

U.S. Coal Supply and Demand: 1999 Review

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Overview

Unlike increases in previous years, U.S. coal production declined by 2.1 percent from 1998, to 1,094 million short tons in 1999, according to preliminary data from the Energy Information Administration (Table 1). This decline marked the first decrease in coal production since a slight dip in 1996 and was primarily attributable to a large drop in coal exports coupled with a smaller than usual growth in coal consumption for power generation.

Coal consumption in the United States totaled 1,041 million short tons in 1999. Some 942.6 million short tons, 90.5 percent of the total consumption, were used by the electric power sector to produce 50.9 percent of total electric generation from all energy sources. Nonetheless, coal use for electricity generation grew only by 0.5 percent in 1999, as nuclear power generation surged by 8 percent, to a record level in 1999, displacing some coal-based generation. Unseasonably mild weather in 1999 also contributed to reduced reliance on coal-fired generation. Coal use in the non-electricity sector continued its downward trend, totaling 98.4 million short tons in 1999.

Faced with weak world coal prices and fierce competition from other coal exporting countries, U.S. coal exports fell precipitously in 1999, by 25.1 percent, to 58.5 million short tons in 1999. On the other hand, coal imports rose by 4.2 percent to 9.1 million short tons, reflecting weak offshore coal prices and increased demand for low-sulfur coal to meet stricter sulfur emission reduction requirements of Phase II of the 1990 Clean Air Act Amendments (CAAA), which became effective January 1, 2000.

Year-end coal stocks in the United States totaled 180.3 million short tons, an increase of 15.7 million short tons from 1998. Stocks held by coal producers and distributors remained nearly unchanged at 36.4 million

short tons. The increase was entirely due to increased stocks on hand at electric generators, reflecting less than anticipated demand for coal-fired generation.

The price of coal continued its downward trend that started more than a decade ago. On a delivered basis, the average utility coal price per ton dropped by 3.2 percent in 1999, the price of industrial steam coal declined by 2.1 percent, and the price of coking coal fell marginally. With unusually weak world coal prices, the average price of U.S. coal exports, measured in free alongside ship (f.a.s.) value, declined by 6.1 percent to \$36.50 per short ton in 1999, while the price of coal imports fell by 4.4 percent to \$30.77 per short ton.

The text that follows provides detailed information about these figures and other coal supply and demand trends in 1999.

Production

Coal production in 1999 totaled 1,094 million short tons, down by 2.1 percent (23.5 million short tons) from 1998 (Figure 1 and Table 1). The 1999 decline was primarily attributable to (1) a weak demand for coal for power generation due largely to a sizable increase in nuclear-powered electricity generation, and (2) a substantial drop in coal exports. Because many nuclear power plants are located east of the Mississippi River and a majority of coal exports originate from eastern coal fields (primarily West Virginia, Virginia, and Eastern Kentucky), eastern coal production suffered the largest setback in 1999. Power plant operators' preparations for the stricter sulfur emissions reduction requirements of CAAA Phase II also contributed to the decline in high-sulfur eastern coal production and boosted low-sulfur western coal production, principally out of the Powder River Basin (Figure 2 and Table 2).

Coal production in the Appalachian Region was 423.3 million short tons in 1999, down by 8.1 percent from the 1998 production of 460.4 million short tons, reaching

Table 1. U.S. Coal Supply, Disposition, and Prices, 1996-1999
(Million Short Tons and Nominal Dollars per Short Ton)

