

U.S. Coal Supply and Demand: 1997 Review

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Overview

U.S. coal production totaled a record high of 1,088.6 million short tons in 1997, up by 2.3 percent over the 1996 production level, according to preliminary data from the Energy Information Administration (Table 1). The electric power industry (utilities and independent power producers)—the dominant coal consumer—used a record 922.0 million short tons, up by 2.8 percent over 1996. The increase in coal use for electricity generation was attributable primarily to (1) a substantial decline in nuclear-powered generation, and (2) moderate growth in electricity demand.

Coal consumption in the non-electricity sectors (residential/ commercial and industrial users) fell by 2.6 percent to 105.8 million short tons. Coal imports edged up slightly, rising 5.1 percent to 7.5 million short tons, but coal exports declined considerably in 1997, by 7.0 million short tons to 83.5 million short tons, reversing the upward trend of the past two years. The decline was mostly in steam coal exports, as a result of weak international coal prices and strong competition from other coal-exporting countries.

The trend toward holding reduced levels of coal stocks (in terms of both absolute tonnage and days of supply) generally continued in 1997, with year-end coal stocks declining to 139.1 million short tons, a drawdown of 12.5 million short tons from 1996 levels. Consequently, coal production requirements were reduced that much in 1997. Year-end stocks at electric utilities declined by 16.4 million short tons; however, stocks held by producers and distributors grew by 4.2 million short tons largely because rail transportation bottlenecks during the latter part of the year caused delays in coal shipments to consumers.

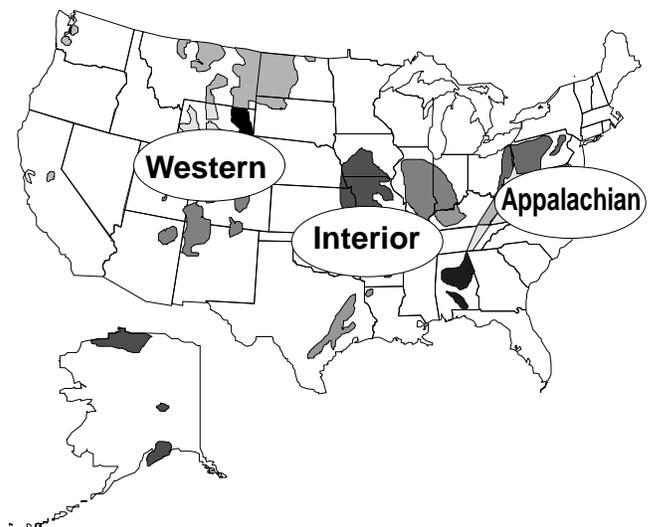
Although domestic coal demand rose in 1997, the price of coal declined, continuing its downward trend that

started more than a decade ago. The average utility coal price (per ton) dropped by 1.1 percent, while the price of industrial coal remained relatively unchanged. The average price of U.S. coal exports (measured in free alongside ship (f.a.s.) value) also declined slightly (0.5 percent). The price of U.S. coal imports edged up by 2.6 percent in 1997.

Production

In 1997, the U.S. coal industry produced a record high of 1,088.6 million short tons, 24.8 million short tons more than the 1996 production level (Table 1). Regionally, Western coal output continued its growth in 1997, but coal production in Appalachia also rose significantly, at the same pace of 2.8 percent as for Western coal. Coal output in the Interior Region was virtually unchanged from the 1996 level (Figure 1).

Figure 1. Coal-Producing Regions



Source: Energy Information Administration, *Coal Industry Annual 1996*, DOE/EIA-0584(96) (Washington, DC, November 1997).

Table 1. U.S. Coal Supply, Disposition, and Prices, 1994-1997
(Million Short Tons and Nominal Dollars per Short Ton)

Item	1994	1995	1996	1997 ^a
Production by Region				
Appalachian	445.4	434.9	451.9	464.7
Interior	179.9	168.5	172.8	172.3
Western	408.3	429.6	439.1	451.6
Total	1,033.5	1,033.0	1,063.9	1,088.6
Consumption by Sector				
Electricity	838.6	850.2	897.0	922.0
Utilities	817.3	829.0	874.7	898.5
Independent Power Producers	21.3	21.2	22.2	23.5
Coke Plants	31.7	33.0	31.7	29.4
Other Industrial Plants	75.2	73.1	70.9	70.4
Residential/Commercial Users	6.0	5.8	6.0	6.0
Total	951.5	962.0	1,005.6	1,027.8
Year-End Coal Stocks				
Electric Utilities	126.9	126.3	114.7	98.3
Coke Plants	2.7	2.6	2.7	2.4
Other Industrial Plants	6.6	5.7	5.7	5.6
Producers/Distributors	33.2	34.4	28.6	32.9
Total	169.4	169.1	151.7	139.1
U.S. Coal Trade				
Exports	71.4	88.5	90.5	83.5
Steam Coal	24.0	36.5	37.5	31.4
Metallurgical Coal	47.3	52.1	53.0	52.2
Imports	7.6	7.2	7.1	7.5
Net Exports	63.8	81.3	83.3	76.1
Average Delivered Price				
Electric Utilities	28.03	27.01	26.45	26.16
Coke Plants	46.56	47.34	47.33	47.36
Other Industrial Plants	32.55	32.42	32.28	32.40
Average Free Alongside Ship (f.a.s.) Price				
Exports	39.93	40.27	40.76	40.55
Steam Coal	34.34	34.51	34.09	32.42
Metallurgical Coal	42.77	44.30	45.49	45.45
Imports	30.21	34.13	33.45	34.32

^aData on coal production are preliminary.

