The U.S. coal industry has taken on an increasingly important role in recent years as a source of energy for electric utilities. The data from the Petroleum Exporting Countries (OPEC) have increased the price of oil 15-fold since 1973, making coal a lower-priced alternative. For example, the delivered cost of oil purchased by electric utilities in 1982 has averaged $4.81 per million Btu's, while white coal has cost $1.65 per million Btu's. The prospect that oil will become more scarce as energy demand grows also increases coal's attraction, because it is a much more abundant mineral. Moreover, the embargo that some OPEC nations imposed on oil shipments to the United States in 1973–74 made Americans realize the importance of this nation's domestic coal reserves.

U.S. coal production historically in steelcent, particularly in Appalachiashiana. which produced 69 percent of the nation's coal supply in 1970. By 1981, Appalachia's share of U.S. coal production dropped to 52 percent (see table 1). In the same period, coal producers in the western United States increased their share of national coal production from 6 percent to 27 percent, providing 87 percent of the increase in national coal output.

Because western coal is cheaper than other American coals and because it is closer to areas of market growth, it is likely to play an increasingly important role in U.S. coal production. Western coal also contains less ash and sulfur, which permits its use in midwestern and Appalachian coals—a major factor in conforming to state and federal regulations on sulfur emissions. The shift of the westward shift in coal production are examined in this Economic Commentary.

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Causes of the Westward Shift

The primary reason that western coal is capturing an increasing share of the market is that it is cheaper than other American coals. Montana and Wyoming coals, for example, sell at the mine for about one-half the price of Ohio coal, when prices are quoted per million Btu's. The major source of the west's price advantage is that most western coal is surfaceminined. Coal output per miner per day is about three times higher at surface mines than at underground mines. (Underground mining requires workers to bolt ceilings, install lighting, control dust, and provide ventilation, tasks generally not needed at surface mines.) Western coal seams are 20 feet to 100 feet thick; thicker seams of Appalachian coals are accessible deposits have already been exploited, and the remaining deposits are more costly to work. A second reason for the dramatic increase in western coal production is that the four states where U.S. coal consumption is growing most rapidly. The West North Central, West South Central, Mountain, and Pacific census regions each have growing populations. Both domestic coal consumption and coal exports are likely to continue growing, providing opportunity for all coal-producing regions to increase their output. Because of their competitive advantages, however, western producers probably will take a greater share of the export market.

Coal in the Fourth District

States in the Fourth Federal Reserve District are major producers and consumers of coal. Kentucky, West Virginia, Pennsylvania, and Ohio ranked first, second, fourth, and seventh, respectively, in coal production in 1980, and together accounted for nearly one-half of national coal production. In consumption, Ohio ranked first among the states in 1981, using 9 percent of the nation's coal. Pennsylvania ranked third, West Virginia sixth, and Kentucky eighth, and together the four states accounted for more than one-fourth of U.S. coal consumption.

Despite the large share of coal-mining employment has increased in Fourth District states. Between 1970 and 1980, coal-mining employment expanded 68 percent in Kentucky, 60 percent in Pennsylvania, 57 percent in Ohio, and 13 percent in West Virginia. These employment increases resulted from a sharp decline in coal output per worker per day and a modest increase in coal output.

Coal consumption has increased in the western United States mostly in response to an increased demand for energy rather than to replace high-priced oil and natural gas. About 72 percent of U.S. coal is used to generate electricity. In most western regions, oil and gas use in electricity generation either grew or was unchanged, while actual consumption of coal for that purpose expanded sharply. Only in the West North Central region did annual consumption of oil and gas to generate electricity actually decline between 1970 and 1980; however, the decline was by the equivalent of only 13 million tons of coal, while actual consumption of coal to generate electricity expanded by 49 million tons.

A third advantage of western coal is its low sulfur content, which is preferred by consumers trying to reduce air pollution-abatement costs. Low-sulfur coal (i.e., coal with 1 percent or less sulfur content) accounts for more than three-fourths of western coal reserves; only 2 percent of midwestern and 28 percent of Appalachian coal reserves are low-sulfur coal. Sulfur is a significant pollutant. When burned, sulfur forms malodorous sulfur dioxide, which in turn forms corrosive sulfuric acid when combined with water. Burning coal thus produces acid rain, although coal's relative importance as a source of acid rain is hotly disputed. Utility plants that burn coal are estimated to be the source of about three-fifths of U.S. emissions of sulfur dioxide. The Clean Air Act of 1968 and its 1970 and 1977 amendments are intended to reduce emissions of sulfur dioxide and other pollutants from coal, as well as other sources. The low sulfur content of western coal will remain a significant competitive advantage unless there is a reversal in concern about air quality, or sulfur emission control technology becomes less expensive.

Western coal production has increased despite the fact that eastern coal has a significantly higher energy content. Most Appalachian coal is bituminous, averaging about 24.5 million Btu's per ton. Western coal is generally low-sulfur, averaging 12 million Btu's per ton. Higher energy content reduces the costs of mining, transporting, and handling coal at electricity-generating stations for a given energy yield.

Outlook for U.S. Coal Production

Both domestic coal consumption and coal exports are likely to continue growing, providing opportunity for all coal-producing regions to increase their output. Because of their competitive advantages, however, western producers probably will take a greater share of the coal market. Exports of U.S. coal are likely to continue growing. U.S. coal exports expanded from 66 million tons in 1979 to 113 million tons in 1981. Despite the current worldwide recession, which should retard demand for coal, U.S. coal exports in the first seven months of 1982 expanded slightly to a 114-million