Item	1996	1997	1998	1999
Production by Region				
Appalachian	451.9	467.8	460.4	423.3
Interior	172.8	170.9	168.4	162.5
Western	439.1	451.3	488.8	508.2
Total	1,063.9	1,089.9	1,117.5	1,094.0
Consumption by Sector				
Electric Power	896.9	922.0	937.8	942.6
Electric Utilities	874.7	900.4	910.9	896.6
Other Power Producers ^a	22.2	21.6	26.9	46.0
Coke Plants	31.7	30.2	28.2	28.1
Other Industrial Plants	70.9	70.6	68.1	65.5
Residential/Commercial Users	6.0	6.5	4.9	4.9
Total	1,005.6	1,029.2	1,039.0	1,041.0
Year-End Coal Stocks				
Electric Power	114.6	98.8	120.5	136.4
Coke Plants	2.7	2.0	2.0	1.9
Other Industrial Plants	5.7	5.6	5.6	5.6
Producers/Distributors	28.6	34.0	36.5	36.4
Total	151.6	140.4	164.6	180.3
U.S. Coal Trade				
Exports	90.5	83.5	78.0	58.5
Steam Coal	37.5	31.4	31.0	26.3
Metallurgical Coal	53.0	52.2	47.1	32.1
Imports	7.1	7.5	8.7	9.1
Net Exports	83.3	76.1	69.3	49.4
Average Delivered Price				
Electric Utilities	26.45	26.16	25.64	24.83
Coke Plants	47.33	47.61	46.06	45.85
Other Industrial Plants	32.32	32.41	32.26	31.57
Average Free Alongside Ship (f.a.s.) Price				
Exports	40.76	40.55	38.89	36.50
Steam Coal	34.09	32.42	30.24	29.91
Metallurgical Coal	45.49	45.45	44.58	41.91
Imports	33.45	34.32	32.18	30.77

^aInclude utility coal-fired power plants sold to nonutilities during 1998 and 1999. Coal consumption by cogenerators are included in the end-use sector.

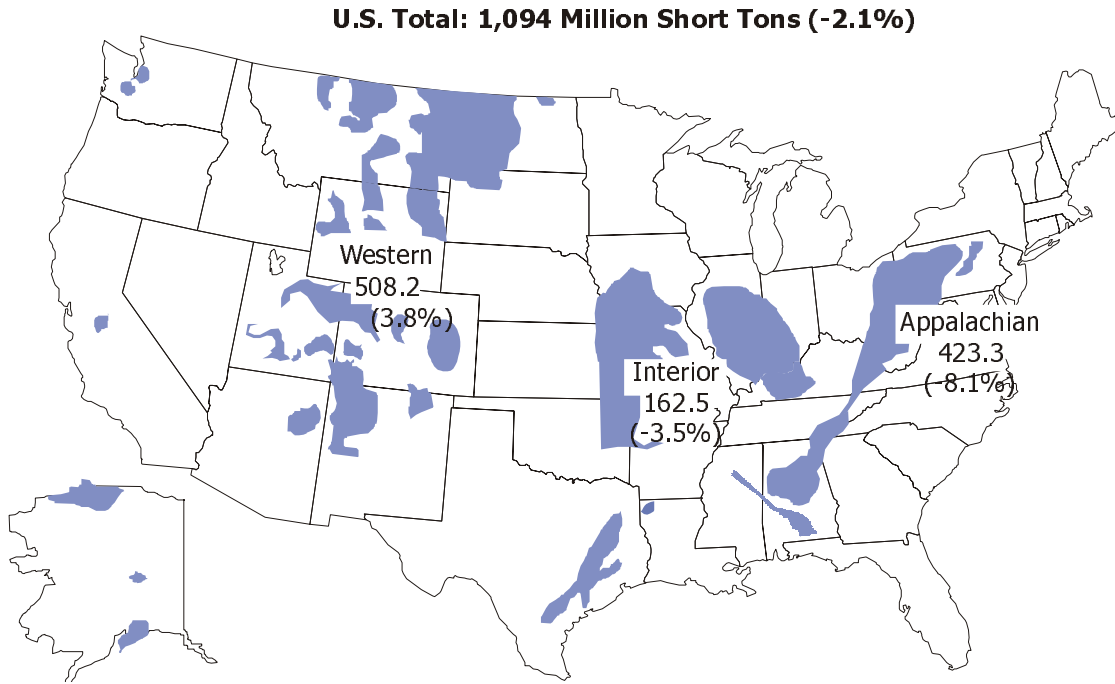
Notes: Totals may not equal sum of components due to independent rounding. Sum of net exports, stock changes, and consumption may not equal production, primarily because the supply and disposition data are obtained from different surveys.

