Improving International Competitiveness of U.S. Coal and Coal Technologies

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THE NATIONAL COAL COUNCIL

JUNE 1987

The National Coal Council is a federal advisory committee to the Secretary of Energy.

The sole purpose of The National Coal Council is to advise, inform and make recommendations to the Secretary of Energy on any matter requested by the Secretary relating to coal or the coal industry.

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June 2, 1987

The Honorable John S. Herrington
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Mr. Secretary:

On behalf of The National Coal Council, I respectfully submit the attached report on Improving International Competitiveness of U.S. Coal and Coal Technologies, prepared in accordance with your request of August 21, 1986, and approved by the Council on June 2, 1987.

The purpose of this report is to provide a better understanding of the factors that determine the position of U.S. coal in relation to its competitors in world coal trade and to recommend both government and industry actions that can be taken to improve its competitiveness. Set forth in six sections, this report covers the areas of trends and structure of international coal trade, transportation and production costs in major exporting countries, clean coal technology, financial assistance programs, and non-competitive, indigenous production in coal importing countries. Significant findings include:

- World coal trade almost doubled in the twelve years between 1973 and 1985 due to increased demand for steam coal used in electricity generation;
- Exchange rate fluctuations in the past ten-to-twelve years have had a significant adverse impact on the competitive position of U.S. coal;
- The United States is disadvantaged on a cost per million BTU basis when competing with other major coal exporting countries;
- Good and timely information on competitors, including financial assistance programs, is required in an increasingly competitive world export market; and
- Coal production totalling 100 to 150 million tons in six coal-consuming countries is non-competitive and is underwritten by their respective governments.

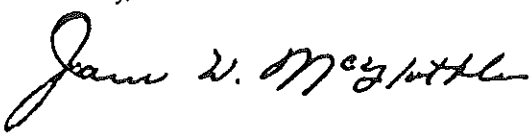
Based on these and other major findings, The National Coal Council offers for your consideration several recommendations on improving the international competitiveness of U.S. coal and coal technologies. Specifically, the Council recommends:

- Coal should be accorded a higher priority in trade policy to better contribute to the U.S. balance of trade;
- Industry and government should jointly pursue new market opportunities and aggressive trade negotiation strategies;
- U.S. trade policy should recognize that reducing coal trade barriers in major coal importing countries could result in expanded exports;
- The U.S. should consider the impact of exchange rate fluctuations between both major trading partners *and* competing exporters;

- The tax and regulatory burden should be held to a minimum consistent with sound resource and environmental management and equitable tax policies;
- Industry and government should jointly pursue a strategy to promote the use of coal in developing countries in the interests of national security and expanded coal exports;
- Further investment in research and development by industry and government for clean coal technologies may enhance U.S. coal exports;
- Industry and government should develop more sophisticated and integrated international financing methods to better compete with those offered by exporting countries.

The Executive Summary further defines these points. We are confident that this report will prove useful to you in policy matters involving the international competitiveness of U.S. coal and coal technologies and are prepared to provide to you any additional information on this subject.

Sincerely,



James W. McGlothlin
Chairman

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Introduction

This study was initiated in December 1986 by a work group composed of representatives to The National Coal Council in response to a request from The Secretary of Energy dated November 26, 1986. The Secretary authorized The National Coal Council to conduct a study and make recommendations regarding:

> Improving the International Competitiveness of U.S. Coal and Coal Technologies. Specifically, I request the NCC's advice on what barriers prohibit U.S. coal and coal technologies from freely competing in the international market place and recommendations for improving the competitiveness of the U.S. in these markets. It is recommended that you build upon studies on the subjects that have been completed or are underway.

Some would argue that coal exports are not in the long-term best interest of the United States. They reason that exported coal is of generally high quality and that this nonrenewable energy resource should be preserved for future generations. An underlying assumption to this study, contrary to the above view, is that the United States should pursue policies that encourage U.S. coal exports, since they represent, among other things, a means to reduce the trade deficit, help domestic employment and provide tax revenues.

Numerous comments by members of The National Coal Council were received on the various drafts of this report. These comments were ultimately incorporated in the final draft, or otherwise addressed, and therefore are excluded from the appendices of this report for the sake of brevity.

This study is not intended to be all encompassing, but rather to highlight certain issues that deserve consideration. An attempt was made in the study to provide sufficient historical background on international coal trade to give the reader a better understanding of the subject.

All data presented in the study are in U.S. dollars and short tons unless specifically noted. Efforts have been made to report data accurately and to note reference sources where possible.

The International Competitiveness Work Group was responsible for preparing this report. A list of the members and their respective organizations can be found in Appendix D.

Executive Summary

Interest in coal as a primary energy source was renewed in 1973 when the Organization of Petroleum Exporting Countries (OPEC) raised world oil prices from $3.00 a barrel to over $11.00 a barrel. This first price shock forced countries to explore alternatives in order to decrease their dependence on oil. New coal-fired generating and industrial plants were planned. In the spring of 1979, another round of increases by OPEC more than doubled the price of oil. Efforts were then accelerated to build new coal-burning facilities and to convert existing oil-burning facilities to coal in both the utility and industrial sectors.

From 1973 to 1985, world coal trade has almost doubled. Although the U.S. coal industry had benefited from this growth, it certainly cannot be described as having dominated it. Indeed, the U.S. share of the world market has slipped, from 28 percent in 1973 to 25 percent in 1985. In 1984, the United States lost its position as the leading exporter of coal to Australia.

The purpose of this study is twofold:

- To provide a better understanding of the factors that determine the position of U.S. coal in relation to its competitors in world coal trade; and
- To recommend both government and industry actions that can be taken to improve its competitiveness.

The discussion is divided into six sections. The first section, TRENDS IN INTERNATIONAL COAL TRADE, reviews international coal trade trends since the oil embargo in 1973. It traces trade volumes, identifies the major markets, the suppliers and their market shares. It also looks at price trends and the significant impact of exchange rate fluctuations on trade patterns. The projected growth in demand over the next decade is presented with particular emphasis on the anticipated growth in developing countries.

THE STRUCTURE OF INTERNATIONAL COAL TRADE, section two, discusses qualitatively commercial trading practices that have emerged over this same period. How is the coal trade business actually conducted? Who are the buyers and the sellers? What do these practices mean for U.S. coal exporters? What can or needs to be done to assist them to compete more effectively, given the trade structure that has emerged?

The third section, COMPARATIVE DELIVERED COSTS AND PRODUCTION COSTS IN MAJOR COAL EXPORTING COUNTRIES, looks at the major cost components of coal production in the United States and compares them with the major competing exporting countries to see where the inherent advantages and disadvantages of competition lie. It identifies certain areas of opportunity for cost reduction in the U.S. industry. Also, by documenting the various cost advantages enjoyed by the other major competitors, it emphasizes how sensitive this country's export standing is to any additional cost burden.

TRANSPORTATION ISSUES AND COMPARATIVE COSTS, the fourth section, examines transportation issues and comparative costs as an extension of the preceding section. It compares the U.S. situation with that of its major competitors, focusing on the inherent strengths and weaknesses of the transportation components of the coal chain for these countries.

Section five, CLEAN COAL TECHNOLOGY AND FINANCIAL ASSISTANCE PROGRAMS: LINKAGE TO COMPETITIVE EXPORT SALES, reviews in broad terms the various programs offered by foreign government export credit agencies to establish how competing foreign exporters are assisted by their governments and explores some areas where existing U.S. financial assistance arrangements can be improved. Research and development is addressed with the linkage of clean coal

technologies and financial assistance/foreign aid programs to give U.S. coal exporters a marketing advantage.

The final section, NON-COMPETITIVE INDIGENOUS COAL PRODUCTION— OPPORTUNITIES FOR INCREASED EXPORTS, addresses the issue of trade barriers in world coal trade. A substantial amount of coal consumption in the non-socialist countries, equal to as much as fifty percent of estimated 1986 world seaborne coal trade of 304 million tons, consists of coal produced at costs that exceed the landed cost of coal traded competitively in the world coal market. The countries protecting their own high cost production, by using a variety of subsidies and import restrictions, are identified, and the potential impact on world trade of at least partially opening these markets is explored.

The study's major findings and recommendations are summarized here.

MAJOR FINDINGS

I. Trends in International Coal Trade

World coal trade has almost doubled (91 percent increase) in the twelve years between 1973-1985, due to the increased demand for steam coal used in electricity generation. On the demand side, the Western European countries and Japan have been the dominant buyers, but increasingly, they are being joined by North African, South American and other Pacific Rim countries. The traditional major exporting countries still include Australia, the United States, South Africa, Poland, Canada and the U.S.S.R. (in descending rank order), but they have recently given up part of the market to two new entrants—Colombia and the People's Republic of China.

Exchange rate fluctuations in the past ten to twelve years have had a significant adverse impact on the competitive position of U.S. coal. Currency relationships *between exporting* countries, rather than between importing and exporting countries, contribute to greater or lesser price competitiveness for one exporting country vis-a-vis another. In the period 1973 through 1986, continued devaluation of the Australian dollar, the South African rand and the Canadian dollar versus the U.S. dollar, alone, caused deterioration of U.S. price competitiveness of 69 percent against South Africa, and of 53 percent and 28 percent, respectively, against Australia and Canada.

Growth on the order of three percent per year through the year 2000 is projected for world coal trade. This growth is attributable primarily to increasing demand of steam coal imports in Asia and Western Europe. Developing countries will look to coal to supply their growing energy requirements. U.S. exports are expected to increase as total world coal trade expands. However, the United States will face even greater competition as new low cost producers, such as Colombia and the People's Republic of China, expand their coal exports.

II. The Structure of International Coal Trade

Seaborne trade of steam coal in substantial volumes in recent years has brought to the market new buyers, new sellers and new exporting countries. Its development has brought *new* buyers in traditional metallurgical coal importing countries, *new* buyers in newly-importing countries and *new* sellers from traditional and two *new* exporting countries. Among producers, transporters and consumers, the rising scale of facilities in the form of new mine developments, port handling facilities, larger vessels and power generating capacity has increased the level of risk by raising the level of capital requirements from the front to the back end of the coal chain. At the same time, credit-worthiness of many new buyers provoking this chain of investments is open to question. The combination of larger capital requirements and higher commercial and political risk implies a larger role for governments in providing the financial assistance without which these projects would not go forward.

As world steam coal trade has increased in recent years, various governmental entities of other major exporting countries have provided financial assistance for coal-burning installations in order to facilitate export coal sales. Neither the U.S. coal industry nor the relevant government agencies have adequate intelligence on the range and scope of the assistance offered by the competing countries and the trends in prevailing financial practices.

III. Comparative Delivered Costs and Production Costs in Major Coal Exporting Countries

The United States is generally at a disadvantage with respect to delivered costs on a dollar per million BTU delivered basis. Low cost producing countries such as Colombia, Australia and South Africa have the economic advantage.

Foreign exporting countries are not constrained by the same major cost components of coal production that are found in the United States. Black Lung taxes are not paid by other major exporting countries, for example. Foreign competitors generally do not have regulations as restrictive as those in the United States affecting longwall mining, a cost-effective method in producing coal.

IV. Transportation Issues and Comparative Costs

The United States is inherently disadvantaged by long inland freight distances between mines and ports. Transportation is a greater factor in the competitiveness of U.S. coal than it is for other countries. The relative lack of deep-draft harbors in the U.S. is not presently a handicap, but could become so if world-wide coal trade expands rapidly.

Other countries exercise greater governmental investment in and control of transportation of coal exports, both of which may afford those countries more control over the entire coal export chain in their pursuit of national export objectives.

V. Clean Coal Technology and Financial Assistance Programs: Linkage to Competitive Export Sales

Foreign governments of exporting countries can play an increasing role in facilitating export sales with financial assistance programs as the demand for steam coal increases. Some major coal exporting countries, namely Australia, Canada and South Africa, are party to export credit agreements intended to standardize foreign assistance practices that governments use chiefly to help win businesses for exporters. Securing good and timely information on what all competitors are doing, and responding flexibly to changing practices, will become increasingly important as the trade stakes get larger.

Important national security interests are served by promoting selection of the coal option in developing countries. The United States, as one of the largest markets for, and developers of, clean coal utilization technology, can offer developing country customers state-of-the-art technology to meet their power generation needs. Opportunities exist to link such equipment sales with fuel sales.

VI. Non-Competitive Indigenous Coal Production—Opportunities for Increased Exports

The cost of producing some 100-150 million tons of coal in six major coal-consuming countries in the non-socialist world is underwritten in some form, either directly or indirectly, by their respective governments. Were this indigenous production reduced by one-third, in favor of imported coal, world seaborne trade (estimated at 304 million tons in 1986) could experience an increase of more than fifteen percent.

The U.S. government agencies involved in monitoring and promoting free and open world coal trade do not have adequate resources to perform effectively. At least three U.S. government agencies—the Office of the Special Trade Representative, the U.S. Department of State's Office of Energy-Consuming Country Affairs and the U.S. Department of Commerce—are, in varying degrees, active in promoting open world coal trade. But the agency most directly responsible for trade strategy and negotiations, the Office of the Special Trade Representative, has only one person assigned to energy issues, and that person is charged with covering every aspect of the energy arena from petrochemicals to oil, gas, electricity, uranium, fertilizers, basic inorganic chemicals, other natural resources and finally, coal. This allocation of human resources is not adequate.

Recommendations

1. COAL SHOULD BE ACCORDED A HIGHER PRIORITY IN U.S. TRADE POLICY IN ORDER TO EXPAND ITS CONTRIBUTION TO THE U.S. BALANCE OF TRADE.

   Coal already makes an important contribution to the U.S. trade balance and, in view of the size and efficiency of the U.S. coal industry, is capable of expanding its contribution significantly. Developing a comprehensive set of coal trade polices to reduce trade barriers and other practices that restrict free trade is a first step that must be taken to achieve this objective. The next step is the inclusion of coal trade issues in broad U.S. trade negotiation strategy. Industry and government trade negotiation representatives should meet regularly to exchange information and plan near- and long-range negotiation strategy.

2. INDUSTRY AND GOVERNMENT SHOULD WORK TOGETHER IN THE PURSUIT OF NEW MARKET OPPORTUNITIES AND DEVELOPMENT OF AGGRESSIVE TRADE NEGOTIATION STRATEGIES.

   The implementation of the foregoing recommendation requires accurate, timely and comprehensive economic and market intelligence to project market development and to understand prevailing foreign governmental policies and commercial trading practices. Coordinating the gathering of such information by industry and government is essential.

3. UNITED STATES TRADE POLICY SHOULD RECOGNIZE THAT A REDUCTION IN COAL TRADE BARRIERS IN MAJOR COAL IMPORTING COUNTRIES COULD RESULT IN EXPANDED U.S. COAL EXPORTS AS THE U.S. CAPTURES A SHARE OF RESULTING INCREASED IMPORT DEMAND.

   The accelerated reduction of these coal trade barriers should be given higher priority in overall U.S. international trade strategy, thereby making clear to major coal importing countries that such a reduction is an important component of the trade relations with our major trading partners. In general trade discussions, the United States should promote the view that barriers to increased international coal trade create a major inefficiency in the world economy. These inefficiencies cost energy consumers billions of dollars annually and deny markets to efficient competitors in the United States and elsewhere. Discussions held by the United States with importing coal countries should focus on the competitive advantages of U.S. coal relative to subsidized domestic production.

4. THE UNITED STATES SHOULD CONSIDER THE IMPACT OF EXCHANGE RATE FLUCTUATIONS BETWEEN BOTH MAJOR TRADING PARTNERS AND COMPETING EXPORTERS, (AUSTRALIA, SOUTH AFRICA AND CANADA), AS THESE RATES HAVE AN IMPORTANT BEARING ON U.S. COMPETITIVENESS IN WORLD COAL MARKETS.

   The adverse impact of these fluctuations represents a cost to the U.S. coal industry and to the U.S. trade balance in terms of lost export sales. This cost should be quantified, along with other adverse effects of an international monetary system that has permitted such volatility in exchange rates in recent years, as the Federal Government formulates its position on international monetary policy.

5. THE UNITED STATES GOVERNMENT CAN AFFECT U.S. COAL COMPETITIVENESS BY ADDRESSING THE COST OF PRODUCING COAL. IT IS OF CRITICAL IMPORTANCE THAT THE TAX AND REGULATORY BUR-

DEN ON THE U.S. COAL INDUSTRY BE HELD TO THE MINIMUM, CONSISTENT WITH SOUND RESOURCE AND ENVIRONMENTAL MANAGEMENT AND EQUITABLE TAX POLICIES.

The level of royalty rates should be reviewed. High federal rates may be detrimental because other leases typically have lower rates and would be favored for exports. Regardless of the rate, federal royalties should be calculated on the coal's value net of all other taxes and fees. Regulations which discriminate against longwall mining should be changed.

6. THE FEDERAL GOVERNMENT AND THE COAL INDUSTRY SHOULD PURSUE A BROAD, INTEGRATED AND COORDINATED STRATEGY TO PROMOTE THE USE OF COAL IN DEVELOPING COUNTRIES FOR POWER GENERATION IN THE INTEREST OF NATIONAL SECURITY AND EXPANDED COAL EXPORTS.

   In the past decade, the total primary energy requirements (TPER) of developing countries have grown 5.3 percent annually, while the TPER in OECD (Organization of Economic Cooperation and Development) countries have grown 0.8 percent annually. In most developing countries, oil dependency is still high. Components of this policy should include the use of foreign aid and technical assistance to support coal-fired projects.

7. FURTHER FUNDING BY THE U.S. GOVERNMENT AND PRIVATE INDUSTRY OF RESEARCH AND DEVELOPMENT EFFORTS FOR CLEAN COAL TECHNOLOGIES WILL CONTRIBUTE TO INCREASED COMPETITIVENESS OF U.S COAL EXPORTS.

   The "packaging" or "linkage" of new technologies that have been demonstrated with U.S. coals provide exporters with a marketing advantage. In addition, clean coal technologies which can utilize higher sulfur coals will increase demand for these lower cost coals from the United States that are currently demand-limited. Coal producers and suppliers of coal equipment and/or technology should coordinate export marketing activities to provide for packaging and linkage arrangements.

   More responsive and internationally competitive financial assistance programs would also enhance the opportunities for both U.S. coal producers and suppliers of equipment and/or technology.

8. THE UNITED STATES GOVERNMENT SHOULD ASSESS THE EXTENT TO WHICH TRANSPORTATION POLICIES OF COMPETING COAL EXPORT COUNTRIES IMPACT U.S. EXPORTERS.

   By studying how competing countries subsidize, organize and regulate their transportation systems, advantages and disadvantages for U.S. exporters can be determined. This information can then be utilized in international negotiations.

9. THE FEDERAL GOVERNMENT SHOULD CONTINUE TO PURSUE POLICIES WHICH FOSTER COMPETITIVE SYSTEMS FOR THE INLAND MOVEMENT OF EXPORT COAL FROM MINE TO PORT AND AVOID POLICIES WHICH INCREASE FREIGHT OR PORT COSTS.

   Encouraging a coordinated marketing effort on the part of both coal producers and transporters would be a positive first step.

10. PRIVATE ENTERPRISE AND THE FEDERAL GOVERNMENT NEED TO DEVELOP MORE SOPHISTICATED AND BETTER INTEGRATED INTERNATIONAL FINANCING METHODS TO RAISE THE CAPITAL REQUIRED FOR THE SCALE OF INVESTMENTS ASSOCIATED WITH NEW COAL-FIRED POWERPLANTS IN COAL IMPORTING COUNTRIES.

    For industry, this would include long-range packaging of coal utilization equipment and fuel sales. For government, it would mean integrating various financial assistance programs, in conjunction with private industry, that would meet what is currently being offered by governments of competing exporting countries.

Section I

Trends in International Coal Trade

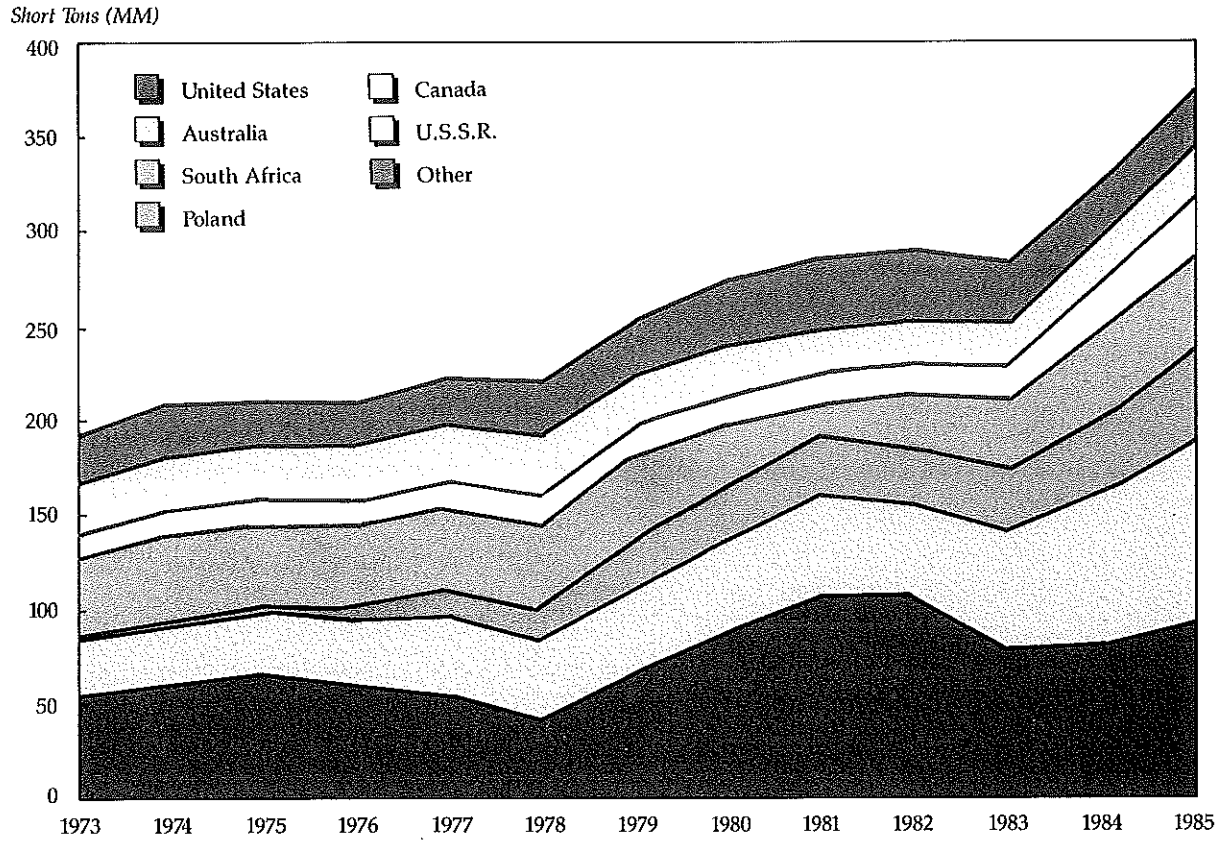
Introduction

Interest in coal as a primary energy source was renewed in 1973 when the Organization of Petroleum Exporting Countries (OPEC) raised the world price of oil to over $11.00 a barrel compared with less than $3.00 a barrel at the beginning of the year. Figure 1 charts the price of oil since 1972. This first price shock forced countries to explore alternatives to decrease their dependence on oil. New coal-fired generating and industrial plants were planned. Then in the spring of 1979, another round of increases by OPEC more than doubled the price of oil. Efforts were accelerated to build new coal-burning facilities and to convert existing oil-burning facilities to coal in the utility and industrial sectors.

FIGURE 1 World Oil Prices (Refiner Acquisition Cost of Imported Crude Oil) 1972-1986

SOURCE: Energy Information Administration, *Monthly Energy Review*, (DOE/EIA-0035).

FIGURE 2 International Coal Trade



SOURCE: Energy Information Administration, *Annual Prospects for World Coal Trade 1987* (DOE/EIA-0363 [87]).

As a result of this new demand for steam coal, a demand that far outstripped indigenous coal production capabilities, world coal trade almost doubled from 190.9 million tons in 1973 to 364.3 million tons in 1985, a 91 percent increase. Seaborne trade accounts for more than 74 percent of total coal trade.[1] Overall world coal trade grew at an average growth rate of 5.5 percent per year from 1973 to 1985. This trend is illustrated in Figure 2 which shows the major exporters' tonnage. Coal trade began to increase dramatically in 1979 as new coal-fired facilities conceived in the early seventies started to come on line.

Major Coal Markets—Steam and Metallurgical Coal

Coal markets fall generally into two categories, metallurgical or coking coal and steam coal. A major change has occurred in coal usage and coal trade since 1973. For example, in the twenty-four OECD (Organization for Economic Cooperation and Development) countries, 57 percent of all coal requirements (not just imports) in 1973 went for electricity generation.[2] By 1985, this percentage had grown to 71 percent. During the same period, coal for steel production declined from 22 percent to 12 percent. The remaining 17 percent went for all other uses, the largest being for the cement industry.[3]

Throughout the sixties, and even into the mid-seventies, most of the coal moved in world trade was for metallurgical uses although hard data indicating the tonnage breakdown between metallurgical and steam coal prior to 1980 is not readily

1. International Energy Agency, *Coal Information 1986*, (Paris: OECD, 1986), p. 39.

2. OECD Member Countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, West Germany and the United States.

3. International Energy Agency, *Coal Information 1986* (Paris: OECD, 1986), p. 12.

available.[4] It is estimated that steam coal represented approximately 35 percent of the world coal trade in 1973.[5] By comparison, in 1985, steam coal represented 52 percent of international coal trade.

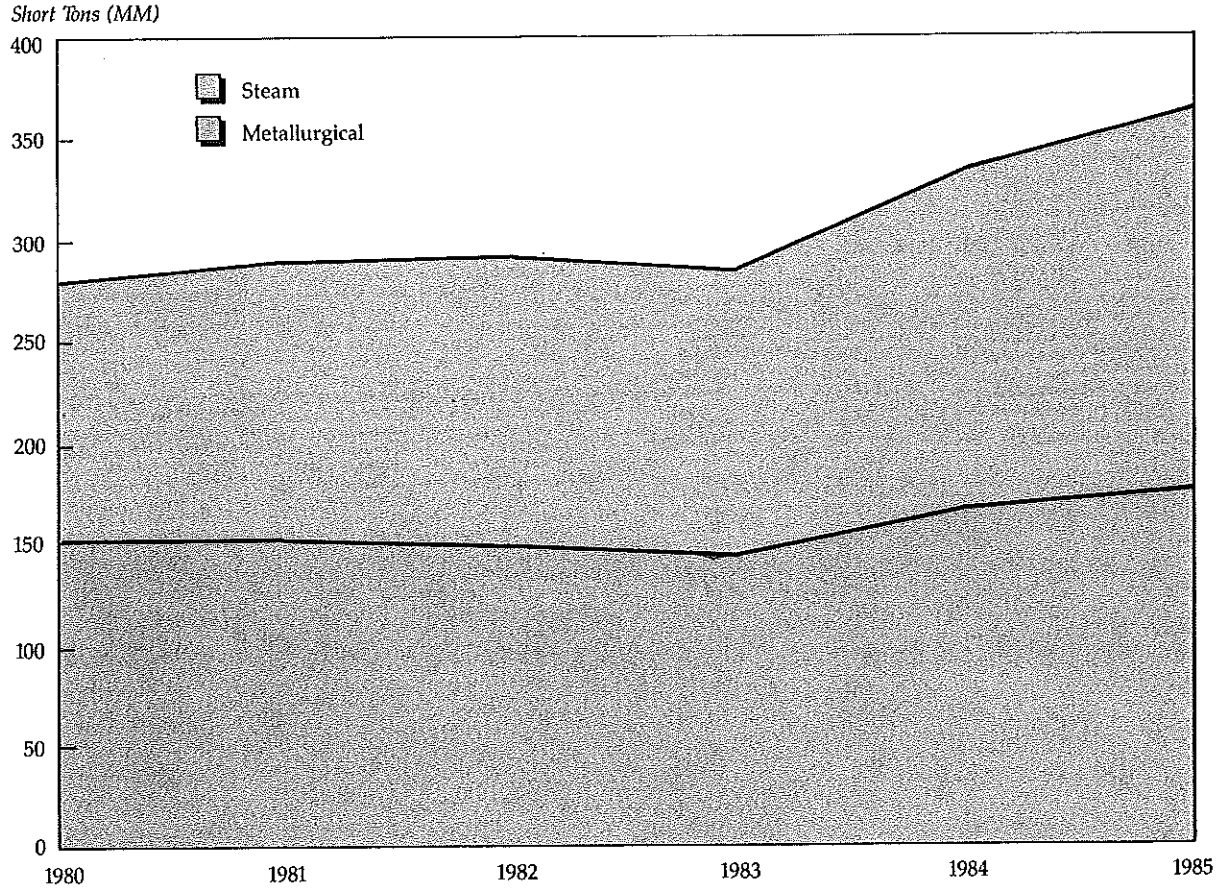
Figure 3 provides a tonnage breakdown between metallurgical and steam coal in international trade for 1980 through 1985. In terms of tonnage, steam coal trade increased over two and one-half times as fast as metallurgical coal in the 1980 to 1985 period.

