THE ROLE OF U.S. COAL IN ENERGY, THE ECONOMY, AND THE ENVIRONMENT

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Prepared By

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OVERVIEW

The future of the U.S. coal industry is inextricably bound to public policies concerning energy, the economy and the environment. The purpose of this paper is to:

- Discuss the status of the U.S. coal industry; and
- Review the implications of coal's role in U.S. energy, economic and environmental policies.

The potential of clean coal technology provides an enormous future opportunity for the United States. Energy efficiency can be improved and the environment protected while coal use expands to generate electricity, promote growth and improve the nation's balance of payments. Coal, the nation's largest source of domestic energy, contributes both directly and indirectly to the U.S. economy.

- *Direct Economic Contribution.* The $21 billion in current value of annual coal production yields an impact of $81 billion on the economy. While many U.S. industries have declined over the past two decades, the U.S. coal industry has increased its export position. The abundant coal resources of the U.S. provide opportunities to improve the nation's balance of trade in the 1990s, strengthen basic infrastructure, and employ advanced technologies in the U.S. and overseas.

- *Indirect Economic Contribution.* The U.S. economy and the standard of living it supports depend on coal, primarily in the form of electricity. Electric power is the largest and fastest growing end-use sector in energy. Coal is the principal fuel used to generate electricity. Availability of low cost coal has enhanced the electrification of the U.S. economy.

CONTRIBUTION TO U.S. ENERGY REQUIREMENTS

For nearly a decade, coal has accounted for the largest share of U.S. primary energy production. Coal's role in the U.S. energy mix is projected to expand further, according to the U.S. Department of Energy, from 30 percent in 1991 to about 35 percent in 2010:

U.S. PRIMARY ENERGY PRODUCTION
(quadrillion Btu)

	1970	1991	2010
Coal	14.6	21.6	28.8
Gas	21.7	18.3	20.8
Oil	22.9	18.0	15.3
Nuclear	0.2	6.5	6.9
Hydro/Other	2.6	6.7	10.1
	62.1	71.1	82.0

Source: Energy Information Administration, 1/93

Coal is the nation's most abundant energy resource. The U.S. coal reserve base is 475 billion short tons, with proved recoverable reserves estimated at 261 billion tons (Source: DOE/EIA, 1993). It should be noted that the National Coal Council projected substantially less recoverable reserves, approximately 170 billion tons (Reserve Data Base, National Coal Council, 1987). By comparison, coal production in 1992 was 1.0 billion tons. Coal reserves are broadly distributed over 38 states. States with the most reserves are: Montana, Illinois, Wyoming, West Virginia, Kentucky, Pennsylvania, Ohio, Colorado, Texas, and Indiana.

Consumption

Coal supplies nearly one-fourth of the total U.S. energy consumption. Annual coal use currently is equivalent to nearly 7 billion barrels of oil which approximates the nation's annual petroleum imports. Domestic electric utilities are the primary market for U.S. coal, accounting for nearly 80 percent of U.S. production:

CONSUMPTION OF U.S. COAL
(million tons)

	1970	1991	2010
Electric Utilities	320	772	1006
Export	72	109	235
Industrial/Retail	106	82	98
Coking	97	34	31
	595	997	1370

Source: Energy Information Administration, 1/93

One of coal's most significant contributions to U.S. energy supply has been to reduce the use of imported oil and gas as utility boiler fuels. Coal's share of electric generation increased from 44 percent in 1970 to about 56 percent in 1992. Most of this increase arose through the reduced reliance on oil and gas. Annual oil consumption for electric power generation fell by 211 million barrels between 1971 and 1991. If oil had maintained its share of U.S. electric generation, utilities would have consumed 2.5-3.0 times more oil in 1991 or over 500 million barrels.

ROLE OF COAL IN THE U.S. ECONOMY

Our economy and standard of living depend on coal, primarily in the form of electricity. Coal's relationship to the economy is two-fold:

- As the primary source of electric power, a major factor in America's growth and prosperity.

- As a direct provider of employment, wages, profits and tax revenues in the mining sector. In addition, the coal industry is an indirect provider of employment in the transportation and service sectors.

Coal and Electric Power

Electric power generation is, by far, the largest and chief growth market for coal. Nearly 80 percent of the one billion tons of coal produced in the U.S. is used to generate electricity. Conversely, the electric power industry is dependent upon coal for about 56 percent of all generation.

Electricity is our nation's largest end-use sector of energy, accounting for 35 percent of primary energy use. Twenty years ago, electricity met 25 percent of America's energy needs. According to the Department of Energy, the importance of electricity in the energy industry is projected to continue to grow over the next 20 years to 37 percent of end-use energy consumption.

Electricity will be the primary growth market in energy through the 1990s and into the next century. While the economy's energy intensity is weakening, the link between electricity and Gross Domestic Product continues to be strong as shown on the following chart.

Coal supplies about 56 percent of the electric power generated in the U.S. A dozen states obtain over 85 percent of their electricity from coal. More broadly, utilities in 21 states rely on coal for two-thirds or more of their total generation. These 21 coal-dependent states have a population of over 80 million people. As shown by the above chart, coal is projected to continue to fuel the bulk of electric power generated in the U.S. through 2000.