Sources: **Production, consumption, stocks, and prices:** Energy Information Administration, *Quarterly Coal Report, October-December 1999*, DOE/EIA-0121(99/4Q) (Washington, DC, April 2000); *Coal Industry Annual 1998*, DOE/EIA-0584(98) (Washington, DC, April 2000); *Electric Power Monthly, March 2000*, DOE/EIA-0226(00/03) (Washington, DC, March 2000); and Federal Energy Regulatory Commission Form 423, "Cost and Quality of Fuels for Electric Utilities." **Exports and imports:** U.S. Department of Commerce, Bureau of the Census, "Monthly Report EM 545" and "Monthly Report IM 145."

its lowest level since 1993. West Virginia, the largest coal-producing State in the East, produced 156.4 million short tons, down by 8.6 percent (14.8 million short tons) from 1998, a result of declines in U.S. coal exports and weak growth in coal-fired generation in the East. Similarly, coal output in Eastern Kentucky, another key coal field in the East, declined by 5.9 percent (6.8 million short tons) to 109.8 million short tons in 1999.

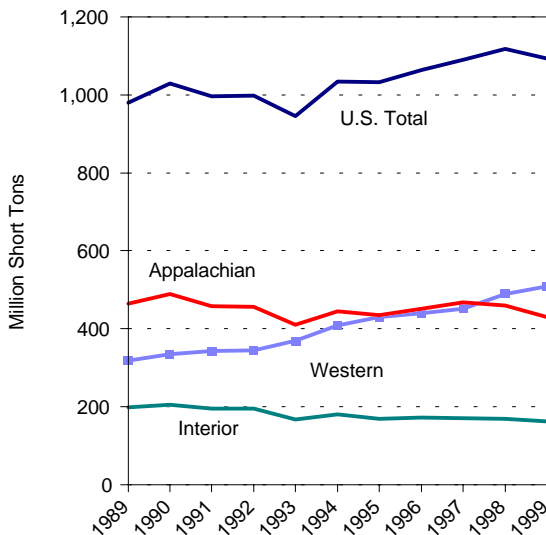
Coal output in Pennsylvania was also lower in 1999, by 5.8 percent (4.7 million short tons), reflecting weak utility coal demand in the State. The 1999 decline reversed the production growth in 1997 and 1998, which was due to increased shipments of its coal to Canada's Ontario Hydro and increased utility coal use in the State.

Figure 1. Coal Production by Coal-Producing Region, 1999
(Million Short Tons and Percent Change from 1998)



Source: Energy Information Administration.

Figure 2. Coal Production by Region, 1989-1999



Sources: Energy Information Administration, *Quarterly Coal Report, October-December 1999*, DOE/EIA-0121(99/4Q) (Washington, DC, April 2000); *Coal Production*, DOE/EIA-0118, various issues; and *Coal Industry Annual 1998*, DOE/EIA-0584(98) (Washington, DC, April 2000).

Coal production in the Interior Region was down by 3.5 percent from 1998, to 162.5 million short tons in 1999. This decline was most evident in Western Kentucky, where coal production dropped by 11.9 percent (4 million short tons), continuing its slide in recent years. Indiana's coal production also declined in 1999, by 2.8 million short tons (7.6 percent). In the previous two years, Indiana's coal production rose substantially in contrast to the declines in other coal fields of the Illinois Basin—Illinois and Western Kentucky. Coal output in Illinois in 1999 was slightly higher than in 1998. Lignite production in Texas, another large coal-producing State in the Interior Region, was also slightly higher at 53.1 million short tons in 1999. Recent noteworthy events in this Region include the opening of the first ever lignite mine in Mississippi at a minemouth power plant.

The Western Region was the only region to increase production overall in 1999. Led by Wyoming, coal output reached 508.2 million short tons in 1999, comprising 46.5 percent of the U.S. total. Western coal production was up by 4 percent (19.4 million short tons) from 1998. Coal output in Wyoming, by far the largest coal-producing State in the country, continued to grow rapidly, by 6.5 percent (20.5 million short tons), to 334.9 million short tons in 1999. Low-sulfur, low-ash Powder River Basin

Table 2. U.S. Coal Production by Coal-Producing Region and State, 1996-1999
(Million Short Tons)