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.

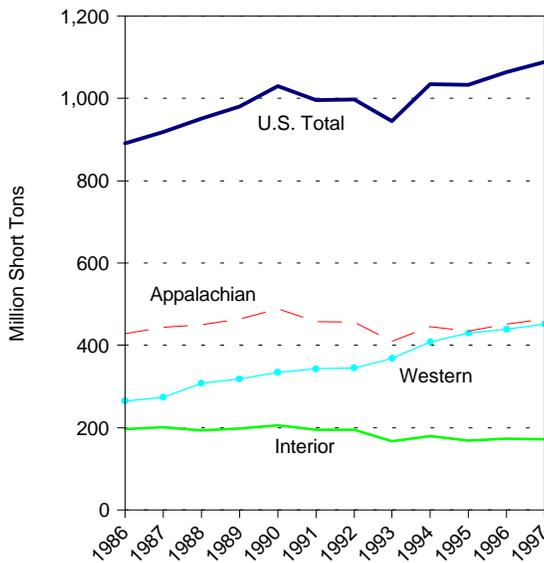
Sources: **Production, consumption, stocks, and prices:** Energy Information Administration, *Quarterly Coal Report, October-December 1997*, DOE/EIA-0121(96/4Q) (Washington, DC, May 1998); *Coal Industry Annual 1996*, DOE/EIA-0584(96) (Washington, DC, November 1997); *Electric Power Monthly, March 1998*, DOE/EIA-0226(98/03) (Washington, DC, March 1998); and Federal Energy Regulatory Commission Form FERC 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."

The rising demand for western low-sulfur coal for electricity generation, driven by its low cost and the sulfur emissions reduction requirements of the 1990 Clean Air Act Amendments (CAAA), continued to boost coal production in the Western Region (Figure 2). This trend, however, slowed somewhat in 1997, as it did in 1996, because of strong demand for coals from Appalachia and the Illinois Basin in the East. A significant drop in nuclear-powered electricity generation in 1997, mostly in the East, contributed to the rise in demand for eastern coal, which had been declining in recent years.

Appalachian Region

Coal production in the Appalachian Region rose by 2.8 percent to 464.7 million short tons in 1997 (Table 2). The production growth came primarily from increased utility coal consumption in the South Atlantic, Middle

Figure 2. Coal Production by Region, 1986-1997



Sources: Energy Information Administration, *Quarterly Coal Report, October-December 1997*, DOE/EIA-0121(97/4Q) (Washington, DC, May 1998); *Coal Production*, DOE/EIA-0118, various issues; and *Coal Industry Annual 1996*, DOE/EIA-0584(96) (Washington, DC, October 1997).

Atlantic, and New England Regions (Figure 3), more than offsetting a substantial decline (about 6 million short tons) in coal exports from the region, primarily from the Central Appalachian States (Virginia, Southern West Virginia, and Eastern Kentucky). The rise in utility coal use offset a substantial decline in nuclear-powered generation in the East, mostly in New England and the East North Central region.

Notable production gains were made in Ohio (7.3 percent or 2.1 million short tons) and Pennsylvania (7.8 percent or 5.3 million short tons). Utility demand for high- and medium-sulfur coals from Ohio and Pennsylvania remained strong in 1997, as it was in 1996, and increased coal shipments to Canada also helped boost Pennsylvania coal production in 1997.

Coal output in West Virginia—the largest coal-producing State in the East and the country’s second largest after Wyoming—increased slightly (by 1.5 percent) to 173.0 million short tons in 1997. A sizable increase in utility coal demand was largely offset by reduced demand for coal exports, resulting in a modest gain.

Coal output in Eastern Kentucky rose for the first time in three years, up by 2.4 percent in 1997 to 119.7

million short tons. The combined output total from Eastern and Western Kentucky was 155.9 million short tons, the third largest after Wyoming and West Virginia. Virginia’s coal production rose by 2.2 percent in 1997, continuing the upturn of the past 2 years.

Interior Region

Overall coal production in the Interior Region remained almost unchanged at 172.3 million short tons in 1997. However, production increased by 0.8 million short tons in the Illinois Basin (Illinois, Indiana, and Western Kentucky). Indiana’s coal production rose significantly (by 16.3 percent or 4.8 million short tons), more than offsetting a decline in Illinois (10.1 percent or 4.7 million short tons). With production in Western Kentucky rising slightly, Illinois Basin coal production totaled 112.6 million short tons in 1997.

The increase in Indiana was largely a response to the decline in Illinois that resulted from the closure of several mines (e.g., Freeman United’s Orient No. 6 mine, Consol’s Burning Star No. 4 mine, and Ziegler’s Spartan mine). Shortfalls in Illinois coal shipments to electric utilities in Indiana were covered by the production increase in Indiana. Coal supplies from the Illinois Basin were tight throughout the year because of mine closures in the past several years. There was a substantial decline in nuclear-powered generation in the Midwestern States, especially in Illinois (as discussed in the consumption section below), but it did not cause any sizable increase in Illinois Basin coal production.