The availability of coal has afforded enormous savings for consumers of electric power. If additional low cost coal had not been available to meet the growing demand for electricity over the past two decades, consumers would have paid $193 billion more to generate the replacement power with oil. If natural gas had been used to meet coal's incremental generation since 1971, consumers would have incurred nearly $100 billion more in fuel costs. On an individual customer basis, these higher costs would have increased the average residential electric bill by 10 percent to $815 in 1990, or $71.00 above the actual bill of $744. In states where most electricity is produced from coal, the impact would be far greater than the national average.

Coal and the Economy

Coal contributes directly to the nation's economy as a direct provider of jobs, wages, tax revenue, exports to improve the balance of trade, and through infrastructure and technology development. According to a 1990 study by Penn State University economists, the $21 billion in coal production, revenues, wages and tax payments translates into an overall economic impact of $81 billion. For every billion dollars of coal produced, ultimate demand of $3.5 billion is created. Direct coal industry employment also stimulates a total of approximately 1.1 million jobs.

Exports

U.S. coal producers have been successful in competing in overseas markets. Exports of U.S. coal rose by almost 50 percent between 1970 and 1991, and coal exports contributed over four billion dollars to the U.S. trade balance in 1991. U.S. coal is now shipped to consumers in over twenty-five countries, including Japan and much of Europe. Major importers of U.S. coal are shown in Table 1.

The success of the industry in improving productivity has made U.S. coal competitive abroad. As government subsidies to uneconomic coal industries in other countries are reduced or eliminated, U.S. coal exports are expected to rise significantly. The U.S. Energy Information Administration is forecasting that U.S. coal exports will rise by over 80 million tons by 2005, an increase of over 80 percent.

Infrastructure

Increased coal consumption has resulted in significant investment in the U.S. rail and waterway transportation network. The past decade has been a significant era in the evolution of transportation systems used to move coal to the consumer. Both railroads and barge lines invested in new facilities and improved their productivities during this period.

The coal industry is a principal source of revenue for the U.S. transportation system. In the case of the nation's railways, for example, coal accounts for over 20 percent of Class I railroad revenues. Much of the recovery of the nation's rail system arguably can be attributed to the growth of the U.S. coal industry since 1970. Coal is now the largest single commodity carried by U.S. railroads, and annual coal tonnages are more than three times greater than the second largest commodity—farm products.

The waterways system used to carry coal by barge is a classic example of cooperative efforts between the federal government, private industry and state and local governments. The U.S. Army Corps of Engineers operates and maintains the waterways and constructs improvements at locks and dams. Private industry, in turn, has developed terminals linking barge lines, railroads, truck lines and ocean transport. State and local governments, through the establishment of port authorities, also participate in the ownership and operation of facilities to transport coal.

Security

During the 1980s, the domestic coal industry exhibited the ability to supply a growing portion of the nation's energy needs. In the future, reliance on imported energy is projected to increase. The case for expanded coal use is, therefore, most compelling. Supply security, price stability and the geopolitical and economic security advantages associated with reduced imports necessitate that coal be an integral part of the nation's future energy strategy.

THE ENVIRONMENT

Coal producers and users are subject to strict environmental regulations, the most significant of which are the Surface Mining Control and Reclamation Act, the Clean Water Act, and the Clean Air Act. EPA estimates that U.S. industry has spent $250 billion on clean air improvement since 1970, $100 billion of which went for sulfur dioxide removal. Environmental expenditures will continue to increase as a result of the 1990 Amendments to the Clean Air Act.

Since 1970, coal use has increased 80 percent while sulfur dioxide emissions have declined 26 percent. In addition to the more stringent clean air standards associated with the 1990 Amendments, a new, major challenge has emerged for coal: predictions of catastrophic climate change. Environmental externalities are being imposed by state public utility commissions in generating option decision-making, and coal is being penalized because of its higher carbon content.

Within the scientific community, consensus does not exist on the extent, timing, or overall impact of climate change on the global environment. Between 1950 and 1980, world-wide carbon dioxide emissions more than tripled while the U.S. share declined from 42 percent to 22 percent. U.S. coal use currently accounts for only a very small portion of these emmissions. Our share will decline even further in the future as electrification and coal use expand throughout the world.

SUMMARY

The economic well-being of the United States depends substantially on coal, primarily in the form of electricity. Coal has been the nation's largest domestic source of energy for nearly a decade. Electric power, the largest and fastest growing end-use sector in energy, is the primary market for coal. Accounting for 56 percent of total generation, low cost coal contributed to the electrification of the economy over the past twenty years. If coal had not been available to meet the growth in electric demand, consumers would have incurred over $190 billion in additional fuel costs since 1971. Coal contributes over $80 billion annually to the economy and stimulates over one million jobs. Coal also contributes to the economy in terms of tax revenue, exports, and infrastructure and technology development. Further development of coal production, combustion and emissions technologies can ensure that coal continues to contribute to energy security, economic growth, and environmental protection.

This report has been prepared and reviewed by members of the National Coal Council and/or their designees.

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