existing studies and data on coal transportation rates and presents several options for collecting data and establishing the data base needed to carry out the study specified in Section 1340(b), with regard to the potential impact of the Clean Air Act Amendments of 1990 (CAAA90) and other Federal legislation on coal trans-portation. A detailed review of currently available data on coal transportation rates is presented in Appendix A.

Chapter 3, "Petroleum Transportation," describes the availability of existing studies and data on transportation rates for petroleum, followed by recommendations as to the study and data base development.

After presenting a brief discussion of natural gas markets including prices and transportation system, Chapter 4, "Natural Gas Transportation," discusses the potential effects of Federal legislation on those trends as background information. Chapter 4 then discusses the findings of existing studies on natural gas transportation rates and describes several options for the development of a data base suitable for studies of transportation rates. Draft survey forms for the proposed data base development options are attached in Appendix B.

2. Coal Transportation

Background Information

Past and Present Distribution Patterns of Coal and Trends in Coal Transportation Rates

Coal Distribution Patterns

While U.S. coal consumption has been on the rise, domestic coal distribution patterns changed substantially during the 1970 through 1990 period.[1] As increasing quantities of low-sulfur coal from Wyoming's Powder River Basin were shipped to electric power plants, the proportion of domestic coal shipments originating in the Western Region rose from 6 percent in 1970 to 36 percent in 1990 (Table 1 and Figures 1 and 2). With declining demands for high-sulfur coal, the proportion of domestic coal shipments originating in Appalachia declined from 65 percent to 42 percent, and the propor-tion of coal shipments originating in the Interior declined from 29 to 22 percent over the same period.

There were also important shifts in the destination of domestic coal shipments between 1970 and 1990. The South replaced the Midwest as the leading coal demand (or destination) region, as Texas electric utilities began burning indigenous lignite in new power plants and coal shipments to utilities in the Southeast grew. The proportion of coal shipped to the West nearly tripled between 1970 and 1990, while the share distributed to the Northeast fell by more than half.

The dominance of electric utilities as coal consumers also increased over the 1970-1990 period. In 1990, 798 million short tons of coal went to electric utilities, representing 87 percent of all domestic coal shipments, up from 63 percent in 1970. Among the coals shipped to nonutility sectors, the proportion of coal going to coke plants fell most significantly, from 18 percent in 1970 to 4 percent in 1990. The consumption of coking coal fell, as U.S. steel production declined and steel companies adopted technologies that required less coke.

Rail was the dominant coal transportation method throughout the 1970-1990 period, accounting for 58 percent of domestic coal shipments in 1990. While the proportion of coal shipped by water (primarily barge, the second-largest coal transportation method) declined from 29 percent in 1970 to 17 percent in 1990, the relative importance of tramway and conveyor transpor-tation increased over the same period, with the growth in coal shipments to minemouth power plants. The share of coal shipped by truck in 1990 (11 percent) was about the same as in 1970.

It should be noted that coal shipments by transport mode between various coal supply and demand regions may differ substantially from those at the national level. For example, in 1990, only 41 percent of the coal shipped to the Northeast, mostly from Appalachia, was transported by rail, while 64 percent of the coal shipped to the South was transported by rail.[2] In particular, the western low-sulfur coals shipped to the South and the West in the past two decades have been carried primarily by rail.

Coal Transportation Rates

An EIA report,[3] published in 1991, analyzed the trends in average transportation rates for coal for the period from 1979 through 1987, using data on shipments of coal to electric utilities under contract that were reported on Federal Energy Regulatory Commission (FERC) Form 580. According to this report, at the national level, transportation cost accounted for 25 percent of the delivered price of electric utility contract coal in 1987, and as much as 29 percent in 1984. The importance of transportation cost was greater for coal supplies to certain demand regions, primarily because of the longer distances covered. In 1987, transportation cost accounted for 40 percent of the delivered price of contract coal shipped to utilities in the South.

[1]Energy Information Administration, *The U.S. Coal Industry, 1970-1990: Two Decades of Change*, DOE\EIA-0559 (Washington, DC, November 1992), pp. 65-80.

[2]Energy Information Administration, *The U.S. Coal Industry, 1970-1990: Two Decades of Change*, DOE/EIA-0559 (Washington, DC, November 1992), Tables 40 and 42.

[3]Energy Information Administration, *Trends in Contract Coal Transportation*, DOE/EIA-0549 (Washington, DC, September 1991).

Table 1. Domestic Distribution of U.S. Coal by Origin, Destination, Consumer, and Transportation Method, 1970, 1980, and 1990

Item	Percent of Total Shipments		
	1970	1980	1990
Region of Origin			
Appalachia	65.0	47.9	42.0
Interior	28.7	23.8	22.2
Western	6.3	28.4	35.7
Region of Destination			
Northeast	19.1	11.2	9.0
Midwest	45.8	40.1	36.0
South	30.7	37.1	41.6
West	4.5	11.4	12.8
Consumer Category[a]			
Electric Utilities	62.7	81.5	86.8
Coke Plants	18.2	9.1	4.1
Other Industries	NA	8.3	7.7
Residential/Commercial	NA	0.9	0.7
Method of Transportation			
Rail	54.4	57.4	57.5
Water	29.3	19.4	17.0
Truck	11.9	13.9	11.4
Other[b]	4.4	9.0	13.4

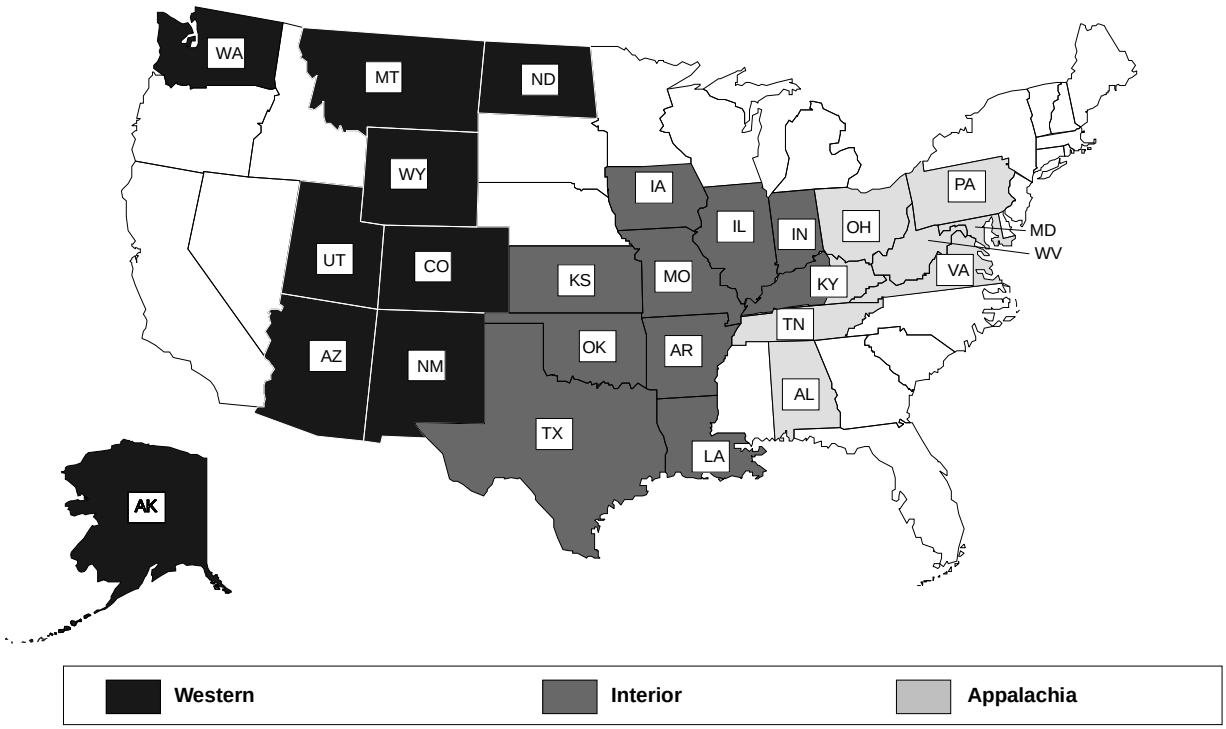
[a]For 1970, anthracite consumption is excluded and coal carbonized at gas plants is included in coke plant consumption.
[b]Primarily tramway, conveyor, and slurry pipeline.
NA = not available.
Note: Components may not add to 100 percent because of independent rounding and some shipments for which the destination, consumer, or transportation method were unknown.
Sources: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Bituminous Coal and Lignite Distribution, Calendar Year 1970," (Washington, DC, March 1971), and *Minerals Yearbook, 1970* (Washington, DC, 1972); Energy Information Administration, *Coal Distribution January-December 1980*, DOE/EIA-0125(80/4Q) (Washington, DC, April 1981), Table 9, and *Coal Distribution January-December 1990*, DOE/EIA-0125(90/4Q) (Washington, DC, April 1991), Table 34.

While rail is the predominant mode of U.S. coal transportation, the average cost per ton for rail shipments is high relative to other transportation modes, as rail movements are relatively long. Also, rail transportation rates for coal vary according to the region where the utilities are located (Table 2). For example, in 1987, the average rail transportation rate per ton (in 1990 dollars) ranged from $7.87 for utilities in the West to $14.28 for utilities in the South. This was primarily because the average distance of coal movements by rail was nearly twice as great for utilities in the South as for those in the West.

However, as the shipping distance increases, the average transportation rate per ton-mile generally declines. The average rail transportation rate per ton-mile in 1987 was the lowest for utilities in the South, where rail transportation usually is by long-distance unit trains and barge competition is significant. In contrast, the average rate per ton-mile is the highest for utilities in the Northeast, where shipping distances are shorter and unit trains are less prevalent.

At the national level, both the average rate per ton and the average rate per ton-mile for contract coal shipments by rail declined between 1983 and 1987 (Table 2). This is consistent with the view that the deregulation of the railroad industry by the Staggers Rail Act of 1980 resulted in increased efficiency, greater competition, and generally lower rail transportation rates for coal. However, many other factors have influenced the average rail transportation rates, including changes in the average shipping distance, technological change, and a significant decline in the

Figure 1. U.S. Coal-Producing Regions



Source: Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels.

cost of diesel fuel, the primary locomotive fuel. In particular, as the levels of actual coal shipments by rail in the 1980's failed to meet the expectations of the 1970's, excess coal transportation capacity exerted downward pressure on rail coal transportation rates.