With production of 53.7 million short tons, primarily lignite, Texas, the largest coal-producing State in the Interior Region, produced slightly (by 2.6 percent) less in 1997 than it did in 1996. The production decline reflected a similar decline in lignite use for electricity generation in the State.

Western Region

Coal production in the Western Region rose by 2.8 percent in 1997, the same growth rate as in Appalachia. At 451.6 million short tons, however, the region’s coal output still trailed that of Appalachia, historically the region with the highest U.S. coal production. In 1997, the increase in production from the Western Region was largely attributable to strong (2.6 percent) growth in electricity demand (measured in utility retail sales) in the Mountain Region.

Table 2. U.S. Coal Production by Coal-Producing Region and State, 1994-1997
(Million Short Tons)

Coal-Producing Region and State	1994	1995	1996	1997 ^a
Appalachian Total	445.4	434.9	451.9	464.7
Alabama	23.3	24.6	24.6	24.4
Kentucky, Eastern	124.4	118.5	117.0	119.7
Maryland	3.6	3.7	4.1	4.1
Ohio	29.9	26.1	28.6	30.7
Pennsylvania Total	62.2	61.6	67.9	73.2
Anthracite	4.6	4.7	4.8	4.9
Bituminous	57.6	56.9	63.2	68.3
Tennessee	3.0	3.2	3.7	3.3
Virginia	37.1	34.1	35.6	36.4
West Virginia	161.8	163.0	170.4	173.0
Northern	49.3	46.1	45.9	46.0
Southern	112.5	116.9	124.5	127.0
Interior Total	179.9	168.5	172.8	172.3
Arkansas	0.1	0.0	0.0	0.0
Illinois	52.8	48.2	46.7	42.0
Indiana	30.9	26.0	29.7	34.5
Iowa	0.0	--	--	--
Kansas	0.3	0.3	0.2	0.4
Kentucky, Western	37.2	35.2	35.5	36.1
Louisiana	3.5	3.7	3.2	3.6
Missouri	0.8	0.5	0.7	0.4
Oklahoma	1.9	1.9	1.7	1.6
Texas	52.3	52.7	55.2	53.7
Western Total	408.3	429.6	439.1	451.6
Alaska	1.6	1.7	1.5	1.4
Arizona	13.1	11.9	10.4	11.8
Colorado	25.3	25.7	24.9	27.5
Montana	41.6	39.5	37.9	41.0
New Mexico	28.0	26.8	24.1	27.1
North Dakota	32.3	30.1	29.9	29.5
Utah	24.4	25.2	27.5	27.1
Washington	4.9	4.9	4.6	4.5
Wyoming	237.1	263.8	278.4	281.6
U.S. Total	1,033.5	1,033.0	1,063.9	1,088.6

^aPreliminary data.

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

Source: Energy Information Administration, *Coal Industry Annual 1996*, DOE/EIA-0584(96) (Washington, DC, November 1997); and *Quarterly Coal Report, October-December 1997*, DOE/EIA-0121(97/4Q)(Washington, DC, May 1998).

In prior years, output growth for the Western Region has largely been determined by demand growth for Western coal in Texas and the Midwestern States.

Coal production in Wyoming, by far the largest coal-producing State in the country, rose by 1.2 percent to

281.6 million short tons in 1997, 25.9 percent of the U.S. total. The increase in 1997 was far less than the 7.1 percent average annual growth between 1990 and 1996, in part because of the transportation problems experienced by Union Pacific Railroad carrying Powder River Basin coal to markets in Texas and the Midwest.

With strong utility coal demand in the Mountain Region, coal production rose substantially in some other coal-producing States in the region—13.1 percent in Arizona, 12.8 percent in New Mexico, and 10.5 percent in Colorado. Colorado’s output of 27.5 million short tons was a record high. Montana bounced back from a setback in 1996, producing 41.0 million short tons, up by 8.2 percent.

In contrast, coal output in Utah, at 27.1 million short tons in 1997, was slightly lower than in 1996. The State’s coal production was in part constrained by the rail shipment problems for Utah coal being carried to West Coast ports for export and sales to other domestic customers. Lignite production in North Dakota was marginally lower, reflecting a slight decline in lignite use for electricity generation and synthetic gas production in the State.