Metallurgical coal is used to produce coke, which is in turn used in blast furnaces as both a fuel and chemical reducing agent to produce pig iron. Few single coals meet all the criteria to produce a high-quality coke, hence, coals must be blended to meet blast furnace requirements. Frequently, in commercial blends, it is economically attractive to include coals that do not meet normal metallurgical coal specifications. In these cases, it is necessary that the other coals in the blend be correspondingly higher in quality or have properties that compensate for deficiencies in the poorer quality coal. When heated, coking coals soften, then become fluid and finally solidify. High-quality strong coking coals become extremely fluid, while poor coking coals have no or very little fluidity.

As a result of technological improvements in steel-making, the amount of coke required to produce a ton of pig iron has been declining. Today about 1,100 pounds (0.55 ton) of coke are consumed per ton of pig iron produced; by contrast, in 1960, 1500 pounds (0.75 ton) were used.[6] The coke rate

4. Energy Information Administration, *Coal-Exporting Countries: The Asian Market* (DOE/EIA-0462, December 13, 1984), p. 1.
5. Robertson Research International, *Coal Trade Statistics*, (Financial Times Business Information Limited), 1982.
6. Energy Information Administration, *Coal Data: A Reference* (DOE/EIA-0064 [84], January 30, 1985), p. 17.

FIGURE 3 Breakdown Between Metallurgical & Steam Coal in International Trade 1980—1985



SOURCE: Energy Information Administration, *Annual Prospects for World Coal Trade 1987* (DOE/EIA-0363 [87]).

(ratio of tons of coke per tons of pig iron produced) has declined due to increases in blast furnace efficiency and the use of higher grade ores. By blending, as previously mentioned, lower quality coking coals can be substituted for higher-cost premium coking coals.

Steel is produced in one of three furnaces: open hearth, basic oxygen, or electric arc. A "charge" of pig iron and/or scrap metal is subjected to high temperatures to produce steel in all furnaces. Each type of furnace, however, varies with respect to the proportions of raw materials and energy sources. The open hearth and basic oxygen furnaces are charged with pig iron along with scrap metal, whereas the electric arc furnace uses primarily scrap metal.[7] The growing use of electric arc furnaces has lowered the demand for pig iron and the concomitant demand for coke and metallurgical coal. In 1973, 18 percent of raw steel in the United States was produced from electric arc furnaces compared with 35 percent in 1985.[8]

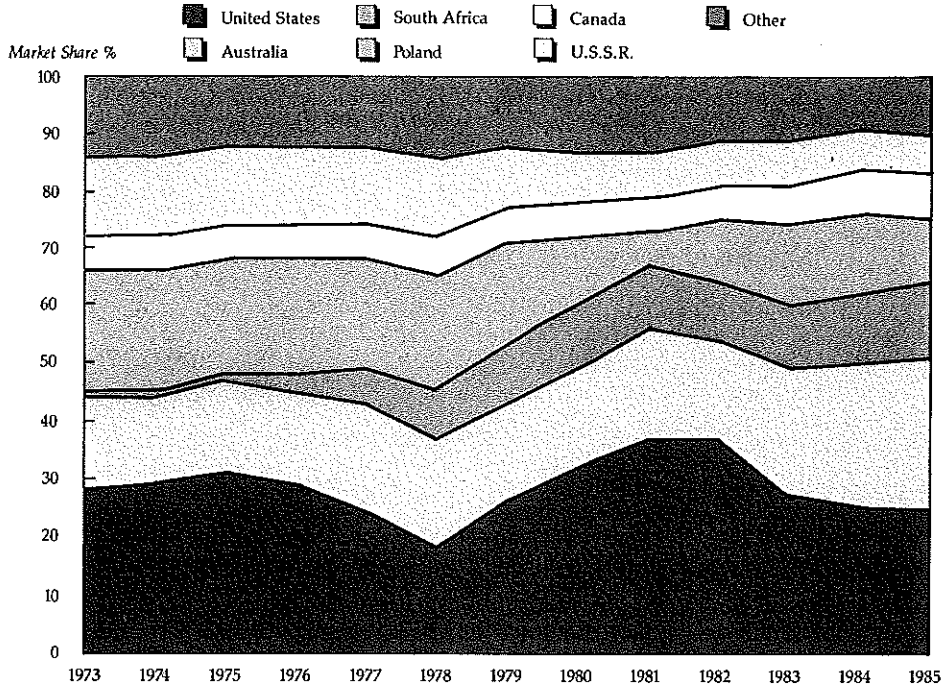
New processes and technological improvements are blurring the distinction between metallurgical coal and steam coal. Recent developments in steelmaking, such as briquette-blend coking and preheated coal charges, use noncoking coal to make coke.[9] Other new processes like "KS steel-making" use ordinary low sulfur coal injected into a furnace to melt scrap, thereby, competing with electric arc furnaces.[10] As demand for high quality metallurgical coal is decreased, some of it can move into the steam coal market. The exception to this is low-volatile metallurgical coal which cannot be used in many steam raising furnaces. While there is always a base level demand for strong coking coals, the demand increases or decreases with the demand for coke and pig iron.

Major Exporters

Major exporters of coal include Australia, the United States, South Africa, Poland, Canada and the U.S.S.R. The United States and Australia are the dominant exporters in terms of tonnage, providing over 50 percent of international volume. Figure 4 indicates the market shares of major exporters. In 1984, Australia surpassed the United States to become the leading exporter, primarily because

7. Energy Information Administration, *Annual Prospects for World Coal Trade 1985* (DOE/EIA-0363 [85], May 3, 1985), p. 14.
8. National Coal Association, *Coal 2000*, March 1986, Table IV-4, p. 37.
9. Energy Information Administration, *Annual Prospects for World Coal Trade 1985*, (DOE/EIA-0363 [85], May 3, 1985), p. 14.
10. *American Metal Market*, December 14, 1983.

FIGURE 4 Market Share of Major Exporters



SOURCE: Adapted from Energy Information Administration, *Annual Prospects for World Coal Trade 1987* (DOE/EIA-0363 [87]).

of its dominance in the Asian steam coal market. As indicated in Figures 2 and 4, several countries, such as South Africa, Australia, and Canada have substantially increased exports since 1973. South Africa has increased its market share from approximately one percent (two million tons) in 1973 to over 13 percent (49 million tons) in 1985. During the same period, Australia increased its market share from 16 percent (31 million tons) to 26 percent (96 million tons).

China and Colombia have recently entered into international coal trade. China's exports first exceeded one million tons in 1979 and had grown to over eight million tons by 1985. Colombia exported 3.7 million tons in 1985 and is expected to increase exports to 16 million tons or more in the near future. Both these countries have low cost reserves and can be expected to become major competitors in international coal trade.

Importance of U.S. Coal Trade to Total U.S. Exports

Coal exports provide a valuable contribution toward balancing trade. The U.S. trade deficit has increased sharply over the past several years, reaching $170 billion in 1986. Table 1 compares the value of total U.S. coal exports to total U.S. domestic merchandise exports. While coal exports historically represent only about two percent of total U.S. exports, coal's dollar contribution since 1980 has averaged over $4.8 billion annually and was over $6.0 billion in 1981 and 1982.

The U.S. coal industry has the capacity already in place which would allow exports to be expanded significantly, without disruption to the domestic market. Coal exports in 1986 represented only nine percent of total production.

TABLE 1
Relationship of Value of Coal Exports to Value of Total U.S. Exports Domestic Merchandise

(Millions of Dollars)

Year	Value of Total U.S. Exports Domestic Merchandise	Value of Total Coal Exports*	Percent Coal of Total
1970	42,593	1,044	2.5%
1971	43,497	951	2.2
1972	48,876	1,019	2.1
1973	70,223	1,052	1.5
1974	97,143	2,487	2.6
1975	106,157	3,343	3.1
1976	113,323	2,988	2.6
1977	117,963	2,730	2.3
1978	141,154	2,123	1.5
1979	178,578	3,496	2.0
1980	220,705	4,780	2.2
1981	233,739	6,019	2.6
1982	212,275	6,080	2.9
1983	200,538	4,123	2.1
1984	217,888	4,225	1.9
1985	213,146	4,559	2.1
1986 (p)	217,304	3,998	1.8

*Includes bituminous, anthracite, coke, briquette.

Value is f.a.s. value basis, at the seaport, border point, or airport of exportation.

SOURCES: U.S. Exports, FT 990, December issues, various years.
U.S. Bureau of Census, Department of Commerce.
U.S. Exports, FT 990, December issues, various years.
U.S. Bureau of Census, Department of Commerce.

Major Importing Regions

Figure 5 compares metallurgical and steam coal imports by geographical area for 1980 and 1985. In Western Europe (including the Mediterranean), metallurgical coal imports have remained static, while steam coal imports have increased by 20 million tons from 1980 to 1985. Steam coal represented 64 percent of total coal imports in 1985. Major steam coal importers in Western Europe include Denmark, Italy, France and West Germany.

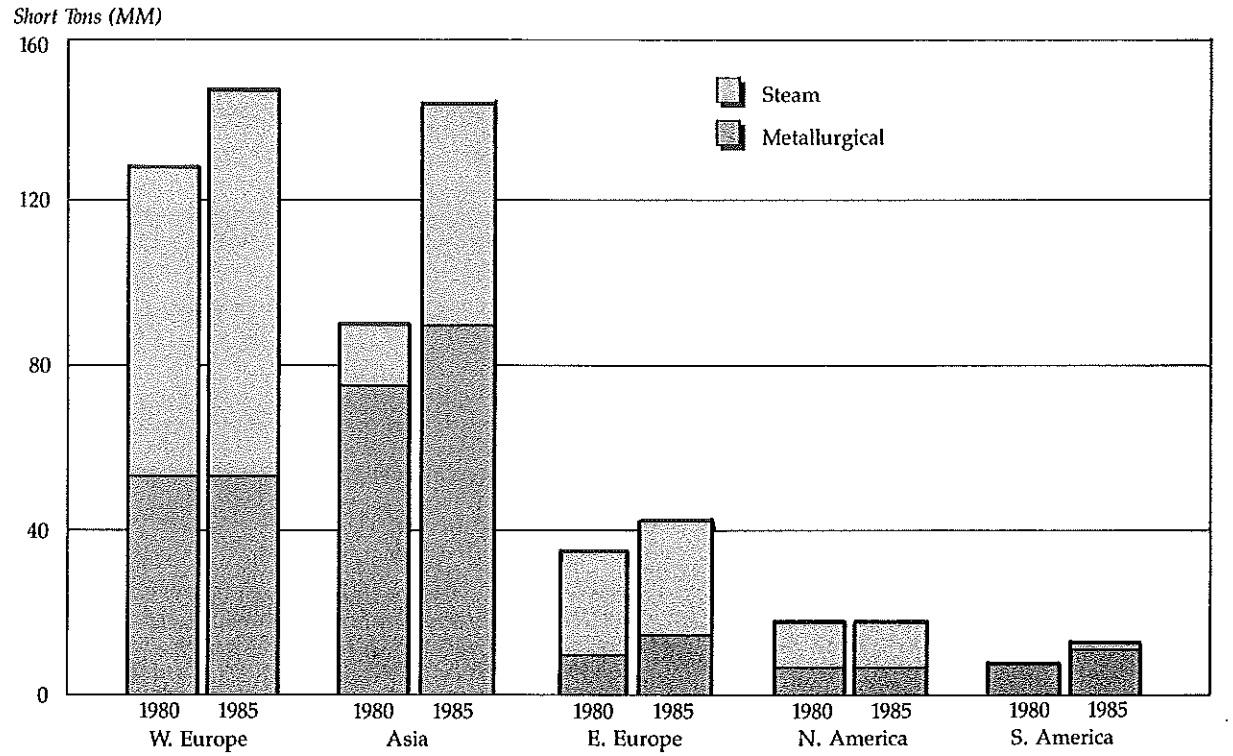
Coal imports to Asia have increased by over 60 percent between 1980 and 1985. Japan is the dominant coal importer in the region, receiving 71 percent of the total imports in 1985. Unlike Western Europe, Asia has increased both metallurgical and steam coal imports; steam imports increased by almost 40 million tons while metallurgical imports grew by 15 million tons.

Buying Criteria

Several criteria are used in coal procurement policies of importing countries. These include delivered cost, quality, reliability, diversification of supply and political criteria such as balance of trade issues.

The United States has the reputation of being a reliable and politically stable supplier. However, it is viewed as the "swing" producer in international coal trade, particularly in steam coal trade. Coals from the United States are generally the most expensive; however, sufficient production and export capacity exists to quickly fill any short-term swings in demand caused by disruption of supply from other exporters. This role was clearly evident in 1981 when Polish exports were curtailed and Aus-

FIGURE 5 Coal Importing Regions 1980/1985



SOURCE: Energy Information Administration, *Annual Prospects for World Coal Trade 1987* (DOE/EIA-0363 [87]).

tralian miners were on strike, and importers turned to the United States. Coals produced in the U.S. that enter the export market tend to be higher cost, higher quality coals. This is due, in part, to the geographic distribution of coal reserves. Those closest to shipping ports (the reserves where inland transportation costs to ports are lowest) are in Appalachia, where production costs are highest (as is quality).

The United States has billions of tons of surface mineable coal in the West and relatively low cost Midwest reserves. However, the distance from ocean ports (resulting in high inland transportation costs) and the lower calorific content of these coals from these basins, raise the F.O.B. (free-on-board) loading cost on a dollar per million BTU basis to levels which have exceeded world market price levels in recent years. In metallurgical markets, the United States faces its toughest competition from Australia, Poland, and indigenous European production. From a quality standpoint, premium U.S. metallurgical coals are comparable to European metallurgical coals. From a combined cost and quality standpoint, the United States is the lowest cost coal producer of high fluidity coking coals. Most indigenous European metallurgical coal is high cost, subsidized production. This issue is discussed further in Section VI. On the steam coal side, the export market is currently dominated by South African and Australian coals.

South African coal trade benefits from low delivered costs. However, political unrest arising from apartheid policies has created a question of reliability. The United States has banned South African coal imports. The European Economic Community (EEC) is considering sanctions which may include a ban on coal imports. Denmark has already banned South African coal imports, and France is not renegotiating any South African steam coal contracts.[11] It is also reported that the Netherlands, Sweden, Finland, Norway, Ireland and the United Kingdom and Korean utilities (CEGB and KEPCO, respectively) either openly or tacitly ban South African coals.

Australian coal exports in the past have been hindered by frequent labor disputes which have affected its image as a reliable supplier. There are some thirty to forty unions involved in the coal

11. Energy Information Administration, *Coal Exporting Countries: The European Market* (DOE/EIA-0520, January 13, 1987), p. 12.

movement from mine through port facilities.[12] Most labor disputes in Australia involve demarcation between unions, and strikes are most unpredictable. This is in contrast to the United States where most labor disputes involve compensation, and strikes are relatively predictable. The close proximity of the Asian market and low ocean freight rates are advantageous to Australia.

Market Shares

Figure 6 provides a breakdown of the major exporters of steam coal to each importing region during 1980 and 1985. South Africa is the largest steam coal exporter to Western Europe, followed by the United States, Poland and Australia. These four exporters provided over 80 percent of all steam coal exports to Western Europe. The United States' market share amounted to 20 percent in 1985. South Africa captured 46 percent of the growth in steam coal imports to Western Europe between 1980 and 1985.

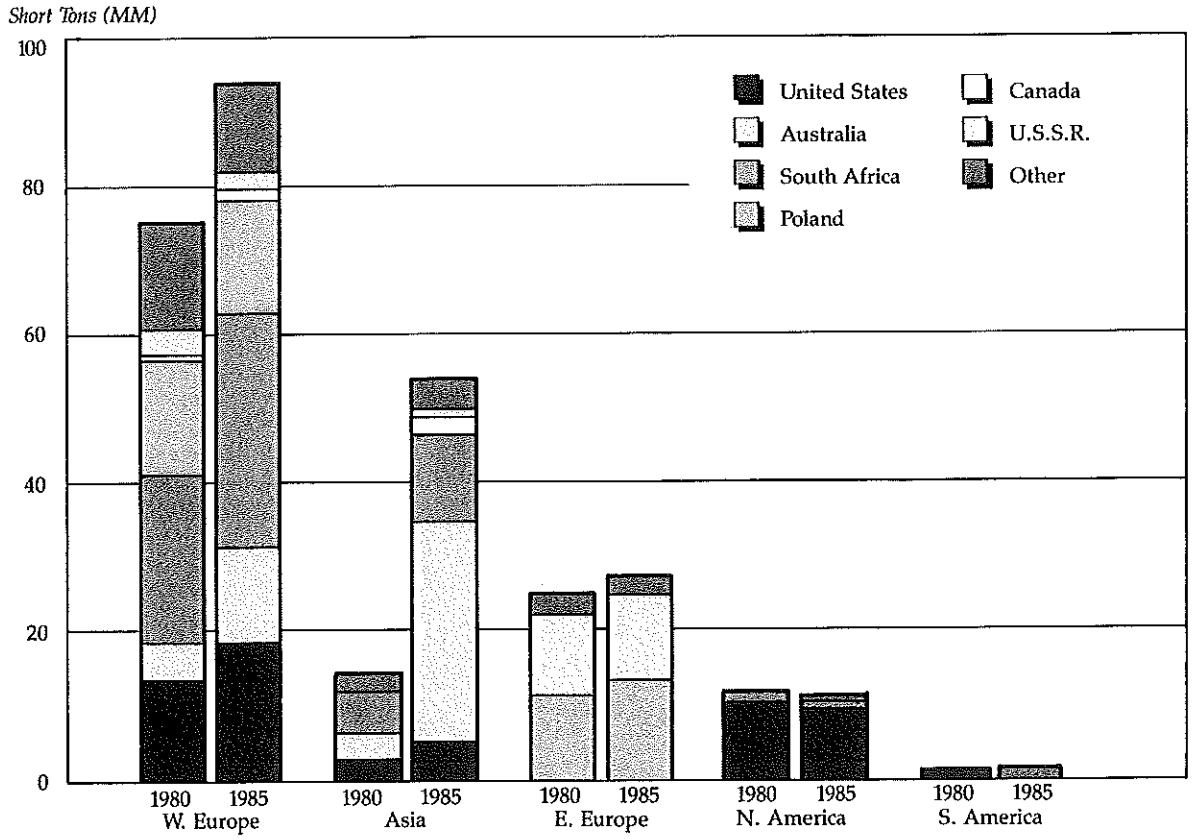
Australia was the leading steam coal exporter to Asia in 1985 by a wide margin, followed by South Africa, the United States and China. The United States' market share was less than ten percent. Australia has more than doubled its steam coal market share from 25 percent in 1980 (3.5 million tons) to 55 percent in 1985 (29.4 million tons).

In steam coal trade, the United States trails South Africa for shipments to Western Europe and lags behind both Australia and South Africa in shipments to Asia.

Figure 7 provides a similar breakdown of exporters' shipments of metallurgical coal to various importing regions for 1980 and 1985. The United States has maintained its position as the largest metallurgical supplier to Western Europe with a market share of approximately 50 percent. Australia and Poland also provide substantial quantities of metallurgical coal to Western Europe.

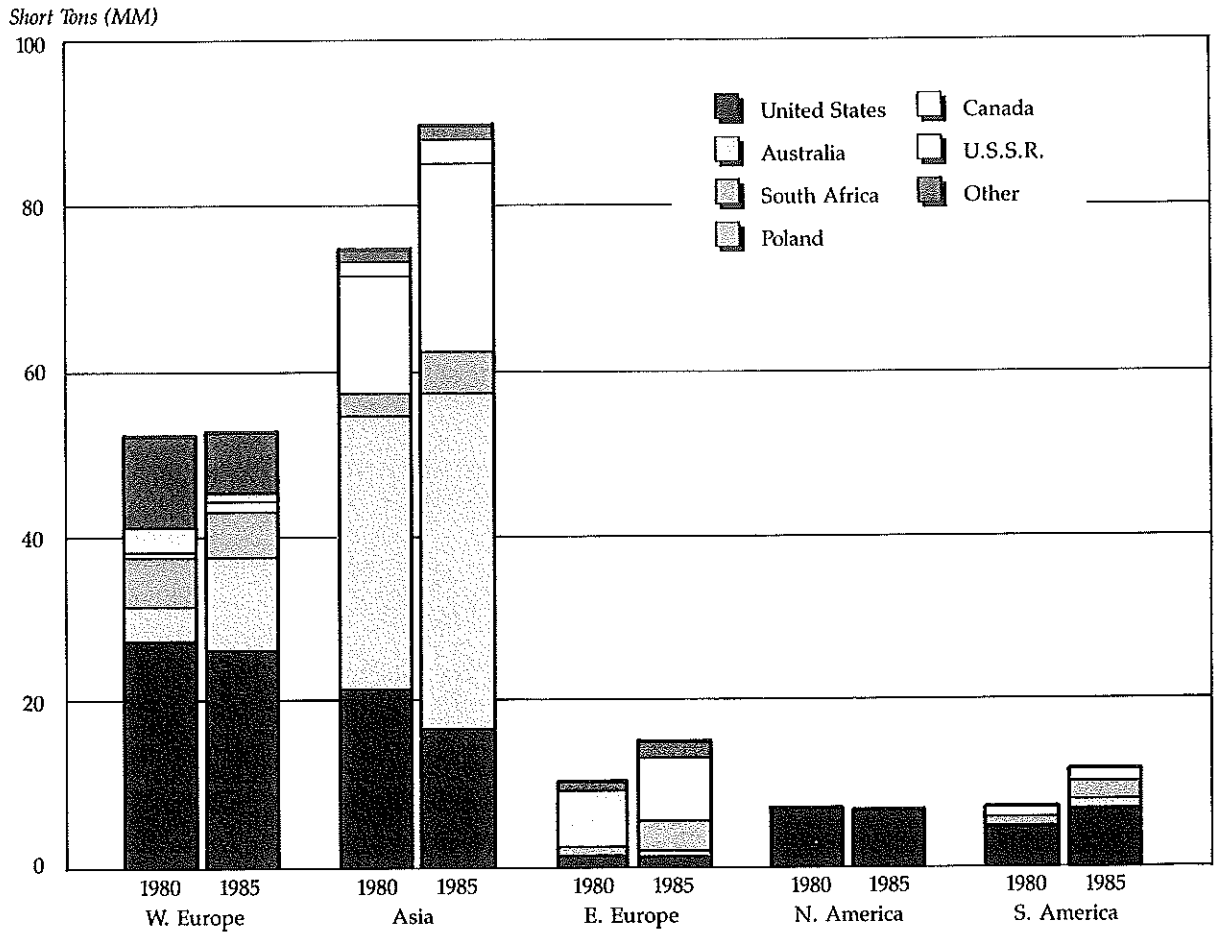
12. Energy Information Administration, *Annual Prospects for World Coal Trade 1985* (DOE/EIA-0363 [85], May 3, 1985), p. 30.

FIGURE 6 Suppliers of Steam Coal By Importing Regions 1980/1985



SOURCE: Energy Information Administration, *Annual Prospects for World Coal Trade 1987* (DOE/EIA-0363 [87]).

FIGURE 7 Suppliers of Metallurgical Coal By Importing Regions 1980/1985



SOURCE: Energy Information Administration, *Annual Prospects for World Coal Trade 1987* (DOE/EIA-0363 [87]).

Australia is the leading metallurgical exporter to Asia, although Canada has significantly increased its metallurgical exports to this region from 14 million tons in 1980 to 23 million tons in 1985. The United States, meanwhile, exported fewer tons in 1985 than in 1980, which reflects, in part, technological improvements in steel making which have enabled lower quality coals from Australia to displace higher quality and higher cost U.S. coals.

Steam and Metallurgical Price Trends

Figure 8 shows the trends since 1980 of steam coal import prices to European Economic Community (EEC) countries from various exporters, expressed in United States dollars. These prices represent the total delivered cost and therefore include transportation as well as coal costs. Note that in 1985 United States steam coal was most expensive, whereas South Africa, Western Europe's leading steam coal supplier, provided the least expensive steam coal. Figure 9 provides similar steam coal import price trends to Japan, the major importer in Asia. The United States was the highest cost supplier to Japan.

Some caution should be exercised when considering delivered C.I.F. (cost-insurance-freight) prices on a per ton basis. U.S. steam coals average around 12,500 BTU/lb. compared to Australian and South African coals which average approximately 11,800 and 11,000 BTU/lb., respectively. Therefore, on an equivalent energy delivered cost basis, U.S. coals should naturally command about a $2.50 per ton premium over Australian steam coal and $5.50 per ton over South African steam coal.

Figure 10 shows import price trends for metallurgical coal to EEC countries. Whereas South Africa generally has been the low cost supplier, it provides only minor quantities to Europe (approximately one

hundred thousand tons in 1985). As shown in Figure 11, South Africa also has the lowest delivered cost for metallurgical coal tc Japan. Also, note the wide margins between prices for metallurgical coal, e.g., between low cost, lower quality producers like Australia and high cost but higher quality, producers like the United States and Canada. A significant portion of U.S. metallurgical exports are for premium quality low volatile coals. South African metallurgical exports are weak coking coals. Section III compares in greater detail the cost components resulting in these delivered prices.