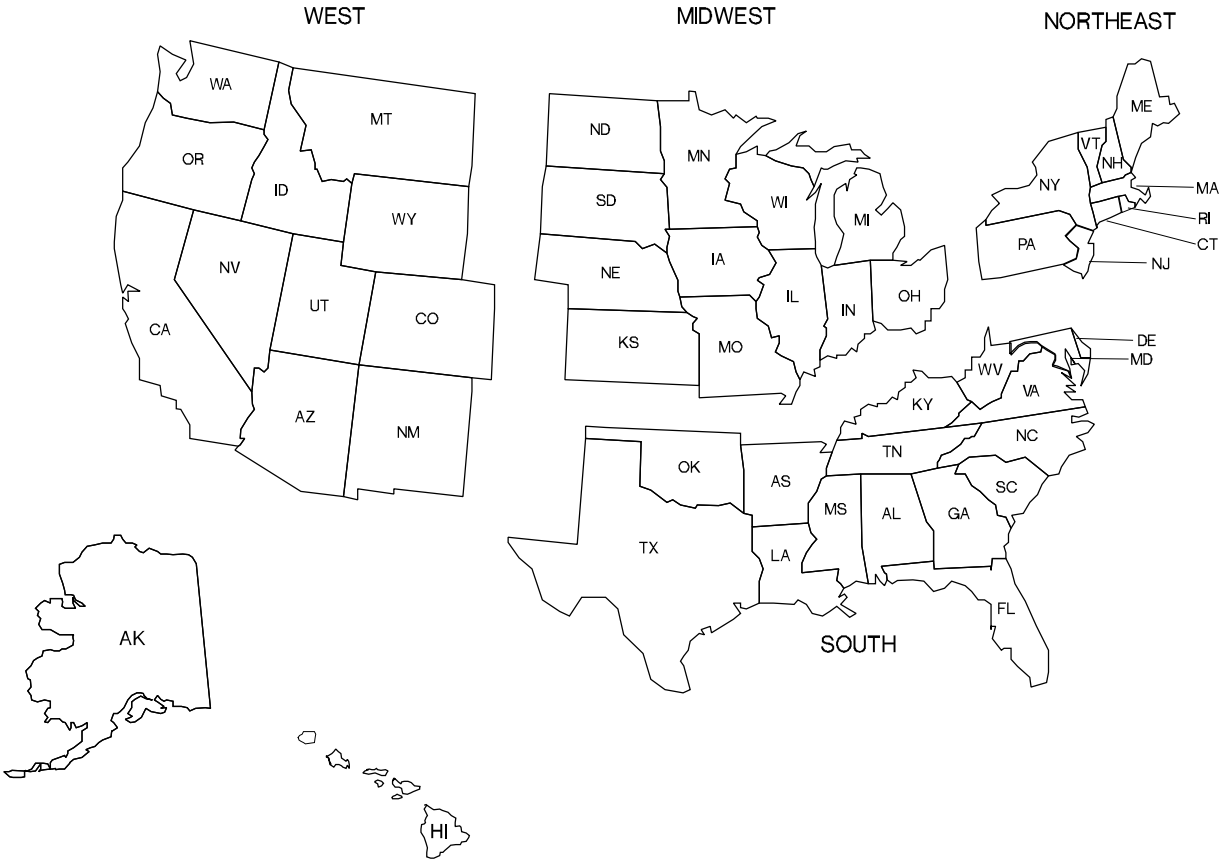
Potential Effects of the Clean Air Act Amendments of 1990 and Other Federal Policies

The Clean Air Act Amendments of 1990

On November 15, 1990, the CAAA90 were signed into law (P.L. 101-549). Title IV of the new legislation sets as a target for the year 2000 a cutback in annual sulfur dioxide emissions of at least 10 million tons from the 1980 level. Total sulfur dioxide emissions from all electric power plants will be restricted to 8.9 million tons annually. This reduction will occur in two phases. By January 1, 1995, the beginning of Phase I, the 110 largest sulfur-emitting power plants must reduce their emissions to an average of 2.5 pounds of sulfur dioxide per million Btu or less. By January 1, 2000, the start of Phase II, affected plants will be required to reduce their sulfur dioxide emissions to no more than 1.2 pounds per million Btu.

Annual allowances, each permitting the emission of one ton of sulfur dioxide, are allocated initially by the Environmental Protection Agency (EPA). There are several methods by which utilities may meet the emissions restrictions if they do not initially hold sufficient allowances. Utilities may choose to reduce emissions by switching to low-sulfur coal, a coal blend containing low-sulfur coal, or an alternative fuel such as natural gas. They may also reduce emissions by producing less of their electricity from plants that emit relatively high levels of sulfur dioxide, while increasing generation from their less-polluting plants. They may also reduce emissions by installing flue gas scrubbers or by using new clean coal technologies. Alternatively, utilities may purchase emissions allowances from other utilities that have excess allowances. Utilities may use any combination of these methods to meet the sulfur dioxide emissions limitations of the CAAA90.

Figure 2. U.S. Demand Regions



Demand Regions

Northeast
- Connecticut
- Maine
- Massachusetts
- New Hampshire
- New Jersey
- New York
- Pennsylvania
- Rhode Island
- Vermont

Midwest
- Illinois
- Indiana
- Iowa
- Kansas
- Michigan
- Minnesota
- Missouri
- Nebraska
- North Dakota
- Ohio
- South Dakota
- Wisconsin

South
- Alabama
- Arkansas
- District of Columbia
- Delaware
- Florida
- Georgia
- Kentucky
- Louisiana
- Maryland
- Mississippi
- North Carolina
- Oklahoma
- South Carolina
- Tennessee
- Texas
- Virginia
- West Virginia

West
- Alaska
- Arizona
- California
- Colorado
- Hawaii
- Idaho
- Montana
- Nevada
- New Mexico
- Oregon
- Utah
- Washington
- Wyoming

Table 2. Average Utility Contract Coal Rail Transportation Rates by Demand Region, 1979, 1983, and 1987

Demand Region	1979	1983	1987
Northeast			
1990 Dollars per Short Ton	12.37	12.38	10.86
1990 Dollars per Ton-Mile	0.037	0.059	0.038
Midwest			
1990 Dollars per Short Ton	12.60	12.83	8.60
1990 Dollars per Ton-Mile	0.023	0.027	0.027
South			
1990 Dollars per Short Ton	12.22	14.68	14.28
1990 Dollars per Ton-Mile	0.026	0.025	0.024
West			
1990 Dollars per Short Ton	5.03	6.96	7.87
1990 Dollars per Ton-Mile	0.025	0.030	0.032
United States			
1990 Dollars per Short Ton	11.79	13.01	11.13
1990 Dollars per Ton-Mile	0.025	0.027	0.026

Source: Energy Information Administration, *Trends in Contract Coal Transportation, 1979-1987*, DOE/EIA-0549 (Washington, DC, September 1991), Tables 13 and 15. Data were compiled from Federal Energy Regulatory Commission, FERC Form 580, "Interrogatory on Fuel and Energy Purchase Practices."

Compliance with the CAAA90 requirements is expected to result in changes in coal distribution patterns and transportation rates. In particular, shipments of low-sulfur coal from the Powder River Basin should increase, perhaps affecting rail transportation rates. Because of the flexibility of the methods for meeting the requirements of the legislation, however, the impacts of the CAAA90 on coal and coal transportation markets are highly uncertain. In addition, the uncertain outcome of the air toxics studies mandated by the CAAA90 is causing some utilities to postpone their decisions on whether to switch to low-sulfur coals or to install flue gas scrubbers.

Other Federal Policies

Other policies currently being considered in Congress and within the Administration add to this uncertainty. Foremost among these is the prospect for global climate change legislation that would mandate reductions in "greenhouse gases," particularly carbon dioxide. For example, a tax based on the carbon content of fuels could cause a sharp decline in coal demand.

Railroads are currently paying a 2.5-cent-per-gallon fuel tax for Federal deficit reduction. The recently enacted transportation fuel tax will raise coal transportation costs additionally. Any future changes in taxes or user fees, which have been particularly important in barge transportation, could affect costs for particular transportation modes, with significant impacts on coal transportation rates and distribution patterns.

Other potential Federal policies that could affect coal distribution patterns and transportation rates include Federal coal leasing policies and changes in coal royalty rates. The availability and price of low-sulfur coal Federal lands in the West would partly determine the extent to which eastern utilities will use that coal to meet CAAA90 requirements. The funding and success of the Department of Energy's Clean Coal Technology Program could impact the demand for various types of coal from different regions and, hence, distribution patterns and transportation rates.

Availability of Existing Studies

Section 1340(b) of the Energy Policy Act (EPACT) of 1992 (P.L.102-486) requires the Secretary of Energy to report to Congress on the extent to which any agency of the Federal Government is studying the rail rates

and distribution patterns of domestic coal, oil, and gas to determine the impact of the CAAA90 and other Federal policies on such rates and distribution patterns.

The Energy Information Administration (EIA) solicited information on studies of rail rates and distribution patterns and the impact of the CAAA90 from Federal agencies that may have an interest or jurisdiction in this matter. Contacts were made and/or discussions were held with the following agencies:

Interstate Commerce Commission
Federal Energy Regulatory Commission
Environmental Protection Agency
Federal Railroad Administration.

The EIA has found from its inquiries that no Federal agency is conducting such a study nor is any agency planning to have results of a study on rail rates and distribution patterns available to the Congress by the dates established in Section 1340(c) of the EPACT. However, reports on related subjects were published by two agencies, the EIA and the General Accounting Office, and by a private concern, the Electric Power Research Institute. These reports are discussed in detail below.

Energy Information Administration Reports

At the request of the House Committee on Energy and Commerce, the EIA prepared an analysis report on the market effects of Title V (Acid Deposition Control) of H.R. 3030, the Clean Air Act Amendments of 1989, and provided it to the Committee in November 1990. The purpose of the report was to provide a neutral and expert analysis of the legislative proposals concerning acid deposition control. The report projected the effects of H.R. 3030 on the electric utility and coal industries through the year 2010. The analysis examined the impact on coal production, minemouth prices, delivered prices, mining employment, and electricity prices at the regional level. However, the report did not specifically address the potential impact on rail transportation rates of H.R. 3030.

Trends in Contract Coal Transportation 1979-1987 (DOE/EIA-0549), an EIA report published in September 1991, presents a broad overview of trends in contract coal transportation to electric utilities. The EIA report was based on data drawn from the public use files of the FERC Form 580 survey, "Interrogatory on Fuel and Energy Purchase Practices." The EIA maintains the FERC data in the Coal Transportation Rate Data Base (CTRDB). The FERC Form 580 survey covers utilities that are interstate (i.e., distribute electricity across State lines) and are investor-owned. Thus, the FERC 580 survey excludes intrastate utilities and the publicly owned utilities of the Federal Government, municipalities, and cooperatives.

The purpose of the EIA report was to analyze the impact of transportation cost on the delivered price of coal to electric utilities. Transportation costs were examined over the 1979-1987 period for major coal transportation modes: rail, barge, multimode (any combination of rail and water-borne vessels), and truck. In addition to transportation rates, the report examined trends in transportation mode, contract duration, and the average distance shipped. These trends were examined at the national level, for three major coal-producing regions (Appalachia, Interior, and Western), and for four demand regions (Northeast, Midwest, South, and West). Trends were examined for contract coal shipments between each pair of supply and demand (origin and destination) regions.

While the EIA report was an important study of trends in rail transportation of coal, it did not specifically address the effects on rail transportation costs or coal distribution patterns of any acid deposition control legislation. Such a study would have required analysis of changes in the distribution of low-sulfur and high-sulfur coal at a detailed regional level and the resultant changes in coal transportation rates.

General Accounting Office Report

In May 1990, the General Accounting Office (GAO) published a report, *Railroad Regulation, Economic and Financial Impacts of the Staggers Rail Act of 1980* The purpose of the report was to determine whether the Staggers Rail Act of 1980, enacted to reduce regulation and improve the financial performance of the railroad industry, had, in fact, improved the financial health of the railroads. The GAO reviewed the financial and competitive conditions within the railroad industry to determine how the financial performance of the indus-try had changed since the passage of the Staggers Rail Act, and how the railroads' performance compared with that of other transportation modes.