Consumption

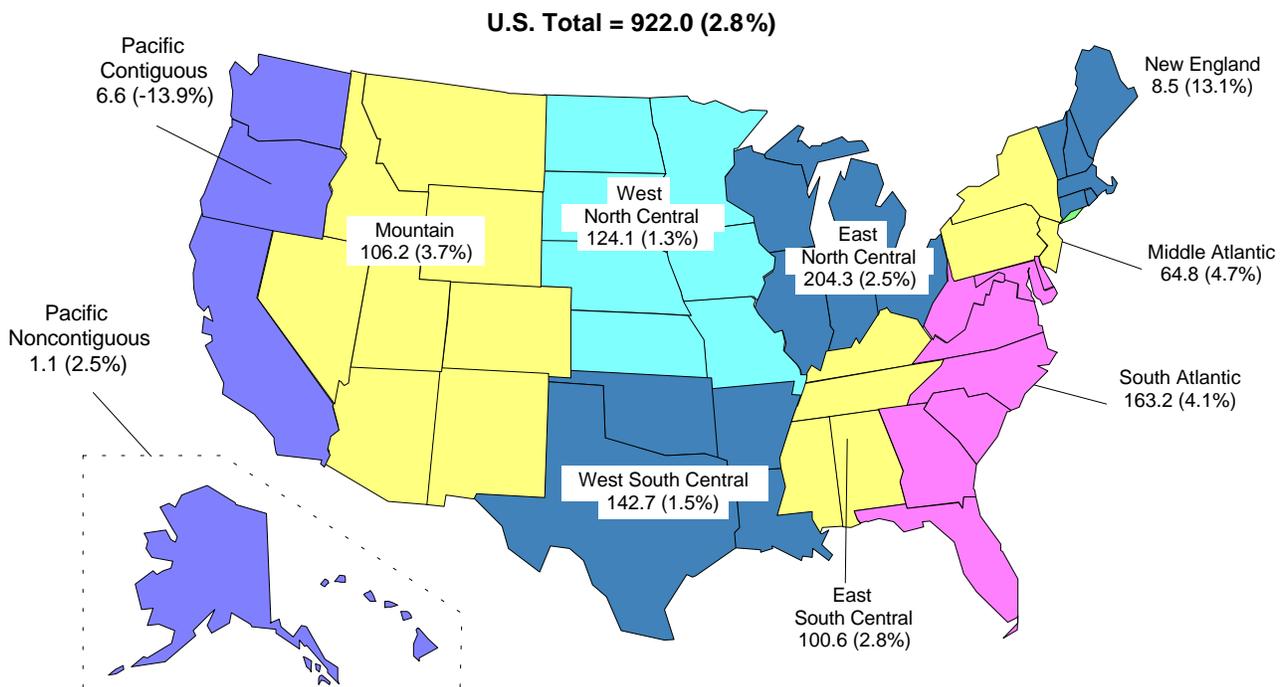
Electricity Generation Sector

National Overview

U.S. coal consumption by all users totaled 1,027.8 million short tons in 1997, a 2.2-percent increase over 1996 (Table 1). Growth came entirely from the electric power industry (Figure 3), as coal consumption in the non-electricity sectors decreased by 2.6 percent. Electric utilities burned 898.5 million short tons and independent power producers 23.5 million short tons, for a total of 922.0 million short tons of coal for electricity generation (Figure 4).

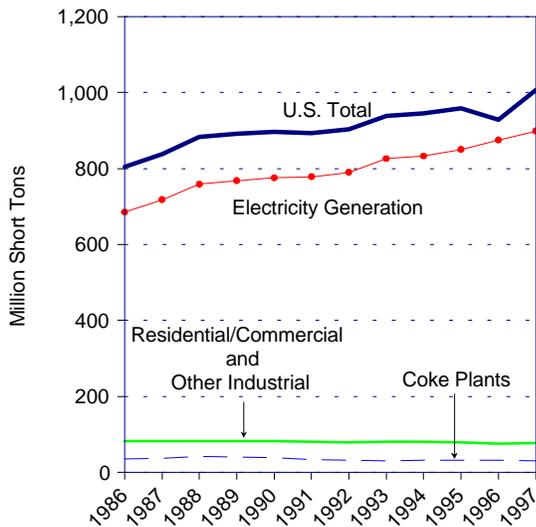
Much of the 2.8-percent increase in coal use for electricity generation can be attributed to replacement

Figure 3. Electric Power Industry Consumption of Coal by Census Division, 1997
(Million Short Tons and Percent Change from 1996)



Source: Energy Information Administration, *Electric Power Monthly*, March 1998, DOE/EIA-0226(98/03) (Washington, DC, March 1998); Form EIA-867, “Annual Nonutility Power Producers Report,” and 1997 estimates for nonutility power producers.

Figure 4. Coal Consumption by Sector, 1986-1997



Sources: Energy Information Administration, *Quarterly Coal Report, October-December 1997*, DOE/EIA-0121(97/4Q) (Washington, DC, May 1998); *Coal Industry Annual 1996*, DOE/EIA-0584(96) (Washington, DC, October 1997); and *Electric Power Monthly, March 1998*, DOE/EIA-0226(98/03) (Washington, DC, March 1998).

power for lost nuclear generation. Many nuclear power generating units were shut down in 1997, mostly in New England and the East North Central Region. Nationwide, nuclear generation declined by 45.3 billion

Table 3. Change in Electric Power Industry Net Generation by Census Division and Fuel Type, 1997 versus 1996 (Billion Kilowatthours)