Coal-Producing Region and State	1996	1997	1998	1999
Appalachian Total	451.9	467.8	460.4	423.3
Alabama	24.6	24.5	23.0	19.5
Kentucky, Eastern	117.0	120.9	116.7	109.8
Maryland	4.1	4.2	4.0	3.8
Ohio	28.6	29.2	28.0	22.5
Pennsylvania Total	67.9	76.2	81.0	76.3
Anthracite	4.8	4.7	5.2	4.8
Bituminous	63.2	71.5	75.8	71.5
Tennessee	3.7	3.3	2.7	3.0
Virginia	35.6	35.8	33.7	31.9
West Virginia	170.4	173.7	171.1	156.4
Northern	45.9	42.8	44.7	38.5
Southern	124.5	130.9	126.5	117.9
Interior Total	172.8	170.9	168.4	162.5
Arkansas	*	*	*	*
Illinois	46.7	41.2	39.7	40.4
Indiana	29.7	35.5	36.8	34.0
Kansas	0.2	0.4	0.3	0.4
Kentucky, Western	35.5	34.9	33.6	29.6
Louisiana	3.2	3.5	3.2	3.0
Mississippi	—	—	—	*
Missouri	0.7	0.4	0.4	0.4
Oklahoma	1.7	1.6	1.7	1.7
Texas	55.2	53.3	52.6	53.1
Western Total	439.1	451.3	488.8	508.2
Alaska	1.5	1.5	1.3	1.6
Arizona	10.4	11.7	11.3	11.8
Colorado	24.9	27.4	29.6	30.0
Montana	37.9	41.0	42.8	41.1
New Mexico	24.1	27.0	28.6	29.8
North Dakota	29.9	29.6	29.9	30.3
Utah	27.5	26.7	26.1	24.7
Washington	4.6	4.5	4.6	4.1
Wyoming	278.4	281.9	314.4	334.9
U.S. Total	1,063.9	1,089.9	1,117.5	1,094.0

* = Less than 50 thousand short tons.

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

Sources: Energy Information Administration, *Coal Industry Annual 1998*, DOE/EIA-0584(98) (Washington, DC, April 2000); and *Quarterly Coal Report, October-December 1999*, DOE/EIA-0121(99/4Q)(Washington, DC, April 2000).

(PRB) coal continued to expand its markets in the southwestern and midwestern States and penetrate into the eastern coal markets. Preparations for CAAA Phase II sulfur emission reduction requirements helped to drive PRB coal production in 1999.

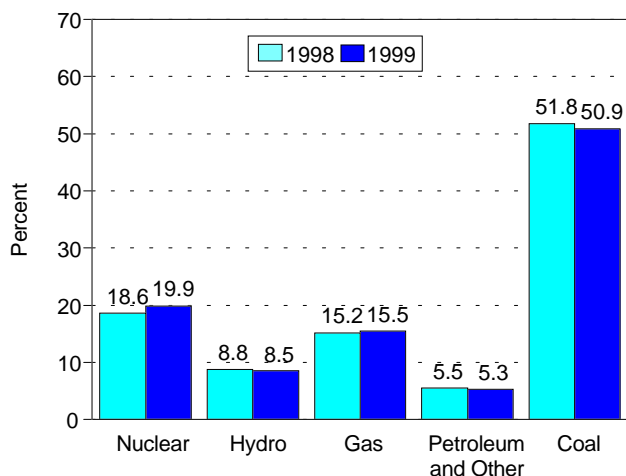
No other western coal-producing States realized growth as robust as Wyoming did in 1999. While coal produc-

tion rose 4.4 percent in Arizona and 4.2 percent in New Mexico, output growth was marginal in other States and was negative in Montana and Utah, reflecting weak utility demand for coal from those States. Western coal exports, primarily from Colorado, Utah, and Alaska, declined from 3.8 million short tons in 1998 to 3.5 million short tons in 1999 and negatively affected coal output growth.

Consumption

In 1999, coal consumption in the United States totaled 1,041 million short tons. Some 942.6 million short tons, 90.5 percent of the total, were used by the electric power sector to produce more than half (50.9 percent) of all electricity generated (Table 1, Figure 3). However, coal consumption for power generation rose by a mere 0.5 percent in 1999, owing to unseasonably mild weather and improved nuclear power plant performance (Figure 4).