The GAO report analyzed available data from the 1970-1988 period. The GAO used financial information from ICC's publication *Transportation Statistics*, the American Trucking Associations' publications *Financial Analysis of the Motor Carrier Industry* and *1988 Motor Carrier Annual Report*, and the EIA's *Statistics of Interstate Natural Gas Pipelines Companies*. The GAO also consulted with the

Interstate Commerce Commission, the Federal Railroad Administration, the Federal Energy Regulatory Commission, the Association of American Railroads, and the American Trucking Associations. The GAO report identified financial impacts on railroads and shippers, but did not establish cause-and- effect relationships between the financial and economic impacts and the Staggers Rail Act of 1980. The report did not specifically address the commodities carried by the railroad or how changes in those commodity markets, which may occur during the implementation of the CAAA90, would affect the railroad industry.

Electric Power Research Institute Report

In September 1991, the Electric Power Research Institute (EPRI) published a two-volume study entitled *Coal Transportation Risks for Fuel Switching Decisions*. The primary objective of the report was to identify and assess potential coal transportation-related risks faced by utility fuel buyers that could result from large-scale switching to low-sulfur coal from Central Appalachia (CA) and the Powder River Basin (PRB). The report examined issues related to both rail and barge transportation modes.

To evaluate how increased coal flows would affect cost and quality of service, the EPRI used a series of analytical models. Input data for the models were developed from characteristics of the current railroad corridors and infrastructures that would bear the increased demand from CA and the PRB.

The EPRI study assessed the current rail networks serving CA and the PRB, the need for additional investment, the potential for competition, and the effects of increased traffic on the cost and quality of rail service. On barge-related issues, the study addressed the availa-bility and distribution of river transloading facilities to serve the CA and PRB coal fields and the cost implications for large-scale increases in river coal traffic from the CA origins.

The EPRI report was prepared as a primer for utilities to use in making compliance decisions. Though it considered in general terms the impacts of compliance with the CAAA90 on rail rates, it did not specifically quantify increased rail transportation costs for coal between various coal supply and demand regions.

None of the reports described above contains quantitative information on the impact of the CAAA90 or other Federal policies on rail transportation rates and distribution patterns for coal. There are no other known existing Federal studies on this subject matter. In order to satisfy the requirements of EPACT's Section 1340(b), the EIA is required to initiate such a study. Conducting the study, however, depends on availability of suitable data, which is discussed below.

Availability of Data

The CAAA90 and other Federal policies that may affect rail transportation rates for coal were reviewed, and meetings were held with experts in the transportation field to determine the data needed for analyzing the potential impacts of the CAAA90. Also reviewed were reports prepared by Federal agencies on rail rates and related issues and available literature from professional and trade journals on the impact of CAAA90 on coal markets and transportation costs.

The information-gathering process led to the identification of certain outcomes of the two-phase reduction in power plant sulfur-dioxide emissions mandated by the CAAA90 that could affect rail transportation rates. Some of the outcomes are: (1) increases in demand for low-sulfur coal, (2) changes in sulfur content and Btu content of coal purchased, (3) shifts to more distant suppliers, and (4) changes in rail traffic patterns. To analyze these outcomes, the following data elements (among many others) were identified to be vital requirements, which must be available for coal shipments between various coal supply and demand regions:

- Tonnage shipped (to determine changes in volumes of coal purchased and transported by rail between supply and demand regions).
- Average distance shipped (to determine how the transportation cost is affected by changes in the distance coal is shipped).
- Average rate per ton (to analyze trends and make comparisons of transportation costs over time between supply and demand regions).
- Average rate per ton-mile (to make comparisons in transportation costs over varying distances).
- Average sulfur content (to analyze the impact of switching to lower sulfur coal on transportation costs and distribution patterns).
- Average Btu content (to analyze the effect the Btu content of coal has on switching decisions and transportation costs).

- Type of train and carload ranges (to determine whether the rate reflects the cost advantage associated with unit train shipments).

- Single or multiple line haul (to determine whether the rate reflects the cost advantage associated with single line hauls).

Contacts were made, and meetings were held in some cases, with representatives of the following Federal agencies to determine whether any data on coal transportation rates were collected:

Interstate Commerce Commission, Office of Economics
Federal Energy Regulatory Commission, Office of Electric Power Regulation
Environmental Protection Agency, Office of Atmospheric Programs
Federal Railroad Administration, Office of Policy
Energy Information Administration
Bureau of Labor Statistics, Producer Price Index Office.

The Federal Railroad Administration (FRA), the Environmental Protection Agency (EPA), and the Bureau of Labor Statistics (BLS) had no rail transportation data to meet the requirements. The FRA uses rail transportation data from the Interstate Commerce Commission (ICC), while the EPA may use data prepared by other agencies to evaluate its Acid Rain Program. The BLS collects a limited amount of rail transportation data, to develop its Producer Price Index (PPI). The PPI does not provide information on many critical data elements such as geographical divisions, coal quantity, or coal quality.

The Federal information useful for studies of rail transportation rates and distribution patterns for coal are:

Agency	Survey or Data Base
1. Interstate Commerce Commission	Carload Waybill Sample
2. Energy Information Administration	Coal Transportation Rate Data Base (data taken from public use files of FERC Form 580, “Interrogatory on Fuel and Energy Purchase practices”)
3. Energy Information Administration	Form EIA-3A, “Annual Coal Quality Report—Manufacturing Plants”
4. Energy Information Administration	Form EIA-5A, “Annual Coal Quality Report—Coke Plants”
5. Federal Energy Regulatory Commission	FERC Form 423, “Monthly Report of Cost and Quality of Fuels for Electric Utilities”
6. Federal Energy Regulatory Commission	FERC Form 580, “Interrogatory on Fuel and Energy Purchase Practices”

The EIA's Coal Transportation Rate Data Base (CTRDB) contains coal transportation data (currently for 1979 through 1991) drawn from the public use files of the FERC Form 580, excluding the confidential data for some electric utilities that are withheld in non-public use files of the FERC Form 580. Also, FERC Form 580 data are limited to coal purchased under contract by interstate and investor-owned electric utilities only. (In 1991, the coal tonnage covered by this survey represented about 58 percent of all coal shipped to all electric utilities that have coal-fired plants with a nameplate capacity of 50 megawatts or more.) Nevertheless, the CTRDB contains all the vital data elements required, while all other surveys reviewed lack three or more of the required data elements.

The ICC's Carload Waybill Sample survey collects data on transportation rates, distances shipped, and origin/destination States. The Waybill Sample is a stratified sample with an average sampling rate of 8.8 percent for coal in 1991. This represents about 40 per-cent of all coal tonnage terminating in the United States in 1991. However, the Waybill Sample lacks informa-tion on the sulfur and Btu contents of the coal transported and provides an estimate of coal tonnage transported, not actual data.

The FERC Form 423 survey of receipts of coal and other energy sources by electric utilities has data available on tonnage shipped, sulfur content, Btu content, and State of

origin and destination, but it lacks data on distance shipped, mode of transportation, and transportation rates.

Beginning in 1993, Form EIA-3A and Form EIA-5A will start collecting information on coal quality and the supply sources of coal consumed by manufacturing plants and coke plants, respectively. (It is planned to obtain 1992 data as well when 1993 data are collected.) However, these surveys will still lack data on transportation mode, transportation rates, and distances shipped.

A detailed review of each survey or data base is presented in Appendix A of this report.

Data Base Development Plan

To establish a coal transportation data base, as required by the Energy Policy Act, three options have been developed in light of the review of existing data. These options differ in the extent of the coverage of the coal transportation network. The coverage ranges from the electric utility sector only to coverage of the electric utilities, manufacturing plants, and coke plants. The differences in coverage are accompanied by differing costs. The options, data collection plans, and associated costs are presented below.

The use of ICC's Waybill Sample statistics is not taken as an option, primarily because Section 1340(a) of the EPACT specifies that "to obtain data pertaining to rail contract rates, the Secretary (of Energy) shall acquire such data in aggregate form only from the Interstate Commerce Commission . . . to maintain the confi-dentiality of such rates." However, aggregated data would not satisfy EPACT's mandate for the development of a data base suitable for transportation rate analysis. Also, the ICC Waybill Sample lacks information on coal shipments by coal quality, namely the sulfur and Btu content of coal, which is so vital to studying the impact of the Clean Air Act Amendments of 1990. Recognizing some usefulness of the ICC statistics, however, the EIA plans to obtain them in aggregate form. They could be used either to supplement or verify, where practicable, the data base used for the mandated transportation rate analysis.

Option 1: Obtain Non-Public Use File Data from FERC Form 580

The existing CTRDB, which contains publicly available data on coal transportation from the FERC Form 580 survey, would be augmented with confidential data withheld in non-public use files for the years 1988 through 1991 initially, and the data base would be updated biennially thereafter. This option would cover contract coal shipments to investor-owned, interstate electric utilities only.

Data Collection Plan

- Develop a data sharing agreement with FERC, stipulating that the non-public use file data will be used in aggregate to conserve confidentiality
- Collect and process data for 1988 through 1993
- Conduct a quality review of the data
- Develop software to produce analytical data reports
- After initial augmentation of data for 1988 through 1993, update data biennially.

Cost

First Year Cost: $130,000
  Software Development and System Documentation: $50,000
  Data Collection: $80,000
Subsequent Years' Cost: $40,000 (1993 dollars) per biennial update (for 1994-1995 and 1996-1997 data)
Total Cost for Collecting 1988-1997 Data: $210,000

Option 2: Modify FERC Form 423 Survey

The current FERC Form 423 survey would be modified to include information on the distance of shipments, the mode of transportation, the type of train, and the transportation cost and/or minemouth price of coal. This option could raise the issue of the confidentiality of not only the transportation-related data but also the current FERC Form 423 data. This option would cover all electric utilities 50 MW or larger and all coals under both contract and spot purchases.

Data Collection Plan

- Request FERC to modify FERC Form 423
- Obtain OMB approval
- Collect data for 1988 through the current year
- Modify software and FERC Form 423 data base to accommodate new data fields
- Develop software to produce analytical data reports

- Collect and process data on a monthly basis.

Cost

First Year Cost: $220,000
  Software Development and System Documentation: $100,000
  Data Collection: $120,000
Subsequent Years' Cost: $60,000 per year (for 1994, 1995, 1996, and 1997 data)
Total Cost for Collecting 1988-1997 Data: $460,000
Total Respondent Burden: 20,000 hours

Option 3: Modify All Coal Consumer Survey Forms

FERC Form 423, Form EIA-3A, and Form EIA-5A would be modified to include data elements on transportation costs and distance.

Data Collection Plan

- Request FERC approval to modify FERC Form 423
- Modify FERC Form 423, Form EIA-3A, and Form EIA-5A to accommodate new data elements
- Obtain OMB approval
- Collect data for 1988 through the current year
- Modify software and FERC Form 423, Form EIA-3A, and Form EIA-5A data bases to accommodate new data fields
- Develop software to produce analytical data reports
- Collect FERC Form 423 data on a monthly basis and Form EIA-3A and EIA-5A data on a yearly basis.