Census Division	Total		Coal		Gas		Hydro		Nuclear		Other	
	Net Change	Percent Change	Net Change	Percent Change	Net Change	Percent Change						
New England	1.8	1.7	2.2	11.2	3.1	14.0	-0.3	-3.8	-13.8	-45.7	10.7	44.8
Middle Atlantic	16.3	4.5	8.4	5.9	11.4	19.8	1.8	5.9	-3.8	-3.3	-1.4	-6.3
East North Central	-15.8	-2.8	8.0	1.9	3.9	21.1	-0.1	-1.7	-28.4	-23.6	0.8	7.8
West North Central	3.3	1.3	2.0	1.0	0.7	19.4	1.3	8.1	-0.9	-2.2	0.3	10.4
South Atlantic	23.4	3.5	17.4	4.5	3.4	6.9	-2.1	-11.5	0.0	0.0	4.7	9.7
East South Central	19.3	4.8	7.1	3.1	5.6	8.4	0.0	-0.2	3.5	5.7	3.1	18.4
West South Central	9.2	2.1	4.4	2.1	1.5	1.1	2.4	35.3	0.2	0.3	0.7	7.7
Mountain	16.7	6.0	8.6	4.6	2.1	12.2	5.3	12.4	0.5	1.6	0.3	7.2
Pacific Contiguous	12.1	3.5	-0.9	-7.3	9.4	12.8	3.6	1.9	-2.5	-6.3	2.6	8.2
Pacific Noncontiguous	2.0	11.7	0.2	9.6	0.3	7.6	-0.2	-16.4	0.0	0.0	1.7	17.9
U.S. Total	88.1	2.6	57.3	3.2	41.3	9.0	11.5	3.3	-45.3	-6.7	23.4	13.3

Note: Other category includes petroleum products, geothermal, wood, wind, waste, and solar.

Source: Energy Information Administration, *Electric Power Monthly, March 1998*, DOE/EIA-0226(98/03) (Washington, DC, March 1998); Form EIA-867, "Annual Nonutility Power Producers Report," and 1997 estimates for nonutility power producers.

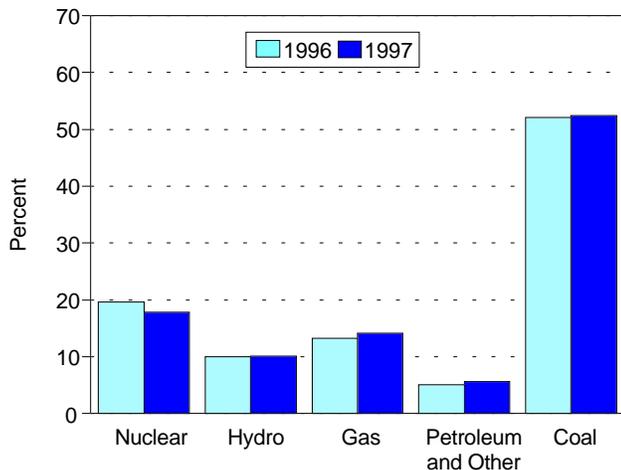
kilowatthours, equivalent to about 21 million short tons of coal (Table 3).

Growth in retail sales of electricity by U.S. electric utilities was weak in 1997— only 0.7 percent, far less than the 3.6-percent growth in gross domestic product—and was at best a marginal factor in the increased coal use for electricity generation. Milder than normal temperatures during the winter and spring months and a cooler than normal summer led to a 1.0-percent decline in residential electricity demand. Industrial use rose a mere 0.5 percent, and commercial use was up by 2.9 percent.

Growth in coal consumption in the electric power industry was limited by increases in generation from hydropower and natural gas. Gas-fired generation rebounded from its poor year in 1996, growing by 9.0 percent. Hydroelectric generation increased for the third consecutive year, rising by 3.3 percent to a record 344.4 billion kilowatthours.

Overall, coal continued to be the principal energy source for electric power generation in the United States. Coal's share of power generation rose marginally to 52.4 percent in 1997 (Figure 5). In spite of strong demand growth, 1997 utility coal prices continued the steady downward trend that started more than a decade ago (Figure 6). Ongoing productivity gains in coal mining and transportation maintained the downward price trend. Increased shipments of relatively low-cost

Figure 5. Share of Electric Power Industry Net Generation by Energy Source, 1996 vs. 1997



Source: Energy Information Administration, *Electric Power Monthly, March 1998*, DOE/EIA-0226(98/03) (Washington, DC, March 1998); Form EIA-867, "Annual Nonutility Power Producers Report," and 1997 estimates for nonutility power producers.

western coal and the expiration of high-cost, long-term coal contracts also contributed to the trend. The average delivered price of coal to electric utilities declined by 1.1 percent, from \$26.45 per short ton in 1996 to \$26.16 per short ton in 1997 (or by 1.2 percent, from 128.9 to 127.3 cents per million Btu).

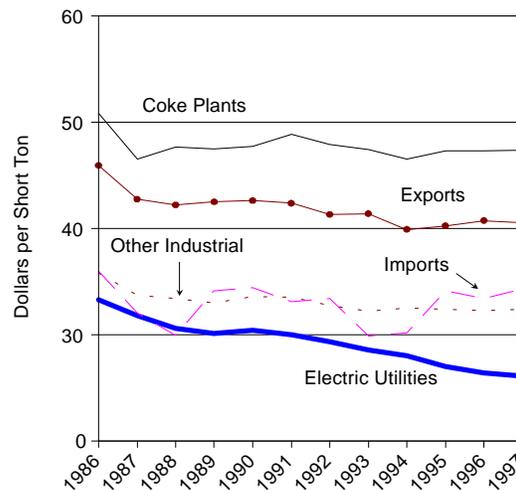
Regional Summaries

In New England, five nuclear power units, a total of 4.1 gigawatts generating capacity, were out of operation in 1997. Although the region's oil-fired generation rose by 44.8 percent over 1996 levels, the drop in nuclear generation was so large (13.8 billion kilowatt-hours) that increased coal-fired generation was also needed. New England's coal-fired plants consumed 13.1 percent (0.9 million short tons) more coal in 1997, reaching a capacity utilization rate of 81 percent. Almost all the extra coal burned in 1997 came from Appalachia, the primary source of coal supplies to New England.