Since some 80 percent of internationally traded coal is priced in U.S. dollars, currency exchange rates between countries are of primary importance.[13] *Exchange rates between exporting countries, rather than rates between individual importers and exporters, contribute to greater or lesser price competitiveness for one exporting country vis-a-vis another.*

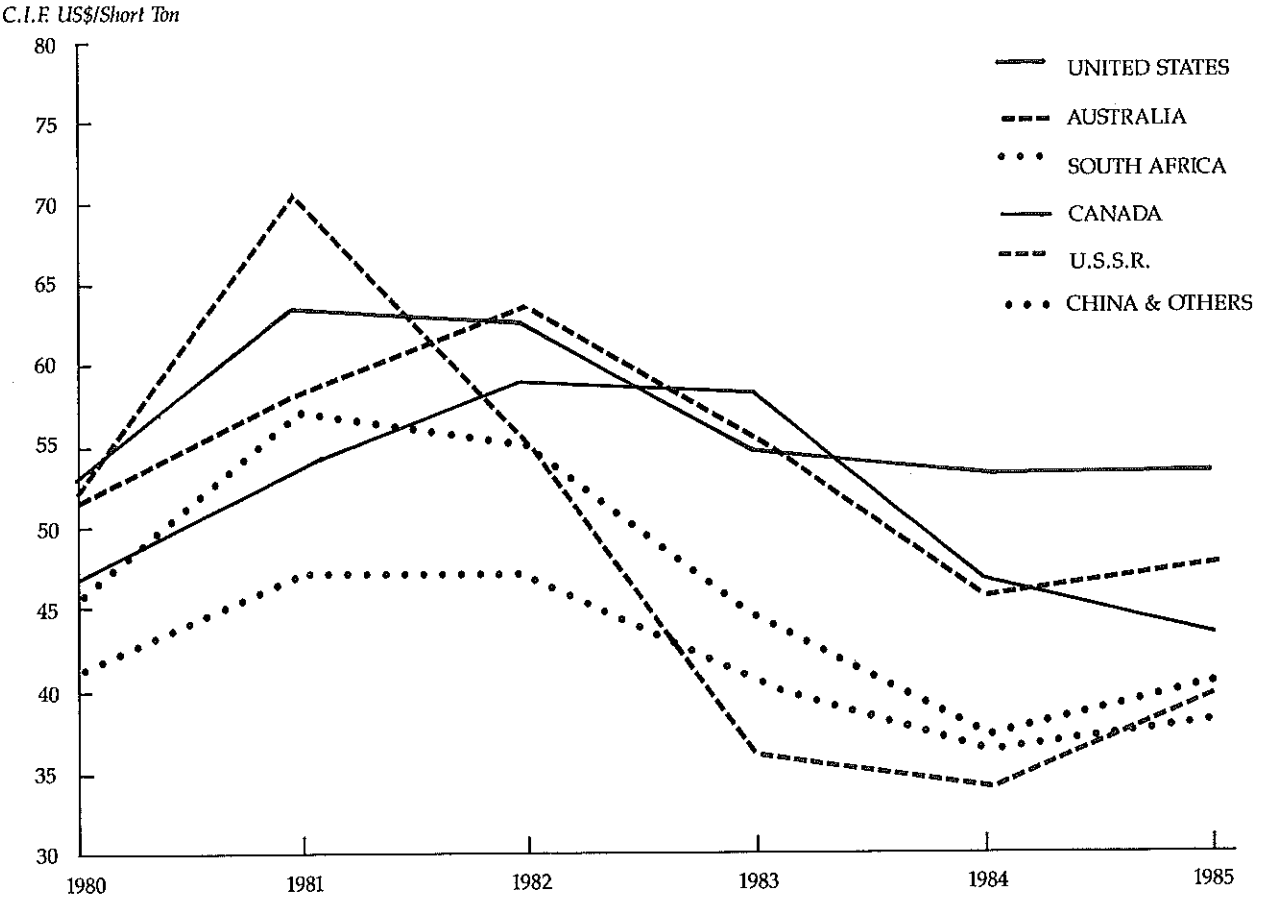
Impact of Currency Exchange Rate Fluctuations

Figure 12 charts currency exchange rates between the United States and Australia, Canada and South Africa. Although Poland is a major coal exporter, exchange rates are not shown. This is because it is generally believed Poland will continue coal exports regardless of prices since they are Poland's principal means to raise foreign currency, providing about 13 percent of Poland's total income in foreign currency.[14] As shown in Figure 12, Australian, Ca-

13. International Energy Agency, *Coal Information 1986* (OECD, Paris, 1986), p. 24.

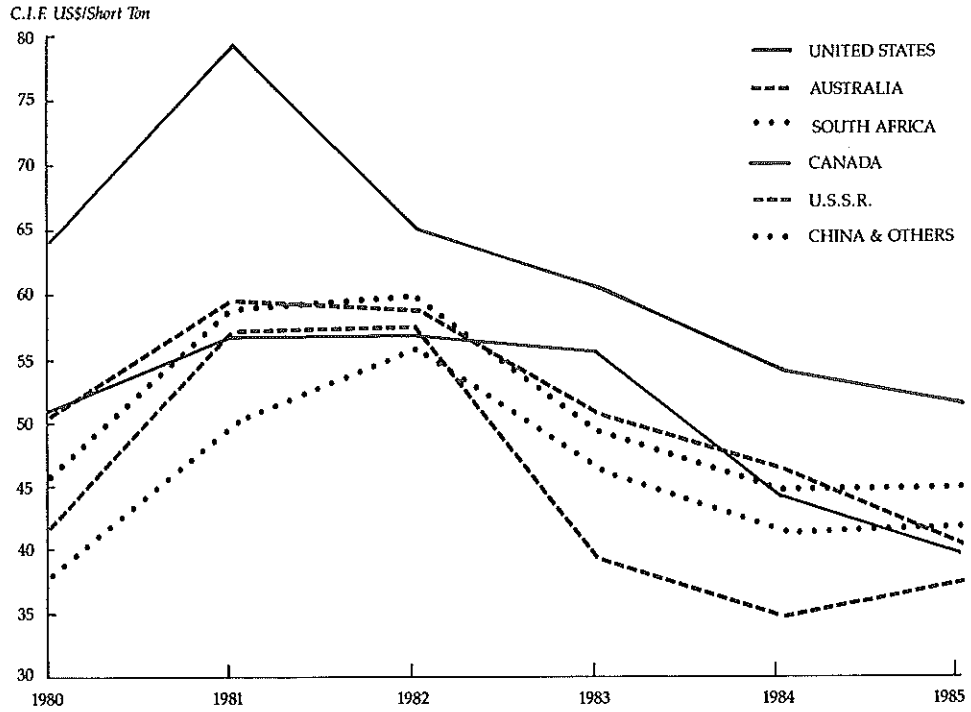
14. Energy Information Administration, *Coal Exporting Countries: The European Market* (DOE/EIA-0520, January 13, 1987), p. 13.

FIGURE 8 EEC—Steam Coal Import Prices



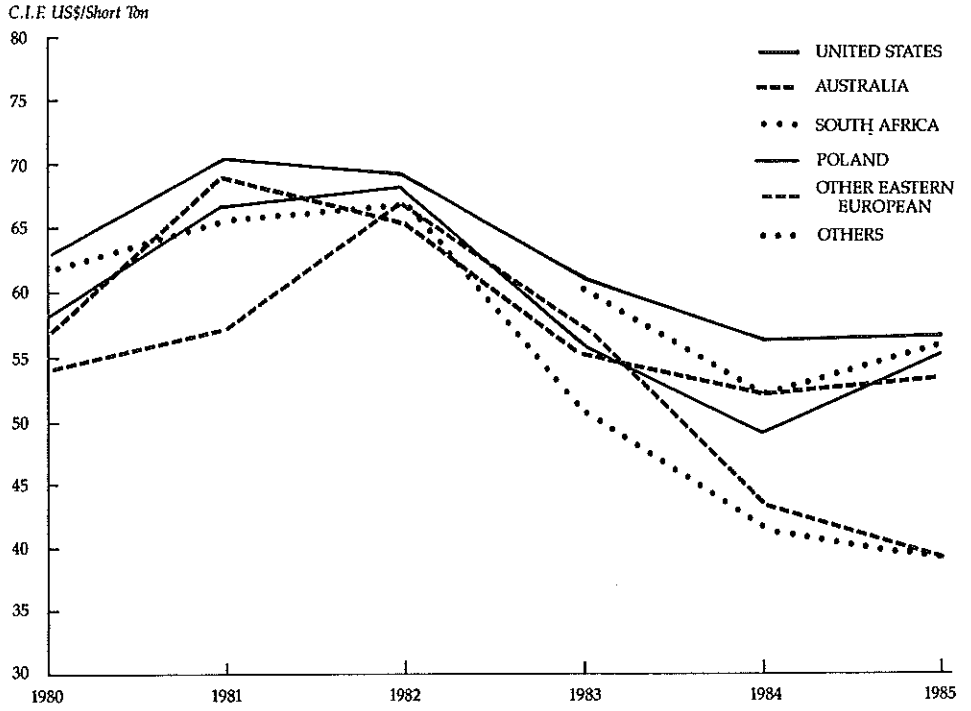
SOURCE: Adapted from International Energy Agency, *Coal Information 1986*, OECD.

FIGURE 9 Japan—Steam Coal Import Prices



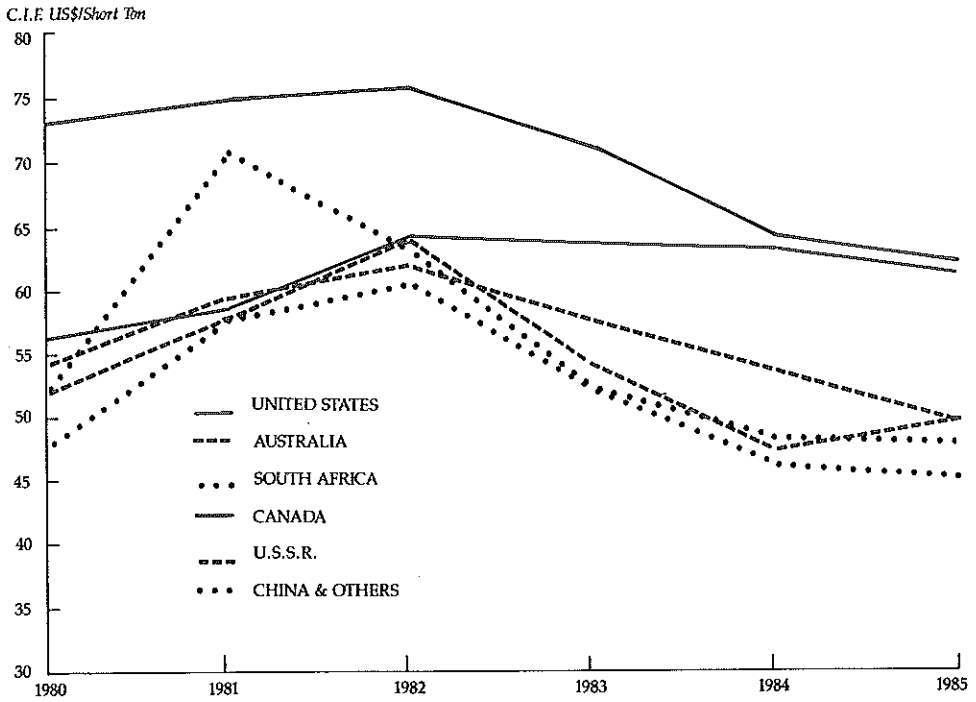
SOURCE: Adapted from International Energy Agency, *Coal Information 1986*, OECD.

FIGURE 10 EEC—Coking Coal Import Prices



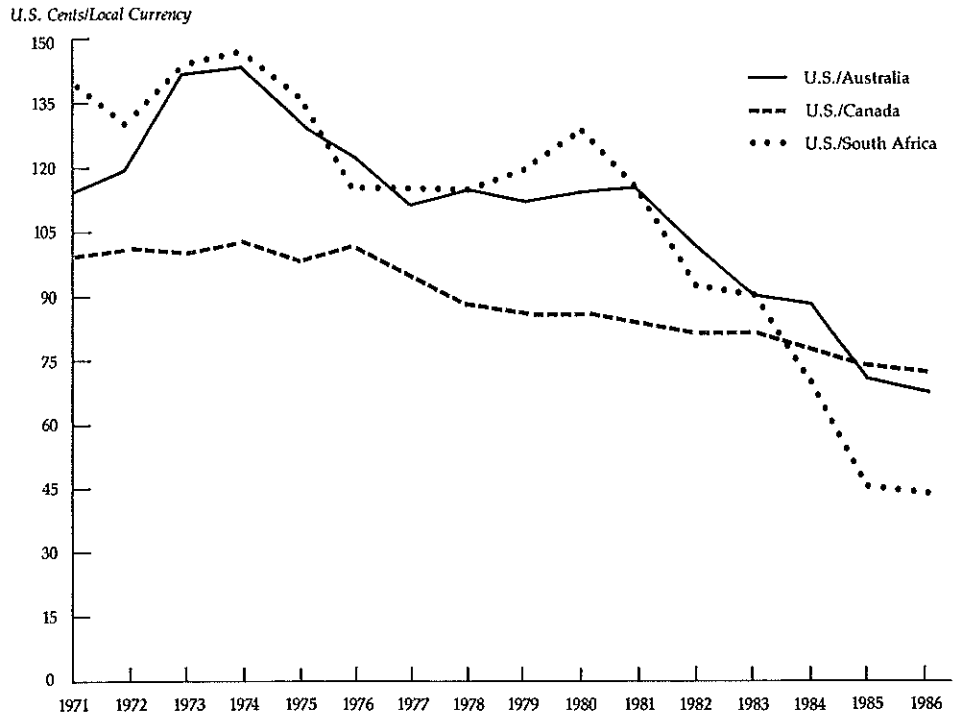
SOURCE: Adapted from International Energy Agency, *Coal Information 1986*, OECD.

FIGURE 11 Japan—Coking Coal Import Prices



SOURCE: Adapted from International Energy Agency, *Coal Information 1986*, OECD.

FIGURE 12 Exchange Rates 1971—1986



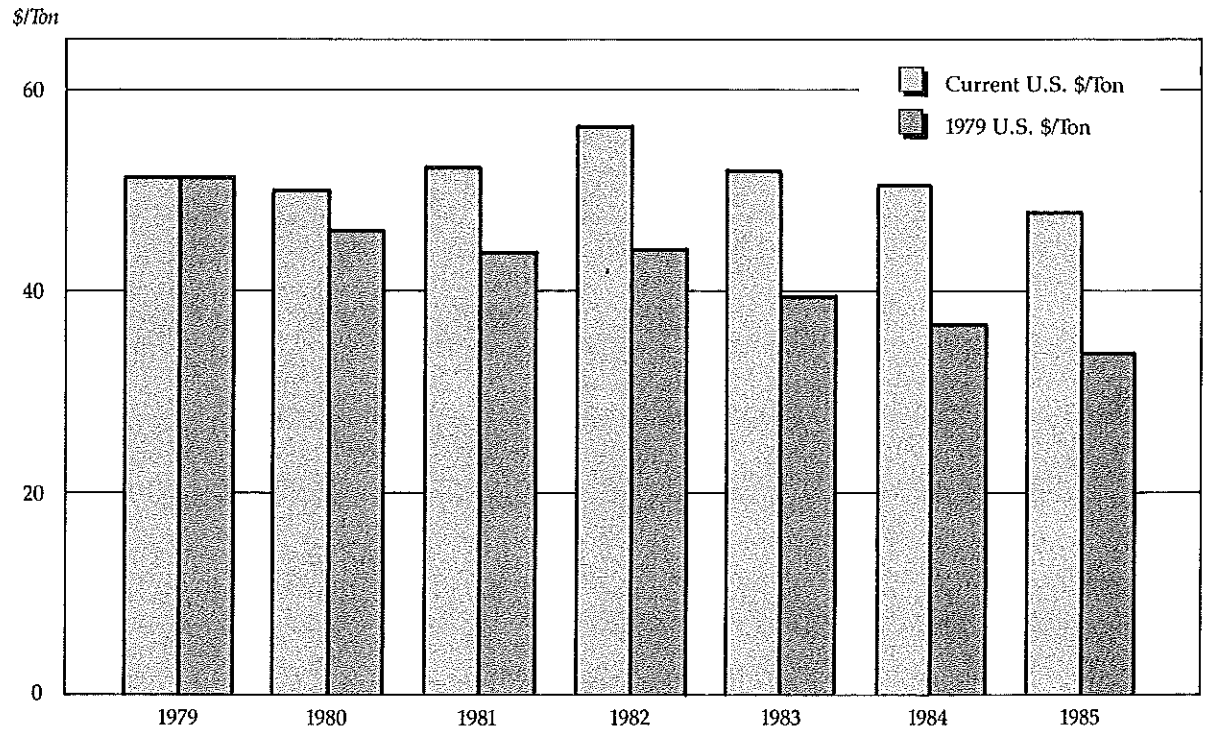
SOURCE: I.P. Sharp Associates (on-line data service).

nadian and South African currencies have all generally depreciated against the U.S. dollar. In the period 1973 through 1986, United States price competitiveness, from currency devaluation only, declined 69 percent against South Africa; 53 percent against Australia; and 28 percent against Canada, based on average exchange rates during each year. Contrary to this long-term trend, in the period of December 1986 though April 1987, the U.S. dollar has fallen against Australian, Canadian and South African currencies by 7.9, 4.6 and 10.3 percent, respectively.

In general, both steam and metallurgical import prices have trended downward on a C.I.F. delivered basis since 1981 when expressed in U.S. dollars. A somewhat different picture emerges when F.O.B. export prices are considered both in terms of United States dollars, nominal local currency and constant 1979 currency which takes into account inflation.

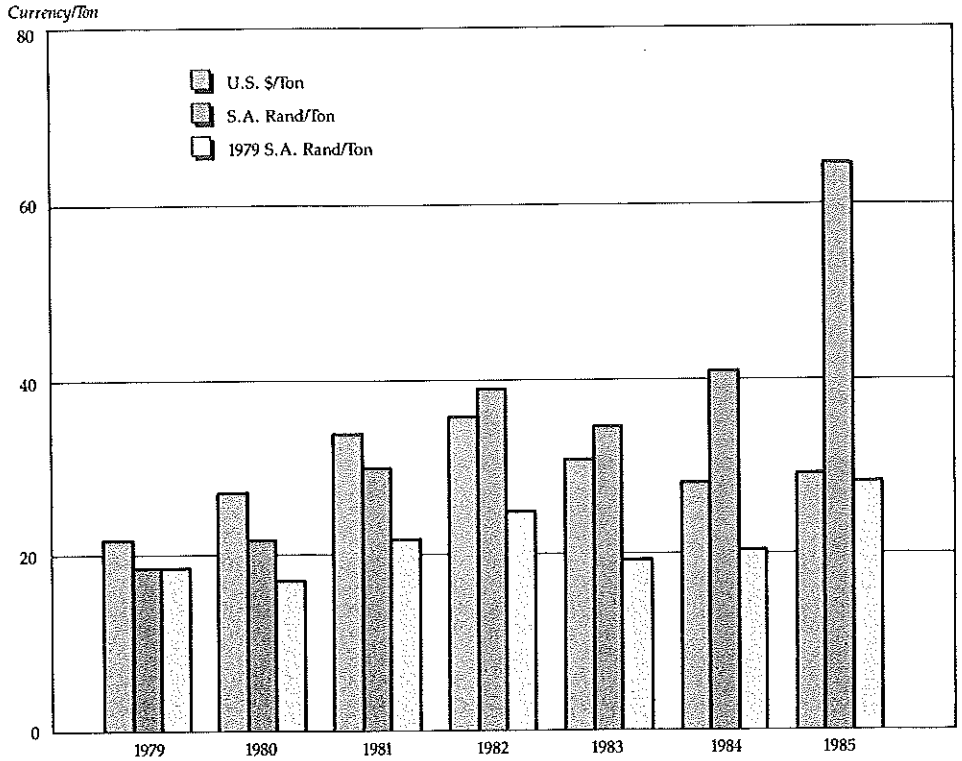
Figures 13 through 16 chart F.O.B. port coal prices from 1979 to 1985 for the United States, South Africa, Australia and Canada, respectively, in U.S. dollars, nominal local currency and constant 1979 local currency. These prices are averages over metallurgical and steam coal and, as such, are somewhat affected by the mix; however, the trends are illustrative. United States F.O.B. port prices have trended mostly downward since 1982 in nominal dollars. In current 1979 U.S. dollars, the price of an average ton of coal has declined by 34 percent between 1979 and 1985. Other exporting countries have also experienced a softening of their F.O.B. port prices in terms of U.S. dollars. But since the majority of international coal trade is done in U.S. dollars and the U.S. dollar has appreciated against other exporters' currency, these competing countries have benefited. These countries have cut their export prices in U.S. dollars, while generally maintaining or increasing their prices in terms of their local currency as a result of the appreciation of the U.S. dollar. Note the increase in South African F.O.B. port prices expressed in rands per ton. The average price has increased from 18.63 rands per ton in 1979 to 64.54 rands per ton in 1985. Even when adjusted for inflation, an average South African export ton increased in constant rand price by over 50 percent between 1979 and 1985.

FIGURE 13 United States F.O.B. Prices



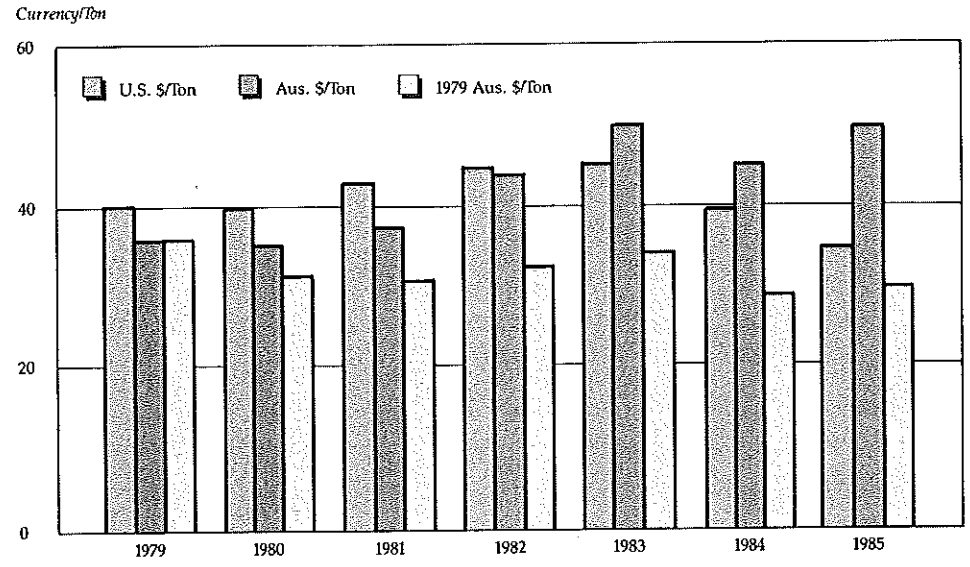
SOURCE: Adapted from the National Coal Association, *International Coal—1986 Edition*.

FIGURE 14 South African F.O.B. Prices



SOURCE: Adapted from the National Coal Association, *International Coal—1986 Edition.*

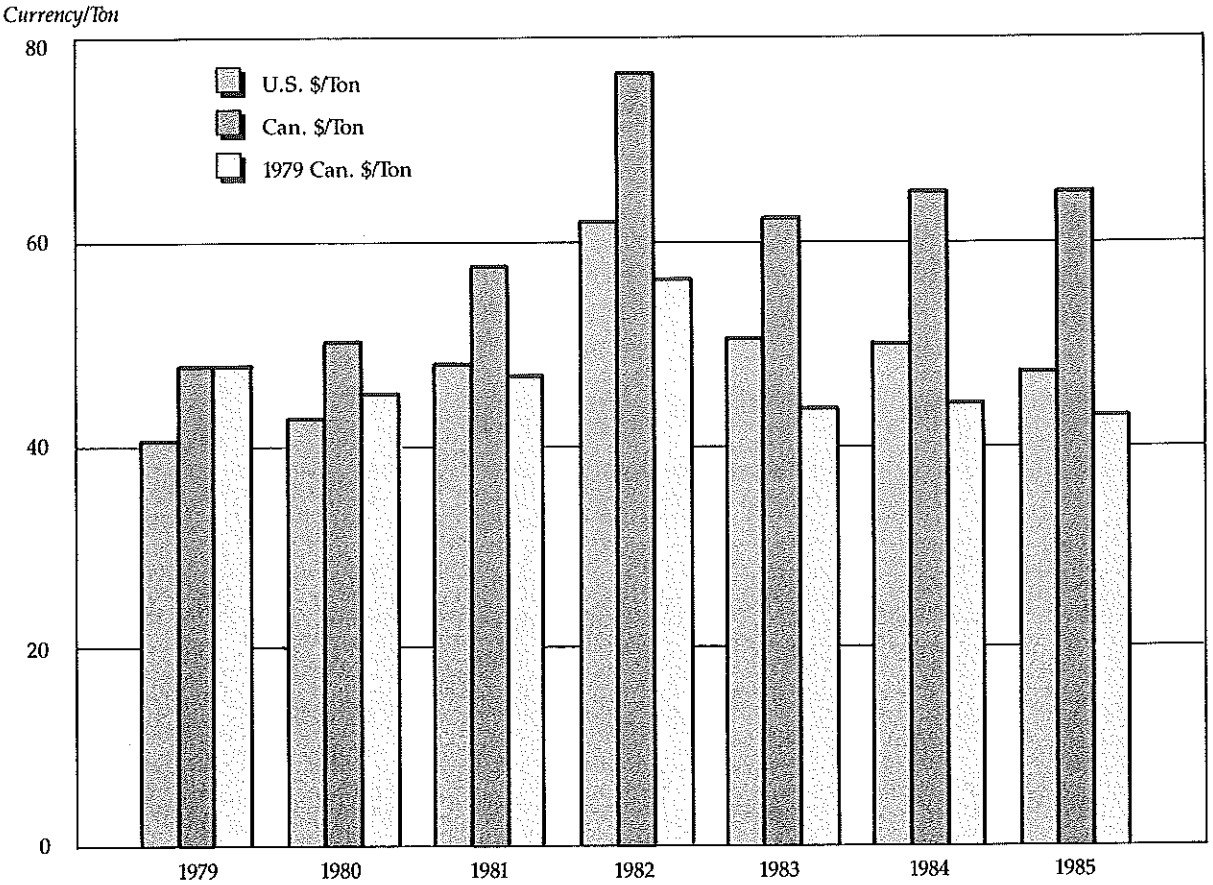
FIGURE 15 Australian F.O.B. Prices



Based on fiscal year July 1 through June 30

SOURCE: Adapted from the National Coal Association, *International Coal—1986 Edition.*

FIGURE 16 Canadian F.O.B. Prices



SOURCE: Adapted from the National Coal Association, *International Coal—1986 Edition.*

Outlook for International Trade

International coal trade is expected to grow, primarily as the result of increasing import demand for steam coal. The Energy Information Administration (EIA) projects that world coal trade will increase from 364 million tons in 1985 to 541 million tons in the year 2000 in its mid-demand case.[15] This reflects a growth rate of almost 2.7 percent per year or 48 percent over 1985 levels.

These EIA projections are based upon 2.8 percent per year real growth in gross domestic products of market economies and 1.7 percent annual growth in primary energy consumption. Developing countries are expected to have higher growth rates in primary energy consumption, averaging 3.0 percent per year compared with industrialized countries at 1.3 percent per year.

Others forecast that primary energy requirements in developing countries might grow even faster. During the last decade, primary energy requirements in OECD countries have grown at a rate of 0.8 percent annually, while in developing countries, the historical rate is 5.3 percent annually. Coal is well suited to meet anticipated energy needs in developing countries. Table 2 provides a projection of capacity additions for coal-fired power plants in developing countries. Coal-fired capacity by 1995 is expected to be almost 150 percent greater than in 1985 for the regions listed in Table 2.

Steam coal trade is projected by the EIA to expand significantly from 188 million tons in 1985 to 357 million tons in the year 2000 or 4.4 percent per year. Figure 17 shows the breakdown of steam coal imports by region. All regions (except South America, which does not import significant quantities of

15. Energy Information Administration, *Annual Prospects for World Coal Trade 1987* (DOE/EIA-0363 [87], May 1987).

TABLE 2
Projection of Coal-Fired Capacity Additions

(Megawatts)

	Existing Capacity	Projected New Capacity			
	1985	1986-1990	1991-1995	1996-2000	Total
Asia (excluding China)	14,154	17,981	6,848	2,420	27,249
China	4,520*	4,400	1,800	—	6,200
Central and South America	385	4,202	3,720	1,340	9,262
Africa, Middle East (including Turkey)	22,843	14,964	7,508	550	23,022
TOTAL	41,902	41,547	19,876	4,310	65,733

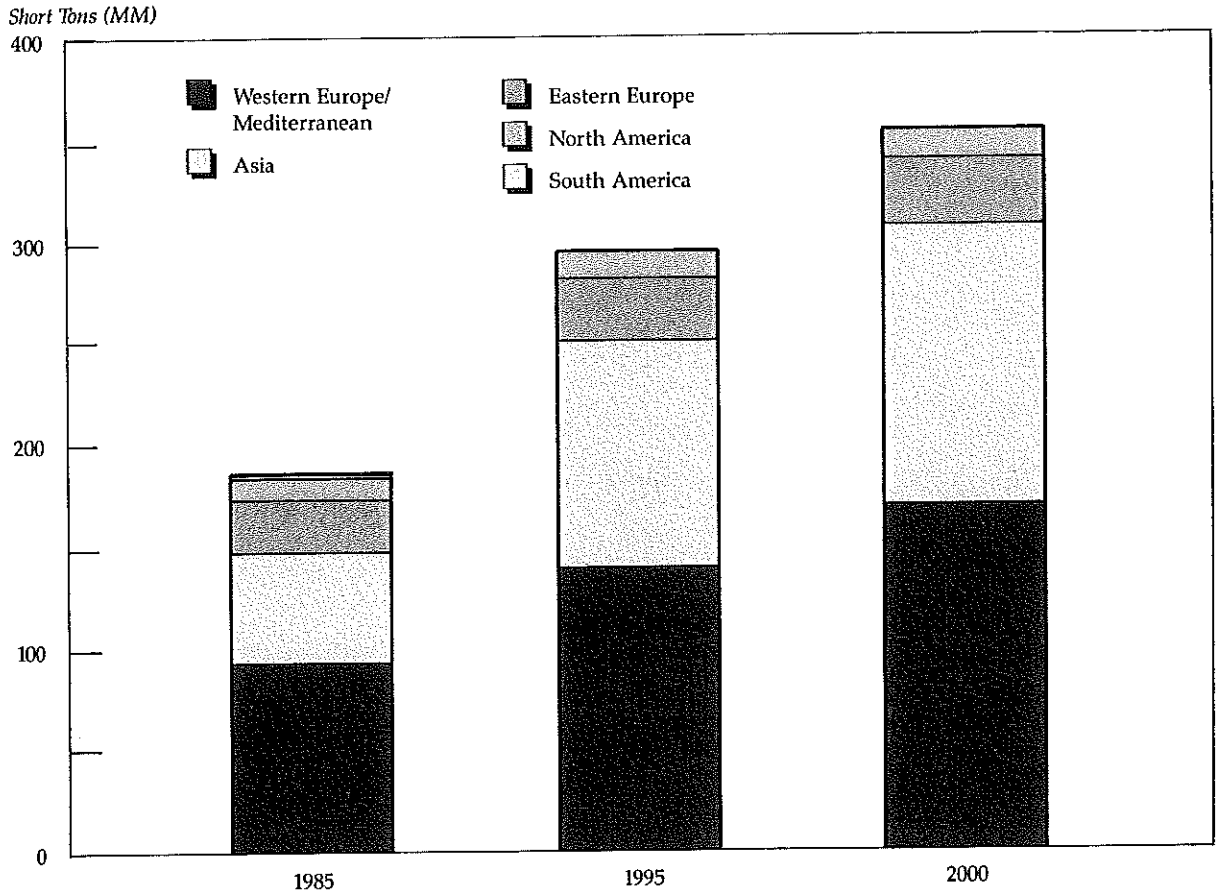
*Indicates 1984 data, not 1985.