Cost

First Year Cost: $375,000
  Software Development: $155,000
  Data Collection: $220,000
Subsequent Years' Cost: $110,000 per year (for 1994, 1995, 1996, and 1997 data)
Total Cost for Collecting 1988-1997 Data: $815,000
Total Respondent Burden: 25,000 hours

Recommendation

Option 1 (Obtain Non-Public-Use File Data from FERC Form 580) is recommended over other options, since it has the lowest overall cost and collects a majority of the coal consumed by electric utilities. It also will place no additional respondent burden on any of the users, producers, or transporters of coal, since the data survey is already in place.

Future Reports

The EPACT requires that an update to this report be submitted to Congress in October 1995 and a final report be provided by October 2000. The 1995 report on coal will contain a coal transportation rate data base as it exists at that time. The data base will also be made available to the public then. The 2000 report on coal will provide Congress with an in-depth analysis of the data assessing the effects of Federal laws and policies on the transportation rates and distribution patterns of domestic coal.

3. Petroleum Transportation

Availability of Existing Studies

Two and one-half years ago, the Secretary of Energy requested that the National Petroleum Council (NPC) conduct a comprehensive study on the future of U.S. petroleum refining. The NPC is an advisory committee to the Secretary of Energy. It was formed during the Second World War to provide the President and the Secretary of the Interior with a means of obtaining information and advice from the petroleum industry. When the Department of Energy was formed in late 1977, the President shifted the advisory focus from the Department of the Interior to the Department of Energy.

In requesting the study, the Secretary of Energy asked that the NPC focus on environmental regulations and their impact on refineries and petroleum products. In part the request letter stated:

> "I request that the NPC assess the effects of these changing conditions on the U.S. refining industry, the ability of that industry to respond to these changes in a timely manner, regulatory and other factors that impede construction of new capacity, and the potential impacts of this response on American Consumers."

The study, *U.S. Petroleum Refining—Meeting Requirements for Cleaner Fuels and Refineries*, carefully examines the cost of implementing the requirements of legislation, including the Clean Air Act Amendments of 1990, affecting the petroleum industry, the economic impact on the consumers of petroleum products, the availability of technology to implement the requirements, the impact on the petroleum supply and distribution system, and the schedule for implementation of these requirements. The study was completed and presented to the Secretary of Energy on August 31, 1993. Copies of the report are available from the NPC.

Availability of Data

In response to the requirements of Section 1340 of the EPACT for the petroleum industry, the EIA conducted an investigation to determine the availability of any relevant data bases or studies. The EIA contacted and / or met with representatives of the Interstate Commerce Commission, the Federal Energy Regulatory Commission, the National Petroleum Council, and several industry associations to determine the availability of cost data for the shipment of petroleum products via rail and pipeline. The investigation resulted in the following findings:

- The Federal Energy Regulatory Commission (FERC) collects tariff information from pipeline companies as requests for the establishment of rates are received. Approved tariff rates are available through the FERC or from pipeline companies that move petroleum products. Rate information is readily available for individuals or companies seeking such data.

- The Interstate Commerce Commission (ICC) collects transportation rate data on the shipment of petroleum products by rail. Information on rates and volumes shipped are available from the ICC upon request.

- The NPC, with the assistance of the EIA, conducted an extensive survey of 1,200 companies involved in the refining, shipping, storing, importing, and exporting of petroleum products. Included in the survey were forms that collected transportation costs for rail, truck, pipeline, and seaborne movements of petroleum products. These costs were collected for movements between 13 demand regions and 13 supply regions in the United States and between the United States and 6 foreign supply / demand regions. The data were collected for 1987 and 1989, and estimates were given by companies for costs expected for 1995. These data, along with other publicly available data on transportation costs, formed the basis for forecasting the expected costs for 1995, 2000, and 2010. The data base also contains cost estimates for the additional logistic and distribution facilities that the companies were planning to construct and the additional costs that would be incurred as these facilities were brought on-line. The aggregated data are available to the public from the NPC.

Data Base Development Plan

The EIA considered two options during the course of this analysis. One is to use existing data and the NPC study; the other is to develop a new data collection system to collect historical and future transportation cost data.

Option 1: Utilize Existing Data

The data available from the FERC, the ICC, and soon to be available from the NPC, along with the results of the NPC study, appear to fully meet the intent of the Energy Policy Act of 1992 to determine the impact of the Clean Air Act Amendments of 1990 (CAAA90). There is no additional cost for this option. This option does not provide an ongoing, systematic process of collecting transportation cost data in a single location, but does provide information needed to determine the impact of the CAAA90.

Option 2: Develop New Data Collection System

The EIA examined the option of developing an ongoing data collection system to capture cost information (similar to FERC and ICC data) for the movement of petroleum products via pipeline. The EIA estimated that to implement such a data collection system would require an investment of $450,000 in FY94 and $450,000 in each fiscal year thereafter to operate the system. This process would be implemented in two phases: the col-lection of historical data from 1988 forward and the collection of current data. In addition to the costs to the EIA, a significant reporting burden would be placed on those companies that would be required to report the data, especially the effort required to obtain the historical data.

Recommendation

The Energy Information Administration recommends the adoption of Option 1. This option would not require any additional resource expenditures, fully meets the intent of the law, and would make rate information available to anyone seeking it. This recommendation is also based upon the findings from the NPC study on refining that the impact of the CAAA90 and other related health, safety, and environmental legislation is expected to add only $0.0025 per gallon to the cost of petroleum products shipped via pipeline in the year 2010.

4. Natural Gas Transportation

Background Information

Natural Gas Prices and Transportation System

Natural gas prices to consumers vary widely based on distance from the source of natural gas and service requirements. The major components of the prices paid by consumers include:

- The wellhead price paid to the producer (the commodity cost of the gas)
- The citygate price, which includes the commodity cost plus transportation costs and is paid by the local distribution company (LDC)
- The end-use price paid by the respective customer classes (residential, commercial, industrial, and electric utility), which includes charges for distributing the gas by the LDC.

Not only do different price categories exist, but the prices to consumers vary by region. For example, prices are often lower in main producing areas where trans-mission costs are lower.

The transmission and distribution system for natural gas in the United States is shaped by both institutional arrangements (State and Federal regulatory bodies) and market forces. Its basic function in the market is to move gas physically from the wellhead where it is produced to the burner-tip where it is consumed. The principal requirement of the system is that it be capable of meeting the peak-day demand of its customers who have contracts for firm service. To meet this requirement, the Nation has a vast network of pipelines for transporting gas from supply areas (including Canada and Mexico) to every State in the continental United States (Figure 3).

The natural gas transportation system consists of gathering, transmission, branchline, storage, peak-shaving, liquefied natural gas (LNG), and pipeline-interconnecting facilities. Gathering system facilities receive gas from the wellhead and transport, process, compress, and deliver that gas to a pipeline (interstate or intrastate), LDC, or end-user. Intrastate pipelines operate natural gas pipeline facilities that do not cross State borders. Interstate pipelines often transport gas for long distances; they are regulated by the Federal Energy Regulatory Commission because the operation involves interstate commerce. Pipeline companies deliver gas directly to end-users and to LDC's. LDC's, in turn, distribute gas to residential, commercial, and some industrial customers. Total end-use consumption in 1991 was 19.6 trillion cubic feet (Figure 4).

The continuing restructuring of the natural gas industry is providing opportunities for participants in all segments to benefit from greater market competition. However, it is also increasing the complexity of the process of moving gas from the wellhead to the burner-tip. Customers who had relied on the merchant (sales) services of the interstate pipeline companies now have increasing opportunities for transportation and storage of their natural gas supplies. The number of possible transaction paths for obtaining natural gas supplies has greatly increased (Figure 5).

The unbundling of merchant and transportation services, mandated by Federal Energy Regulatory Commission (FERC) Order 636, will essentially convert a pipeline company's firm sales customers into firm transportation customers, who will be responsible for making their own gas purchases. Because of the move toward open-access transportation, many of these customers have already entered into such new contractual arrangements with producers, using the pipeline company for transportation service only. These customers can now contract for gas purchases either directly with producers or with the new entity in the industry, the natural gas marketer.

Potential Effects of the Clean Air Act Amendments of 1990 and Other Federal Policies

The natural gas industry has undergone extensive restructuring over the past decade. In the face of this ongoing restructuring process and recent legislative

Figure 3. Generalized Natural Gas Flow and Throughput Capacity to Major U.S. Markets, 1990

Source: Federal Energy Regulatory Commission, FERC Format 567, "Systems Flow Diagram," 1990, and Energy Information Administration, Office of Oil and Gas.

changes, the interaction among these events is complex and not easily evaluated separately.

Two events in 1992, the issuance of FERC Order 636 and the passage of the Energy Policy Act of 1992 (EPACT), will have substantial impacts on natural gas transmission patterns and transportation rates. Order 636 is designed to improve the ability of the industry to compete effectively for new markets. The EPACT provides the opportunity for the increased use of natural gas, primarily in transportation and in electricity generation by nonutility power producers.

The CAAA90 will also affect natural gas transmission patterns and transportation rates. The purpose of the CAAA90 is to improve air quality by reducing emissions of hazardous pollutants. The amendments promote the control of ozone and sulfur emissions and the use of clean fuel vehicles. As a result, the electric utility and transportation sectors are expected to consume more natural gas, which emits fewer pollutants than other fossil fuels, in order to meet CAAA90 standards.

FERC Order 636

FERC Order 636 is designed to allow more efficient use of the interstate natural gas transmission system by fundamentally changing the way pipeline companies conduct business. Some of the key provisions of the Order that will affect transmission patterns and transportation rates are:

Figure 4. Natural Gas Flow, 1991
(Trillion Cubic Feet)

[a] Includes lease and plant fuel.

Notes:
- Data are preliminary.
- Sum of components may not equal totals due to independent rounding.

Source: Energy Information Administration, *Nat*

- Interstate pipeline companies must provide transportation services unbundled (separate) from sales services.

- Interstate pipeline companies can sell gas at market-based rates.

- Pipeline companies must offer a new "no-notice" firm transportation service (i.e., advanced notice by the shipper is not required) if they provided bundled citygate firm sales service on May 18, 1992.

- Tariff provisions cannot inhibit the development of market centers or production pooling areas.

