

COAL FACTS

This paper provides some basic information and data related to coal-fired electricity. Most of the data are taken from independent sources, especially the Energy Information Administration (EIA). The paper relies on the most current information available as of May 2017.

Electricity Sources

- ✓ Coal was responsible for 30.4% of electricity generated in the U.S. during 2016. Natural gas was responsible for 33.8%, nuclear power 19.7%, and renewable energy (including hydroelectric power) 14.8%. Non-hydroelectric renewables (wind, solar, geothermal, and biomass) were responsible for 8.4%.¹
- ✓ Coal is projected to provide 31% of U.S. electricity in 2017 and 2018. Natural gas is projected to generate 32% of U.S. electricity in those same years.²
- ✓ Through 2030, coal is projected to provide 31% of U.S. electricity generation, with natural gas providing 29%.³

Coal Fleet

- ✓ At the end of 2015, there were 427 coal-fired power plants in the U.S.⁴ As of February 2017, there were 914 individual coal-fired electric generating units (EGUs) representing approximately 270,000 megawatts (MW) of generating capacity.⁵ There were 317,000 MW of coal-fired electric generating capacity in 2010.⁶
- ✓ EIA projects that the U.S. coal fleet will total 217,000 MW by 2030 and thereafter.⁷
- ✓ From 2011 to 2016, 18 new coal-fired EGUs (totaling 9,000 MW) began operation.⁸
- ✓ Since 2010, owners of coal-fired EGUs have announced that nearly 100,000 MW of coal-fired generating capacity has retired, will be retiring, or will be

converting to other fuels, with nearly two-thirds of these shutdowns occurring by the end of last year. Of this total, EPA policies have been cited as a factor in the closure of 75,000 MW (over 450 coal-fired EGUs) in 37 states.⁹ Ohio, Indiana, Pennsylvania, Alabama, Michigan, Kentucky, and Georgia have the most closures attributed to EPA policies.

Electricity Prices

- ✓ The U.S. average retail electricity price was 10.28 cents per kilowatt-hour (kWh) in 2016.¹⁰ The average family spent \$114 per month on electricity in 2015.¹¹
- ✓ Twenty-five (25) states that generate, on average, only 8% of their electricity from coal pay an average of 12.29 cents per kWh for electricity, which is 20% more than the national average.¹²
- ✓ Thirteen (13) states that, on average, generate nearly 70% of their electricity from coal pay an average of 9.18 cents per kWh, which is 11% less than the national average.¹³

Coal and Natural Gas Prices

- ✓ The table below compares EIA-projected coal and natural gas prices (\$ per MMBtu) delivered to the electric power sector:¹⁴

	2017	2018	2020	2030	2040
Natural gas	\$3.68	\$3.96	\$4.52	\$5.07	\$5.35
Coal	\$2.16	\$2.22	\$2.32	\$2.42	\$2.60

- ✓ EIA projects that natural gas prices for electric power generation will increase by nearly 50% between 2017 and 2040. Coal prices are projected to rise 20% over the same period.¹⁵

Cleaner Coal

- ✓ Emissions per kWh of sulfur dioxide (SO₂), nitrogen oxides (NO_x), and particulate matter (PM) from coal-fired power plants have been reduced by 92% over the period 1970-2016.¹⁶

- ✓ Approximately \$120 billion had been invested in emission controls through 2016. Owners of coal-fired EGUs are expected to spend an additional \$7 billion for emission controls through 2020.¹⁷
- ✓ Today, virtually all U.S. coal-fired electric generating capacity has installed advanced controls to reduce emissions of SO₂, NO_x, PM, mercury, acid gases, and non-mercury metals.¹⁸
- ✓ At least 15 clean coal technologies are being used today by the U.S. coal fleet.¹⁹

States

- ✓ Coal is used to generate electricity in 48 states. Only Rhode Island (mostly natural gas) and Vermont (mostly renewables) do not generate any electricity from coal.²⁰
- ✓ Coal provides at least half the electricity in 13 states and at least one quarter of the electricity in 26 states.²¹
- ✓ During 2016, the ten (10) states that generated the most kilowatt-hours of electricity from coal were Texas, Indiana, West Virginia, Ohio, Kentucky, Missouri, Illinois, Pennsylvania, Michigan, and Wyoming.²²
- ✓ During 2016, the ten (10) states with the highest percentage of electricity from coal were West Virginia (94%), Wyoming (86%), Kentucky (83%), Missouri (77%), Indiana (71%), North Dakota (71%), Utah (69%), Nebraska (58%), Ohio (58%), and New Mexico (56%).²³

Domestic Coal

- ✓ According to EIA, the U.S. has the largest recoverable coal reserves in the world.²⁴
- ✓ 93% of the coal consumed in the U.S. is used to generate electricity.²⁵ Coal is also used in the steel, cement, paper, and plastics industries, and to produce activated carbon for water purification.
- ✓ Coal is mined in 25 states and is responsible for over 500,000 U.S. jobs.²⁶ Wyoming is the largest coal-producing state, followed by West Virginia, Kentucky, Illinois, and Pennsylvania.²⁷ In 2015, approximately 60% of coal was produced west of the Mississippi River and 40% from the east.²⁸

- ✓ According to EIA, domestic coal production totaled 739 million tons in 2016, and is projected to be 774 million tons in 2017 and 785 million tons in 2018.²⁹