In the East North Central Region, nuclear-powered generation declined by 23.6 percent or 28.4 billion kilowatt-hours—63 percent of the total national decline in nuclear generation. The decline was centered in Illinois, Michigan, and Wisconsin, where five units were out of operation for all of 1997 and another five were shut down for part of the year. Much of the region's lost

In contrast to the national trend, nuclear-powered generation rose strongly in the East South Central Region. Nevertheless, coal-fired generation was the largest contributor to the region's

Figure 6. Coal Prices, 1986-1997 (Nominal Dollars)



Sources: Energy Information Administration, *Quarterly Coal Report, October-December 1997*, DOE/EIA-0121(97/4Q) (Washington, DC, May 1998); *Coal Industry Annual 1996*, DOE/EIA-0584(96) (Washington, DC, October 1997); *Electric Power Monthly, March 1998*, DOE/EIA-0226(98/03) (Washington, DC, March 1998); and U.S. Department of Commerce, Bureau of the Census, "Monthly Report EM 545" and "Monthly Report IM 145."

nuclear generation was replaced with imported electricity from Canada and neighboring U.S. regions, but coal-fired generation also rose by 1.9 percent, using 2.5 percent (5.1 million short tons) more coal than in 1996, most of which was Western coal.

In the Middle Atlantic Region, electricity generation rose by 4.5 percent, despite a substantial decline in generation from nuclear and oil-fired plants. Most of the growth resulted from a resurgence in natural gas generation (up by 19.8 percent) after a severely depressed 1996 showing. Coal-fired generation also grew strongly, increasing by 5.9 percent. Coal consumption for electricity generation rose more rapidly than in any other region, by 4.7 percent. Some of the electricity generated was sent to other regions, including New England and the East North Central Region.

Coal-fired generation was the dominant component of the South Atlantic Region's 3.5-percent growth in generation. Utility coal consumption rose by 6.1 million short tons in 1997, the largest tonnage increase of any region. Four new coal-fired plants that came on line during 1996 with a combined capacity of 1.4 gigawatts became fully operational in 1997 and contributed significantly to the increase.

4.8-percent growth in electricity production. Coal consumption for electricity generation rose by 2.8 million short tons in the

region. As in the Middle Atlantic Region, some of the increased generation was sent to outside regions.

Abundant hydropower generation in the Pacific Northwest, together with higher gas-fired generation, led coal-fired generation to decline in the Pacific Contiguous Region. The decline in tonnage (0.9 million short tons) was slight, however, as coal is only a minor component of Pacific generation.

The increase in hydroelectric generation also constrained the growth in coal-fired generation in the neighboring Mountain Region, which traditionally dispatches a large amount of “coal-by-wire” to the West Coast States. Nevertheless, coal-fired generation in the Mountain Region increased by 4.6 percent, an increase of 3.7 million short tons of coal over the 1996 level, in response to relatively large growth in electricity demand within the region.

In the West South Central Region, utility coal consumption for electricity generation rose by only 1.5 percent (2.1 million short tons) over 1996. Hydroelectric generation was up by 35.3 percent for the region, displacing some coal-fired generation. During the second half of the year, rail delivery problems for coal led to a substantial increase in gas-fired generation, particularly in Texas and Arkansas where utilities burned gas to conserve coal stocks, which were being rapidly depleted.

Non-electricity Sectors

Coal consumption in the non-electricity sectors (coke plants, other industrial plants, and residential/ commercial users) totaled 105.8 million short tons in 1997, down by 2.6 percent from the 1996 level of 108.7 million short tons. Metallurgical coal consumption (carbonization) at the 26 operating coke plants in the United States declined by 7.1 percent to 29.4 million short tons (Table 1), and coke production declined by 4.2 percent to 22.2 million short tons. The average price of metallurgical coal delivered to coke plants remained steady at \$47.36 per short ton in 1997, compared with \$47.33 per short ton in 1996.

As in earlier years, the U.S. iron and steel industry relied on imports to supplement the domestic coke

supply for pig iron production. U.S. pig iron production rose by 3.0 percent in 1997. Net imports of coke amounted to 0.7 million short tons, as coke imports totaled 1.6 million short tons and exports were 0.8 million short tons. Most of the coke imports came from Japan and China. Almost all of the exports went to Canada and Mexico, the two traditional export markets for U.S. coke.

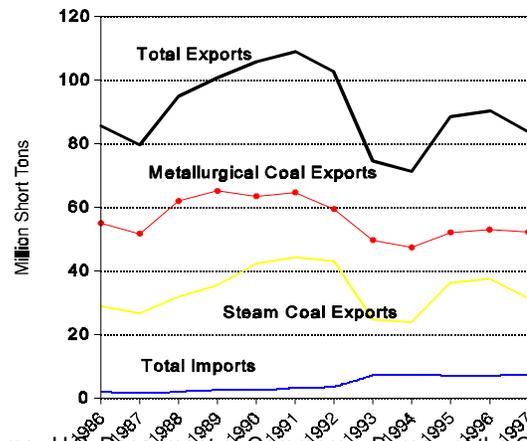
Coal consumption by other industrial plants and residential/ commercial users remained virtually unchanged at 76.4 million short tons in 1997. The average delivered price of coal to industrial consumers was \$32.40 per short ton, up slightly from \$32.28 per short ton in 1996.