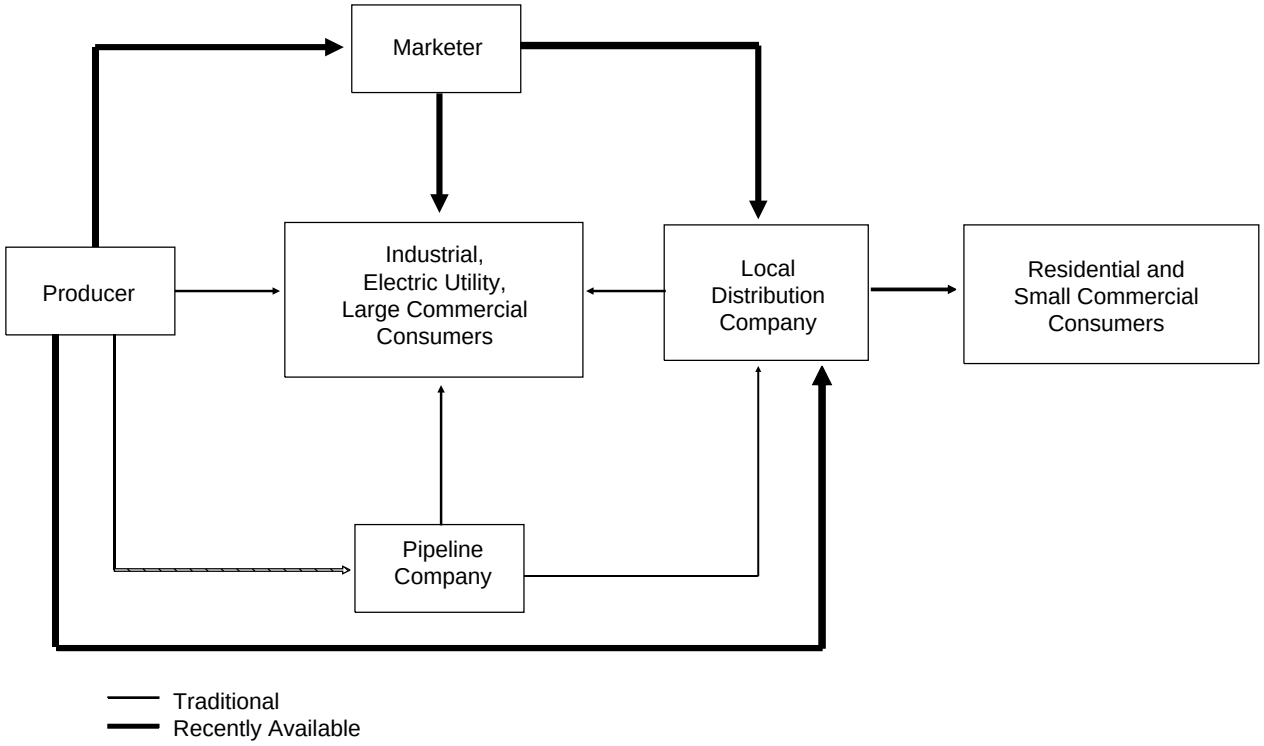
- Two new generic capacity assignment mechanisms are established. A new mechanism authorizes and requires pipeline companies to provide firm shippers on downstream pipelines with access to capacity on upstream pipelines that is held by the downstream pipelines. The second mechanism authorizes a capacity reallocation so that firm shippers can release unwanted capacity to those who want it.

- In most instances, the straight fixed-variable (SFV) rate design must be used for billing and allocation purposes. Pipeline companies are required to use various ratemaking techniques to mitigate "significant" changes in revenue responsibility to any customer class. If changes in revenue responsibility for any customer class still exceed 10 percent after mitigation, pipeline companies must phase in the increase over a 4-year period.

- Firm shippers must have flexibility in changing receipt points.

The natural gas industry will endure an adjustment period under the implementation of Order 636. Significant cost shifts to customer classes are expected from the change in rate design. Transition costs are also anticipated as the industry adopts the provisions of the

Figure 5. Transaction Paths for Natural Gas Purchases



Source: Energy Information Administration, *Natural Gas 1992: Issues and Trends*

ruling. Even with the cost shifts and transition costs, the natural gas industry is expected to benefit overall from Order 636, which is intended to create a more efficient market by promoting competition among gas suppliers and transporters.

The change from the modified fixed-variable (MFV) to the SFV rate design under Order 636 will presumably be associated with cost shifts. Although there is no consensus on the impacts of these cost shifts, some end-users are likely to benefit more than others. The FERC recognized the potential for significant cost shifts and incorporated mitigation measures in Order 636 to offset them.

Significant transition costs are anticipated from the implementation of Order 636. These costs, estimated to be in the billions, will affect transmission patterns and transportation rates. This is largely attributable to the unbundling of pipeline companies' transportation service from sales service. The full impact of the transition costs on the different customer classes remains uncertain, however, because State Public Utility Commissions (PUC's) will decide how much of these costs the LDC's can pass through to end-users. Although the transition costs will likely be substantial, they are expected to be offset by increased competition and new efficiencies in the natural gas market.

Energy Policy Act of 1992

Other provisions of the Energy Policy Act of 1992 are expected to expand market opportunities for natural gas, although its emphasis on conservation and efficiency improvements may limit growth in some areas. Provisions affecting the natural gas industry include measures to:

- Encourage conservation and energy efficiency by gas utilities, including demand-side management measures
- Protect natural gas imports and exports involving nations with which the United States has free-trade agreements

- Give a variety of financial incentives to developers and users (both public and private) of clean fuel vehicles, such as natural gas-fueled vehicles

- Lift Public Utility Holding Company Act (PUHCA) restraints on nonutility generated power (independent power producers, many of which will use natural gas as their primary fuel)

- Provide relief for independent producers from Alternative Minimum Tax preferences for percentage depletion and drilling costs.

Clean Air Act Amendments of 1990

Provisions of the CAAA90 require compliance with emissions limits and seek to decrease sulfur dioxide and nitrogen oxide emissions from electric utilities. This offers significant opportunities for increased natural gas use since emission rates of sulfur dioxide, nitrogen oxide, and carbon monoxide are the lowest for natural gas compared with other fossil fuels. Since restrictions on the release of hazardous pollutants are tightened under the amendments, increased gas use is expected from electric utilities and commercial vehicles, affecting natural gas transmission patterns and costs.

Availability of Existing Studies

The EIA contacted other agencies to determine whether they had undertaken any studies of the impact of the CAAA90 and other Federal policies on natural gas transportation rates. None have focused on the impact of the CAAA90, but several, including reports done by EIA, have addressed impacts relating to FERC Order 636 and the restructuring ruling. These reports are described below.

Energy Information Administration Reports

The EIA report, *Natural Gas 1992: Issues and Trends*, includes three chapters which address aspects of the Section 1340 request. One chapter, "Impact of Recent Rate Design Changes," analyzes how the change mandated by Order 636 from MFV to SFV rates could affect customers of pipeline companies. This analysis demon-strated the potential for large costs shifts stemming from recent FERC rate design changes. However, the reports concludes that the cost shift mechanisms outlined in Order 636 "should generally be adequate to offset the cost shift fully so that the rates paid by most customers will remain largely unchanged."

Another chapter, "Natural Gas Pipeline Capacity and Service," addresses some aspects of current and potential natural gas distribution patterns. The analysis examines current interstate natural gas pipeline capacity and actual utilization of the interstate pipeline system by looking at 1991 average daily flows on a State-to-State basis. In addition, the analysis addresses the potential for increased flows on a regional basis by examining planned pipeline capacity expansions through 1995. The analysis concludes that the interregional capability of the interstate system to transport natural gas could increase by as much as 13 percent by the end of 1995.

The need for additional capacity reflects changing supply and consumption patterns. In particular, substantial increases in natural gas demand are expected in the Western Region of the country. There is a potential for capacity increases of as much as 50 percent during the period from 1991 to 1995. The increasing importance of natural gas supply from the Central Region will require significant increases in capacity to move natural gas from that region to the Southwest to connect with existing long-distance transmission lines. While the report does not directly address the impact of the CAAA90 on future transmission patterns, these requirements are implicit in the plans for pipeline capacity expansions. Another EIA report, *Capacity and Service on the Interstate Natural Gas Pipeline System, 1990*, provides comparable information for 1990 average daily flows on a State-to-State basis.

Other Reports

A discussion paper, *Costs and Benefits of the Final Restructuring Rule*, was published by the FERC's Office of Economic Policy in the spring of 1992. This report estimated the benefits and costs that would result from implementation of the Restructuring Rule (Order 636). It concluded that the net social benefits from the effects of Order 636 were between $15 and $42 billion for the period from 1994 to 2000. The paper noted that the Order does raise issues of income transfer but stated that "the Commission did consider income transfers in the Final Rule and made provision for mitigation."

The issue of income transfer is being addressed as part of a study being done by the General Accounting Office (GAO). In June 1992, Congressman John Dingell (Chairman, House Energy and Commerce Committee) requested that the GAO undertake an analysis of the economic impact of Order 636. This study will estimate the potential cost shift by customer class resulting from

moving from MFV to the SFV rates. This study was transmitted to Congress in draft form in July 1993.

The National Petroleum Council study, *The Potential for Natural Gas in the United States, Volume IV, Transmission and Storage*, addresses the need for expansion of natural gas transmission and storage facilities in response to projected consumption requirements through the year 2010. This report concludes that through the year 2000 capacity expansion will be driven principally by the need for expanded service to market areas. Additional access to Canadian supplies is a key factor in this expansion. After 2000, the projected decline in supplies from the Southwest Region will necessitate additional capacity to supplement supplies from the Southwest Region to neighboring market areas.

None of the reports described above specifically addresses the impact of the CAAA90 or other Federal policies on natural gas transportation rates and distribution patterns. There are no other known existing Federal studies on the impact of the CAAA90 and other Federal policies on transportation rates and distribution patterns. Therefore, the EIA is required to initiate an impact analysis study to satisfy the requirements of EPACT's Section 1340(b). However, the study is subject to availability of data, which is reviewed in the following section.

Availability of Data

Several Federal agencies were contacted to evaluate the available data. Data on actual transportation rates are not systematically collected by FERC, EIA, the Interstate Commerce Commission, the Department of Transportation, or any other Federal agency. Some information is available on interstate pipelines from FERC forms; however, it is very general and does not provide insights into trends in specific markets, the effect of varying market conditions, or differences in services (i.e., interruptible versus firm service). Other sources provide information on rates but not volumes, so it is not possible to determine how much natural gas actually flows under those posted rates. In summary, the data required to satisfy the requirement of EPACT are not available.

Existing data collection forms relevant to natural gas transportation are summarized below. Additional, however, limited data sources including FERC Form 592 (Marketing Affiliates of Interstate Pipelines), FERC Form 549-ST (Self Implementing Transportation Reports), and FERC Monthly Discounted Transportation Rate Report (18 CFR 284.7(d) (5) (iv)) are described in Appendix B.

Data on transportation rates for "major" interstate pipeline companies are available from FERC Form 2, "Annual Report of Major Natural Gas Companies." The data are public information and are currently available for the years 1985 through 1992. Baseline data elements requested in the section, "Revenue from Transportation of Gas of Others—Natural Gas (Account 489)," include: Name of Company and Description of Service Performed, Distance Transported, Mcf of Gas Received, Mcf of Gas Delivered, Revenue, Average Revenue per Mcf of Gas Delivered, and FERC Tariff Rate Schedule Designation. However, the level of detail reported by each company varies, and a random check of filings showed that none of the filing companies completed reporting of the distance transported.

FERC Form 11, "Natural Gas Pipeline Company Monthly Statement," collects data on volumes and dollar revenues for transportation of gas of others. These data are reported by companies selling gas for resale, transporting gas, or storing gas in excess of 50 million cubic feet per year. Details about transportation agreements or rate schedules are not available from this form. Data from FERC Form 11 are available monthly from 1985 to the present and are considered public information. The data from the form are aggregated and published monthly by the EIA in the *Natural Gas Monthly*.

Other data on transportation of natural gas are available on Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and Disposition," which collects volumes of gas transported and delivered in each State, by company. Transported gas volumes include gas transported across State lines (Figure 6), imported and exported, and delivered to consumers for the account of others. The data are publicly available. However, Form EIA-176 does not collect any revenue data for these items because, in most cases, the company transporting or delivering the gas does not know the total cost of the gas. No details about transportation rates or agreements are available on the Form EIA-176. (This form is, however, the proposed vehicle to collect information on transportation rates because the frame of the survey is the universe of all transporting companies.)

Form EIA-857, "Monthly Report of Natural Gas Purchases and Deliveries to Consumers," collects a monthly sample of data on natural gas deliveries to end-users for the account of others. These data are confidential and are aggregated to the State level for publication in the *Natural Gas Monthly*. The survey does not collect information on transportation rates.