SOURCES: IEA Coal Research
Kidder, Peabody & Co.
Electric Power Industry in China 1984-1985

steam coal) are projected to increase their coal imports. While steam coal consumption is expected to increase in South American countries, indigenous production will supply their requirements.

Western Europe and Asia will account for the majority of the growth in steam coal imports. Western European imports (including the Mediterranean) are projected to increase from 94 million tons

FIGURE 17 Projected Steam Coal Import Demand: Mid-Demand Case



SOURCE: Energy Information Administration, *Annual Prospects for World Coal Trade 1987*, (DOE/EIA-0363 [87]).

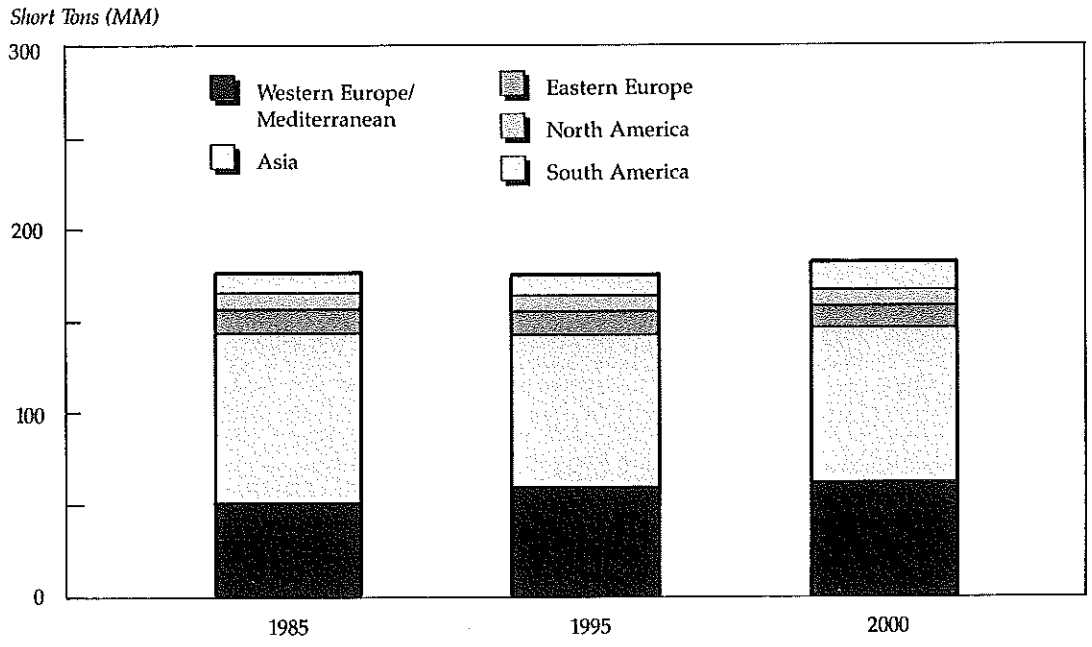
to 170 million tons. Major increases in steam coal imports are forecasted for such countries as Italy, Denmark, Finland and Sweden. Italy has no bituminous coal production (and only a minor amount of lignite production) and therefore must look to imports to satisfy its requirement.

Asian steam coal import requirements are forecast to grow from 54 million tons in 1985 to 139 million tons in the year 2000 or by over 150 percent. Hong Kong, South Korea and Taiwan account for a major portion of the expected growth, while Japan is also forecast to more than double its 1985 imports of 26 million tons by the year 2000. The growth of coal imports in developing countries is attributable to high energy growth rates, particularly for electricity.

Figure 18 shows the projected EIA metallurgical coal import demand. Metallurgical imports are expected to rise only eight million tons from 176 million tons in 1985 to 184 million tons in the year 2000. The growth in metallurgical coal imports in countries such as South Korea, Taiwan, Egypt, Israel, Brazil and Yugoslavia is being offset by lower import requirements in Japan, the United Kingdom and Canada. This reflects the stagnation of the older steel industries in these industrial countries as they face increasing competition from more modern and efficient steel industries in developing countries. Overall, metallurgical import demand is rather stable over the forecast period.

U.S. exports are expected to increase with the growth in international coal trade. However, the United States will face even more competition as Colombian exports expand. In addition, other countries, such as China, Indonesia and Venezuela, have low cost reserves that could capture a significant share of international steam coal trade in the future.

FIGURE 18 Projected Metallurgical Coal Import Demand: Mid-Demand Case



SOURCE: Energy Information Administration, *Annual Prospects for World Coal Trade 1987*, (DOE/EIA-0363 [87]).

Section II

The Structure of International Coal Trade

Introduction

The preceding section traces quantitatively the trends in world coal trade since the 1970s. It identifies the major exporting and importing countries, cites the almost doubling of trade that occurred in the twelve years between 1973 and 1985, and notes the rise in steam coal from approximately 35 percent of total world coal trade in 1973 to over 50 percent in 1985.

This section explains qualitatively the commercial trading practices and structures that emerged from these trade patterns with a particular emphasis on what these mean for the U.S. coal industry. The year 1979 is taken as a pivotal year for the purposes of this analysis—it marks the U.S. entry as a major supplier of steam coal to the world market and augurs the beginning of an important evolution in international coal trade patterns.

Understanding the origins of the commercial practices and structures that grew up around the coal trade in the 1960s and 1970s is helpful in deciphering the market structure that prevails today and in discerning the changes that lie ahead. This discussion begins with the factors that shaped world coal trade in the postwar period up to 1979.

THE STRUCTURE OF WORLD COAL TRADE: POSTWAR TO 1979

Coking Coal Dominates in Restricted Markets

In the postwar period, Japan and the Western European countries of Belgium, France, West Germany, Italy, the Netherlands, Spain and the United Kingdom, all possessed or re-built steel-making capacity that required coking coal to produce pig iron. All, except Italy, had long histories of producing coal indigenously, but their reserves were being depleted, and those that remained were often high cost and of limited quality ranges as compared to coking coals available in the world market.

These countries permitted metallurgical coals to be imported, but only under controls and quotas carefully constructed to protect indigenous producers. The significant role the coal mining industries had played in the basic economies and national security of their countries—most were, in fact, state-owned—afforded them considerable political power and influence. Protectionist policies restricting imports and providing subsidies for indigenous coal were adopted and exist to this day in some form in most of the aforementioned importing countries.

Central Buying

The buyers were largely state-owned steel mills. Buying was centralized in the hands of one state-owned entity or importing agency and transactions were generally made between the ultimate consumer and the coal producer-exporter. Exceptions to this prevailing pattern existed in countries such as West Germany where several autonomous steel producers purchased coal independently through trading company affiliates. Intermediary traders also played a facilitating role in coastal ports (such as Amsterdam, Rotterdam, and Antwerp) and provided stevedoring and barge and rail trans-shipping services for their customers.

The small number of well-known customers with their governments' backing contributed to the producer-exporters' willingness to sell on open account. Some 80 percent of U.S. sales to European and Japanese steel mills were conducted on this basis. Most sales were also F.O.B.-U.S. port basis, thus sheltering the U.S. producer from exposure to risks associated with ocean freight shipping, un-

loading and trans-shipping for ultimate delivery to the customer. This practice was made possible by the establishment by foreign steel producers, their agents, or their trading company affiliates of United States-based offices in New York or near the U.S. East Coast loading ports.

U.S. producers were the principal suppliers to Western Europe and Japan. Australia became Japan's other major supplier and South Africa assumed that role in Western Europe. Special circumstances in Japan led to reliance on somewhat different procurement strategies there. Japan's more limited indigenous coal resources and the ambitious expansion of its steel sector made it comparatively more dependent on imported sources of coking coal than most of its European counterparts. To gain greater security of supply, Japanese steel mills, first in Australia and more recently in Canada, engaged in the coordinated development of production and user facilities and entered into joint venture arrangements with local Australian producers. This approach also helped to overcome the shortage of local Australian (and later, Canadian) capital for investments in mining projects needed to fill the Japanese steel mills' requirements.

Coking Coal Trade Shapes Commercial Practices and Physical Infrastructure

While metallurgical coal was being traded internationally, world steam coal trade was insignificant in the first three postwar decades. Some regional coastal trade was carried on in Western Europe and the United Kingdom where house coal was still used for home heating. But what little amount of steam coal that did move across national borders traveled short distances—from the United States to Canada, from Poland to the U.S.S.R. and Western Europe and from the United Kingdom to the Continent. Even in 1979, the first year of the surge in world steam coal trade, only 25 million tons of steam coal traded was seaborne, and 70 percent of that moved from South Africa to Europe.

Metallurgical coal's postwar dominance of export trade set the standard for the industry's requirements insofar as U.S. port capacities and port handling facilities were concerned. U.S. port terminals and shiploading facilities were suited for metallurgical coal blending and loading purposes. Because metallurgical coal was stored in rail cars and blended for loading car by car, the metallurgical coal trade literally shaped the physical facilities and infrastructure supporting it. Moreover, the low growth prospect for metallurgical coal trade did little to encourage capital investment in the upgrading of the infrastructure that did exist. Due to the more homogeneous nature of steam coal and the fact that its lower price could not support storage in rail cars, U.S. ports, terminals and shiploading facilities were not suited to handle the large volumes of steam coal that entered the trade in the early eighties.

The needs of metallurgical coal trade had, in short, shaped the physical facilities and infrastructure supporting that trade and the commercial and marketing practices that evolved in connection with it. Then came the trebling of oil prices in 1979, the Solidarity strike in Poland and a spate of rail and dock strikes in Australia, all of which contributed to a sharp increase in demand for steam coal from the United States in 1979, 1980 and 1981.

Before considering the changes that occurred in the structure of international coal trade as a result of the events surrounding 1979, some attention should be given to the structure and character of the U.S. coal industry, specifically to the export sector of the industry, at that turning point. This should provide some perspective on the industry's capacity to respond to the rapid changes it was facing in the international market.

The industry as a whole was unconcentrated, composed of several thousand small producers, and fragmented and regional in orientation (with Appalachian, Illinois Basin and Powder River Basin coals competing more among themselves than across regional boundaries). To the extent the industry acted in a concerted fashion, this was most likely to occur in response to the threat of government regulation that would increase production costs or have a negative impact on coal's competitive position in relation to other fuel sources. Export issues generally did not stir broad industry attention and commitment of resources.

Because export tonnages amounted to an average of less than 11 percent of total production, the number of firms which participated in the export trade was necessarily small. With the exception of a very limited number of producer/exporters, most exports were handled by trading companies or brokers who purchased the coal F.O.B. from the producer and managed the transaction/logistics directly for and to the customers.

EVOLUTION OF WORLD COAL TRADE: 1979—PRESENT

With the upsurge in demand for steam coal in Western Europe and the Pacific region, important changes occurred in the major players involved in world coal trade and in the structural and commercial aspects of that trade. First, the new end-users were principally powerplants and some general industry, as opposed to steel mills. Second, the producers of steam coal on a scale sufficient to mine shipload quantities (60,000-80,000 tons) within a reasonable period, while serving the domestic market as well, were not necessarily the same as the producers that supplied the export metallurgical coal of the 1960s and early 1970s. Third, the range of countries importing steam coal was broader than that of the traditional metallurgical coal importing countries. Thus, the trade was confronted with *new* buyers in traditional importing countries, *new* buyers in newly-importing countries and *new* sellers from traditional and eventually some *new* exporting countries (such as Colombia and the People's Republic of China). What were the consequences of these changes and what do they mean for U.S. exporters seeking an attractive share of the dynamic world steam coal market?

New Buyers from Old Importing Countries

Taking first the new buyers—powerplants and general industry—it is helpful to divide these into buyers experienced in coal utilization (generally the case in Western Europe and to some extent Japan) and those who were comparatively new to coal-fired electricity generation. The Western European consumers generally had experience purchasing coal from local producers, and occasionally in small vessels from the United Kingdom and Poland, but they were new to the procurement of Panamax vessel quantities (50,000-60,000 metric tons) from suppliers as distant as the United States, South Africa, Canada and Australia. Security of supply was, if anything, more important to the powerplants than it was to the steel producers. National statutes required them to supply sufficient and uninterrupted electric power to their customers. They typically wanted to visit their prospective suppliers' mines and be assured of the producer-exporter's ability to deliver. They were seasoned buyers who understood the value of long-term supply relationships, but who knew little about the far-flung foreign producers of steam coal for the export market.

Energy use being more closely supervised in most other countries of the world than it is in the United States, these electric utilities often took their broad orders on fuel mix in their power system from electricity supply boards and national energy planning commissions. Governmental importing agencies, or semi-autonomous extensions of the national governments, were often the primary negotiators for imports. In this respect, the centralized buying by powerplants that prevailed in most importing countries (West Germany being a clear exception) was similar to that of the steel mills.

They were not, however, as familiar with seaborne shipping and were less inclined than the steel mills to accept sales on an F.O.B. loading port basis. This created opportunities for the intermediary trading companies to close the gap between the U.S. producer selling F.O.B. loading port and the end-user buying C.I.F. unloading port or F.O.B. plant. With the mix of new producer-exporters and new buyers, credit issues had to be faced by both parties. The open account selling that prevailed between established metallurgical coal buyers and sellers tended to be replaced by the use of letters of credit. The transaction's value was usually stated in U.S. dollars, for sales from Australia, South Africa and Canada as well as from the United States.

The commercial practices that mushroomed around steam coal trade in the first few years after 1979 were greatly influenced by the tight supply situation of those years, the newness of the players and the lack of history to provide reassurance. Here was an untested system with severe demands being placed on it for the first time.

Extreme congestion at U.S. ports introduced demurrage risks and the strengthening dollar added to suppliers' uncertainty as to what their delivered fuel costs would actually be in their own currencies. This combination of factors created a very volatile and seemingly risk-laden market. Utility coal buyers in such countries as Denmark, Italy, West Germany and Israel tried to compensate for their uncertainty by "locking in" imported coal supplies with multi-year contracts of three-to-five years duration.

On the suppliers' side, the prospect of large-volume steam export sales and rapid market growth attracted larger producer-exporters. These, often owned by parent companies with multi-national energy and mining activities that were experienced in international bulk commodity trading, embarked on "forward integration" of their mining operations by investing in coal transfer facilities at loading, and even at some unloading, ports. Their new terminals offered ground storage, high-volume shiploaders and automated blending and sampling. Much of

this terminal capacity was installed without the benefit of long-term throughput commitments in the belief that such aggressive action was essential in the race to capture market share.

Meanwhile, representatives of foreign state-owned electric utilities and steel mills were trying to make a case for the U.S. government and industry to upgrade and expand port capacity and handling facilities at East and Gulf Coast ocean ports. This maelstrom of activity, involving foreign end-users and their governments, the Departments of State, Commerce and Energy and U.S. Congressional officials, immersed coal firms in international perspectives to a degree that few had experienced previously.

New Importing Countries, New Financing Arrangements

Add to this constellation of players an entirely new cast of buyers that began entering the scene in both the metallurgical and steam coal markets. In metallurgical coal, while Western European steel-makers were shrinking their output and Japanese mills were facing stiffer competition from South Korea and Third World producers, new steel-producing capacity in Turkey, Egypt, Brazil and Korea was creating increased demand for metallurgical coal imports in those countries. The question of creditworthiness arising from the trade and external debt positions of these countries was a pressing concern for sellers dealing with some of these consumers. Concurrently, a new crop of steam coal buyers was also surfacing in such countries as Greece, Morocco, Hong Kong, Taiwan and Costa Rica. And, if projections of future world steam coal demand are accurate, this trend of new markets developing outside of Western Europe and Japan may be expected to continue.

Increasingly, therefore, an ability to participate in these new markets, perceived as posing higher credit risks, depended either on a seller's willingness to assume those risks or find a reliable and creditworthy trading company intermediary prepared to do so. In some cases, such as Brazil, doubts about receiving timely payment in U.S. dollars were so high that many U.S. producers would not consider entering into a sales agreement without assurances of Eximbank financing. But Eximbank financing traditionally had been reserved for timely payment of large capital goods items, not for an expendable commodity such as coal. Obtaining the necessary authorization to allocate Eximbank resources for this purpose was an awkward, frustrating and attenuated process.

During this same period, the early 1980s, world economic conditions were giving rise to a growing use of barter and countertrade as a means for countries that possessed limited foreign hard currency reserves to obtain goods and services they needed to import. The socialist bloc countries had long used this vehicle in trading with the West, but the deterioration in the terms of trade for Third World commodities compelled many Southern hemisphere countries to resort to such practices as well. This meant that for a coal seller even to be eligible to compete with other sellers for a powerplant's business, he would have to agree to take specified goods or services produced by the coal-buying country in exchange as payment. Such requirements created opportunities once again for international trading companies and financial institutions experienced in such deals to act as intermediaries. Few U.S. producer-exporters were sufficiently experienced to accept such risks themselves. Yet, dependence on barter and countertrade was unquestionably on the rise. Some knowledgeable observers who were tracking this phenomenon in the period of 1983-85 estimated that as much as 25-30 percent of all world trade involved such arrangements. The scaling back in countertrade departments that has occurred at banks since 1985, however, would suggest that the amount of business actually consummated on this basis fell short of expectations.

Regardless of whether or not barter and countertrade figured in as much as 25 percent of world trade, coal was not the best prospect for countertrade deals, and this was particularly true for U.S.-produced coal in the years from 1983 to the present. Due to the competitiveness of the international coal market in these years, the profit margin has been very small for steam coal originating from the United States, the world market's "swing" supplier. By 1983, Poland and Australia were back in the market and South Africa had expanded its export capacity. The entry of Colombia as a new supplier added to the competition.

With the negligible to non-existent profit margins that characterize the current market, exporters are hardly in a position to absorb the additional costs that often accompany countertrade deals—the costs of intermediary services and the time value of money—if payment is delayed until after disposition of the bartered goods. With the downside risks perceived to be so great and the profit margin often in the one percent range, at best, on spot sales that offer no guarantees of future long-term business,

the incentive to experiment with countertrade financing not surprisingly, was and is weak. Yet, the willingness to explore such arrangements with potential customers that ask for them is often an important step in developing a relationship that becomes the basis for future sales.

Government Roles in Export Promotion and Market Development

Today's new customers demand of coal suppliers far more sophisticated international financial engineering than did Western Europe's steel mills in the postwar years. Among producers, transporters and consumers, the rising scale of facilities in the form of new mine developments, port handling facilities, larger vessels and power generating capacity has increased the level of risk by raising the level of capital requirements from the front to the back end of the coal chain. Longer lead times, plus the scale and nature of supply sourcing have given added weight to forward planning and financing of procurement.

When Japan faced similar challenges in the postwar world, it had a broader capital and more advanced industrial base to draw upon than do most Third World countries in need of such developments today. The Japanese tapped their Eximbank to finance development of the foreign coal mines destined to supply Japanese steel mills and powerplants. Their Eximbank has the role of financing not just Japanese exports, but developments in other countries which ensure imports into Japan and whose development also provides opportunities for exporting Japanese capital equipment. In the United States, Eximbank financing has long been used to facilitate the sale of capital goods overseas. But the marketing packages being conceived today go far beyond financing of straight-forward equipment sales to foreign buyers.

Recently, the coal industry has seen complex hybrid public/private international consortia not only offering these incentives to sell power generation technology but also tying equity participation in the powerplant by a coal-producing state to a long-term supply agreement with the powerplant customer.

The example referred to here involves an Australian-based consortium with a Japanese general contractor and Westinghouse of the United States, as the operator of a proposed coal-fired powerplant in Turkey.[16] Under the proposed deal, the Australian state of Queensland would take a $70 million equity stake in the Turkish thermal power station in return for long-term guarantees for the use of Queensland coal. Besides the new coal mines that would be dedicated to the $1.5 billion powerplant, the project involves the construction of a deep-sea coal port at Iskenderun.

The Australian government has recently formed a new Trade Commission known as Austrade. The purpose is to actively promote Australian exports. It brings under one management export services that were previously spread throughout the government. The organizations and groups affected include the Department of Trade, the Export Finance and Insurance Corporation, the Export Development Grants Board, the Australian Overseas Projects Corporation and the Trade Commission Service. The Australian coal mining industry will benefit particularly in the area of insurance for exports to higher risk markets.

The Australians are also in the process of putting together a multi-faceted project in Egypt. This project includes a power station and coal receiving project on the Gulf of Suez, which involves Siemens of West Germany, General Electric of the U.S. and several other international groups. It is expected that part of this project will be funded by the World Bank.

These two examples of government activities in export promotion (albeit both in Australia) are cited here principally to illustrate the scope and complexity of U.S. government and industry cooperation that may be required to compete effectively in today's global markets. State and federal governments in the United States have not been inactive in the area of coal export promotion, although these activities generally fall short of the initiatives undertaken by some of the major competitors.

As to U.S. government activities, the Departments of Commerce and State and the Office of the U.S. Trade Representative have participated in bilateral discussions with Japan, South Korea and Italy. The Department of Energy has pursued many cooperative agreements with foreign governments in the areas of coal technology and basic energy research and development. In addition, the Foreign Commercial Service with offices located in various embassies around the world can provide information on markets and potential exporting opportunities. Some states, notably Illinois and Kentucky, have made their presence known in coal consuming nations not only in areas of coal and coal technology, but overall trade as well.

16. *Coal Week International*, Vol. 8, No. 4, January 28, 1987, p. 1.

IMPLICATIONS FOR U.S. COAL OF TRENDS IN INTERNATIONAL COAL TRADE

Key Factors Beyond Industry Control

Certain conditions in the international marketplace are to a large degree beyond the control of U.S. producers by themselves. Section I notes, for example, that the relative values of the U.S. dollar and of currencies in other major producing countries (Australia, Canada and South Africa) have shifted to adversely affect U.S.-produced coal competing in the export market with coal from those three countries. Although U.S. producers have no control over these currency relationships, they can apply their expertise in the business to educate the government on the cost in coal trade and jobs that devolves from policies over which the U.S. government does exercise some control.

Similarly, U.S. coal producers can work with the U.S. government in reaching a better understanding of the prevailing commercial practices and export policies of competing exporting countries and then jointly consider if U.S. policy actions are warranted. They can also use their knowledge of Western European markets to estimate the extent to which non-competitive indigenous production could be replaced by increased U.S. export sales.

Over the past decade, the European Coal and Steel Community has designed and implemented an integrated European policy to restructure the iron and steel industry to fit the requirements of changing European and world markets. With Spain and Portugal now members of the European Economic Community, most major potential coal producers and importers in Europe are part of this European body. An integrated European policy of rationalizing local coal production with imports and infrastructure, taking into account the availability of lower cost imported coal, would be an efficient move to make, and one in which the U.S. President's special trade representatives might play some role in shaping, when considered in the overall context of trade negotiations.

The Need for Information

An efficient market is one which disseminates adequate information to all its participants and allows transactions to be concluded at an acceptable cost. With the scale of investments larger and the lead times so much longer, accurate information on critical determinants of future coal demand in overseas markets, such as economic growth rates, energy/GNP ratios and electricity demand, are critical if the industry is to act aggressively and intelligently in global markets. This will require a more effective partnership between industry and the government to combine their economic and market intelligence resources.

High Risk, Low Margin Business

The facts are that with markets shifting more to Third World and less creditworthy countries and with competitive forces squeezing profit margins to break even, even on an incremental or cash cost basis, the export business for most U.S. coal producers under present conditions is a high risk, low margin business. Unless (1) ways can be found to cover that risk, (2) market share can be obtained as a condition of concessions or broader trade packages negotiated by the U.S. government and/or (3) the delivered cost of U.S. coals can be made more competitive through further productivity gains in coal mining, handling and utilization, the U.S. producer's participation in the export market over the next ten years will be adversely affected. Later sections of this study look at opportunities for improving the competitiveness of U.S. coal in the areas mentioned above.

Section III

Comparative Delivered Costs and Production Costs in Major Exporting Countries

Introduction

The United States competes in international coal trade with other major exporters on the basis of such criteria as quality, reliability, diversification of supply, political issues and delivered costs. All are important, and the United States is generally at a disadvantage with respect to delivered costs. Table 3 provides a comparison of representative delivered costs of steam coal to Western Europe and to the Far East.

Comparison of Delivered Costs

The delivered cost of coal is composed of the F.O.B. mine price, inland freight, port terminaling costs, and ocean freight (and ultimately the forwarding transportation cost to the end user which is not included in Table 3). The F.O.B. mine costs shown in Table 3 are representative of costs, not prices, from each of the regions, whereas the transportation components represent the cost to the exporter to transport the coal (not the internal costs of the firm providing the transportation service). Subse-

TABLE 3
Relative Delivered Costs
(U.S. $/T)

	United States					Australia		
	Appalachia	Midwest	West	Canada	Colombia	Queensland	New South Wales	South Africa
F.O.B. Mine	31.15	23.85	21.70	30.40	16.35	17.40	14.65	8.60
Inland Freight	14.50	15.50	19.50	15.50	8.00	7.00	7.50	6.50
Port/Terminal	1.50	2.00	2.50	2.50	3.00	3.00	4.00	3.00
F.O.B. Port	47.15	41.35	43.70	48.40	27.35	27.40	26.15	18.10
Freight-Europe	4.50	5.50	N/A	8.50	4.50	7.00	7.50	5.50
Freight-Far East	8.50	10.00	5.00	4.50	10.00	4.50	5.00	5.50
C.I.F.-Europe	51.65	46.85	N/A	56.90	31.85	34.40	33.65	23.60
C.I.F.-Far East	55.65	51.35	48.70	52.90	37.35	31.90	31.15	23.60
BTU/LB	12,500	11,500	12,000	11,500	11,600	11,000	11,800	11,000
C.I.F.-Europe ($/MMBTU)	2.07	2.04	N/A	2.47	1.37	1.56	1.43	1.07
C.I.F.-Far East ($/MMBTU)	2.23	2.23	2.03	2.30	1.61	1.45	1.32	1.07

SOURCES:
A Perspective on the British Columbian Coal Industry, Coal Association of Canada, 1986 ed.
Barnett, Donald W., "Export Coal Costs in Australia, Canada, South Africa and the U.S.," as presented to the Australian Bureau of Mineral Resources, Canberra, Australia, March 1985.
International Energy Agency, Coal Research, *The Availability and Cost of Coal in South Africa*, October 1985.
International Energy Agency, Coal Research, *The Cost and Availability of Canadian Coal*, February 1986.
International Energy Agency, Coal Research, *The Cost and Availability of Colombian Coal*, March 1985.
The National Coal Council Producer Cost Survey, April 1987.
U.S. Department of Commerce and U.S. Department of Interior, *A Cost Comparison of Selected U.S. and Colombian Coal Mines.*

quent discussions in this section and in Section IV on transportation issues describe these cost components in the coal distribution chain.