Figure 3. Share of Electric Power Industry Net Generation by Energy Source, 1998 vs. 1999



Sources: Energy Information Administration, *Electric Power Monthly*, March 2000, DOE/EIA-0226(00/03) (Washington, DC, March 2000); Form EIA-860B, "Annual Electric Generator Report - Nonutility," EIA-900, "Monthly Nonutility Power Report".

Nuclear power generation increased substantially (8 percent) in 1999, to a record level of 727.9 billion kilowatthours, a 19.9-percent share of total electricity generation in 1999. Several nuclear generating units returned on line after maintenance, repair, and refueling outages. This event resulted in a record average annual capacity factor of 84.5 percent, up from 78.2 percent in 1998. The 54.2 billion-kilowatthour increase in nuclear power generation—equivalent to approximately 27.8 million short tons of utility coal—constrained growth in coal-fired generation in 1999 and, hence, coal consumption and production, largely in the East.

While overall coal consumption for power generation rose only by 0.5 percent in 1999, a wide variation was observed in two regions. Coal use for power generation

rose significantly in the East South Central Census Division, up by 7.1 percent (7 million short tons) in 1999 (Figure 4). This increase was attributable primarily to declines in hydro-powered generation (6.0 billion kilowatthours) in the region. On the other hand, coal use for power generation in the Middle Atlantic Census Division declined by 4.8 percent (3.1 million short tons), reflecting significant increases in nuclear power generation of 17.5 billion kilowatthours in that area.

Coal use in the non-electric power sector declined by 2.7 percent to a total of 98.4 million short tons in 1999 (Figure 5). While coal consumption by coke plants (at 28.1 million short tons) and residential/commercial users (4.9 million short tons) remained virtually unchanged, other industrial use of coal (largely in the food, paper, chemical, nonmetallic mineral products, and primary metal manufacturing industries) fell by 5.4 percent to 65.5 million short tons in 1999, continuing its downward trend in recent years. Competition from natural gas has gradually been diminishing coal use in the manufacturing industry.

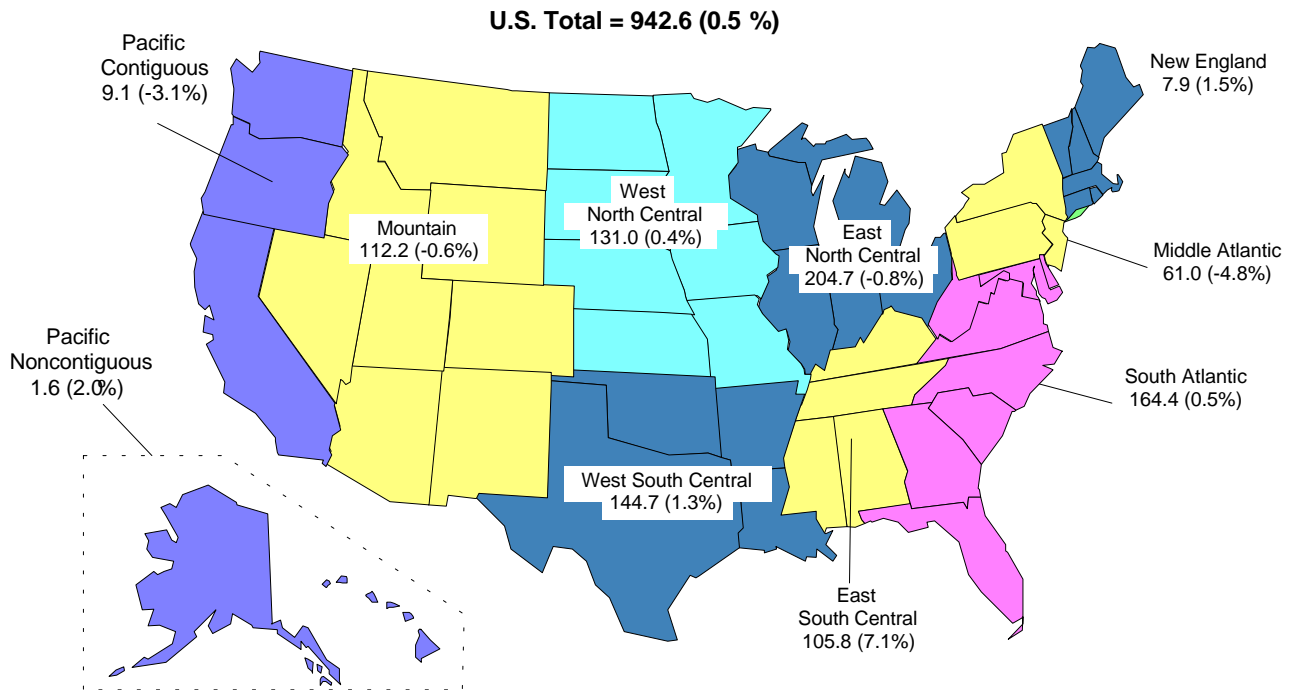
Coal prices continued their downward trend in 1999, reflecting ongoing productivity gains in coal mining and transportation and expirations of high-cost, long-term coal contracts. On the delivered basis, the average price of utility coal declined by 3.2 percent from \$25.64 per short ton (125.2 cents per million Btu) to \$24.83 per short ton (122.0 cents per million Btu) in 1999. The price of industrial steam coal declined to \$31.57 per short ton, and the price of coking coal eased down slightly from 1998's \$46.06 per short ton to \$45.85 in 1999 (Figure 6).