Figure 6. Interstate and Cross-Border Movements of Natural Gas in the United States, 1991
(Million Cubic Feet)

Source: Energy Information Administration, Form EIA-176, “Annual Report of Natural and Supplemental Gas Supply and Disposition.”

Another potential source for transmission patterns and transportation rate information will be the Electronic Bulletin Boards (EBB's), the electronic information systems. In Order 636, FERC requires pipeline companies to provide all shippers equal and timely access to certain information through the use of EBB's. EBB's are intended to advertise a company's released capacity. This, unfortunately, limits the value of EBB information since only released pipeline capacity is posted. Original transactions are not included in a pipeline company's EBB listing. An additional limitation of EBB's is the lack of volume information.

Data Base Development Plan

The research on the availability of data and/or studies on natural gas transportation rates and distribution patterns indicates that there are no data bases or studies that fully satisfy the requirements of Section 1340 of the EPACT.

A number of options to develop a data base on transportation rates and distribution patterns have been developed. The options vary in scope, limitations, and resource requirements.

The data development plans are divided into two parts: one for historical data for 1988 through 1992 and the other for current and future data for the years 1993 through 1997. Three options for the historical data and five options for the 1993 through 1997 data have been developed. The options, data collection plans, and associated costs are presented below, followed by recommendations.

Development of Historical Data for 1988-1992

Option 1: Uniform Statistical Report Data Maintained by the American Gas Association

The American Gas Association (AGA) has developed the Uniform Statistical Report (USR) survey, which contains annual data on gas volumes transported and the associated revenues. The AGA data base consists of general and statistical information collected from companies engaged in natural gas distribution and transmission, including interstate and intrastate pipeline companies and LDC's. Compared with EIA data for 1991, the USR survey represents approximately 80 percent of throughput volumes.

The AGA data base includes gas volumes transported for others (excluding exchange gas) and the associated transportation revenues. The data are disaggregated by type of customer: residential, commercial, electric generation, industrial and other consumers, and LDC's. Annual transportation volumes are reported for each State in which the companies operate. Starting in 1991, the volumes, but not the associated revenues, are reported on a monthly basis. Information on the type of service or the tariff schedule is not collected.

The AGA has agreed to provide the USR data to EIA to the maximum extent possible. Most of the AGA data (approximately 60 percent of total natural gas throughput) are nonproprietary and therefore will be readily available to EIA. In addition, the AGA is willing to provide the proprietary data for the EPACT data base, provided that respondent companies agree to either designate the data as nonproprietary or release the proprietary information to the EIA for restricted use.

The advantages and limitations of this option are:

Advantages:

- The AGA has already collected the data so there is no additional respondent burden.
- The AGA has indicated its willingness to make the data available to the maximum extent possible.
- Using the AGA data reduces the resources required to create the EPACT data base.
- There is a great deal of uncertainty about the extent to which meaningful analysis is possible comparing the services and rates in the pre- and post-Order 636 periods. This suggests that extensive data development for the historical period is not warranted.

Limitations:

- The coverage and confidentiality of the AGA data base limit the usefulness with respect to the requirements of EPACT.
- The coverage of the survey is approximately 70 percent of the market.
- Some of the data are confidential.

Data Collection Plan

The following plan is proposed for collecting historical data for 1988 through 1992:

- Develop a data sharing agreement with the AGA regarding the USR data base and determine the feasibility of lifting the confidentiality restrictions on the data
- Acquire and process the data for 1988 through 1992
- Determine the coverage and quality of the data
- Develop summary reports of the data
- Integrate the data in the EPACT data base on natural gas transportation rates and volumes.

Cost

First Year Cost: $25,000
Subsequent Years' Cost for Data Collection:
$0 (one-time effort).
Total Cost: $25,000

Option 2. Use Form EIA-176 to Collect 1988-1992 Data

Under this option, a new schedule would be added to an existing EIA survey, Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and Disposition," to collect annual data on natural gas transportation rates. The form is completed by all companies that take custody of natural gas including interstate and intrastate pipeline companies, local distribution companies and storage operators.

The advantages and limitations of this option are:

Advantages:

- Would permit some comparison of historical and future data
- Would provide 100 percent coverage
- Would make use of an existing survey instrument.

Limitations:

- Additional response burden would be placed on the industry.
- Because of the restructuring of the industry, comparisons between the historical periods and the future years may be difficult.

Data Collection Plan

- Design new schedule to add to the Form EIA-176
- Obtain approval from the Office of Management and Budget
- Perform the one-time survey, to collect 1988-1992 data
- Process the data for 1988 through 1992
- Conduct a quality review of the data; determine the coverage and comparability of the data
- Develop software to generate summary reports.

Cost

Collect and process the data for 1988 through 1992:
$55,000
Software development: $20,000
Total Cost for Compiling 1988-1992 data: $75,000
Total Respondent Burden: 275,000 hours.

Option 3. Use Data from Form FERC-2

Annual revenues and the associated volumes for each of the major interstate pipeline companies are collected on the Form FERC-2, "Annual Report of Major Natural Gas Companies." The data are disaggregated by rate schedule for both sales and transported gas. The data are further broken out by customer (but not customer class) for which the respondent is performing either sales or transportation services. For transported gas, both the receipt company (transported from) and delivery company (transported to) are requested on the form.

The advantages and limitations of this option are:

Advantages:

- Data are already collected. There is no additional respondent burden to the industry.

Limitations:

- Company responses are not uniform and the coverage is not consistent across the companies.

Some respondents include rate information, others do not.

- Data quality and comparability problems exist. The data are difficult to aggregate and comparisons between companies may be very difficult.

- Annual data do not allow for analysis of seasonal variation in rates—where the impact of recent regulatory policies will be most visible.

- The coverage is limited to 44 interstate pipeline companies.

Data Collection Plan

- Process the data for 1988 through 1992

- Conduct a quality review of the data; determine the coverage and comparability of the data

- Develop software to generate summary reports.

Cost

Process the data for 1988 through 1992: $80,000
Quality review of the data: $80,000
Software development: $40,000
Total Cost for Compiling 1988-1992 data: $200,000

Recommendation

Option 1 (the AGA's USR data base) is the approach recommended by the EIA for 1988 to 1992 data, because it would cost the least and appears to be the most useful for the purposes of EPACT Section 1340. Because of the extensive restructuring of the gas industry, however, the EIA has a reservation about the usefulness of historical information prior to 1992. Service tariffs are being completely revised to meet the requirements of the FERC Order 636. Comparability of rates over time would, therefore, be difficult to determine and may limit the validity of the analysis using the data prior to 1993.

Development of Data for 1993-1997

Five options are proposed and presented below for the development of a data base capturing current (1993) and future information on natural gas transportation rates and volumes. Option 1 and Option 2 can be accomplished at a reasonable cost. The others have limitations, require more resources, and may not provide adequate information.

Option 1. Attach a New Schedule to the Form EIA-176 to Collect Annual Data

Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and Disposition," is sent to all interstate and intrastate pipeline companies, local distribution companies, and storage operators who take custody of natural gas between the wellhead and end-users. The form requires each company to account for the supply and disposition of natural gas in their system for each State in which the company operates. In this option, a new schedule would be added to Form EIA-176 to collect annual data on transportation volumes and revenues by State, customer category (end-user sector, pipeline, local distribution company), and types of service (e.g., firm / primary, firm / secondary, interruptible). A copy of the new schedule is included in Appendix B, Attachment 3.

This approach will allow a State-to-State comparison of per unit transportation payments by customer class on an annual basis. It will provide information on the types of transportation service (including the secondary market for released capacity) and the associated revenues (net of capacity release credits). This approach does not allow for a comparison of transportation rates of comparable pipeline segments (or routes) over time, but will provide information on how overall transportation rates being paid by users are changing on an annual basis.

A key element of FERC's restructuring of the gas industry is the secondary market for released capacity that provides a mechanism for holders of firm capacity to waive and be compensated for those rights (or resell via pipeline's electronic bulletin board). Information on transportation revenues and volumes broken down by firm / primary, firm / secondary (or released firm), and interruptible (or "operationally available") is necessary in order to analyze the prices associated with the different types of transportation services which can vary significantly. The gas transported under the secondary market mechanisms will be included in the firm / secondary classification. The variation in transportation prices may be substantial and therefore need to be distinguished so as not to skew the resulting analysis. The reported revenues will reflect the capacity release credits that have been posted and will provide the effective rates that customers (i.e., end-users, pipelines, resellers, etc.) pay for transportation services. The data on volumes and prices for firm / secondary transportation service will provide key information on the operation and development of the capacity release market for natural gas.

The proposed new schedule will cover transported volumes and will exclude bundled sales transactions. Although bundled sales transactions on the interstate pipelines will disappear under the unbundling provisions of Order 636, they will continue to represent a significant portion of the market served by local distribution companies (LDC's). The market served by LDC's include most captive customers, such as residential customers, who require guaranteed service. This means that any analysis of sales volumes and rates will be based on bundled transactions in which the price includes both the cost of gas and transportation services. Analysis of the specific costs of transportation only will not be available for sales volumes. Annual data on sales are currently collected on Form EIA-176 and monthly data are collected on Form EIA-857, "Monthly Report of Natural Gas Purchases and Deliveries to Consumers."

The advantages and limitations of Option 1 are:

Advantages:

- The survey frame and collection mechanism is already in place.
- Option 1 is less burdensome to the industry than some of the other options.

Limitations:

- Analysis of transportation rates and patterns will be limited in scope because this approach provides only aggregate, annual measures of transportation rates and patterns.
- Variations in rates and patterns resulting from changes in seasonal or other conditions will be masked under this approach, as only average annual data will be available.
- This approach would not permit explicit analysis of the impact of "other Federal policies," such as FERC Order 636, as stated in Section 1340 of the Energy Policy Act of 1992.

Data Collection Plan

- Develop survey schedule to add to the Form EIA-176 survey
- Obtain respondent input on survey schedule and reporting burden
- Obtain approval from the Office of Management and Budget.
- Include new schedule in annual surveys for 1993 and each year thereafter
- Develop software to create data base, process data
- Determine data coverage and quality and crosscheck data with monthly volumes reported on the Form EIA-857 and other sources.
- Collect and process data on an annual basis.

Cost

First year cost:
Data survey design, collection, processing and documentation: $60,000
Subsequent Years' Cost:
Continuation of data collection: $20,000 per year.
Total Cost: $140,000
Total Respondent Burden: 24,000 hours per year.

Option 2. Attach a New Schedule (Monthly) to Form EIA-176

This approach is similar to Option 1, but monthly data would be collected instead of annual data. The Form EIA-176, submitted annually, would be used to collect monthly data on transportation volumes and revenues by State, customer category (end-user sector, pipeline, local distribution company), and type of service (e.g., firm/primary, firm/secondary (released firm), interruptible). A copy of the new monthly schedule is included in Appendix B, Attachment 4.

This option would provide data on the development and use of the secondary market for released capacity, a key component of Order 636. Rate data will be net of any revenue credits resulting from released capacity, so effective rates that customers pay will incorporate the benefits of the capacity release mechanism.

The advantages and limitations of this approach are:

Advantages:

- This approach provides the ability to address the impact of Federal laws and policies (including FERC Order 636) on transportation rates by looking at changes in the rates paid by individual consumer groups.