While these figures are only aggregate estimates, they clearly demonstrate on a dollar per million BTU delivered basis, economic advantages of low cost producers such as Colombia, Australia and South Africa over the higher costs of the United States and Canada.

The F.O.B. mine cost is one major component in the total delivered coal cost structure. Each exporting country has unique mining conditions, governmental mining regulations and taxation policies which impact on the cost of production. Tables 4 and 5 provide a breakdown of mine costs by major competing exporting countries, in local currency and U.S. dollars, respectively, according to the following cost categories:

1) Labor
2) Black Lung
3) Other Direct
4) Environmental and Reclamation
5) Royalties
6) Taxes
7) Depletion, Depreciation and Amortization (D.D.& A.)
8) Corporate Overhead/Other.[17]

The costs presented in Tables 4 and 5 were estimated using broad industry averages, and it must be noted that individual mines may have cost structures that are substantially different for a variety of reasons (i.e., geological conditions, preparation technologies, etc.). The objective is to demonstrate representatively the inherent advantages and disadvantages among foreign countries rather than to state costs definitively. Multiple reference sources were used in estimating representative costs, as noted on the Tables.

Comparison Of Production Costs

CANADA

The cost components for Canadian coal production were derived from cost structures found in the large open cast mines located in southeast British Columbia. Although geological conditions are favorable,

17. In Table 5, costs are rounded to the nearest $0.05 per ton.

TABLE 4
Mine Cost Components of Major Exporting Countries
(Local Currency/T)

	Canada	Colombia	Queensland	New S. Wales	S. Africa
1. Labor	12.25	725	13.50	10.00	4.5
2. Black Lung	None	None	Gov't Ins	Gov't Ins	None
3. Other Direct	22.25	2050	11.00	9.00	8.5
4. Environment/Reclamation	0.50	100	0.50	0.50	1.0
5. Royalties	1.50	400	1.50	2.75	1.5
6. Taxes	4.00	400	0.25	0.25	4.5
7. D.D.&A.	N/A	N/A	N/A	N/A	N/A
8. Overhead/Other	N/A	N/A	N/A	N/A	1.5
9. Total Mine Cost	40.50	3675	26.75	22.50	21.50
10. Exchange Rate*	0.75	0.00444	0.65	0.65	0.4

SOURCES:
A Perspective on the British Columbian Coal Industry, Coal Association of Canada, 1986 ed.
Barnett, Donald W., "Export Coal Costs in Australia, Canada, South Africa and the U.S.," as presented to the Australian Bureau of Mineral Resources, Canberra, Australia, March 1985.
International Energy Agency, Coal Research, *The Availability and Cost of Coal in South Africa*, October 1985.
International Energy Agency, Coal Research, *The Cost and Availability of Canadian Coal*, February 1986.
International Energy Agency, Coal Research, *The Cost and Availability of Colombian Coal*, March 1985.
U.S. Department of Commerce and U.S. Department of Interior, *A Cost Comparison of Selected U.S. and Colombian Coal Mines.*

*U.S. dollars per local currency. Currency valuations represent the New York Market closing rate as of January 2, 1987.

TABLE 5
Mine Cost Components of Major Exporting Countries

(U.S. $/T)

	Canada	Colombia	Queensland	New S. Wales	S. Africa
1. Labor	$ 9.20	$ 3.20	$ 8.80	$ 6.50	$1.80
2. Black Lung	0.00	0.00	0.00	0.00	0.00
3. Other Direct	16.70	9.10	7.15	5.85	3.40
4. Environment/Reclamation	0.40	0.45	0.35	0.35	0.40
5. Royalties	1.15	1.80	1.00	1.80	0.60
6. Taxes	3.00	1.80	0.15	0.15	1.80
7. DD&A	N/A	N/A	N/A	N/A	N/A
8. Overhead/Other	N/A	N/A	N/A	N/A	0.60
9. Total Mine Cost	$30.40	$16.35	$17.40	$14.65	$8.60

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

SOURCES:
A Perspective on the British Columbian Coal Industry, Coal Association of Canada, 1986 ed.
Barnett, Donald W., "Export Coal Costs in Australia, Canada, South Africa and the U.S.," as presented to the Australian Bureau of Mineral Resources, Canberra, Australia, March 1985.
International Energy Agency, Coal Research, *The Availability and Cost of Coal in South Africa*, October 1985.
International Energy Agency, Coal Research, *The Cost and Availability of Canadian Coal*, February 1986.
International Energy Agency, Coal Research, *The Cost and Availability of Colombian Coal*, March 1985.
U.S. Department of Commerce and U.S. Department of Interior, *A Cost Comparison of Selected U.S. and Colombian Coal Mines.*

this area is generally considered to have high cost mining projects due to fairly expensive wage rates, remote locations in difficult terrain, severe winter weather conditions and long rail hauls to port (roughly 700 miles).[18] The port facility is a modern and efficient operation, capable of loading very large ocean-going vessels.

Clearly, Canada's total production costs of $30.40 per ton rank highest of the four foreign countries reviewed here. Labor costs of $9.20 per ton, the highest of the foreign countries, constitute 30 percent of total production costs. Other direct costs of $16.70 per ton represent 55 percent of total production costs and reflect the highest percentage cost component. Historically, the Crows Nest/Elk River coal fields in British Columbia have been the coal exporting area in the southeast region of the province (see Figure 19). Two new coal mines have been developed in the northwest region in the Peace River coal field. In addition to the costs associated with the development of these two new mines, the construction of an extensive infrastructure was involved including:

- the development of a new town;
- the addition of an 80-mile rail spurline;
- the substantial upgrading of the mainline railroad; and
- the construction of a new coal-loading facility at Prince Rupert on Ridley Island.

The development of the Peace River coal fields was undertaken at the urging of Japanese purchasers, who, at that time were looking for more diverse and more secure coal supplies within Canada.

COLOMBIA

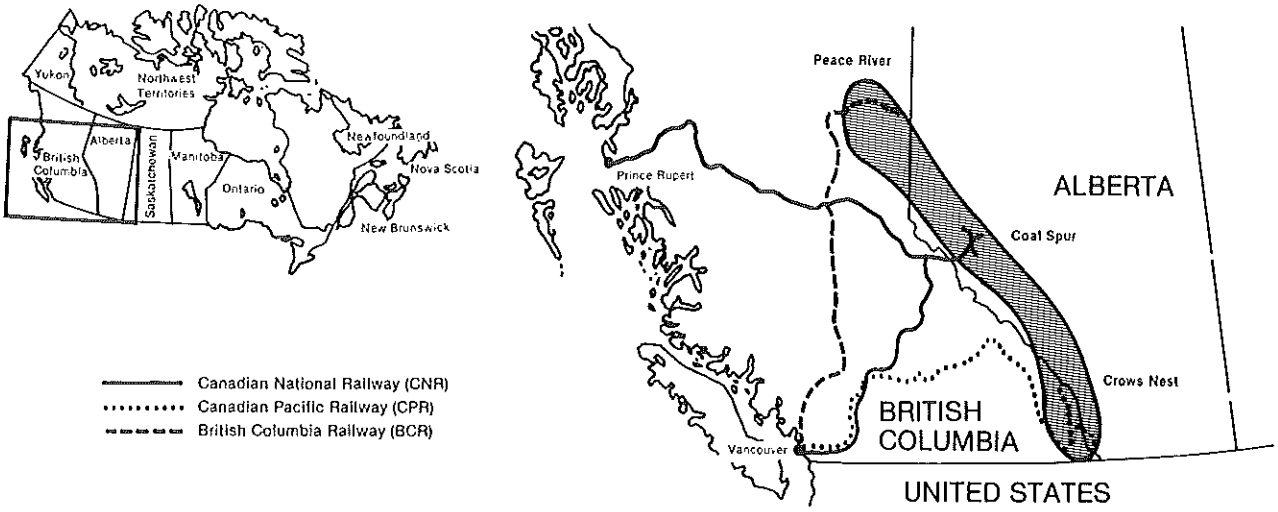
Cost components of Colombian coal production were taken from the Cerrejon North project, a large-scale surface mine. The geological conditions in this area are favorable, but complex. Wage rates are relatively low by world standards. The project enjoys an efficient, integrated infrastructure with modern port facilities capable of loading large vessels. The remote location and lack of regional development required large capital investment.

Colombia's total production cost of $16.35 per ton ranks third highest, after Canada and Queensland, Australia. Labor costs of $3.20 per ton or 20 percent of total costs are recorded as the second lowest with South Africa reporting the lowest labor costs. Other direct costs of $9.10 per ton represent the largest cost component for Colombia (56 percent).

In 1976, the Colombian government established Carbocol and became a direct participant in coal development. Ecopetrol (the national oil and gas corporation) and Proexpo (the government export

18. Energy Information Administration, *Coal-Exporting Countries: The Asian Market* (DOE/EIA-0462, Dec. 1984), p. 21.

FIGURE 19 Western Canadian Export Coal Areas



SOURCE: Energy Information Administration, *Coal-Exporting Countries: The Asian Market* (DOE/EIA-0462), December 13, 1984.

promotion agency) are the principal shareholders in Carbocol. Main objectives of Carbocol include:

- Guide and coordinate the execution of policies to develop Colombian coal;
- Organize and manage National Coal Fund (financed by a five percent tax on coal production);
- Coordinate coal exports from private and public sources;
- Promote new coal ventures; and
- Undertake mining projects and commercialize its own coal production.[19]

Since the 1970s, government energy development policy has come forth with the *contract of association* to encourage foreign investment in resource exploration and development. Foreign partners must register the terms of any sales contract with the Colombian government, for purposes of controlling foreign exchange.

In 1976, a contract of association was executed for the Cerrejon North project, the main Cerrejon development (see Figure 20). Partners to this contract included Carbocol and Intercor, International Colombian Resources Corporation, a wholly-owned subsidiary of Exxon Corporation. Carbocol and Intercor share equally in both capital and operating costs associated with the mine and transportation facilities. Intercor operates the mine.

The cost of the Cerrejon North project was estimated at $3.2 billion. At current prices, the mine is not likely to provide a return on investment, but the project is believed to be making a $9 per ton profit over its operating costs.[20] The Cerrejon North project will provide Colombia with foreign exchange earnings to finance imports from abroad and represents a major milestone in the country's economic development.

AUSTRALIA

Queensland

Cost components from Queensland represent large open cast mines and reflect the extremely favorable geological conditions with competitive rail hauls due to the close proximity of the mines to the available ports (see Figure 21). The region enjoys moderately low tax and royalty rates, but has high wage rates and a somewhat difficult labor environment.

Queensland labor rates, in fact, represent the highest labor rate of the four foreign countries un-

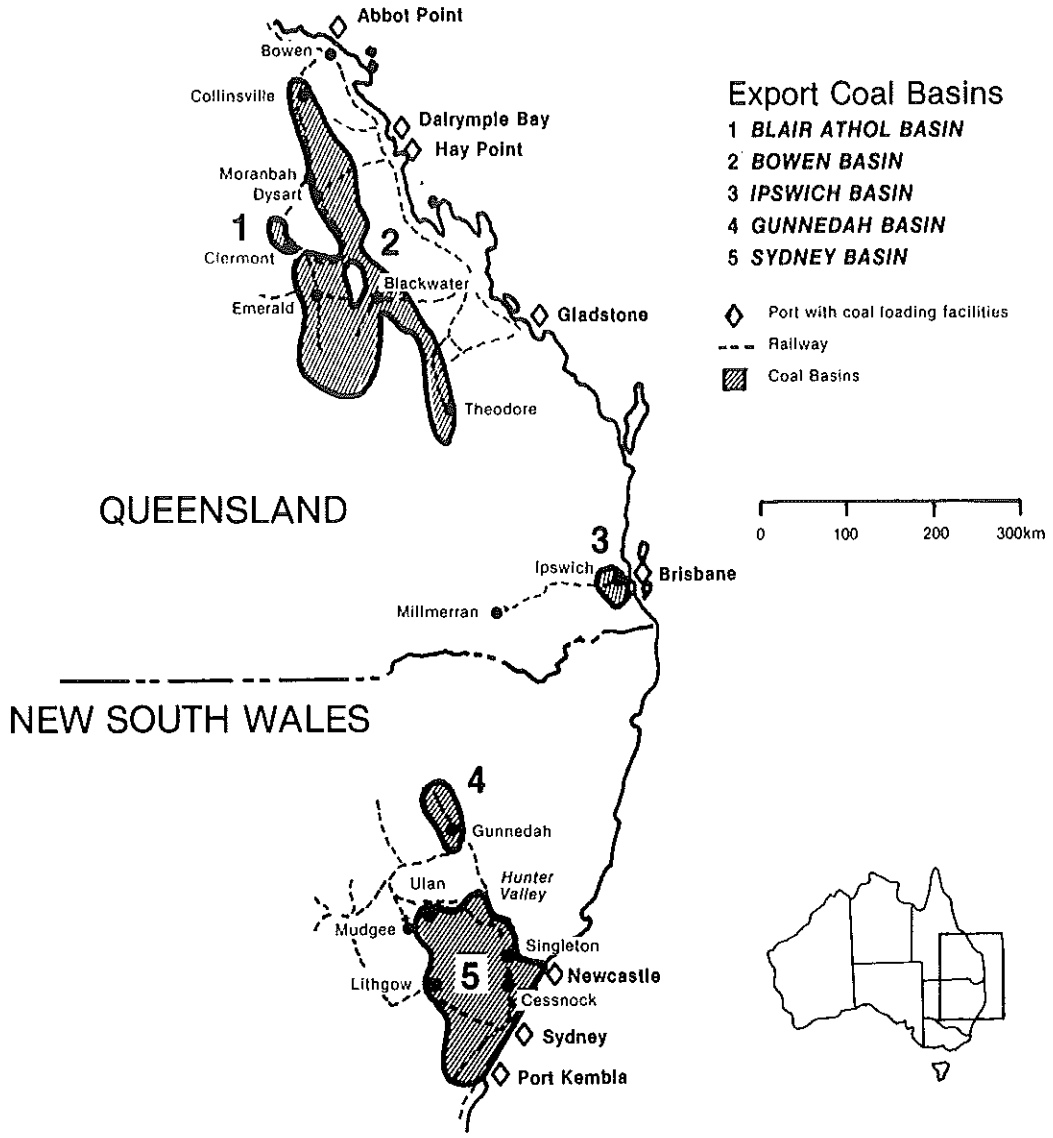
19. Energy Information Administration, *Coal-Exporting Countries: The European Market* (DOE/EIA-0502, Jan. 1987), p. 25.

20. Energy Information Administration, *Coal-Exporting Countries: The European Market* (DOE/EIA-0502, Jan. 1987), p. 25.

FIGURE 20 Colombian Coal Deposits

SOURCE: Energy Information Administration, *Coal-Exporting Countries: The European Market* (DOE/EIA-0502), January 13, 1977.

FIGURE 21 Australian Export Coal Areas



SOURCE: Energy Information Administration, *Coal-Exporting Countries: The Asian Market* (DOE/EIA-0462), December 13, 1984.

der study at $8.80 per ton or 50 percent of total costs. Other direct costs of $7.15 per ton are 41 percent of the total. Total production costs are recorded at $17.40 per ton.

New South Wales

New South Wales cost data also reflect large open-cast mines and further demonstrates the many advantages generally available to producers in this country. The geological conditions are among the most favorable in the world. This region's competitive position in the world market is somewhat hampered by a high royalty structure and a particularly difficult labor environment.

Labor rates at New South Wales are the second highest in this study, following Queensland, and stand at $6.50 per ton or 44 percent of total costs. Other direct costs of $5.85 per ton reflect 40 percent of costs. Royalties of $1.80 per ton or 12 percent of total costs are the highest of the countries studied.

Coal mining conditions in Australia are generally good. Seams are thick, mostly over six feet, coal dips are gentle, faulting is minimal and the terrain is flat. Australian coal mining is technically advanced and highly mechanized.

In recent years, a shift from underground to surface mines has occurred. Coal mines in Queensland

are predominantly surface operations and have nearly twice the coal seam recovery rate of the New South Wales underground mines. Surface-mined coal costs less to produce and is therefore more competitive for export purposes. Underground mines are increasing productivity through such methods as longwall mining in order to compete with surface mines and with low cost producers in other countries.

Wages in Australia's coal mining industry are generally higher than those in other sectors of the economy and have increased in recent years to attract enough labor for their rapidly growing mining industry. Australian state and federal training and recruitment programs as well as the slower rate of growth for coal demand have eased concerns about the future availability of trained personnel and engineers.

Most Australian coal is produced in mines that are either owned or otherwise dedicated to the end user, i.e. mines that are owned by electric utilities, and steel or cement companies, or mines whose output is contracted over the long term to these companies. Most non-captive mines are dedicated to either the export market or to domestic consumption. Few mines supply both markets. The Australian coal industry is dominated by private ownership.[21]

SOUTH AFRICA

The South African cost components readily exhibit that this area is and will continue to be the lowest cost coal production available to the world market. The region has been plagued by political unrest and sanctions arising from apartheid policies which impact South African coal. This situation has somewhat reduced the markets available to these producers. The region enjoys the advantages of extremely favorable geological conditions, low wage rates and a highly developed and efficient infrastructure with ports that are capable of loading very large ocean-going vessels.

Total mine costs for South Africa are estimated at $8.60 per ton, the lowest of all countries studied and compared to the highest cost of $30.40 per ton recorded by Canada. Labor costs of $1.80 per ton are 21 percent of total costs and are by far the lowest labor costs reported. Whether South Africa can maintain its low wage rates to Black South African miners over the long term is open to question. Other direct costs of $3.40 per ton are the largest cost component for South Africa (40 percent). Royalties at $0.60 per ton are also low compared to the other foreign countries reviewed here.

Although coal mining began in South Africa in the 1800s, large-scale mining did not begin until the 1970s when southern Transvaal coal (see Figure 22) was mined to provide electric power to the diamond and gold mines. The need for large-scale coal production led to the ownership and control of the major coal-producing mines by large gold mining companies. In order to provide the gold mining companies with low cost electric power, the South African government established the Electricity Supply Commission (Escom) to generate and distribute electric power on a non-profit basis. As South Africa has no economically recoverable petroleum or gas reserves, coal accounts for most of the energy consumed in South Africa.

South African coal can be mined at a relatively low cost, as reserves generally lie in thick seams that are close to the surface and easily accessible. Roughly two-thirds of South Africa's coal production is underground mined and one-third is surface mined.

Although South African coal is exported by privately-owned companies, the government controls coal exports through a system of export allocations to maintain sufficient coal reserves for future domestic requirements. Accordingly, domestic prices for South African coal are also controlled by the government and held below world price levels primarily because the country depends on coal for much of its energy needs. Export allocations are important to coal producers, as they provide access to higher prices available in foreign markets.

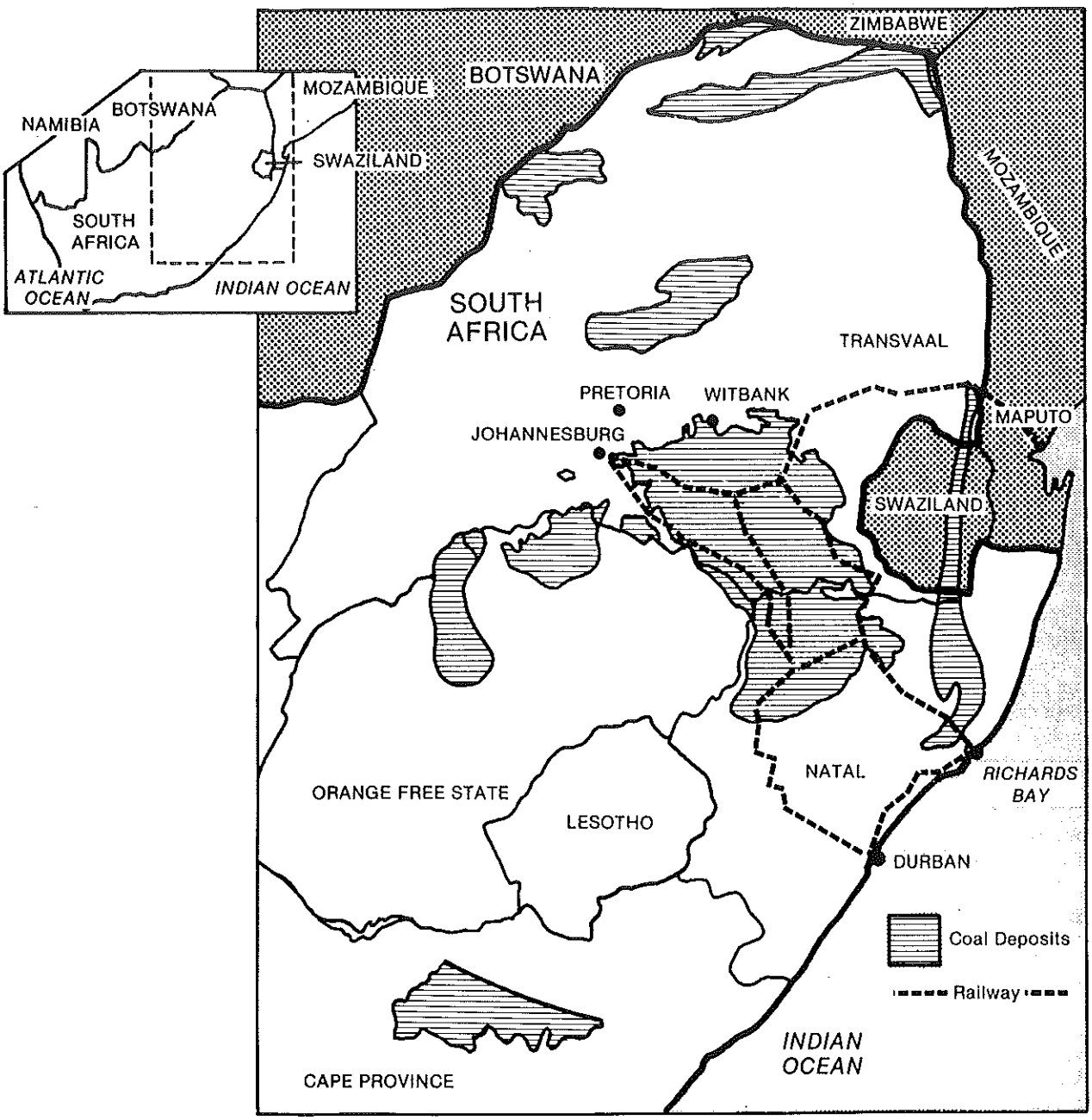
The tax laws affecting coal mines in South Africa are in contrast to the tax laws in most other coal-producing countries. Although coal mines pay normal corporate income taxes on profits, capital expenditures are deducted from taxable profits before taxes are calculated. Only when capital investment is fully recovered is the mine regarded as taxable.

In 1985, coal exports had reached a record level of 49 million tons; exports to Europe accounted for more than half that amount.[22] As a result of recent growing social and political unrest in South Africa, some coal-importing countries in Europe (e.g. France and Denmark) are restraining or stopping imports of South African coal. The future growth of South African coal exports will depend to a large

21. Energy Information Adminstration, *Coal Exporting Countries: The Asian Market* (DOE/EIA-0462, Dec. 13, 1984), p. 6.

22. Energy Information Administration, *Coal-Exporting Countries: The European Market* (DOE/EIA-0502, Jan. 13, 1987), p. 5.

FIGURE 22 South African Coal Deposits



SOURCE: Energy Information Administration, *Coal-Exporting Countries: The European Market* (DOE/EIA-0502), January 13, 1987.

extent on whether the country can find an expanding market for its coal in Asia and to what extent it can preserve its market share in Europe.

Relevant Production Cost Components

When reviewing Table 5 in total, several points are relevant:

- There are no costs or taxes associated with Black Lung in Canada, Colombia, or South Africa, while the Australian government relieves the producer through government-sponsored insurance. This is in contrast to the United States where producers have Black Lung taxes up to $0.55 per ton, for surface mines and $1.10 per ton for underground mines.
- Environmental and reclamation costs are approximately the same for all exporters.
- Royalties and taxes vary significantly among exporters.

Other Exporting Countries

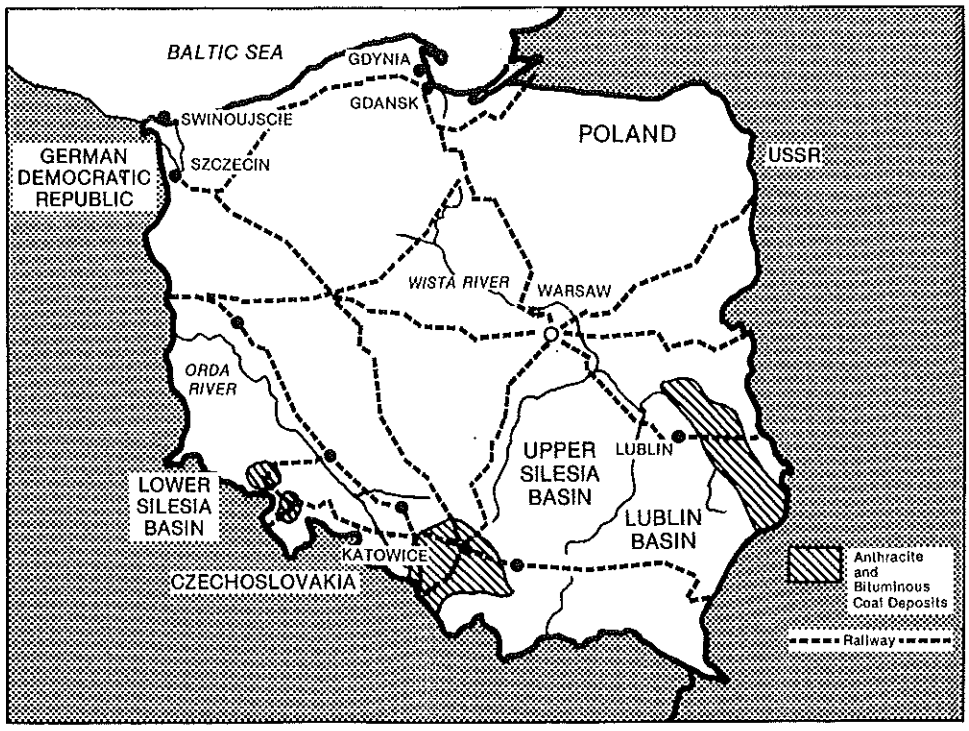
Although specific data on coal mine production cost components are not available for the countries of Poland and the People's Republic of China (China), it is important to review their export capabilities. In 1985, for example, over half of Poland's coal exports went to Western Europe.[23] China is developing its coal mining industry. Given the size of China's recoverable coal reserves (109 billion tons) and its geographic location, it has the potential to become a major player in exports to the Asian market.[24]

POLAND

The majority of coal mined in Poland is bituminous steam coal, mined exclusively by underground methods; longwall production accounts for 88 percent of their output.[25] Poland's bituminous coal deposits are found in three major coal basins: the Upper Silesian Basin, the Lower Silesian Basin, and the Lublin Basin (see Figure 23). The Upper Silesian

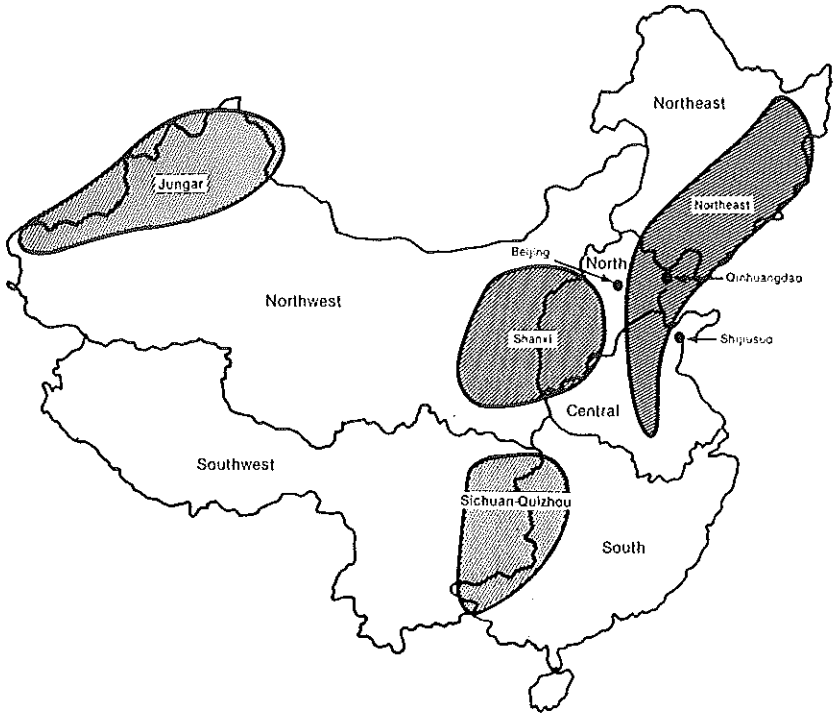
23. Energy Information Administration, *Coal-Exporting Countries: The European Market* (DOE/EIA-0502, Jan. 13, 1987), p. 13.
24. Energy Information Administration, *Coal-Exporting Countries: The Asian Market* (DOE/EIA-0462, Dec. 13, 1984), p. 23.
25. Energy Information Adminstration, *Coal-Exporting Countries: The European Market* (DOE/EIA-0502, Jan. 13, 1987), p. 16.