Exports and Imports

Exports

The upward trend in U.S. coal exports over the past 2 years reversed in 1997, as exports declined by 7.7 percent to 83.5 million short tons. The decline was mostly in steam coal, which fell by 16.3 percent to a total of 31.4 million short tons. There were declines in exports of U.S. steam coal in every world region except North America (Canada and Mexico). Weak international coal prices, a strong dollar, and increased competition from other exporting countries were the major factors contributing to the decline. The average price for U.S. steam coal exports fell by 4.9 percent in 1997 to \$32.42 per short ton. The average for metallurgical coal exports remained almost unchanged at \$45.45 per short ton (Figure 7).

Figure 7. U.S. Coal Exports and Imports, 1986-1997



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

Exports to Europe, the primary market for U.S. steam coal exports, fell by more than one-third to 12.5 million short tons in 1997, with reductions to every major European country except the United Kingdom (U.K.). In addition to strong competition from Colombia, Venezuela, and South Africa, interfuel competition from natural gas in the electricity generation market in Europe continued to affect U.S. steam coal exports. Among the major importing countries in Europe, the Netherlands

showed the largest decline—a drop of 2.2 million short tons, a 76-percent drop from its purchases of U.S. steam coal in 1996. Italy's imports fell by 1.5 million short tons (from 3.9 million short tons in 1996). On the other hand, exports to the U.K. rose by 0.5 million short tons to 3.6 million short tons. U.K. imports have risen sharply since 1995, as subsidies to domestic coal producers were eliminated, allowing imports to compete.

Steam coal exports to Asia declined by 28.9 percent to 6.5 million short tons in 1997. Japan, Korea, and Taiwan—the major Asian importing countries—all took less U.S. steam coal.

In addition to weak coal prices and strong competition from Australia and Indonesia, U.S. exports to Asia were also hurt by the delivery problems experienced by Union Pacific Railroad (UP) from mines in Utah and Colorado to the ports of Los Angeles and Long Beach during the latter half of the year. Also, some unit trains carrying export coal from Colorado to Mexico were temporarily suspended as part of UP's efforts (Service Recovery Plan) to maintain essential services to its domestic customers, hurting export shipments. These transportation bottlenecks were reported to have reduced U.S. coal exports out of the Western Region by at least 1 million short tons.

In Africa, Morocco's imports of U.S. steam coal fell by 1.4 million short tons in 1997 to only about one-tenth of its 1996 import level, practically drying up the African market.

On the positive side, U.S. steam coal exports to Canada rose by 4.1 million short tons in 1997. Shipments to Canada were bolstered by increased purchases by Ontario Hydro, which shut down several nuclear power plants for upgrades and substituted increased coal-fired generation for the lost nuclear generation (a situation that is expected to continue for the next 3 years). Mexico took 0.4 million short tons more U.S. steam coal in 1997 than it did in 1996. The increased shipments to Mexico reflected a new multi-year contract for Cypress Amax Coal Company to supply coal to the Commission Federal de Electricidad's C.T. Carbon II generating station. Shipments to Mexico would have been even larger in 1997, had there not been rail delivery problems between Colorado and Mexico.

U.S. metallurgical coal exports also fell in 1997, but only slightly, by 1.5 percent to 52.2 million short tons. The high quality of U.S. metallurgical coal, coupled with strong growth in pig iron production worldwide in 1997, especially in Europe and Asia, maintained the export volume and price of U.S. metallurgical coal in 1997. Exports to Canada declined by 1.1 million short tons, but the decline was largely offset by an almost equal increase in exports to Brazil. Shipments to Asia fell by 0.8 million short tons to 8.0 million short tons, but exports to Europe, by far the largest market for U.S. metallurgical coal, rose by 0.5 million short tons to 28.8 million short tons. Brazil remained the largest importer of U.S. metallurgical coal with 7.4 million short tons in 1997, followed by Canada, Japan, Italy, and the Netherlands, each of which imported 4 to 5 million short tons.

Imports

U.S. coal imports totaled 7.5 million short tons in 1997, a 5.1-percent increase over 1996. Imports represented less than 1 percent of total US consumption and were equivalent to less than 10 percent of total US exports. The average price of all imported coal to the United States edged up by 2.6 percent from \$33.45 per short ton in 1996 to \$34.32 per short ton in 1997 (Figure 6).

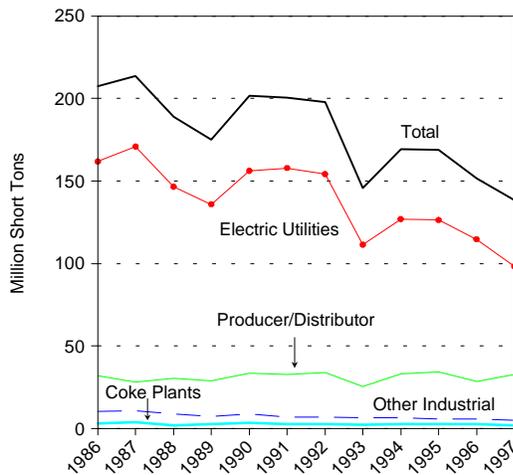
After nearly doubling from 3.8 million short tons to 7.3 million short tons between 1992 and 1993, the level of U.S. coal imports has remained steady. The jump in 1993 came about as East Coast and Gulf Coast utilities turned to imports to offset losses of supply that resulted from floods in the Midwest and strikes by the United Mine Workers of America. In subsequent years, many of these utilities have maintained their level of imports as a means of assisting in meeting CAAA Phase I requirements for sulfur emission reductions, which became effective on January 1, 1995. U.S. imports of steam coal are invariably low-sulfur coal.