- The survey frame and collection mechanism (Form EIA-176) is already in place.

- Monthly data will provide a basis to analyze fluctuations (seasonal and otherwise) in rates.

Limitations:

- AGA and INGAA do not support the collection of this information on a monthly basis, contending that EPACT does not require the information.

- There is a greater respondent burden to the industry.

Data Collection Plan

- Design new schedule to add to Form EIA-176

- Obtain respondent input on survey schedule and reporting burden

- Obtain approval from the Office of Management and Budget

- Include new schedule in annual surveys for 1993 and each year thereafter

- Develop software to process the data and create the data base

- Determine data coverage and quality and crosscheck with monthly volumes reported on Form EIA-857 and elsewhere

- Collect and process the data on an annual basis.

Cost

First year cost:
Data design, collection, processing and documentation: $60,000
Subsequent Years' Cost:
Continuation of data collection: $25,000 per year
Total Cost: $160,000
Total Respondent Burden: 48,000 hours per year.

Option 3. Derive Tariff Information from Form FERC-2

Form FERC-2, "Annual Report of Major Natural Gas Companies," could be used to analyze annual changes in rates charged by individual companies over time. However, the schedule does not always contain adequate information for each type of service. Therefore, comparisons of rates over time may not always be possible. Industry coverage is for only the major interstate pipeline companies (44 companies).

There are a number of limitations with this approach:

(1) The data are annual and not monthly.

(2) Only data for the major interstate pipelines are included. Data for the remaining interstate pipelines, intrastate pipelines and local distribution companies are not included.

(3) Limited rate schedule information is provided and varies from respondent to respondent. Additional analysis and research will be necessary to characterize the types of services and the corresponding rates paid.

Data Collection Plan

- Develop a cooperative agreement with FERC to provide the Form 2 data

- Determine the quality of the data for 1992 forward (data through 1991 are already available to the EIA.)

- Determine if there are comparability problems and develop an aggregation methodology to consolidate company level data for analytic purposes

- Develop data base structure and process data

- Update with Form FERC-2 data on an annual basis.

Cost

First Year Cost: $160,000
Data development/compilation: $75,000
Quality assessment/software development and system documentation: $85,000
Subsequent Years' Cost: $50,000 (per year).
Total Cost: $360,000

Option 4. Derive Information from the Rate Cases Filed at FERC by Interstate Pipeline Companies

This approach would use information filed by the interstate pipelines at FERC when they request the approval

of new rates (Natural Gas Act, Section 4 rate filings). The information includes market information covering a test period. The frequency of the request for a rate case and the corresponding test period varies considerably by company.

The advantages and limitations of this approach are:

Advantages:

- The information is already collected by the FERC. There is no additional response burden.

Limitations:

- Under Order 636, rate cases may be filed with FERC less frequently than in the past and the posted rates may not be representative of actual market trends.

- A trend analysis of transportation rates across several companies would not be possible because of variations in filing rate cases, making aggregation difficult.

- Limitations of the data. Coverage is limited to the interstate pipeline companies.

Data Collection Plan

- Develop a cooperative agreement with FERC to provide rate case information in electronic form

- Determine the quality of the data

- Determine if there are comparability problems; develop an aggregation methodology to consolidate company level data for analytic purposes

- Develop data base structure and process data

- Update data base when new rate cases are filed at FERC.

Cost

First year cost: $200,000
Subsequent Years' Cost: $100,000 per year
Total Cost: $600,000

Option 5. Download Information from Electronic Bulletin Boards

FERC Order 636 requires that pipelines post certain information about capacity release on electronic bulletin boards (EBB's). The EBB's contain information by pipeline segment on available capacity and rates, minimum acceptable rate, and maximum reservation rates. No information is available on volumes transported under capacity release transactions. The EBB's are currently under development by the interstate pipelines and the industry has limited experience in its use. There is currently no structure planned to integrate the information posted on each company's EBB, although there are reports of the potential development of meta-bulletin boards that would integrate the data.

On July 29, 1993, FERC issued a Notice of Proposed Rulemaking (NOPR) on Standards for Electronic Bulletin Boards (Docket No. RM93-4-000). The NOPR proposes data standards for downloadable capacity release information that will be in place by April 1, 1994. These standard formats will make it easier to aggregate data on current release activity across pipelines. Order 636 also requires that pipelines keep daily backup records of the information displayed on their EBB's for at least three years. The archived data are not required to be maintained on-line, but users must have reasonable access. The procedures for backup, archiving, and retrieval will be included in the pipeline's tariff. Although the EBB's will be a source of information on the secondary release market activity (specifically, the sale of pipeline capacity), it will not include information on actual volumes transported.

The advantages and limitations of this approach are:

Advantages:

- This approach would enable the tracking of changes in posted rates and rates for released capacity on a segment basis.

Limitations:

- The posted rates and rates for released capacity would represent only those services for which there is released capacity. It is not clear what portion of the market would be represented. In addition, no information would be available on the volumes that actually moved under released capacity arrangements. It is possible that a unit of capacity may be released and sold several times before any gas is physically moved.

- When a pipeline's capacity is fully utilized, no information on that pipeline will be available from the EBB.

- The EBB's cover only interstate pipelines, so information on transportation by intrastate

pipelines and local distribution companies would not be available.

- The EBB's include information on capacity release but exclude information on volumes actually transported. Data on transported volumes are needed to satisfy the EPACT requirement to analyze transmission patterns.

- This option would be a costly approach requiring access to the individual bulletin boards and extensive programming to consolidate information across pipeline companies. Developing comparable and aggregated information across companies may be difficult.

- The industry has no experience in the use of EBB's. Steps have been taken to encourage the industry to develop some standardized structures.

- This option would not provide information on the revenue crediting to the releasor of capacity. Therefore, data on "effective rates" paid by customers, net of revenue credits from released capacity, would not be available.

Data Collection Plan

- Determine accessibility (and associated costs) of EBB's

- Determine if meta-EBBs are under development and determine accessibility and associated costs

- Determine comparability and gaps in the EBBs for purposes of EPACT requirements for a data base

- Determine system specifications; design system to capture relevant data from EBB's

- Develop a procedure to obtain backup records for the EBB's.

- Develop and implement a methodology to consolidate the data for inclusion in the EPACT data base on natural gas rates; develop associated software and systems

- Develop software to extract data identified above from the EBB's (or meta-EBB's) and merge with the EPACT data base.

Cost

Rough estimates indicate that the cost for Option 5 would be in excess of 1.0 million dollars.

Recommendation

Option 1 (collect annual data on Form EIA-176 for 1993 through 1997) would satisfy the EPACT requirements, and EIA recommends implementation of this Option at a minimum. Option 2 (collect monthly data on transportation rates on Form EIA-176) would provide more detailed data and permit a more thorough seasonal analysis of transportation rates.

EIA is currently consulting with its customers (including the U.S. Congress, the Department of Energy, and others) to determine if the additional information in Option 2 is required to satisfy their broader analytical requirements.

Future Reports

The EPACT requires that an update to this report be submitted to Congress in October 1995 and a final report be provided by October 2000. The 1995 report will contain a natural gas transportation rate data base as it exists at that time. The data base will also be made available to the public then. The 2000 report will provide Congress with an in-depth analysis of the data assessing the effects of Federal laws and policies on the transportation rates and distribution patterns of natural gas.

Appendix A

Coal Data Availability Review

Appendix A

Coal Data Availability Review

Interstate Commerce Commission

Carload Waybill Sample

REPORTING COMPANIES:

Railroads that terminated 4,500 or more revenue carloads in any of last 3 years.

COVERAGE:

Of 364,184 waybills received in 1991, about 9.5 percent were coal-related.
The average sampling rate for the coal waybills was 8.8 percent in 1991.
Includes all consuming sectors.
Includes Canadian origins.
Includes exports and imports.
Covers all commodities. Standard Transportation Commodity Code (STCC) is used. For example, the STCC for anthracite is 1111, bituminous coal 1121, lignite 1122.

DATA ITEMS:

Minimum Data Requirements:

1. Tonnage shipped. **AVAILABLE**. Waybill Sample provides an estimate of coal tonnage, not actual data. In 1991, the sample represented about 40 percent of all coal tonnage terminating in the U.S..
2. Avg. distance shipped. **AVAILABLE**. Waybill Sample contains both short-line miles (shortest rail route over which carload traffic can be moved without transfer of lading) and an estimate of actual distance. May not include movements to and from the rail terminal.
3. Avg. rate per ton. **AVAILABLE,** calculated from Freight Revenue and "Billed Weight," not the actual weight of lading. May be estimated. Confidential contract rates may be available separately from the ICC in aggregate form.
4. Avg. rate per ton-mile. **AVAILABLE, SEE 3 ABOVE**.
5. Avg. sulfur content. **NOT AVAILABLE**.
6. Avg. Btu content. **NOT AVAILABLE**, but coal rank is available.
7. Origin / destination states. **AVAILABLE, SEE GEOGRAPHIC CONSIDERATIONS.**
8. Type of train and carload ranges. **AVAILABLE**.
9. Single / multiple line haul. **AVAILABLE**.

Potentially Useful Data:

1. Transit charges and misc. charges. **AVAILABLE**.
2. Coal rank. **AVAILABLE**.
3. Minemouth price and / or delivered price. **NOT AVAILABLE**.
4. Data for other transportation modes. **NOT AVAILABLE**.
5. End-use sector, including exports. **NOT AVAILABLE**.

MISSING DATA AND DATA RELIABILITY:

Except for some non-relevant equipment-related data items, the Waybill Sample error rate has been zero since 1987. Errors are defined as missing or incomplete information or data with large deviations from the normal weight / revenue ranges (e.g., extremely heavy loadings or high revenue per car).

The ICC has given railroads permission to report estimated revenues rather than actual contract rates in the waybill sample survey. Most of the large coal carrying railroads in the East are reporting estimated revenues. Although ICC has access to the actual contract rates for internal use only, other agencies or outside users may have access to actual contract rates in aggregated form only.

TREATMENT OF INTERMODAL SHIPMENTS:

Intermodal movements are identified. There are codes for the type of water movement (Barge, Great Lakes, Intercoastal) that are combined with rail. The truck portion of truck / rail movements is ignored. No data are collected for the non-rail part of the shipment.

GEOGRAPHIC CONSIDERATIONS:

Origin and destination are identified by Freight Station Accounting Code (FSAC), by State and county.
Destinations and origins are railroad stations. Distance and rate calculations may not include movements to and from the rail terminal.
Origin and destination are also identified by Standard Point Location Code (SPLC).
The ICC Public Use File now uses Business Economic Area (BEA) codes, which are groups of counties. Previously used State codes.

TIMELINESS AND CONFIDENTIALITY:

Data are available within 7 months of year-end.

The ICC maintains two files of waybill sample data, the Master Waybill file and the Public Use Waybill file. The Master Waybill file contains information that could be used to identify shippers and consignees, the railroad's significant customers, and the rate at which it transports a commodity. Therefore, the Master Waybill file is confidential. Federal agencies may have access to the Master Waybill file provided agreements are signed to meet certain data protection requirements. The Public Use Waybill file contains nonconfidential waybill data such as billed weight in tons, certain commodity codes, linehaul revenue and origin Business Economic Area codes. Reports produced from the Public Use Waybill file may be used, published, or released.