FIGURE 23 Polish Coal Deposits



SOURCE: Energy Information Administration, *Coal-Exporting Countries: The European Market* (DOE/EIA-0502), January 13, 1987.

FIGURE 24 Major Coal Areas of China



SOURCE: Energy Information Administration, *Coal-Exporting Countries: The Asian Market* (DOE/EIA-0462), December 13, 1984.

is the most extensively developed mining area. The Lublin Basin is the newest coal-producing region. Its first mine began production in 1982; a second mine is currently under development with no additional mines planned before 1990.

All industries in Poland, including the coal mining industry, are controlled by the government. No foreign or domestic private investment is permitted. Weglokoks is the agency which is the sole exporter of Polish coal and coke. Weglokoks exports coal through the west coast ports of Szczecin and Swinoujscie and the east coast ports of Gdynia and the Old and North Ports of Gdansk. The North Port of Gdansk is the largest Polish coal export port and has a modern coal terminal.

In 1985, Poland exported 40 million tons of coal, 21 million tons shipped to Western Europe and 17 million tons shipped to socialist countries.[26] Poland provides Western Europe with approximately 15 percent of its import coal demand.

With an energy shortage developing in the Eastern Bloc, Poland faces a dilemma in its coal trading policy. Poland would rather export its coal to Western countries in order to benefit from foreign exchange, but may be forced to decrease those exports in order to supply the increasing needs of its socialist neighbors.

CHINA

Since the 1970s, China has developed its coal mines in the southern and western provinces. Coal mining is spread throughout the country but the bulk of China's coal reserves are found in the north and northeast (see Figure 24). Shanxi Province is China's most important coal-producing area.

China is the second largest coal producer (after the United States) with an annual output reported at 934 million tons (1985).[27] Approximately 56 percent of Chinese coal production in 1981 came from 600 mines controlled by the Ministry of Coal. The

26. Energy Information Administration, *Coal-Exporting Countries: The European Market* (DOE/EIA-0502, Jan. 13, 1987), p. 17.

27. International Energy Agency, *Coal Information 1986* (OECD, Paris, 1986), p. 57.

remaining 44 percent was mined in over 20,000 small mines which are controlled by Provincial coal administrations and communes.[28]

The percentage of coal coming out of these small local mines is expected to decline as the country concentrates on the development of large-scale surface mines. Pingshuo, just such a surface mine project, will be jointly developed by the Chinese government and Occidental Petroleum Corporation. When completed, this mine, located in Shanxi Province, will have a capacity of 12 million tons per year. Seventy percent of this output is expected to be exported.

In 1985, China exported 8.1 million tons (roughly one percent of its coal production).[29] China's role as an exporter has a strong political basis. The trade relationship with Japan, for example, brings Japanese technology as well as exports into China. Coal exports have also provided business with North Korea and Hong Kong. China's current role as an emerging trading partner in the Asian market will expand at the rate it is able to acquire adequate technology and capital to support its desired expansion.[30]

U.S. PRODUCTION COSTS

In contrast to most other exporting countries, the United States has widely distributed coal reserves that are extracted through a variety of mining methods. In an effort to review representative mining costs for different regions and mining methods, questionnaires were submitted to the Council's coal-producing members. The results were tabulated by the accounting firm of Arthur Young & Company to preserve confidentiality.

Three coal producing regions were considered: Appalachia, the Midwest and the West. Within these regions only the mine types and methods presented in Table 6 received sufficient responses to be considered.

Costs were reported according to the categories shown on Table 7 which indicates averages. Since various companies aggregate costs into somewhat different categories (or some companies may not have certain cost categories, such as union royalties) the sum of the averages of each cost component will *not* equal the total average cost for each mine type.

Within Appalachia, total average costs are the lowest for the large underground longwall mine. In the Midwest, average costs are significantly lower than in Appalachia; however, quality is generally not as good as in Appalachia (i.e., lower calorific value and higher sulfur content). Transportation costs to ports in the Gulf are also greater. The West has the lowest cost, but even greater inland distances hamper the export of Western coal.

The coal industry has made strides in recent years to improve its cost competitiveness. Improved productivity is one area where this is evident. During the 1970s, the mining industry faced many new regulations pertaining to health, safety and the environment. The coal industry responded to these regulations, in part, by better educating its workforce and by applying state-of-the-art technology to improve mining methods. As the operators in the mines gained experience in this new work environment and new regulations were assimilated into

28. Energy Information Administration, *Coal Exporting Countries: The Asian Market* (DOE/EIA-0462, Dec.13, 1984), p.23.
29. Energy Information Administration, *Annual Prospects for World Coal Trade 1987* (DOE/EIA-0363 [87], May 1987), p. 2.
30. International Energy Agency, Coal Research in London is currently completing a report entitled "China's Potential in International Coal Trade." This report should be a useful source of additional information on China's role in world coal trade.

Table 6

Region	Mine Type	Production MMTPY	Mining Method(s)
Appalachia	Large Underground	1.1 or greater	Longwall
	Large Underground	1.1 or greater	Conventional, Continuous
	Small Underground	0.33 or less	All Methods
	Medium Surface	0.33 to 0.55 or greater	Surface
Midwest	Large Underground	1.1 or greater	Conventional, Continuous
	Large Surface	1.1 or greater	Surface
West*	Large Underground	1.1 or greater	Continuous, Longwall
	Large Surface	3.3 or greater	Surface

*Exclusive of Powder River Basin

TABLE 7
Average Production Costs by Category ($/T)
The National Coal Council Survey

	Appalachia				Midwest		West	
	Large Underground Longwall	Large Underground Conventional, Continuous	Small Underground	Medium Surface	Large Underground, Conventional, Continuous	Large Surface	Large Underground, Conventional, Longwall	Large Surface
Direct Wages/Benefits	9.53	10.42	12.01	6.61	9.72	7.21	7.98	3.39
Payroll Taxes	0.88	0.74	0.71	1.45	0.72	0.47	*	0.16
Workmen's Compensation	0.57	0.54	0.74	0.37	0.62	0.12	0.22	0.09
Union Royalties	2.16	2.12	2.10	*	2.22	2.16	*	0.00
Black Lung Provisions	0.23	0.48	0.15	0.36	0.14	0.25	*	0.01
Materials/Supplies	3.97	4.30	5.00	6.31	3.99	5.34	3.96	2.13
Maintenance	2.14	1.22	1.00	3.50	0.82	0.89	1.29	0.41
Power	0.80	0.91	0.88	0.47	0.76	1.15	0.80	0.40
Preparation	3.62	4.01	6.09	2.46	2.45	*	*	*
Reclamation/Environmental	0.12	0.09	0.21	1.44	0.28	0.78	*	0.57
Royalties	1.23	1.68	1.01	2.18	0.42	0.89	1.45	0.92
Taxes	1.94	1.86	2.16	1.72	1.72	*	1.39	*
DD&A	2.40	2.38	2.01	2.39	1.64	2.17	1.68	1.23
Corp. Overhead	1.05	1.06	1.26	1.88	0.92	0.91	1.30	0.88
Other	3.01	2.27	1.19	4.15	1.27	1.91	1.31	1.47
Total Average	31.16	32.09	32.92	32.04	24.55	23.84	21.69	12.20

*Data insufficient to accumulate an average

work practices, productivity improved. In fact, during the years 1975-1985, productivity increased by 50 percent (see Figure 25).

In the United States, federal and state governments influence mining costs on both a direct and indirect basis and, therefore, must share some responsibility with industry for the international competitiveness of U.S. coal. Regulations pertaining to mining have an indirect cost impact and are somewhat difficult to quantify. Direct cost influences, such as royalties and taxes are much more evident in the cost structure. Any additional tax burden will correspondingly decrease U.S. competitiveness. Specific actions that the U.S. government can take to improve cost competitiveness include:

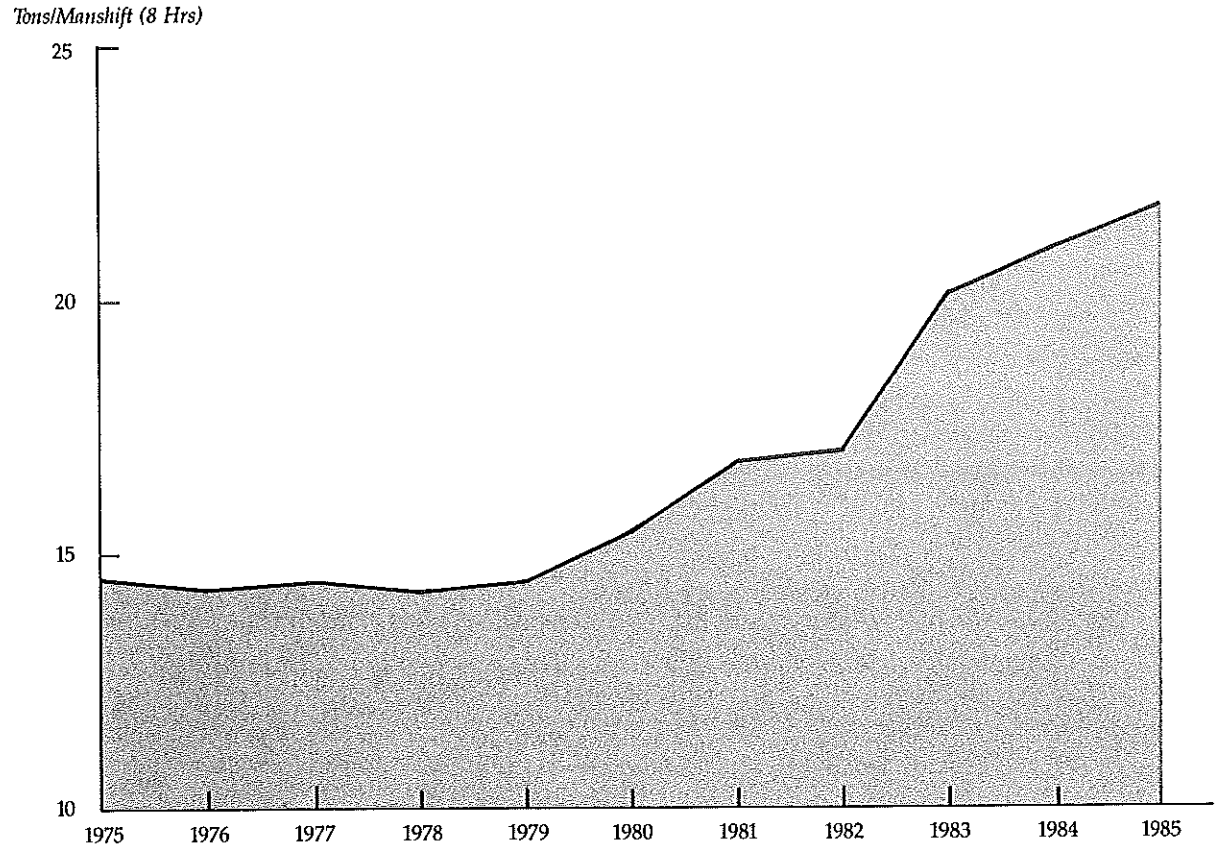
1. **Federal royalty rates should be reviewed.**
   As royalties on federal leases move from a fixed rate per ton to a percentage of value (i.e., 12½ and 8 percent for surface and underground mined coal, respectively), those reserves become less competitive in international markets. This naturally favors less expensive privately-owned coal or state and/or private leases over federally leased coal. *The Federal Government should review the appropriateness of these high percentage-based royalty rates.*

   Regardless of the royalty rate, royalties should be calculated on the coal's value net of all other taxes and fees. If royalties are calculated on gross value, the government is, in effect, collecting a royalty on taxes. This is because the purchase price (which is the implied gross value) includes federal taxes such as Black Lung and Reclamation Fees and any applicable state taxes.

2. **Federal and state governments should not impose any additional taxes or regulatory burden on coal.** Federal taxes on coal mining are the Black Lung Tax and the Federal Reclamation Fee (abandoned mine lands tax). Taxes are levied by the states in the form of severance taxes. Total federal taxes (Black Lung and Reclamation) may be as high as $1.25 per ton for underground mines and $0.90 per ton for surface mines. Severance taxes vary from state to state, from no tax at all to a significant portion of the value of the recovered coal. As indicated in Table 4, none of the foreign coal producers considered in this study are subject to a Black Lung Tax. *Any additional state or federal tax or regulatory burden on coal would be anti-competitive in the international coal market.*

3. **Regulations which discriminate against longwall mining should be changed.**
   Longwall mining is the safest and most cost effective method of undergound coal production available. The National Coal Council survey has

FIGURE 25 Productivity Trends



SOURCE: Adapted from National Coal Association, Facts About Coal, 1987.

indicated that "longwalling" is the lowest average cost coal production method in Appalachia. Additionally, longwall mining provides for the greatest recovery of coal reserves.

Adoption of "longwalling" has been hindered to some extent and in the future may be blocked due to regulations relating to subsidence. The Surface Mining Control and Reclamation Act (SMCRA) recognized the benefits of planned and predictable subsidence which occurs from longwall mining as compared to the long-term uncertainty as to time and extent of subsidence produced by other mining methods. Unfortunately, regulations in some states, primarily with regard to the recognition of mining and subsidence rights held by coal companies, limit areas that might be used by the longwall method. The regulations should allow for the expansion of the use of longwall mining while carrying out the environmental protection aspects of the surface mining laws and balancing the interests of all involved parties (surface owners as well as coal companies). U.S. mine safety regulations impose certain limitations on longwall mining which prevent it from achieving full productivity potential, which tends to increase the cost of production. The regulations govern mine ventilation, roof control, electrical power distribution and other safety-related requirements. These requirements have evolved to a great extent from room-and-pillar mining practices which differ significantly in concept from the longwall mining technique. The latter was developed in Europe and, over the last twenty years since its introduction in the United States, has had a superior safety record when compared with all other underground mining methods.

It is recommended that these regulations be reviewed and certain restrictions that unnecessarily prevent a wider application of longwall mining be modified, consistent with safe mining practices.

Section IV

Transportation Issues and Comparative Costs

Introduction

The transportation cost component of coal export sales is one of the most significant factors in determining how competitive a coal project will be in the international market. Although the transportation infrastructures necessary to support coal exports are made up of the same components for all competing countries, there are significant differences in the physical attributes of the various delivery systems. In addition, there are important differences in the degrees and ways in which national policies are applied to the development, support and regulation of these facilities. Moreover, the policies and systems put in place by one country impact the relative economics and competitiveness of other countries.

After the direct cost of mining and exchange rate effects, export competitiveness is affected primarily by:

- The physical constraints of geography;
- Overall national policies toward transportation; and
- National coal export policies, specifically those policies that are directed at overcoming inherent transportation problems.

The total effects of various national policies in this regard have not been adequately assessed, nor does this document attempt to cover this topic exhaustively. It is, however, extremely important to the U.S. competitive position in the world coal market, both because of the distances that U.S. coal must move from mines to international markets and because the effects of railroad deregulation are still being assimilated.

Coal Export Transportation Infrastructure

For the purposes of this section, the structural characteristics of the coal export infrastructure fall into two categories:

(1) Inherent advantages and disadvantages (e.g. distances from mine to port, natural deep draft ports, ocean shipping distances); and

(2) National transportation and export policies which create advantages and disadvantages.

The infrastructure required for coal exports is very much the same for competing countries and with few exceptions, sufficiently developed to support likely volumes for all countries into the 1990s. The major components are inland transportation (rail and barge), transloading facilities, ports and ocean transportation. For each major exporting country, a summary of the inherent advantages and disadvantages, and the various national policies applied to these attributes is presented.

United States

The United States possesses a well-developed rail system with the capacity to move much larger export volumes. It has a well-developed inland waterway system which is substantially under-utilized by international standards. The volume of U.S. imports creates back-haul opportunities to increase transportation productivity. There is a stable, reliable, well-trained labor force throughout the infrastructure, and a capital structure that is capable of funding major development projects.

A primary disadvantage for U.S. coal producers is the inland nature of the coal deposits. U.S. coals generally travel many times the inland distances of other exporting countries. This is particularly true for Western coals. The United States has limited deep draft harbor facilities and no developed port well located to serve the Powder River Basin. Ocean shipping distances, except from Alaska, to the Pacific Rim countries relative to Australia and Canada is a disadvantage.

Within a framework of private ownership of rail-

roads, inland waterway equipment and operations, local public ownership of ports and private ownership of transloading facilities, the trend for public policy is toward deregulation of rates, user fees to support construction and operation of public facilities and acceptance of inter- and intra-modal consolidation and mergers. There is no national policy regarding coal export transportation. Government policy generally is to favor deregulation of transportation, believing that "product and geographic" competition exists in all cases, i.e., even where direct competition to serve a mine does not exist, there is indirect competition through other coal or energy sources and producing areas. This is a point in dispute among producers and transporters.

Australia

Australia is clearly one of the most competitive coal producers in the world. Their large, developed coal deposits are within 200 miles of deepwater ports and move on a relatively new, well organized and efficient dedicated transportation system.

Australia's export production has no potential internal market and is directly subject to major market risks. Australian rail transportation is built around a narrower gage of track which will ultimately limit per-train capacity. Australian labor, although well-trained, has a history of long, disruptive strikes.

Australia's export coal capacity was developed with the specific intention of exporting the production. Transportation infrastructures are financed through a combination of public and private funds although new capacity additions are determined by the Australian national railway system. Mines are assessed rail rates and user fees at all points of the transportation system that have little to do with the cost of capital or operations. The states appear to capture through high transport charges some of the economic rent provided by low-cost mines. The government reviews all export contracts. It would be difficult to say that Australian national policy, after initial loan guarantees, has contributed in a positive way to the competitiveness of their coal. Rates have been adjusted downward since 1980 to reflect the more competitive world environment for coal trade.

South Africa

South African coal deposits are relatively far from the export terminals (310 miles). Dedicated rail service is provided roughly at cost by a consortium of coal producers to deepwater port facilities at Richard's Bay.

Coal is South Africa's primary source of internal fuel. It is used domestically to produce electricity, gasoline, synthetic oil, natural gas and a variety of chemical precursors. As such, it is a resource that is controlled by public policy and is considered a resource to be preserved. Coal producers are allowed to export coal only if they produce quotas for the South African electric companies. They are only permitted to mine lower grades of coal and all shipping of coal for export is covered under long-term take-or-pay transportation agreements with the South African Transport Services (South African Government). The railroad is reported to be run on a cost basis, however. The railroad is electrically powered and can be expanded to increase its capacity substantially. The Richard's Bay Coal Terminal is privately owned and operated by a consortium of coal export companies. The facility is capable of loading 250,000 DWT vessels. Major expansion plans for both rail and port facilities have recently been postponed due to import bans by various European countries because of South African apartheid policies.

Canada

Canada provides large quantities of metallurgical coal exports to the Pacific Rim countries from western mines. Steam coal mines have been developed more recently in Saskatchewan and Alberta. Much of the coal destined for Japan has been purchased under long-term contracts. Western coal to Pacific markets and eastern coal to European markets have shorter transportation distances than similar deposits in the United States. These newer mines are served by primarily dedicated rail lines.

In 1986, severe labor strike activity disrupted some coal exports. In addition, Japanese steel producers have effectively pressed for lower metallurgical coal prices that have put a strong squeeze on margins. The western mines have essentially no internal market.

The Canadian government publicly encourages coal mining in western Canada as a way of increasing employment and the economic base of the various mining districts. The development of the Peace River coal fields was undertaken at the urging of Japanese purchasers who, at that time, were looking for more diverse and more secure coal supplies within Canada. This northeast project required an estimated investment of $1.9 billion or $C 2.5 billion, of which approximately $1.0 billion or $C 1.3

billion was invested by the Canadian government in rail, port and road facilities.[31] Specifically, the Ridley Island Terminal, costing $173 million, was built by a subsidiary of the Federal Government's Canada Ports Corporation; and the British Columbia Provincial Government spent roughly $500 million on an electrified branch line of British Columbia Railway to access new mines in the Peace River coal fields. In the public sector, the Canadian National Railway (publicly-owned) is involved in a major upgrading of its system including double tracking at a cost of $225-375 million.[32] These examples illustrate the degree of integrated involvement by the Canadian government on both the federal and provincial level, and the public domain to develop the coal exporting ability of these two new mines.

The railroads in Canada are tightly regulated by the government. A major effort is currently underway to deregulate the railroads which is expected to lower coal export transportation costs.

Colombia

The development of Cerrejon North (16 million tons ultimate annual capacity) has made Colombia one of the most competitive sources of steam coal in the world. There are approximately one billion tons of reserves within 95 miles of the eastern Colombian coast. The project is served by a dedicated railroad and dedicated deepwater port facilities.

The mine is located in a remote part of Colombia and, for the time being, much of the work force is transported to the mine on a four days on/four days off basis. The dedicated rail line and port facilities at Puerto Bolivar are the only currently viable means of exporting coal, which means that production bound for the Pacific Rim must pass though the Panama Canal (in vessels limited in size to about 60,000 metric tons) or take the much longer route around the Cape.

The development of Cerrejon was a joint venture between a Colombian government-sponsored company (Carbocol) and Exxon, with each partner supplying half the capital. The Colombian government provided initial capital to Carbocol, and Carbocol obtained Export-Import Bank credits to help finance its share of the project. The development of this mine is considered to be a major thrust in diversifying from dependence on coffee exports. The mine, rail line and port facilities are run as an integrated operation.

31. Energy Information Administration, *Coal-Exporting Countries: The Asian Market* (DOE/EIA-0462, Dec. 1984), p. 18.
32. *Ibid.*, p. 19.

Poland

Advantages to Poland are proximity to Western Europe, high quality coals and package pricing of coal on a delivered, competitive price basis. High production costs and limited transportation structure are disadvantages.

Polish exports are controlled by government policy. While exports are an important source of Western currency, coal production also represents an important resource to Eastern Bloc countries. Polish participation in the European market is perceived as variable. Recent years have seen various strikes interrupt coal production. The rates charged for infrastructure have little to do with direct costs. They appear to be related directly to coal export market conditions and political considerations.

China

Proximity to Asian markets is a distinct advantage to China that is somewhat offset by very long inland distances and inadequate rail or port capacity. Economic development policies have been variable.

Transportation of coal from the northern Provinces, often in mountainous and inaccessible regions, has placed a burden on the existing single-track non-electrified, steam-powered railroad system. With financial assistance from the Japanese, China is modernizing the coal ports of Qinhuangdao and Shijiusuo. To complement improvements on the Beijing-Qinhuangdao railroad, two new berths have been commissioned at Qinhuangdao.

China appears bent on rapid expansion of coal production with a somewhat more tenuous commitment to construction of rail and port infrastructure to support exports. Through its total control of the economy, the country is able to coordinate construction of infrastructure and compete for exports at whatever price it deems appropriate to maintain volumes at mines and on the rail system. In recent years, China has welcomed foreign capital and technical assistance in developing resources.

Comparative Transportation Costs

The total cost of transporting export coal is the most significant factor affecting international competitiveness of the U.S. coal industry. On average, absolute U.S. transportation costs are higher even though unit costs (per ton-mile) and terminal fees are comparable with those of other exporting countries. This paradox is a function of the substantially longer inland distances that U.S. coal exports must move.

Since 1980, it appears that most major coal exporting countries, including the United States, have lowered their real (inflation adjusted) per ton fees for inland transportation and terminal fees to adjust to the intense competition in coal exports. However, for Colombia, Australia and South Africa, greater infrastructure margins have allowed these countries greater flexibility in setting rates.

The economics of moving coal from mine to final export destination vary widely over the major exporting countries. In general, however, for the lowest mining cost producing countries, transportation rates appear to be set on the basis of the total production/transportation package rather than on the economic cost of the transportation component. In particular, Australia which has very low cost coal resources, has charges for inland transportation and terminal fees that are 25-40 percent higher than similar facilities in the United States. In addition, many of these governments also charge export tariffs and fees not seen in the United States. However, the total delivered price to importing countries is maintained at a level that is competitive with other exporting countries.

Similarly, in South Africa and Poland, where longer inland transportation distances are involved, rail and terminal facilities appear to be priced much closer to the margin. For both of these countries, coal is a significant source of foreign currencies.

The ironic aspect of this degree of national involvement in inland transportation fees and terminal charges is that it generally does not lower user fees, but raises them. In other words, low production cost enables the governments to shift more of the economic rent to the transportation sector in these countries without jeopardizing their exporters' ability to compete. However, national policies can also work in an opposite direction.

Several major coal exporting countries include coal exports as a national priority. In the case of Australia and Colombia, coal production was developed primarily as an export business. In the case of South Africa and Poland, a certain percentage of planned annual production is dedicated to the export market.

The following table (Table 8) of estimated costs charged for transporting steam coal was assembled from information submitted by various members of The National Coal Council. In general, this cost data is extremely difficult to obtain and verify, but the numbers included in this table are believed to be representative of current charges. Transportation and terminalling charges are lower than several years ago in nearly all countries. These "costs" are the price of transportation included in total delivered price, not necessarily the costs of the provider of the transportation service.

TABLE 8

Estimated Transportation Costs for Representative Steam Coal Movements

($/TON)

	Inland Rail	Terminal Fees	Ocean Trans. Far East	Ocean Trans. Europe	Total Trans. Far East	Total Trans. Europe
United States:						
West Coast	19.50	2.50	5.00	N/A	27.00	N/A
East Coast	14.50	1.50	8.50	4.50	24.50	20.50
Gulf (barge)	15.50	2.00	10.00	5.50	27.50	23.00
Australia:						
New South Wales	7.50	4.00	5.00	7.50	16.50	19.00
Queensland	7.00	3.00	4.50	7.00	14.50	17.00
Colombia	8.00	3.00	10.00	4.50	21.00	15.50
South Africa	6.50	3.00	5.50	5.50	15.00	15.00
Canada	15.50	2.50	4.50	8.50	22.50	26.50

The costs shown in Table 8 are estimates of representative movements of export coal. They do not represent actual commercial transactions. Particularly for the United States, the range of transportation costs may be quite large. In general, the costs for inland rail transportation are tariffs, except for U.S. West Coast. The U.S. East Coast movement is via Hampton Roads, a non-railroad-owned terminal; same total for railroad-owned terminal but different component costs. The Gulf movement is by barge via New Orleans, including truck or rail origination and inland terminalling.

SOURCES: CSX Corp., Union Pacific Railroad, Port of Long Beach, Virginia Port Authority, Midland Enterprises and Mississippi Valley Coal Exporters Council. Ocean freight rates were compiled from published data on vessel fixtures, July 1986-March 1987, and *International Coal Review*, National Coal Association, March 1987.

While definitive information is not available, the volume of U.S. export coal moving under rail contract may be 80 percent or greater. It is generally believed that contract rates are lower than the tariff rates cited in the accompanying tables.

In addition, the current oversupply of bulk ocean carriers has depressed shipping charges to the point where the relative distance advantage to Europe which the United States has, compared to South Africa or Colombia, does little to improve the total economics. For example, the cost to ship Australian coal to Europe is approximately $3.00 per ton more than to ship U.S. coal from the East Coast. In 1981, the U.S. General Accounting Office estimated the differential was $8.00 per ton.

According to another U.S. Government report, in 1980 there was a cost advantage of $4.98 per long ton in shipping coal from Hampton Roads to Italy in an 80,000 DWT vessel compared to a 50,000 DWT vessel. By 1985, this had shrunk to $1.73 per long ton.[33]

Table 9 shows the distribution of port capacity by ship size.