Exports and Imports

Exports—Although coal exports account for a small segment of the U.S. coal industry, they fell so precipitously in 1999 that their decline was identified as a major factor for the decrease in coal production. Coal exports declined by 25.1 percent, to 58.5 million short tons in 1999 (Figure 7). The year 1999 marked the third consecutive year of decline, and a long fall from the record high of 109.0 million short tons in 1991. The United States ranks third in the world in coal exports, surpassed by South Africa in 1998. Australia is by far the world's largest coal exporter, with exports three times that of the United States.

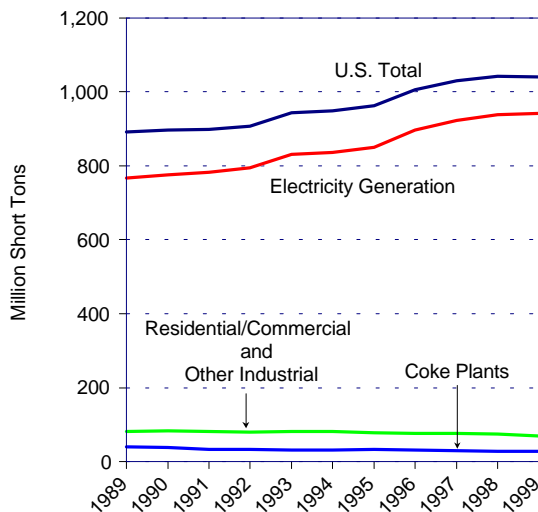
Both steam and metallurgical coal exports declined in 1999. Steam coal exports declined by 14.9 percent, to 26.3 million short tons in 1999. Metallurgical coal exports fell by a staggering 31.8 percent, to 32.1 million short tons in 1999, accounting for the majority of the decline in

Figure 4. Electric Power Sector Consumption of Coal by Census Division, 1999
(Million Short Tons and Percent Change from 1998)



Sources: Energy Information Administration, *Electric Power Monthly, March 2000*, DOE/EIA-0226(00/03) (Washington, DC, March 2000); Form EIA-860B, "Annual Electric Generator Report - Nonutility," and EIA-900, "Monthly Nonutility Power Report."

Figure 5. Coal Consumption by Sector, 1989-1999



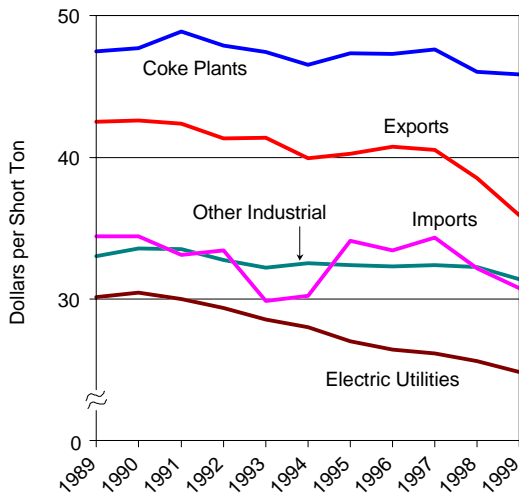
Sources: Energy Information Administration, *Quarterly Coal Report, October-December 1999*, DOE/EIA-0121(99/4Q) (Washington, DC, April 2000); *Coal Industry Annual 1998*, DOE/EIA-0584(98) (Washington, DC, April 2000); and *Electric Power Monthly, March 2000*, DOE/EIA-0226(00/03) (Washington, DC, March 2000).

total coal exports. This downward pattern continued from previous years as evidenced most recently between 1997 and 1998, when exports of metallurgical coal fell by 5.1 million tons.