Colombia remained the largest supplier of U.S. imports, with 3.1 million short tons, followed by Venezuela (1.5 million short tons), Indonesia (1.4 million short tons), and Canada (1.2 million short tons). U.S. imports were primarily steam coal for electricity generation, but coal from Canada was largely metallurgical coal used by coke plants in Illinois, Indiana, and Michigan. The largest importers of steam coal were New England Power Company, Jacksonville Electric Authority, Tampa Electric Company, and Central Hudson Gas and Electric Corporation. Together, they received more than 85 percent of all U.S. steam coal imports.

Coal Stocks

At the end of 1997, coal stocks in the United States totaled 139.1 million short tons, a decrease of 12.6 million short tons from their level a year earlier. Consumers, primarily electric utilities, held a total of 106.3 million short tons in coal stocks, down by 16.8 million short tons, and coal producers and distributors held 32.9 million short tons, up by 4.2 million short tons from the 1996 year-end level (Figure 8).

Figure 8. Year-End Coal Stocks, 1986-1997



Sources: Energy Information Administration, *Quarterly Coal Report, October-December 1997*, DOE/EIA-0121(97/4Q) (Washington, DC, May 1998); *Coal Industry Annual 1996*, DOE/EIA-0584(96) (Washington, DC, October 1997); and *Electric Power Monthly, March 1998*, DOE/EIA-0226(98/03) (Washington, DC, March 1998).

Year-end utility coal stocks fell to 98.3 million short tons, a drawdown of 16.4 million short tons from the 1996 level. Utility coal stocks declined in every region and nearly every State west of the Mississippi. The drawdown was largely attributable to the severe delivery problems experienced by Union Pacific Railroad during the second half of the year. The area hardest hit was the West South Central Region, where Texas drew down 4.1 million short tons of coal from stockpiles, or 39 percent, and Arkansas drew down 1.8 million short tons, or 65 percent. In the East, utility coal stocks also generally declined, except in the East South Central Region, where coal stocks rose slightly. Among the States that had lower year-end stocks, Indiana and Georgia showed the largest declines, 1.7 million short tons and 1.4 million short tons, respectively.

Year-end utility coal stocks represented 37.8 days of supply (in terms of December consumption), down by 7.9 days from a year earlier. The decline largely reflected a continuation of the downward trend that started in the early 1980's as a move by utility operators to reduce operating costs. Supplies at utilities have been declining steadily, at an average rate of about 4 days of supply per year since 1980.

Year-end coal stocks at other industrial plants were down marginally from 1996 levels, at 5.6 million short tons. Coke plant coal stocks showed a sharper decline, down 9.5 percent to 2.4 million short tons.

Producer and distributor stocks increased in every region, but there were large differences among States. In the West, coal stocks rose significantly in Arizona (0.7 million short tons), Colorado (0.9 million short tons), and Utah (0.8 million short

tons), primarily as a result of delayed shipments from mines to consumers. Stocks declined in New Mexico (0.8 million short tons). In the East, stocks rose in Kentucky (1.1 million short tons) and in Virginia (0.5 million short tons) but stocks declined in Pennsylvania (1.0 million short tons).

Summary

The U.S. coal industry had an excellent year in 1997, although not as robust as in 1996. Coal production rose to a record high 1,088.6 million short tons, a 2.3-percent increase over 1996, driven by increased coal use for electricity generation. A significant drop in nuclear-powered generation contributed to a substantial increase in coal-fired generation and utility coal consumption. With milder-than-normal weather in the winter and spring months and cooler-than-normal summer weather in 1997, growth in electricity demand was relatively modest at 0.7 percent, contributing only marginally to the rise in utility coal consumption.

Coal exports declined significantly in 1997 as a result of weak international coal prices and strong competition from other coal-exporting countries. Continuing their downward trends, coal stocks at U.S. utilities declined substantially, and coal prices were generally lower in 1997.

Looking ahead for 1998, many of the factors that affected the coal industry in 1997 are likely to change. Factors likely to cause a rise in coal consumption and production in 1998 include:

- A gradual return to normal water flows for hydroelectric generation
- A return to normal summer temperatures in 1998, resulting in a higher rate of growth in electricity demand than in 1997
- No further decline in coal exports.

Potentially offsetting such favorable factors would be the following:

- A partial recovery of nuclear-powered generation, which would eliminate some of the potential for growth in coal use

- Continued recovery of gas-fired generation from its decline in 1996.

Overall, the performance of the U.S. coal industry in 1998 is likely to be less robust than in 1997 and much less robust than in 1996, when the U.S. coal industry saw many record-breaking achievements, as detailed in the Energy Information Administration's *Short-Term Energy Outlook*. Coal prices are expected to be still lower in 1998 with ongoing productivity gains in coal mining and transportation.