TABLE 9
Annual Effective Port Capacity (Million Short Tons) by Ship Size

Ship Size (Thousand DWT)

Country	<55	55-100	100-150	>150	Total
Australia	1	19	46	80	146
Canada (Western)				83	83
Colombia	4			34	38
South Africa	1			42	43
United States	104	213	14	15*	346

*topping off

SOURCE: International Energy Agency, *Coal Information 1986.*

On a ton-mile basis, the United States is one of the most efficient movers of coal (see Table 10). Ton-mile rates are, in part, a function of distance, with fixed charges spread over more miles for a longer haul. Other things being equal, a shorter haul would be expected to have a higher ton-mile rate.

U.S. coal export volumes are a relatively small portion of total coal production and transportation. And, export volumes are generally not supported by long-term contracts or purchase commitments. As a result, with the exception of several large-volume coal ports, the U.S. infrastructure is not dedicated to export, nor is there coal buyer investment in the infrastructure.

TABLE 10
Comparisons of Inland Transportation Rates

(Expressed in U.S. Dollars per Ton-Mile)

	Distance (miles)	Rate
United States		
LA/Long Beach	1250	$0.016
New Orleans (barge, including truck or rail origination)	1565	0.010
Hampton Roads	524	0.028
Australia		
New South Wales	90	0.083
Queensland	162	0.043
Colombia	95	0.084*
South Africa	310	0.021
Canada	700	0.022

*Estimated transportation costs as part of the integrated project.

Except for U.S. West Coast, U.S. rail rates are for tariffs. The U.S. West Coast rail rate should not be interpreted as an average or actual contract rate.

While it might be argued that the U.S. industry, because of its structure, is able to price coal and transportation at relatively low marginal costs, this is a dubious honor for several reasons:

- Because production and transportation are not integrated, pricing policies of producer and transporter may not be consistent, especially when cross-subsidy considerations arise;
- Marketing coal and transportation on an incremental basis does not allow the economics of scale from long-term dedicated infrastructure;
- Countries with dedicated coal export infrastructure have an incentive to price in order to maintain high capacity utilization.

As one U.S. government report stated: ". . . if the coal production-use-transport chain could be assured of high-capacity use for the economic life of the system, more favorable prices might result. . . . For the export market, the ultimate user would necessarily have to invest in the inland transportation system to reduce the long-term market risk."[34]

33. U.S. Department of Energy, *Final Report on U.S.-Italian Coal Logistics*, May 1986.

34. U.S. Department of Energy, *Report on Potential for Cost Reductions in Inland Transportation of U.S. Coal Exports* 1983; pp. 2.7-2.8.

Section V

Clean Coal Technology and Financial Assistance Programs: Linkage to Competitive Export Sales

Introduction

We have seen how both production costs and transportation costs of competing coal exporting countries impact the ability of the United States to compete in the worldwide coal trade market. This section examines two additional areas that can have an important bearing on the U.S. position. Financial assistance programs afforded by government export credit agencies of foreign exporting countries is one. The second has to do with the role research and development of clean coal/novel coal technologies and the subsequent linkage of these technologies with financial assistance/foreign aid programs can play as a marketing tool for U.S. coal.

This section outlines in broad terms the various programs offered by foreign government export credit agencies to establish how competing foreign exporters are assisted by their governments and explores some areas where existing U.S. financial assistance arrangements can be improved. The subject of research and development, both in the United States (public and/or private mix) and on an international collaborative basis, is addressed. And, finally, the linkage of clean coal technologies with financial assistance/foreign aid programs in order to give U.S. coal exporters a marketing tool is discussed.

Financial Assistance: A Factor in Securing Export Sales

The changing nature of the customers importing coal, the size and complexity of new powerplant projects that are creating a growing demand for steam coal in the world market, and the ability of these new customers to *pay* for the coal that will fuel their plants, were highlighted in Section II. Supplying these new markets and new customers was characterized as involving coal exporters in both larger capital outlays and higher risk than was the case for coking coal sales to established Western European and Japanese steel mills in the postwar years.

U.S. commercial banks and private insurance carriers are often unwilling to assume the risk of guaranteeing payment to the U.S. exporter. If they do, their fees for doing so quickly push the coal price—already high, for reasons detailed earlier—to levels that are even less competitive in the world market. The need for financial assistance programs arises as buyers of technology, for example, often comprise companies or organizations in the less-developed countries, where risk insurance and capital are very limited. Even in trade involving industrialized nations, there is a need to offer financial terms and conditions which are comparable to those available from other developed nations. Foreign buyers are increasingly influenced by the ability to use export contracts to obtain commercial credit and insurance offered by governmental export credit agencies, as exporters are unable to carry extended payment terms.

For coal-exporting competitors—Australia, Canada, South Africa, Colombia, Poland and increasingly, China—coal exports represent either

(1) a far higher percentage of their total coal output than is the case for the United States; *or*

(2) a source of hard currency critically important for financing imports.

Some of these countries have in place a variety of government-based export credit agencies whose policies encourage and assist their exporters. The financial assistance programs offered to exporters in most major industrial countries in North America, Europe and Asia reduce in varying degrees the risks more commonly encountered in international trade than in the domestic market. Such risks include:

(1) Operational risks—those related to not per-

forming at adequate production levels to satisfy contractual obligations (causal factors may include management, climate, local infrastructure, or environmental issues);

(2) Market risks—those associated with non-performance on the part of the buyer, due to techno-economic or commercial (as opposed to political or financial) factors;

(3) Political risks—such risks include losses from bonds (e.g., performance bonds) that are called without due cause, possible changes in ownership, conflagration, or direct market intervention from overseas governments; and

(4) Foreign exchange risks—these include foreign exchange rates, as well as currency convertability.

FINANCIAL ASSISTANCE PROGRAMS OF COMPETITORS AND OTHER INDUSTRIALIZED COUNTRIES

Exporting risks are addressed by various government export credit agencies in categories which include export credit insurance, financial guarantees, direct funding, refinancing and discounting. Table 11 illustrates the types of programs available in the major coal exporting countries of Australia, Canada, and South Africa. Data for Colombia, Poland, and China were not available. Information from France, Japan, the United Kingdom and West Germany is included as a means of establishing the extent to which these industrialized nations offer assistance to their exporters and provides a comparison with the United States. This broad overview of financial assistance programs of foreign countries, based on a study conducted by the Chase Manhattan Bank, N.A., is not intended to reflect programs or policies aimed solely at coal exports, but rather to demonstrate in general terms those programs available to exporters in foreign countries.

Australia

Export credit support in Australia is provided by the Export Finance and Insurance Corporation (EFIC), based on the Export Finance and Insurance Corporation Act of 1974. EFIC is an Australian Government Statutory Authority and conducts its business on a self-sustaining basis, with a board of directors appointed by the Governor General.

Export credit insurance is provided through fourteen types of policies designed to encourage and expand trade by protecting exporters against losses arising from a range of risks not usually covered by commercial insurers. The Comprehensive Policy, for example, provides cover on a whole turnover or an agreed selection basis for export raw materials, primary products, consumer goods, and light manufacturers. Cover can be provided from either date of shipment or date of contract. The Extended Terms Policy provides whole turnover cover for recurring business transacted on credit terms exceeding six months; under this policy, cover for losses incurred in closing out any forward exchange contracts due to an insured cause of loss during the pre-shipment period is also available. The Overseas Investment Insurance Policy offers coverage for overseas investments against the noncommercial risks of loss caused by expropriation, damage by a warlike action or the inability to transfer to Australia monies received as earnings on or return of the investment. This policy is available only for new direct investments which can assist in the economic and social development of the host country *and* provide benefits to Australia. Fees for these policies

TABLE 11
Government Export Credit Agencies

Country	Export Credit Insurance	Guarantees	Funding	Refinancing	Discounting
Australia	x	x	x		
Canada	x	x	x		
South Africa	x	x	x		
France	x		x	x	x
Japan	x	x	x		
United Kingdom	x	x	x		
West Germany	x		x	x	
United States	x	x	x		

SOURCES: Chase Manhatten Bank, N.A., *Chase Guide to Government Export Credit Agencies*. New York, New York, 1984.
EXIMBANK, *Financing and Insuring Exports: A User's Guide to Eximbank and FCIA Programs*. Washington, D.C., 1985.

vary; firm rates are quoted on receipt of a proposal. Average premium rate for comprehensive policies is less than 0.5 percent per annum.

Guarantees are offered by EFIC in order to facilitate the financing of extended-term transactions. Australian companies with an EFIC insurance policy may apply for EFIC guarantees. The Unconditional Guarantee of Banks and other Financial Institutions is provided for both supplier and buyer credits; the Agreement to Guarantee is used most often for bulk purchase of consumer goods.

Funding is provided by the EFIC Direct Lending Facility of up to 85 percent of the contract value for export transactions normally with terms of five years or longer. The transaction must be designed to match competitive financing offered by an EFIC counterpart in another country. EFIC must establish that its participation functions strictly as a matching operation. Fees are determined on an individual case basis, with the rate fixed for the life of the loan. The borrower pays a fixed establishment fee and commitment fee.

Canada

Export credit support in Canada is provided by the Export Development Corporation (EDC), a governmental body established in 1969, which offers export credit insurance, guarantees and funding through direct credits for buyers.

Export credit insurance is available through EDC in eight different types of policies covering risks of insolvency and protracted default; exchange transfer delay, cancellation of import or export license, or imposition of new licensing requirements; repudiation by the buyer where no breach of contract by the exporter exists (global policies only); war or revolution; and any other cause of loss beyond the control of both the exporter and buyer and not otherwise insurable. The short-term Global Shipments Policy covers up to 90 percent of the contract value from the time of shipment until payment is received. Individual transactions of capital goods and services, either from the effective date of contract or the shipment of goods until payment is received is covered by the Medium-term Specific Transaction Policy. The Consortium Insurance Policy protects members of an exporting consortium against the call of a performance instrument where the other members are unable to pay their respective shares. A fee schedule is not published.

Guarantees by the EDC exist to alleviate the seller's liquidity constraints and provide for risk layoff. Four guarantee policies are available which provide up to 100 percent coverage. Medium-term Specific Transaction Guarantees offer banks and other lenders unconditional coverage on non-recourse supplier financing. EDC insurance is required. Bid Security Guarantees cover a bank providing bid security to a foreign buyer on behalf of a Canadian exporter.

Funding in the form of direct credits to buyers is available through EDC to facilitate a buyer located overseas in obtaining Canadian goods. Long-term loans (five years or more) at both fixed and floating rates, are available to foreign buyers of Canadian capital goods and services. Funds are paid directly to Canadian suppliers on behalf of the borrower, effectively giving the exporter a cash sale. EDC has extended lines of credit under this program to a number of countries as a means of **opening the door for Canadian exporters** to bid on foreign projects. EDC looks to banks and other financial institutions to participate in parallel loans, co-lending or other forms of involvement in the EDC loans. The usual division of coverage/participation is for EDC to take 60 percent to 70 percent of the transaction value with the banks putting up the remaining 30 percent to 40 percent. Minimum fees are 0.5 percent per annum over the cost of funds.

South Africa

Credit Guarantee Insurance Corporation (CGIC), a private institution established in 1956, provides exporters in South Africa with export credit insurance against commercial and political risks. The government of South Africa reinsures the political and transfer risks covered by CGIC policies. The Industrial Development Corporation of South Africa Limited (IDC), a governmental body, offers post-shipment direct credits to suppliers and foreign buyers. Commercial banks in South Africa provide pre-shipment financing.

Export credit insurance is offered by CGIC in the form of seven different policies to any exporter registered and trading in South Africa. The All Markets Policy (comprehensive) covers post-shipment risk on all of an exporter's shipment to all countries; the Selected Markets Policy covers post-shipment risks for an exporter's shipment to one or more selected markets. The Pre-shipment Policy covers risks during the period between conclusion of sale and date of shipment and can apply to either an All Market Policy or Selected Market Policy. Fluctuations between rand/U.S. dollars on medium- to long-term contracts is covered by the Foreign Exchange Policy and is available only in conjunction with other medium- or long-term policies. Fees for

short-term policies average 0.05 percent to 2.50 percent while premiums for medium- to long-term transactions are determined on a case-by-case basis. Premiums for the foreign exchange policy are 1.0 percent per annum which is reinsured with the Reserve Bank.

Guarantees are offered by the CGIC through a local bank or financial institution which is financing an importer overseas by the Short Term Guarantee. Fees vary from 0.75 percent to 2.25 percent.

Funding of exports for medium- and long-term transactions is provided by the IDC up to 85 percent of the contract value for buyer credit transactions and up to the insured amount of the credit for supplier credit transactions. A CGIC insurance policy is required. Commitment fees are 0.5 percent per annum with rand interest rates varying between 9 percent and 9.5 percent.

France

The French export credit program provides inexpensive fixed rate long-term financing to foreign purchases of French goods and supports French suppliers with short, medium and long-term facilities. Their loans, made by commercial French banks, are refinanced or discounted by the French government at subsidized rates through the Banque Francaise du Commerce Exterieur. Export credit insurance is provided by Compagnie Francaise d'Assurance pour le Commerce Exterieur (COFACE). The French agencies have, at times, taken an aggressive stance in the competitiveness of terms offered on behalf of French exporters. Specifically, extended buyer credit facilities may be associated with soft loans or aid credits.

Export credit insurance provided by COFACE offers commercial and political risk insurance to exporters and banks in France through thirteen different policies. COFACE, a private, joint stock company owned by nationalized insurance companies and banks, carries out French government export credit policy. The Direction des Relations Economiques Exterieures (DREE), a division of the Ministry of Finance, approves all political and medium- and long-term commercial coverage. The PGS Policy offers commercial (comprehensive) and/or political (may be selective) risk coverage for export of services and technical assistance. Protection for exporters against losses due to expenses in excess of actual revenue derived from overseas marketing efforts is available through the Marketing Campaign Policy. COFACE also insures advance payment bonds. Policies cover between 80 percent and 90 percent of contract value. COFACE premium fees vary widely; specific fee ranges are not publicized.

Funding on a long-term direct basis is available to buyers of French exports, especially those of a project or project-related basis through the Banque Francaise du Commerce Exterieur (BFCE). This program operates as an adjunct to commercial bank financing and will generally fund 80 percent of the French content of goods and services being exported. Commitment fees and management fees, each ranging between 0.30 percent and 0.50 percent per annum, are charged. Financing is done at the Consensus rate for French francs.

Refinancing and Discounting provided by BFCE offers partial rediscount and refinance facilities to commercial banks operating in France in support of financing already extended at Consensus rates. COFACE insurance is required and the percentage of the contract or financed amount varies, as does the interest rate and fee charged.

Japan

Export support in Japan is provided by an arm of the Ministry of International Trade and Industry (MITI) for insurance and by a government agency, the Export-Import Bank of Japan (Japan Exim) for supplier and buyer credits. Japan's export credit support is possibly the broadest of any country. It is estimated that 55 percent of all Japanese exports are covered by either MITI insurance or Japan Exim loans or both.

Export credit insurance is issued by MITI to exporters and commercial banks in seven different policies covering only those risks not insurable with domestic companies. MITI insurance is a prerequisite for Japan Exim Export Supplier Credit. The General Export Insurance Policy is available on a specific or comprehensive basis to exporters whose transactions are normally completed within one year and covers 60 percent (specific basis) and 80 percent (comprehensive basis) of losses due to commercial causes and 95 percent of political risk losses. The Export Finance Insurance Policy covers banks during preshipment finance period for all types of goods and the Overseas Advertisement Insurance Policy covers 50 percent of losses arising from less than anticipated sales following an advertising program. Fees for premiums are a flat percentage of the policy amount.

Guarantees are made available to Japanese commercial banks for their participation in Japan Exim's direct credit to foreign entities. These banks are

protected against loss of principal and interest. Charges are a minimum of 0.30 percent per annum.

Funding is provided by Japan Exim by its participation in transactions where the size and tenor would make it difficult for commercial banks to fund the entire amount. These programs with nine subdivisions reflect the broad base with which Japan Exim covers this means of export support. The primary export credit is the Export Supplier Credit; here Japan Exim limits its involvement to major capital equipment and project transactions. The buyer credit in the form of a direct loan is extended to importers' banks but also is available to foreign governments or corporations for the import of Japanese capital equipment, industrial and chemical plants and technical service or investment in Japanese-led investments. The loan for Capital Subscription to Japanese Joint Venture provides funds to foreign corporations or individuals to participate in a joint venture with a Japanese firm. Stand-by letters of credit issued by a foreign government agency or acceptable international bank are required. Interest rates fluctuate along the Consensus Guidelines.

United Kingdom

Founded in 1919, the Export Credits Guarantee Department (ECGD), an agency of the government of the United Kingdom acting through the Secretary of State for Trade and Industry, is one of the oldest export credit agencies.

Export credit insurance is provided by the ECGD under the Export Guarantees and Overseas Investment Act of 1978. Ten types of policies are available under two broad classifications: "commercial," representing 75 percent of ECGD's activity, and "national interest." Export trade is classified as repetitive (standard or near-standard goods) and nonrepetitive (major projects or large captial goods contracts). The Comprehensive Short-term Guarantee covers political and commercial risks for repetitive trade; generally, the exporter's whole export turnover must be insured. Additional endorsements to this policy include the Supplemental Extended Terms Guarantee which provides extended preshipment periods or credit terms, the ability to insure foreign currency-denominated contracts at the prevailing exchange rate when coverage begins and coverage for losses arising from closing out a forward exchange contract or foreign currency borrowing used to finance the export. The External Trade Guarantee covers political and commercial risks of United Kingdom manufacturers, merchants and confirmers on transactions where goods are shipped directly from the supplying to the buying country without entering the United Kingdom. Fees vary according to policy, riders and endorsements.

Guarantees are available through several different policies offered by ECGD. Some suppliers would rather obtain a direct guarantee from ECGD to their banks than assign rights under insurance policies in support of overdraft, bills, or notes purchased. A direct guarantee usually renders such financing free from recourse to the exporter. Fees vary according to the type of policy provided.

Funding is available through an extension of the ECGD guarantee program by the Interest Make-up arrangement. Here, interest equalization is provided to banks that provide medium and long-term financing at fixed Consensus rates to suppliers and buyers of United Kingdom goods and services. Interest rates are normally set at Consensus minimums for country and tenor.

West Germany

Hermes Kreditversicherungs AG (HERMES), a private company, offers export credit insurance to exporters and banks on behalf and for account of West Germany. HERMES does not provide financing. The AKA Ausfuhrkredit-Gesellschaft (AKA), another private company owned by fifty-seven West German banks, provides various financing programs for supplies and buyer credits. Kreditanstalt fuer Wiederaufbau (KfW) was established in 1948 as a public company to administer Marshall Aid for the reconstruction of the German economy. From the mid-1950s on, this agency has moved to provide official export credits directly to foreign buyers or to German banks for relending to German suppliers. The West German government does not provide for the financing of exports; however, in the case of HERMES-covered exports to developing countries, the KfW and AKA (by means of a rediscount facility with the German Bundesbank) provide credits at subsidized rates.

Export credit insurance is provided by HERMES to any legally West German-domiciled exporter or bank through five different policies. The Cover to Exporters for supplier credit is typically used to cover shipments of goods to a foreign buyer and provides up to 85 percent of losses due to commercial risks and 90 percent of losses due to political risks. Cover to banks for their buyer credits is provided mainly for larger projects. HERMES insurance becomes effective when specific noncovered risks to banks are secured by means of an Exporter Guarantee from the supplier. Exchange Risk Cover applies to export contracts denominated in convert-

ible foreign currencies and becomes effective for up to 100 percent of payments two years after the signing of the export contract. Fees vary according to the obligor, either commercial or governmental, not between country risks or percentages of cover.

Within the overall framework of export insurance coverage, two special arrangements exist: Revolving Insurance, covering the total sales of an exporter to a single buyer with a maximum credit term for each transaction of two years; and Comprehensive Insurance, available to cover all of an exporter's short-term business with a number of buyers abroad with credit terms usually restricted to a maximum of 180 days.

Funding is offered by KfW which provides export financing, both buyer and supplier credits, to facilitate exports of certain capital goods to developing countries. Financing may be obtained only in the context of project work promotable by and/or in the specific interest of West Germany. HERMES insurance is required.

Refinancing is provided by AKA which facilitates the financing of private export credit to developing countries through three programs by pooling the resources of AKA member banks and by using the Deutsche Bundesbank rediscounting facility.

It should be noted that each country develops and maintains its own policies and procedures for each of the programs described above. Exporting companies seeking assistance from export credit agencies are usually subject to thorough investigation and must submit applications and attendant information and documentation in accordance with specific agency guidelines.

FINANCIAL ASSISTANCE PROGRAMS IN THE U.S.

Eximbank, an independent U.S. Government agency founded in 1934, helps to finance and facilitate the export of American goods and services through various programs in three major categories: Working Capital, Credit Risk Protection and Fixed Interest Rate Financing. There are two major divisions at Eximbank. The Exporter Credits, Guarantees and Insurance Division handles transactions having a repayment term up to five years. The Direct Credits and Financial Guarantees Division assists exporters with transactions that, as a rule, have a U.S. contract value of $10 million or more and a term of five years or more. The exception is the Engineering Multiplier Program, which has a maximum term of five years and no minimum U.S. contract value.

Export credit insurance is provided by the Foreign Credit Insurance Association (FCIA) which was created in 1961 by Eximbank and a group of private insurance companies. Eximbank insures the political risks under the various FCIA policies and either insures or reinsures all the commercial risks. FCIA, as Eximbank's agent, is responsible for marketing, servicing and administering the policy. Several different policies are offered to exporters in four broad groups. Policies for new exporters offer coverage for short-term sales of U.S. companies with relatively little export credit experience; applicants for these policies must meet export sales volume criteria and must not have held an FCIA policy in the past two years. Multibuyer policies provide coverage for exporters' short-term, medium-term or combined-term sales to many different buyers. Single-buyer policies insure medium-term sales to one buyer. Special coverage policies provide political risk insurance and insurance on exported services. Exporters can also obtain special endorsements for such events as nonacceptance of shipments, preshipment on a select or whole turnover basis and for payments in a foreign currency. Fees for premiums vary with the credit terms, exporter experience, the quality and number of buyers being insured and the importing countries.

Guarantees are available through Eximbank's Working Capital Guarantee Program which reduces a lender's risk on working capital loans made to creditworthy U.S. companies for export-related activities. Also, the Medium-Term Bank Guarantee encourages commercial lenders to purchase notes of creditworthy foreign buyers of U.S. exports by assuming all of the loss due to political risk and most of the loss due to commercial risks of nonpayment of the loans. Capital equipment and project-related services normally sold on terms of six months to five years are eligible.

Funding is available through several different specific programs and in conjunction with other assistance programs already discussed. The Medium-Term Credit Program and the Small Business Credit Program enable lenders to make medium-term, fixed-rate loans to foreign buyers at the minimum rates allowed under international guidelines by assuring lenders access to funds at one percent below the interest rate of the loan. Through the Direct Loan Program, Eximbank makes long-term loans to foreign buyers of U.S. exports when the U.S. supplier encounters subsidized, officially supported export credit.

Improving U.S. Financial Assistance Programs

The broad overview of U.S. financial assistance programs discussed above allows for a general comparison of export credit agency financial support programs offered by the United States and the major coal exporting countries of Australia, Canada, and South Africa, as well as the industrialized nations of France, Japan, the United Kingdom and West Germany. An informed comparison, specifically relating to assistance programs effectively utilized by coal exporters in these countries, is not addressed here, as it is outside the scope of this study. The subject of effective financial assistance programs offered by government export credit agencies may, in fact, be an area which could be studied in a subsequent report. The Federal Coal Export Commission, an industry/governmental group under the direction of the Department of Commerce, was established in the fall of 1985 to analyze the competitive position of U.S. coal. It considered a range of financial assistance issues in its work. Some of its preliminary findings are brought forward here.

One broad area of concern has to do with the terms and conditions of federally guaranteed insurance coverage. A specific provision, the existence of which, until recently, deterred coal exporters from using government insurance guarantees, was the policy of requiring the exporter to insure *all* short-term exports to all markets. Compliance with this "whole coverage" condition of the FCIA required the exporter to bear the cost of insurance coverage for transactions in minimal-risk as well as high-risk markets, a requirement that added to the exporter's costs on low-risk sales as well as high-risk sales. For the low-risk sales, the exporter normally would not seek such coverage. Recently, Eximbank revised this policy to permit U.S. exporters to be eligible for short-term insurance support (less that 180 days) for "single sale" transactions. This revision is viewed by coal exporters as a distinct improvement over prior policy. It should be particularly beneficial in sales to major high-risk buyers of U.S. coal, such as Brazilian steel mills.

Another restriction that has interfered with some sales has to do with the duration of the coverage. A 180-day limit on the insurance guarantee applies to coal sales. Yet some customers seek longer financing terms than 180 days and some exporting countries are reportedly willing to comply with those terms. Australia, Canada, and the Republic of South Africa are members, as is the United States, of the Berne Union, an international organization that establishes standard financing terms applicable to officially supported export credits. The Berne Union guidelines dictate a 180-day limit for insurance coverage on consumable goods. Not all exporting countries, however, are parties to this agreement. An objective of U.S. trade negotiations should be either to bring the countries that are not members of the Berne Union under the same guidelines or to seek greater flexibility for the group's members to match confirmed competition. This example is used to make a broader point. It is not argued that coverage exceeding 180 days will open vast new sales opportunities to U.S. exporters. But it is important that government and industry cooperate to understand the prevailing commercial practices and support policies of other exporting countries and that the U.S. Government consider appropriate responses.

One possible avenue to pursue in this regard would be the more effective usage of U.S. Consular offices to promote U.S. coal and coal technology. By establishing a higher level of awareness of U.S. coal and coal technology capabilities with these "U.S. representatives" in foreign countries, communication channels would be open for the U.S. coal exporter to become familiar with the customs, values, and business etiquette of overseas markets.

Other improvements to U.S. financial assistance programs which would benefit American coal exporters include:

(1) *Fast response mechanisms* to respond promptly to match overseas financial and risk insurance bids. Experienced lending personnel in U.S. financial institutions could accelerate the system's response time if given authorization to operate within certain financial limits.

(2) *Flexible exposure limits*. Current programs can offer financial and risk assistance only within pre-approved limits set by the government. More flexible parameters, perhaps offering lower percentage coverage, special bonds, or participation from private industrial sectors, could improve this area.

(3) *Establishing revolving cover and credits to specific buyer nations* would allow U.S. exporters to gain competitiveness if buyer nations could utilize pre-approved credit lines with the U.S. Government.

(4) *Selective criteria for coverage*. Financial and risk assistance programs could be tied to the multiplier effect of various industrial sectors. Those activities which generate the largest downstream economic benefit could receive priority funding. Also, priority funding could be

granted to U.S. industrial sectors that have recently suffered the most financial hardships.

(5) *Flexible terms and conditions* for insurance and credit should reflect those offered by other industrialized nations, and they should be revised regularly. Political and commercial risk could favor a variable premium policy. Of particular interest to less-developed countries would be provisions for cost escalation of buyers' contracts.

Many countries in Europe, the Far East and the Pacific have developed aggressive, well-organized trade commissions which utilize all the talents available to promote their products and technologies on a nationwide basis. Their efforts are organized toward a common goal. Some of our efforts in the U.S. are fragmented, with special interest groups representing regions, specific commodities, etc., competing not only with other countries but sometimes with each other. To become competitive, we must coordinate the various entities involved in any export endeavor to put a well-organized, complete "package on the table"—one that has the support of all entities, that reasonably protects everyone involved and that is not unduly burdened by our own regulatory process.

U.S. Research and Development Efforts

The United States Government, through the Departments of Energy and Commerce, supports research and development efforts for the development and the commercialization of new coal technologies. The Department of Energy's (DOE) objectives for international energy research and development collaboration in order to promote a balanced and mixed energy resource system are to

- Maximize the opportunities for early consultations with potential partners;
- Expand the opportunities to increase scientific and technological knowledge related to energy;
- Maximize the productivity and value of science and energy research and development investment;
- Improve the long-term energy security of the U.S. and our collaborating partners; and
- Improve overall U.S. international relations and a foreign view of the U.S. DOE as a reliable research and development partner.

In supporting these Departmental objectives, each fossil energy international collaborative project is designed to achieve at least one of the following:

- Supplement the domestic fossil energy program by facilitating a mutual exchange of information between the U.S. and other countries;
- Promote broader, deeper, and more rapid access to important foreign fossil energy research and technology development;
- Enhance the potential for the marketing and exporting of U.S. technology and products abroad; and/or
- Verify U.S. experimental results and broaden the applicability of those results.