Global Coal

- ✓ EIA projects that coal will remain the second-largest energy source worldwide—behind petroleum and other liquids—through 2030.³⁰
- ✓ Coal is projected to remain the single largest fuel source for electricity generation worldwide through 2040. EIA projects that coal will provide 38% of global electricity in 2020, followed by renewables at 27%, natural gas at 20%, nuclear power at 12%, and petroleum liquids at 3%.³¹
- ✓ For 2016, U.S. coal demand represented about 11% of total global coal consumption. Asia consumes over six times as much coal as the U.S. and represents 71% of global consumption.³²
- ✓ By 2040, global coal consumption is projected to increase by about 12%, with non-OECD Asia's demand growing by 15%.³³
- ✓ Globally, over 1 million MW (1,000 gigawatts) of coal capacity is under construction or in the planning phase. This is approximately four times the size of the entire U.S. coal fleet. The largest amounts of coal capacity are being built in China, India, Indonesia, Vietnam, Europe, and Africa.³⁴
- ✓ U.S. coal exports totaled approximately 60 million tons in 2016, a drop from 74 million tons in 2015.³⁵ EIA projects that U.S. coal exports will remain at 60 million tons in 2017 and drop to 52 million tons in 2018.³⁶

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¹ U.S. Energy Information Administration (EIA), *Electric Power Monthly*, February 2017 edition, with data for December 2016. Percentages are for utility-scale generation and do not include EIA's estimate of distributed solar generation.

² EIA, *Short Term Energy Outlook*, May 2017.

³ EIA, *Annual Energy Outlook 2017* (January 2017).

⁴ EIA, "Count of Electric Power Industry Power Plants By Sector, by Predominant Energy Sources Within Plant, 2005-2015," *Electric Power Annual 2015*, November 2016.

⁵ EIA *Electric Power Monthly*, February 2017 and April 2017.

⁶ EIA, *Electric Power Annual 2015*, November 2016.

⁷ EIA, *Electric Power Annual, 2016; Electric Power Monthly, April 2017; Annual Energy Outlook 2017*. Capacity in 2020 and 2030 represents EIA's reference case without the Clean Power Plan.

⁸ EIA, *Electric Power Monthly*, February 2012, 2013, 2014, 2015, 2016, and 2017.

⁹ ACCCE, *Retirement of Coal-Fired Electric Generating Units as of February 25, 2017*. Sources for the retirements are EIA, SNL Energy, and company announcements.

¹⁰ EIA, *Electric Power Monthly*, February 2017.

¹¹ EIA, "2015 Average Monthly Bill Residential," https://www.eia.gov/electricity/sales_revenue_price/pdf/table5_a.pdf.

¹² EIA, *Electric Power Monthly*, February 2017.

¹³ *Ibid.*

¹⁴ For 2017 and 2018, EIA, *Short Term Energy Outlook*, May 2017. For 2020, 2030, and 2040, EIA, *Annual Energy Outlook 2017*, January 2017. (STEO \$ are nominal; AEO \$ are 2016\$.)

¹⁵ EIA, *Annual Energy Outlook 2017*, January 2017.

¹⁶ EIA, *Electric Power Monthly*, February 2017, Table 1.1; U.S. EPA, *National Emissions Inventory, Air Pollutant Emissions Trends Data, 1970-2016, Fuel Combustion Electric Utilities; EPA Air Markets Program data*.

¹⁷ Energy Ventures Analysis, Inc., *Capital Investments in Emission Control Retrofits in the U.S. Coal-fired Generating Fleet through the Years – 2016 Update*, January 26, 2016.

¹⁸ SNL Energy data.

¹⁹ Clean coal technologies include several types of flue gas desulfurization systems for SO₂ control; control technologies to reduce NO_x emissions; advanced particulate matter control systems; emission control technologies to reduce mercury, non-mercury metals, and acid gas emissions; supercritical and ultrasupercritical steam generators; and integrated gasification combined cycle technology.

²⁰ EIA, *Electric Power Monthly*, February 2017.

²¹ *Ibid.*

²² *Ibid.*

²³ *Ibid.*

²⁴ EIA, *International Energy Outlook 2016*.

²⁵ EIA, *Monthly Energy Review*, April 2017.

²⁶ EIA, *Annual Coal Report*, November 2016, Table 1, Coal Production and Number of Mines by State and Mine Type; National Mining Association, *The Economic Contributions of U.S. Mining (2015 Update)*, September 2016.

²⁷ EIA, *Annual Coal Report*, November 3, 2016, Table 1, Coal Production and Number of Mines by State and Mine Type.

²⁸ *Ibid.*

²⁹ EIA, *Short Term Energy Outlook*, May 2017.

³⁰ EIA, *International Energy Outlook 2016*, May 2016.

³¹ *Ibid.*

³² *Ibid.*

³³ *Ibid.*

³⁴ *Statement of the U.S. Chamber of Commerce on Paris Climate Change Agreement to U.S. House of Representative Committee on Science, Space, and Technology*, February 2, 2016 (citing Platt's database). We subtracted 120,000 MW that China cancelled early this year – see Forsythe, Michael, "China Cancels 103 Coal Plants, Mindful of Smog and Wasted Capacity," *New York Times*, January 18, 2017.

³⁵ EIA, *Quarterly Coal Report*, April 2017.

³⁶ EIA, *Short Term Energy Outlook*, April 2017.