Declines in coal exports were attributable to lower world coal prices, reflecting lower mine costs at U.S. competitors and favorable exchange rates that enabled them to lower their prices in U.S. dollars. Some U.S. exporters reportedly withdrew from coal trade as world coal prices were too low to continue participating. The average price for U.S. metallurgical coal exports fell by 6 percent in 1999 to \$41.91 per short ton, and the average for U.S. steam coal exports declined by 1.1 percent to \$29.91 per short ton.

In 1999, U.S. coal exports declined sharply in every world region except North America, where coal shipments fell marginally. Shipments to Canada totaled 19.8 million short tons in 1999, as compared to 1998's 20.7 million short tons. Steam coal shipments, almost entirely to Ontario Hydro, were at 15.5 million short tons, nearly unchanged from the level in 1998.

Figure 6. Delivered Coal Prices, 1989-1999
(Nominal Dollars)



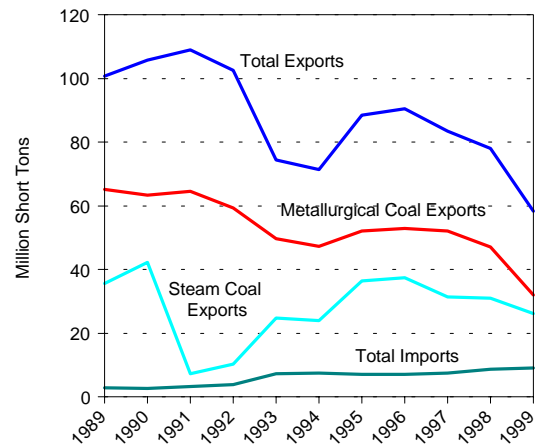
Sources: Energy Information Administration, *Quarterly Coal Report, October-December 1999*, DOE/EIA-0121(99/4Q) (Washington, DC, April 2000); *Coal Industry Annual 1998*, DOE/EIA-0584(98) (Washington, DC, April 2000); *Electric Power Monthly, March 2000*, DOE/EIA-0226(00/03) (Washington, DC, March 2000); and U.S. Department of Commerce, Bureau of the Census, “Monthly Report EM 545” and “Monthly Report IM 145.”

Coal exports to Europe fell by 33.4 percent, to 22.5 million short tons in 1999. Metallurgical coal exports to Europe, the primary market for U.S. coal, declined by 29.6 percent, to 18.3 million short tons in 1999. Similarly, steam coal exports plunged by 46 percent, from 7.8 million short tons in 1998 to 4.2 million short tons in 1999. Increased flows of lower priced Australian metallurgical coal and steam coals from South Africa, Colombia, and Venezuela severely limited U.S. participation in the European markets. Additionally, coal has faced competitive pressures from natural gas in Europe—in terms of both price and environmental protection.

The growing Asian market for steam coal was largely dominated by lower priced Australian coal due to Australia’s favorable exchange rate with the U.S. dollar and large gains in coal mine productivity in recent years. Australia also has a significant cost advantage because of its close proximity to the Asian market. Indonesia, with increased output of its ultra clean, low-sulfur coal, also provided competition for the Asian market.

The metallurgical coal market in Asia was extremely weak in 1999, due to falling steel prices and soft

Figure 7. U.S. Coal Exports and Imports, 1989-1999



Sources: U.S. Department of Commerce, Bureau of the Census, “Monthly Report EM 545” and “Monthly Report IM 145.”

demand. With major price cuts in 1999, Australian and Canadian metallurgical coals dominated the Asian market, which also contributed to limited U.S. participation. U.S. coal exports to Asia totaled 9.2 million short tons in 1999, down by 25.6 percent from 1998. U.S. metallurgical coal exports to Asia plunged 40.1 percent, to 4.1 million short tons in 1999, while steam coal exports declined 7.9 percent, to 5.1 million short tons.