Within DOE, the Office of Fossil Energy (FE) currently participates in thirty-eight bilateral research and development agreements. Of these, nineteen are related to various coal technology areas. In addition, FE cooperates in three multilateral agreements through the International Energy Agency (IEA) that involve several coal technologies. Yet with the exception of certain bilateral programs (i.e., with Italy, which terminated in 1985) and those of the IEA, at present there is no single major program to promote collaboration on clean coal technology.

Rather, current efforts in this area at both U.S. Departments of Commerce and Energy could be characterized as directed toward the dissemination of this information. One example is the "Coal Technology Reference Guide," published some time ago by the International Trade Administration (part of the U.S. Department of Commerce) in collaboration with the Department of Energy.

In the last several years, the United States has cooperated with the other twenty IEA member countries to produce a review of clean coal technology and to organize a series of international workshops on research and development in coal utilization technology. These efforts are important, but hardly adequate, considering coal's important role as an oil substitute and its contribution to the generation of electricity worldwide. A recent report of the Coal Industry Advisory Board (CIAB) of the International Energy Agency to the Energy Ministers of the member countries commented critically on this situation:

> The low percentage of research, development and demonstration resources allocated to coal by OECD Member governments, and to which the CIAB has drawn attention repeatedly in the past, has not been materially improved. In the CIAB's statement to the IEA Governing Board at Ministerial Level on July 9, 1985, Members noted the discrepancy between coal's contribution to electricity generation in the IEA countries and the share of public expenditures devoted to research and development of new technol-

ogy for coal-fired generation of electricity. In that statement the CIAB cited 1983 statistics showing that coal-related R&D funding was only 3 percent of total electricity generation R&D expenditures. Comparable 1985 data show only a slight improvement in coal's share of expenditures—to 3.6 percent of the total.[35] This, despite the fact that coal-fired generation accounts for 41.1 percent of electricity generated in IEA countries.

Research and development efforts for coal and clean coal technologies offer the potential for helping and promoting U.S. coal exports. For example, if U.S. coal technologies can be "packaged" with U.S. coals it could give U.S. exporters a marketing advantage. This would be particularly true if the U.S. coals had been successfully used and demonstrated with the technology. U.S. coal exports could also benefit directly from clean coal technologies which would permit higher sulfur coals to be utilized more widely. The United States has the potential to export higher sulfur, lower cost coal, but demand is limited because of quality constraints. Clean coal technologies offer the potential of opening up the export market to higher sulfur coals.

U.S. Federal Funding for Clean Coal Technologies

On March 18, 1987, President Reagan announced several steps to ensure a continued close working relationship between the United States and Canada in determining and addressing the environmental effects of acid rain. The centerpiece of the President's initiative was his directive to seek $2.5 billion over a five-year period to fund innovative clean coal technology demonstrations. The commitment represents the full amount of the government's share of funding recommended by the Special Envoys on Acid Rain (Drew Lewis of the United States and William Davis of Canada) in their January 1986 report to the President and Prime Minister Mulroney.

The Clean Coal Program to be carried out by the Department of Energy will be comprised of two principle categories of technology-retrofit emission controls and coal-based repowering options.

Retrofit technology will be important if the nation ultimately chooses to impose more stringent requirements on existing, pre-New Source Performance Standards power facilities. Concepts such as limestone injection, in-duct desulfurization and natural gas reburning could be called into use if scientific analyses show that there is a need to move faster to control older plants than normal market forces would dictate.

The second category of eligible projects will involve repowering technologies. Here the potential environmental benefits are just as great as for the retrofit concepts, perhaps even more so. But the repowering concepts offer much more than just emission reduction. Technologies such as atmospheric fluidized bed, pressurized fluidized bed and integrated gasification combined cycle have the potential to be more effective in terms of both environmental controls and costs than today's power systems.

Another area of coal technology that deserves consideration for funding by both the U.S. Government and private industry is coal slurries. This technology could ultimately improve U.S. competitiveness. There are two major categories of coal slurries, transportation slurries and combustible or fuel slurries for direct use as alternatives to oil. Combustible coal slurry represents a clean coal technology which the United States has strongly fostered and was preeminent in as recently as two or three years ago. Coal slurries are being pursued aggressively by Japan, China, Canada, Australia and other countries.

Clean Coal Technologies/U.S. Coal Exports: Linkage to Increased Competitiveness

In a recent appearance before the Subcommittee on Energy Research and Development, Senate Committee on Energy and Natural Resources, J. Allen Wampler, Assistant Secretary for Fossil Energy, made the following statement:

> The availability of demonstrated clean coal hardware can give America a substantial marketing advantage overseas. . . . Because America's clean coal projects will provide commercial-scale performance data using U.S. coals, the potential exists to link U.S. coal exports and U.S. technology in a way that enhances America's competitiveness in both. The "packaging" of U.S. coal and the technology to use it cleanly and efficiently can become an important byproduct of the Nation's clean coal technology program.[36]

The role of U.S. coal technology in enhancing the image and competitiveness of U.S. coals has recently gained some attention. While few less-developed countries and newly industrialized countries worry particularly about environmental concerns,

35. Energy Research, *Development and Demonstration in the IEA*, 1985 Data.

36. U.S. Department of Energy, *DOE This Month*, 1987.

many clean-burning technologies also improve fuel efficiency. Moreover, there are U.S. technologies presently available that may be immediately beneficial to overseas coal users—either those with poor quality domestic coals or who import coals. These technologies include:

(1) advanced design burners that provide for more complete combustion, thus reducing particulate, sulfur and NOx emissions;

(2) post-combustion systems that reduce both particulate and gaseous emissions, thus increasing the range of coals that can be burned; and

(3) pre-combustion technologies which upgrade the quality of carbonaceous fuels.

Another area of linkage opportunities has to do with the coordination of coal utilization technology sales and fuels sales. Those supporting such linkage ask that if government export credit assistance is employed for sales of U.S.-manufactured coal-burning equipment, the sale of U.S.-produced coal to fuel that equipment be linked to the capital goods sale. A companion provision of such linkage might include the extension of short-term financing to cover coal sales that are a by-product of coal utilization equipment exports.

Representatives of the equipment industries in question understandably resist provisions that would restrict their flexibility in the intensely competitive international power generation equipment market. Nevertheless, it should be feasible for the two sectors to work in a mutually supportive posture in the international market, and some prudently employed government incentives might assist in nurturing such relationships. As an example, the U.S. government might require equipment companies to solicit fuel supply proposals from U.S. coal producers and submit them to the buyer with their equipment proposal in order to qualify for export credit assistance. At the very least, this would raise the level of awareness of the U.S. exporter concerning major power projects, and it would make the foreign equipment buyer more familiar with U.S. coal suppliers at a very early stage in the process.

Foreign aid is another type of assistance, albeit more indirect, that can be used to promote coal exports to less developed countries. As the energy demand projections cited in Section I showed, the growth rates for these countries will surpass those of the advanced industrial countries. They need a power generation infrastructure to support economic growth.

The use of U.S. foreign aid to assist developing countries to diversify their energy resource bases serves several important national security and economic objectives, particularly when the funds are devoted to coal-fired power generation. Reliance on coal reduces these countries' dependence on imported oil, which, in turn, reduces OPEC's worldwide leverage. When the coal option is selected over nuclear, it also means the use of a technology that may be better suited to the technical and managerial capabilities of the recipient country, one involving less risk of serious damage to the global environment if the technology is not employed safely.

Funds from the U.S. Agency for International Development (A.I.D.) have been used for technical assistance to train participants from the ASEAN countries in the use of coal technology and to provide partial funding of coal-fired energy projects. The International Development Cooperation Agency's Trade and Development Program (TDP) has employed its funds to finance feasibility studies by U.S. firms of development projects with a potential for generating U.S. exports.

Section VI

Non-Competitive Indigenous Coal Production— Opportunities for Increased Exports

Introduction

The purpose of this section is to review the coal-related trade practices of major coal importers, to identify where government intervention by coal-importing countries restricts access by U.S. coal exporters and to discuss possible approaches to reducing trade barriers and thereby promote opportunities for U.S. coal sales. This means focusing on a half-dozen countries, for although the number of countries importing United States coal is quite large, the number with policies protecting substantial indigenous production is little more than a handful.

SURVEY OF TRADE RESTRICTIONS IN MAJOR COAL IMPORTING COUNTRIES

In 1986, coal producers in the United States exported metallurgical and steam coal to more than forty countries in Europe, North and South America, Asia, Africa and Oceania. Six of these countries (the United Kingdom, West Germany, Spain, France, Belgium and Japan) maintain domestic coal industries which account for a significant share of their total coal use. Through a variety of mechanisms, these countries protect even the inefficient sectors of coal industries from foreign competition. Key 1985 coal statistics as well as the estimated 1986 United States trade balance for these countries are shown in Table 12.

These six countries consume over 400 million tons of hard coal annually, of which about 60 percent is produced domestically and 40 percent is imported. The share of imports in total hard coal consumption ranges from a high of 85 percent in Japan to a low of 10 percent in West Germany. Some segments of hard coal industries in these countries, such as the new open-cast mines in the British Midlands, are efficient and probably competitive at current world coal prices. Other segments serve industries and end-users not easily accessible to coal

TABLE 12

Country Comparison of Coal Consumption, Production and U.S. Trade Balance

Country	1985 Hard Coal Consumed*	1985 Hard Coal Produced*	1986 U.S. Trade Balance (est.)**
United Kingdom	114	100	$– 4.6 billion
West Germany	109	98	$–15.6 billion
Spain	27	18	$– 0.1 billion
France	34	17	$– 3.4 billion
Belgium	16	6	$+ 1.1 billion
Japan	120	18	$–59.7 billion
TOTAL	**420**	**257**	**$–82.3 billion**

*million tons

**minus indicates negative balance of trade

SOURCES: Eurostate Energy Statistics
Japanese Government Published Statistics
Estimates Based On U.S. Department of Commerce Data

imports with a current infrastructure. A large proportion of the coal produced in these countries, however, involves high cost, sometimes $100 per ton or more, and can maintain its market only through extensive trade restrictions. Reduction of these trade barriers would not only open up new markets for internationally traded coal but would also encourage new investment in plant and infrastructure designed to move and utilize inexpensive imported coal. Furthermore, the tonnage at stake is quite large relative to the current volume of world coal trade estimates at about 300 million tons in 1986.

Table 12 also shows estimated 1986 merchandise trade balances of these countries with the United States. In total, the group ran a balance of trade surplus with the United States, estimated at $82.3 billion in 1986, with the largest surplus in Japan ($59.7 billion) and West Germany ($15.6 billion). In the group, only Belgium had a trade deficit with the United States last year. Although an increase in U.S. coal exports could not by itself reduce these surpluses substantially, at least several billion dollars in potential coal trade is at issue.

The following sections describe specific trade barriers in each of these countries.

United Kingdom

The British coal industry has undergone major restructuring in the past several years, with many of the most inefficient mines closed. Nonetheless, the coal industry in the United Kingdom is heavily protected from foreign competition by a variety of factors. Foremost is a contract between government-owned British Coal and the government-owned Central Electricity Generating Board (CEGB), covering 80 million tons of coal deliveries for electric power production. Under the current terms of the contract 55 million tons are supplied at a negotiated price of 43 pounds per ton at the mine ($68 per ton at the current exchange rate). Eleven million tons are sold at a fuel oil parity price, currently about 31 pounds ($49) per ton, and 13 million tons are sold at international prices. The average mine-mouth price for this coal is thus about $61 per ton, at least $20 per ton above the current C.I.F. prices of high-quality U.S. and other internationally traded steam coals.

This cost is borne primarily by British electricity consumers. Even at these high prices, however, a direct operating subsidy is required from the Government. According to EEC figures reported in the *Financial Times* (February 1987), direct subsidies in the United Kingdom amounted to about $2.00 per ton in 1986. The total subsidy to the industry was over $200 million, triple the 1985 total. This subsidy is unevenly distributed with some high cost mines reported to impose a burden of as much as $25 per ton, and others able to compete quite handily with world market prices.

A final restriction on imports is a general concern over opposition from trade unions, including not only the mine workers, but also transport workers and other labor groups, which serves to discourage not only the CEGB but other industrial coal users from importing coal in large quantities.

United States exports to the United Kingdom in 1986 were 2.9 million tons, predominantly metallurgical coal. U.S. steam coal exports in 1985 were only 0.5 million tons. Total steam coal imports that year were just over six million tons, despite total hard coal consumption of well over 100 million tons. Clearly, there would be opportunity for additional competitively-priced imports to supply a larger share of the U.K. electric utility and industrial markets. The total tonnage which could be replaced by imports is unclear, since high inland freight costs make it difficult for imported coal to reach some facilities.

At present, the United Kingdom has about 33 GW of coal-fired capacity in power plants larger than 400 MW. Most of these power plants are designed to receive coal directly from U.K. mines by rail. About one-third of this capacity, however, is located on or within twenty miles of the coast or the Thames. Overall, it is likely that at least ten million tons of additional imports could move to the United Kingdom immediately and another ten million tons within the one or two-year period required to make modest infrastructure improvements to receive imported coal. In the longer term, the CEGB itself has indicated that up to 30 million tons of imports could be used if new coal-fired stations were built on coastal sites.

West Germany

According to recent EEC figures (also reported in the *Financial Times* in February 1987), direct subsidies to current production in West Germany were almost $30 per ton in 1986 and totalled more than $2.5 billion that year. Despite this heavy financial burden and an annual coal consumption level of roughly 110 million tons of hard coal, West Germany imported only about ten million tons in 1985, including only 1.2 million tons from the United States and exported a nearly equal amount.

West Germany has one of the most complex and restrictive coal import structures of all countries surveyed. Since 1959, imports have been controlled both in quantity and geographical distribution by a licensing system. Several revisions over the years have provided for somewhat more flexibility as to quantity and origin of imported coal, but the domestic coal industry remains heavily protected.

The cornerstone of the system is a long-range, government-facilitated agreement (called the Century Contract) between the coal mining industry and the electric industry which ensures the amount of domestic coal that will be consumed by West German powerplants. The Century Contract, signed in 1980, requires annual domestic coal purchases by electric power plants of 47 million tons per year in the 1986-90 period and 51 million tons per year in the 1991-95 period. Once these requirements are satisfied, utilities may import coal according to strict rules:

- An historical quota, controlled primarily by traders, allows a total of 5.6 million tons per year of imports.
- Other imports are permitted in the ratio of one ton of imports for each two tons of domestic coal used through 1987 and one ton of imports for every ton of domestic coal used in 1988 and afterwards.

The fundamental problem with the system is that the West German utility coal burn has fallen short of expectations, so that the full coal requirements are covered by the domestic coal offtake requirements plus a portion of the historical import quota, leaving no demand left for new imports. This situation is expected to persist into the 1990s.

How much of the West German coal consumed by powerplants would be displaced by imported coal if the latter were permitted free entry at world market prices is a matter that deserves attention. A member of the German Coal Importers' Association recently estimated that over a period of time some 44 million tons of West German hard coal production would be replaced by imported coal if all subsidies and restrictions were to be removed. That represents roughly 50 percent of total West German hard coal production. It would also represent a major expansion of demand from steam coal traded on the world market if these needs were to be covered by coal-exporting countries.

Spain

Spain's domestic hard coal production has more than doubled in the past thirteen years to more than 25 million tons. In this respect, it is unlike most of the other countries highlighted here, where the pattern has been for domestic production to be either static or to decline. Nonetheless, the Spanish coal industry requires extensive support to maintain its markets. HUNOSA, the Spanish state coal company, produced about four million tons in 1986 at an average cost of $145 per ton, approximately $80 per ton above the prevailing average coal price in Spain. Other state mining companies under the direction of the National Institute of Industry produce additional tonnage. Marketability of this coal is assured by an import licensing system. U.S. exports to Spain were 2.6 million tons in 1986.

France

Although France continues to maintain an expensive domestic coal industry, successive governments have reduced the size and scope of the industry substantially, and further significant reductions are expected in the future. Hard coal production in 1986 totalled 16 million tons, down from over 20 million tons in 1980. The cost of this coal, however, remains high, with a direct government subsidy reported to be almost $0.5 billion in 1986, or $25 per ton. Despite maintenance of this industry, France is one of the largest coal importing countries in the world, with 1985 purchases of over 20 million tons. France is one of the single largest buyers of U.S. coal, importing over four million tons from the United States in 1985, and 5.4 million tons in 1986. Overall, however, French coal consumption has been declining rapidly because of its highly successful nuclear power program and declining steel production. An accelerated reduction of domestic coal production is probably the most likely avenue to increased international coal purchases.

The government exercises control over imports though the Association Technique de l'Importation Charbonniere (ATIC), the single organization which for the time being has exclusive rights to import coal on behalf of domestic buyers. ATIC therefore has the ability to carry out the coal import policy of the national government. In practice, ATIC has purchased coal freely and actively on the world market based almost exclusively on commercial grounds.

Belgium

Belgium produced about six million tons of hard coal in 1986, with an average subsidy of $270 million or $45 per ton. As in the case of West Germany,

Spain and Japan, an import licensing system protects the domestic coal industry. Although the Belgian Government has recently expressed its desire to reduce annual domestic production by 50 percent, coal production is concentrated in areas of high unemployment, and the issue has been highly contended.

Japan

Japan also maintains a high cost domestic coal industry. Although domestic coal production is only a small share (15 percent) of coal use, the Japanese coal industry is highly uneconomic and maintained solely for domestic political reasons. In 1986, Japan produced five million tons of coking coal at an average cost of $135 per ton and thirteen million tons of steam coal at an average cost of $110 per ton. The Ministry of International Trade and Industry assures an outlet for this coal through import licenses granted to coal users only if the user is consuming an appropriate amount of domestic coal. Pressure has been mounting recently to reduce coking coal production in light of competitive pressures on the steel mills, and the Japanese government recently made the decision to reduce domestic coal output from 18 million to 11 million tons per year by 1991. This decision, however, would leave most of the steam coal production in place. Accelerated phase-out of all Japanese coal production could increase the market for internationally traded coals significantly.

Other Countries

A number of other countries, including Taiwan, Korea, Indonesia, Norway, Greece and others, also maintain domestic coal industries, some segments of which may be uneconomic at current world coal price levels. Overall, however, it was judged that the six countries outlined above warrant the major emphasis in this discussion.

POTENTIAL IMPACTS ON INTERNATIONAL COAL TRADE

As noted earlier, reduction of coal trade barriers would not only allow end-users in these countries to purchase more attractive imported coal, it would also encourage investments in new facilities and infrastructure designed to move and use imported coal efficiently. As a result, the expansion of the international coal market resulting from this restructuring would probably increase over time. Although estimates are highly judgmental, eliminating coal trade barriers in these six countries would probably create an increase in demand for internationally traded coal of 50-60 million tons in the near term and 100-150 million tons within ten years. Such an increase would be the equivalent of a 15-20 percent increase in coal trade in the near term and 30-50 percent within ten years with a total value to exporters of $2 to 2.5 billion per year in the near term and $4-6 billion per year within ten years. U.S. exporters would undoubtedly benefit by capturing a share of such an expanded market. Moreover, the cost to consumers in these countries would be substantially reduced, resulting in a net economic gain for all involved.

UNITED STATES GOVERNMENT ACTIONS TO REDUCE COAL TRADE BARRIERS

It is recognized that the previously discussed countries have supported their coal industries for a variety of reasons which include national security, energy self-sufficiency and employment. In trade negotiations, the United States must convince these countries that it is a stable and reliable supplier. Further, by opening markets for more coal imports, these countries can reduce their costs. For such an approach to be meaningfully received, the United States should keep its own market open to free trade.

The issue of trade barriers in international coal trade has been recognized for some time within the U.S. Government. The U.S. Trade Representative, State Department, Department of Energy and Commerce Department have efforts underway to reduce these trade barriers. These efforts, however, are limited and fragmented.

The Office of the Special Trade Representative has one person assigned to energy issues, and that person is charged with covering everything in the energy arena from petrochemicals to oil, gas, electricity, uranium, fertilizers, basic inorganic chemicals, other natural resources and finally, coal. People assigned to a country-specific area, such as Japan, may touch on coal, but given the rich array of trade issues involving Japan, the three-person Japanese country team can scarcely be expected to do the coal issue justice. The Department of State and Department of Energy have pursued reduction of coal trade barriers for at least the last ten years, primarily through the International Energy Agency in Paris, on the grounds that the overall energy security of the IEA countries would be enhanced by facilitating an increase in international coal

trade. Finally, the U.S. Department of Commerce contributes to the effort as a part of its overall effort to promote U.S. trade and reduce trade barriers.

It is likely that these U.S. Government activities have made a positive contribution to the recent trend of reducing high cost coal production in the major coal-importing countries. It is also clear, however, that the process has been slow and has a long way to go. One fundamental reason for the slow pace of progress is that the subsidies and trade barriers at issue are outside the scope of the legal agreements and measures designed to promote free trade. The General Agreement on Tariffs and Trade, for example, specifically exempts the types of domestic subsidies discussed in this section. The coal trade barriers under discussion do not involve either subsidization of export coal or unfair trade practices regarding coal sales into the United States, either of which would be subject to existing legal remedies.

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Appendix A

Letters from the Secretary of Energy and the Response of The National Coal Council

THE SECRETARY OF ENERGY
WASHINGTON, D.C.

August 21, 1986

Dear Mr. McGlothlin:

Thank you for your letter of June 6, 1986, concerning issues of concern to the National Coal Council.

I appreciate the work the Council has done on various issues outlined in my letter of September 4, 1985. I believe studies of the following two issues would be of benefit to the Department of Energy:

1. Improved International Competitiveness for US Coal and Technologies.

   Evaluate what can be done to make US coal more competitive in international markets. This evaluation should include: consideration of the long-term availability of coal for export from coal producing countries, their long-term reliability, their ability to sustain current coal exports, the inpact of new coal-using technologies on international coal trade, and the factors influencing the price of US coal in international trade.

2. Conduct a strenuous critique of the demonstrated coal reserve data base.

   Evaluate how well the national assessment of quantity and quality of coal represented as being practically available for mining can be supported by data on local knowledge of ownership patterns, bypassed reserves, extraction practices, constraints, etc. Special emphasis should be given to coals where there could be a significant future demand by virtue of special characteristics, such as low sulphur, low ash, and ease of cleansing, etc.

Additionally, I understand from Under Secretary Salgado that you will discuss with the Executive Committee the need to do a broad based study of the Surface Mining and Reclamation Act. Please advise me of the results of the discussion.

Best wishes.

Yours truly,

John S. Herrington

Mr. James McGlothlin
Chairman
National Coal Council
PO Box 17370
Arlington, VA 22216

THE NATIONAL COAL COUNCIL, INC.
Post Office Box 17370, Arlington, Virginia 22216
(703) 527-1191

November 11, 1986

The Honorable John S. Herrington
Secretary of Energy
1000 Independence Avenue
Washington, D. C.

Dear Mr. Secretary:

On behalf of the members of the National Coal Council, let me express our very deep appreciation for visiting with us during our recently completed meeting in Texas. We were very encouraged by your fine remarks and honored to have had you with us again.

At the meeting of the Full Council, we passed resolutions to request your agreement for us to conduct three important studies. Two of these were in response to your letter to us and the third was generated by the members. Accordingly, I do hereby formally request that you authorize the National Coal Council to conduct a study and make recommendations regarding each of the folowing areas:

1. Improving the International Competitiveness of U.S. Coal and Coal Technologies

2. (a) The Demonstrated Coal Reserve data base of the U.S. and to determine and identify any substantially incomplete areas in such data base, if any exist; and

   (b) The degree to which State and Federal statutes, regulations, enforcement agencies, and regulators impact the amount of workable reserves identifies in such data base.

3. The impact on the U.S. economy of substituting coal for imported energy

Mr. Secretary, we look forward to your early favorable consideration of our requests, and hope to hear from you soon as we are eager to begin our efforts.

Again, our most sincere thanks for taking the time from your most busy schedule to be with us. We look forward to continuing to serve and advise you.

With warmest best wishes and personal regards.

Yours very truly,

James W. McGlothlin

James McGlothlin
Chairman

THE SECRETARY OF ENERGY
WASHINGTON, D.C.

November 26, 1986

Mr. James McGlothlin
Chairman
National Coal Council
United Coal Company
P.O. Box 1280
Bristol, Virginia 24203

Dear Mr. McGlothlin:

In response to your November 11, 1986, letter, I authorize the National Coal Council (NCC) to conduct a study and make recommendations regarding each of the following areas:

(1) Improving the International Competitiveness of U.S. Coal and Coal Technologies. Specifically, I request the NCC's advice on what barriers prohibit U.S. coal and coal technologies from freely competing in the international marketplace and recommendations for improving the competitiveness of the U.S. in these markets. It is recommended that you build upon studies on the subject that have been completed or are underway.

(2) (a) The Demonstrated Coal Reserve Data Base of the U.S. and to determine and identify any substantially incomplete areas in such data base, if any exist; and

(b) The degree to which State and Federal statutes, regulations, enforcement agencies, and regulators impact the amount of workable reserves identified in such data base.

It is recognized that an extensive coal data base exists. However, it is possible that there are important gaps in the data base(s) which may result in lack of available and necessary data for policy analyses, domestic and international coal marketing and other purposes. Therefore, I am requesting the NCC's advice on the gaps that exist in the data base, if any, and the impacts the U.S. regulatory system is having on workable reserves and recommendations to deal with any shortcomings identified.

(3) The impact on the U.S. economy of substituting coal for imported energy. A complete accounting by the NCC of the value to the U.S. economy of using U.S. coal in lieu of imported energy should be of great value in the development of National energy and economic policies for the U.S.

It was a pleasure meeting with you and the full NCC in Texas. The four reports you provided to me in August were of extremely high quality and of great value. Deputy Secretary Martin advised me of the extensive discussions at the Coal Policy Committee Meeting on the new requested studies. I look forward to receiving future reports that will be of equal or even greater value than those you have already submitted.

Yours truly,

John S. Herrington

John S. Herrington

Appendix B

Description of The National Coal Council

Recognizing the valuable contribution of the industry advice provided over the years to the Executive Branch by the National Petroleum Council and the extremely critical importance of the role of coal to America and the world's energy mix for the future, the idea of a similar advisory group for the coal industry was put forward in 1984 by the White House Conference on Coal. The opportunity for the coal industry to have an objective window into the Executive Branch drew overwhelming support.

In the fall of 1984, The National Coal Council was chartered and in April of 1985, Secretary of Energy John Herrington, made the Council fully operational. Secretary Herrington's action was based on his conviction that such an industry advisory council could make a vital contribution to America's energy security by providing him with information that could help shape policies leading to the increased production and use of coal and, in turn, decreased dependence on other, less abundant, more costly and less secure sources of energy.

The Council is chartered by the Secretary of Energy under the Federal Advisory Committee Act. The purpose of The National Coal Council is solely to advise, inform and make recommendations to the Secretary of Energy with respect to any matter relating to coal or the coal industry that he may request.

The National Coal Council does not engage in any of the usual trade association activities. It specifically does not engage in lobbying efforts. The Council does not represent any one segment of the coal or coal related industry nor the views of any one particular part of the country. It is instead to be a broad, objective advisory group whose approach is national in scope. Matters which the Secretary of Energy would like to have considered by the Council are submitted as a request in the form of a letter outlining the nature and scope of the study. The request is then referred to the Coal Policy Committee which makes a recommendation to the Council. The Council reserves the right to decide whether or not it will consider any matter referred to it.

The first major studies undertaken by The National Coal Council at the request of the Secretary of Energy were presented to the Secretary of Energy in the summer of 1986, barely one year after the start up of the Council. These reports covered: Coal Conversion, Clean Coal Technologies and Interstate Transmission of Electricity.

The Council also can determine topics which it believes significant for study and then seek the approval of the Secretary to proceed, as in the case of the study of New Source Performance Standards for Industrial Boilers, also completed in 1986.

Members of The National Coal Council are appointed by the Secretary of Energy and represent all segments of coal interests and geographical disbursement. The National Coal Council is headed by a Chairman and a Vice-Chairman who are elected by the Council. The Council is supported entirely by voluntary contributions from its members.

Appendix C

The National Coal Council Membership Roster 1986-1987

CHAIRMAN

Mr. James W. McGlothlin
President/CEO
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Appendix D

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