Other ICC Transportation Data Bases

1. Freight Commodity Statistics. This data base is collected and maintained by AAR. ICC has access to it. Data items collected are revenue, tonnage and carloads from Class I railroads. The data base is used to produce the ICC Annual News Release on transportation rates.

2. ICC Railroad Contract Information. Railroads are no longer required to file copies of contracts with ICC. ICC can request contract information, if necessary. However, the contract information is confidential.

Energy Information Administration

Coal Transportation Rate Data Base (CTRDB) (Based on Public Use Files of FERC Form 580)

REPORTING COMPANIES:

Electric utilities.

COVERAGE:

Covers only jurisdictional utilities (investor-owned, interstate utilities that sell electricity across State lines).
Excludes publicly owned utilities of the Federal Government, municipalities, and cooperatives, notably TVA, and most utilities in Texas, which are intrastate.
Excludes utilities with less than 50 MW generating capacity.
Excludes spot purchases.
In 1991, CTRDB coal tonnage accounted for 68 percent of FERC Form 423 contract coal tonnage and 58 percent of total (contract and spot) FERC Form 423 coal tonnage.

DATA ITEMS:

Minimum Data Requirements:

1. Tonnage shipped. **AVAILABLE**.
2. Avg. distance shipped. **AVAILABLE**.
3. Avg. rate per ton. **AVAILABLE**.
4. Avg. rate per ton-mile. **AVAILABLE**.
5. Avg. sulfur content. **AVAILABLE**.
6. Avg. Btu content. **AVAILABLE**.
7. Origin / destination States. **AVAILABLE**.
8. Type of train and carload ranges. **AVAILABLE**.
9. Single / multiple line haul. **AVAILABLE**.

Potentially Useful Data:

1. Transit charges and misc. charges. **AVAILABLE**.
2. Coal rank. **AVAILABLE**.
3. Minemouth price and / or delivered price. **AVAILABLE**.
4. Data for other transportation modes. **AVAILABLE**.
5. End-use sector, including exports. **AVAILABLE FOR ELECTRIC UTILITIES ONLY**.

MISSING DATA AND DATA RELIABILITY:

If certain data elements from the FERC Form 580 were not available (due to data confidentiality), records within the CTRDB were labelled as missing data fields and excluded, along with the corresponding tonnage, from the calculation of average transportation rate per ton and from other calculations.

Because of missing data on distance shipped and minemouth price, the average transportation rate per ton could be calculated for 46 percent of the tonnage reported on the FERC Form 580 in 1988 and for 36 percent of the tonnage reported in 1991.

The available data should be accurate, since they were checked both manually and through the use of computer programs to detect data that fell outside normal ranges.

TREATMENT OF INTERMODAL SHIPMENTS:

There are 10 mode types—5 for rail (unit train, independent unit train, multiple carload, trainload, single carload) and 1 type each for barge, collier, truck, conveyor and pipeline. Each link between the origin and destination route has mode information.

GEOGRAPHIC CONSIDERATIONS:

Origin is identified by State, county, Bureau of Mines District, and mine.
Destination is identified by State, county, and electric utility plant.

TIMELINESS AND CONFIDENTIALITY:

Survey is conducted biennially, but collects data for interim years. There may be a 2-year lag until the data are available (i.e., 1997 data would be available in 1999).

All data in the CTRDB are available to the public.

OTHER PERTINENT ISSUES:

1. To obtain more complete rate information—i.e., data withheld for confidentiality by FERC—an MOU between the FERC and the EIA is being prepared to obtain non-public file data, but aggregate the data as necessary to protect proprietary data.

2. To enhance the coverage, data must be obtained from intrastate and publicly-owned utilities not required to report on FERC Form 580.

Form EIA-3A, "Annual Coal Quality Report—Manufacturing Plants"

REPORTING COMPANIES:

Manufacturing plants.

COVERAGE:

Manufacturing plants that consume 1,000 short tons of coal annually.

DATA ITEMS:

Minimum Data Requirements:

1. Tonnage shipped. **AVAILABLE FOR ALL TRANSPORTATION MODES COMBINED**.
2. Avg. distance shipped. **NOT AVAILABLE**.
3. Avg. transportation rate per ton. **NOT AVAILABLE**.
4. Avg. rate per ton-mile. **NOT AVAILABLE**.
5. Avg. sulfur content. **WILL BE AVAILABLE BEGINNING WITH 1992 DATA FOR ALL MODES COMBINED**.
6. Avg. Btu content. **WILL BE AVAILABLE BEGINNING WITH 1992 DATA FOR ALL MODES COMBINED**.
7. Origin / destination State. **DESTINATION STATE AVAILABLE. ORIGIN STATE WILL BE AVAILABLE BEGINNING WITH 1992 DATA**.
8. Type of train and carload ranges. **NOT AVAILABLE**.
9. Single / multiple line haul. **NOT AVAILABLE**.

Potentially Useful Data:

1. Transit charges and misc. charges. **NOT AVAILABLE**.
2. Coal rank. **AVAILABLE FOR ALL MODES COMBINED**.
3. Minemouth price and / or delivered price. **DELIVERED PRICE AVAILABLE FOR ALL MODES COMBINED**.
4. Data for other transportation modes. **NOT AVAILABLE**.
5. End use sector including exports. **AVAILABLE FOR MANUFACTURING PLANTS ONLY**.

MISSING DATA AND DATA RELIABILITY:

No data reliability information exists because Form EIA-3A is a new form. However, since the survey frame will be the same as for Form EIA-3, "Quarterly Coal Consumption Report—Manufacturing Plants," the response rate is expected to be similar. Form EIA-3 had a response rate of 100 percent for the 4th quarter of 1992. Coal receipts reported on the Form EIA-3 covered approximately 97 percent of the coal shipments to industrial users other than coke plants reported on Form EIA-6, "Coal Distribution Form."

TREATMENT OF INTERMODAL SHIPMENTS:

Not applicable. Transportation mode will not be reported.

GEOGRAPHIC CONSIDERATIONS:

Origin and destination will be identified by State and county.

TIMELINESS AND CONFIDENTIALITY:

Data for 1992 will be published starting in 1994. Coal receipts and coal quality information will be reported by State and by 2-digit Standard Industrial Classification code if the identity of the manufacturing plants can be held confidential. A name and address list of responding companies will be available upon request.

Form EIA-5A, "Annual Coal Quality Report—Coke Plants"

REPORTING COMPANIES:

Coke plants.

COVERAGE:

All coke plants.

DATA ITEMS:

Minimum Data Requirements:

1. Tonnage shipped. **AVAILABLE FOR ALL MODES COMBINED**.
2. Avg. distance shipped. **NOT AVAILABLE**.
3. Avg. transportation rate per ton. **NOT AVAILABLE**.
4. Avg. rate per ton-mile. **NOT AVAILABLE**.
5. Avg. sulfur content. **WILL BE AVAILABLE BEGINNING WITH 1992 DATA FOR ALL MODES COMBINED**.
6. Avg. Btu content. **WILL BE AVAILABLE BEGINNING WITH 1992 DATA FOR ALL MODES COMBINED**.
7. Origin / destination State. **DESTINATION STATE AVAILABLE. ORIGIN STATE WILL BE AVAILABLE BEGINNING WITH 1992 DATA**.
8. Type of train and carload ranges. **NOT AVAILABLE**.
9. Single / multiple line haul. **NOT AVAILABLE**.

Potentially Useful Data:

1. Transit charges and misc. charges. **NOT AVAILABLE**.
2. Coal rank. **AVAILABLE FOR ALL MODES COMBINED**.
3. Minemouth price and/or delivered price. **DELIVERED PRICE AVAILABLE FOR ALL MODES COMBINED**.
4. Data for other transportation modes. **NOT AVAILABLE**.
5. End use sector, including exports. **AVAILABLE FOR COKE PLANTS ONLY**.

MISSING DATA AND DATA RELIABILITY:

No data reliability information exists because Form EIA-5A is a new form. However, since the survey frame will be the same as for the EIA-5, "Coke Plant Report—Quarterly," the response rate is expected to be similar. Form EIA-5, currently with 33 respondents, had a 100 percent response rate for the 4th quarter of 1992.

TREATMENT OF INTERMODAL SHIPMENTS:

Not applicable. Transportation mode will not be reported.

GEOGRAPHIC CONSIDERATIONS:

Origin and destination will be identified by State and county.

TIMELINESS AND CONFIDENTIALITY:

Data for 1992 will be published starting in 1994. Coal receipts and coal quality information will be reported by State if the identity of the coke plants can be held confidential. A name and address list of responding companies will be available upon request.

Federal Energy Regulatory Commission

FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Utilities"

REPORTING COMPANIES:

Electric utilities.

COVERAGE:

Includes both investor-owned and publicly-owned utilities.
Includes intrastate as well as interstate utilities.
Includes spot purchases as well as contract purchases.
Includes utilities with power plants of 50 megawatts or more generating capacity.

DATA ITEMS:

Minimum Data Requirements:

1. Tonnage shipped. **AVAILABLE FOR ALL MODES COMBINED**.
2. Avg. distance shipped. **NOT AVAILABLE**.
3. Avg. transportation rate per ton. **NOT AVAILABLE**.
4. Avg. rate per ton-mile. **NOT AVAILABLE**.
5. Avg. sulfur content. **AVAILABLE FOR ALL MODES COMBINED**.
6. Avg. Btu content. **AVAILABLE FOR ALL MODES COMBINED**.
7. Origin/Destination state. **AVAILABLE**.

8. Type of train and carload ranges. **NOT AVAILABLE.**
9. Single / multiple line haul. **NOT AVAILABLE**.

Potentially Useful Data:

1. Transit charges and misc. charges. **NOT AVAILABLE**.
2. Coal rank. **AVAILABLE FOR ALL MODES COMBINED**.
3. Minemouth price and / or delivered price. **DELIVERED PRICE AVAILABLE FOR ALL MODES COMBINED**.
4. Data for other transportation modes. **NOT AVAILABLE**.
5. End-use sector, including exports. **AVAILABLE FOR ELECTRIC UTILITIES ONLY**.

MISSING DATA AND DATA RELIABILITY:

Data base is checked manually and by computer program.
Nonrespondents are contacted.

TREATMENT OF INTERMODAL SHIPMENTS:

Not applicable. Transportation mode is not reported.

GEOGRAPHIC CONSIDERATIONS:

Origin—by Bureau of Mines District, State, county.
Destination—by State, county, plant.

TIMELINESS AND CONFIDENTIALITY:

Monthly data are available with a 3-month lag.
Data are not confidential.

Appendix B

Natural Gas Data Sources

Appendix B

Natural Gas Data Sources

The following material provides additional information on the options to develop a data base on natural gas transportation rates. The reference material consists of:

(1) Survey-form information for the American Gas Association's (AGA) Uniform Statistical Report (USR). Sample forms for transportation-related schedules are included.

(2) Background information on the Form FERC-2. A summary of transportation data filed by two companies in 1992 and 1993 is provided.

(3) Draft version of the new schedule for the Form EIA-176 to collect annual data on transportation rates.

(4) Draft version of the new schedule for the Form EIA-176 to collect monthly data on transportation rates.

(5) Information on the Electronic Bulletin Boards (EBB's). Excerpts from the FERC Notice of Proposed Rulemaking on Standards for Electronic Bulletin Boards.

(6) Additional sources of data on transportation rates.