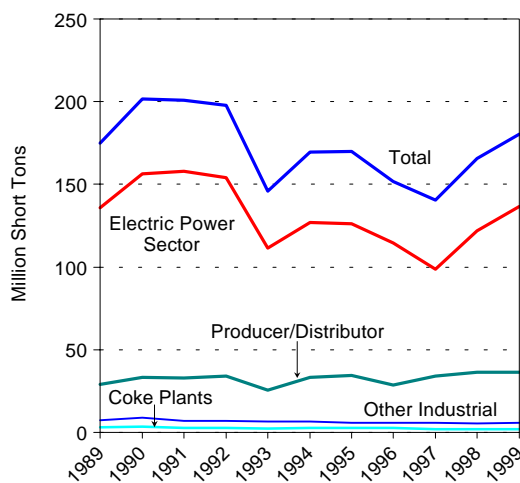
Imports—U. S. coal imports totaled 9.1 million short tons in 1999, a 4.2-percent increase from 1998 (Figure 7). Imports represented less than 1 percent of U.S. consumption and were equivalent to about 15 percent of U.S. exports. The increase in imports in 1999 was attributable to weak prices for offshore coal and increased demand for low-sulfur coal to prepare for the stricter sulfur emission requirements of Phase II of the CAAA. The average price of all coal imported into the United States fell by 4.4 percent, to \$30.77 per short ton in 1999 from the 1998 price of \$32.18.

Colombia remained the largest supplier of U.S. imports, with 4.6 million short tons; Venezuela followed with 2.1 million short tons, Indonesia with 1.1 million short tons, and Canada with 1 million short tons. Although imports primarily consisted of steam coal bought by a few East Coast power plants, coal from Canada was largely metallurgical coal used by coke plants in Illinois, Indiana, and Michigan.

Stock

At the end of 1999, coal stocks in the United States totaled 180.3 million short tons, an increase of 15.7 million short tons from 1998 (Figure 8). Coal producers and distributors held 36.4 million short tons, a figure nearly unchanged from 1998. While year-end coal stocks for industrial users, including coke plants, remained virtually unchanged at 7.5 million short tons, stocks held by the electric power sector swelled to 136.4 million short tons, an increase of 15.8 million short tons over 1998. Coal stocks at power plants rose in virtually every area of the country.

Figure 8. Year-End Coal Stocks, 1989-1999



Sources: Energy Information Administration, *Quarterly Coal Report, October-December 1999*, DOE/EIA-0121(99/4Q) (Washington, DC, April 2000); *Coal Industry Annual 1998*, DOE/EIA-0584(98) (Washington, DC, April 2000); and *Electric Power Monthly, March 2000*, DOE/EIA-0226(00/03) (Washington, DC, March 2000).

Two factors were primarily responsible for the buildup. First, coal consumption for power generation was lower in most regions of the country than the amount of coal receipts by power producers as a result of increased nuclear power generation and the mild weather in 1999. Second, western areas hard hit by Union Pacific Railroad's delivery problems in 1997, particularly the West South Central Census Division, continued to replenish their stockpiles in 1999.

Summary

In 1999, the U.S. coal industry realized a rare decline in coal production, due to (1) an extraordinary drop in coal exports, (2) a surge in nuclear power generation, and (3) unseasonably mild weather. As a result, year-end coal stocks at electric power plants expanded in 1999.

These negative growth factors in 1999 are, however, projected to change in 2000, leading to increased coal demand and production (See Energy Information Administration's *Short-Term Energy Outlook*). Factors contributing to this favorable outlook would include:

- No further erosion in U.S. coal exports.
- The leveling off of performance improvement in nuclear power plants.
- A return to normal weather.

Partially offsetting these favorable factors, however, could be stock withdrawals by power producers returning to the trend of holding smaller stocks.

Overall, the outlook for U.S. coal in 2000 is likely to be somewhat better than it was in 1999. Coal prices are, nevertheless, expected to be still lower in 2000, with ongoing productivity gains in coal mining and transportation more than offsetting any upward price pressure from increases in coal demand.