



**BEFORE THE SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES
COMMITTEE ON NATURAL RESOURCES**

**HEARING ON MINING IN AMERICA: POWDER RIVER BASIN COAL MINING THE
BENEFITS AND CHALLENGES**

JULY 9, 2013

**TESTIMONY OF MARY J. HUTZLER
THE INSTITUTE FOR ENERGY RESEARCH**

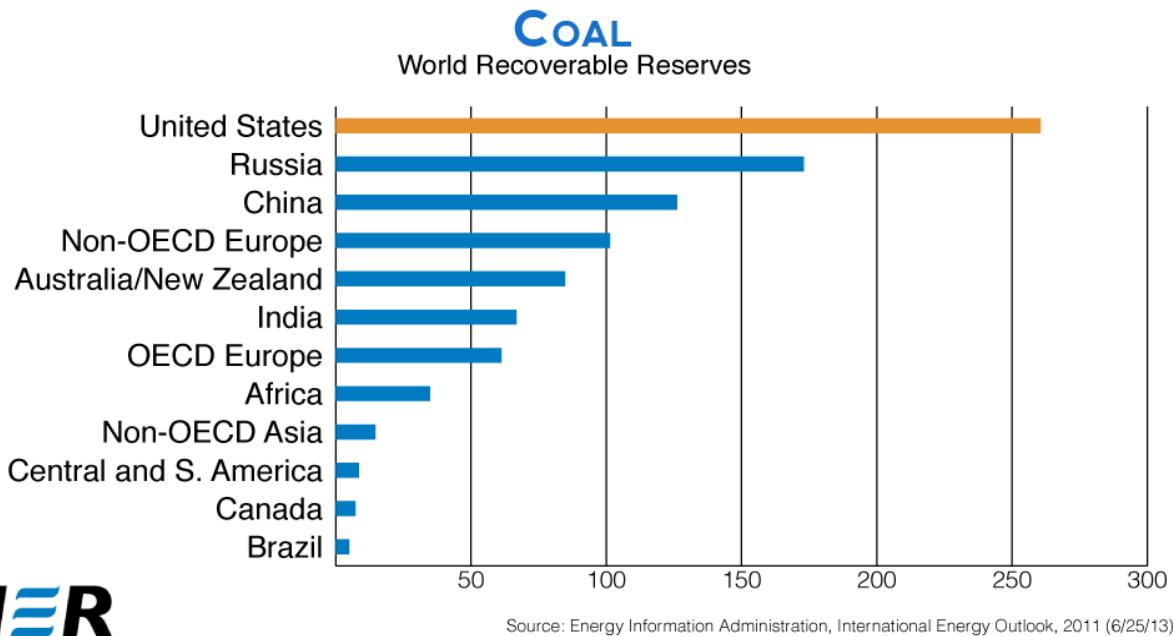
Background

Coal is the world's most plentiful fossil fuel and is the most abundant fossil fuel produced in the United States. Over 90 percent of the coal consumed in the United States is used to generate electricity. Coal is also used as a basic industry source for making steel, cement and paper, and is used in other industries as well.

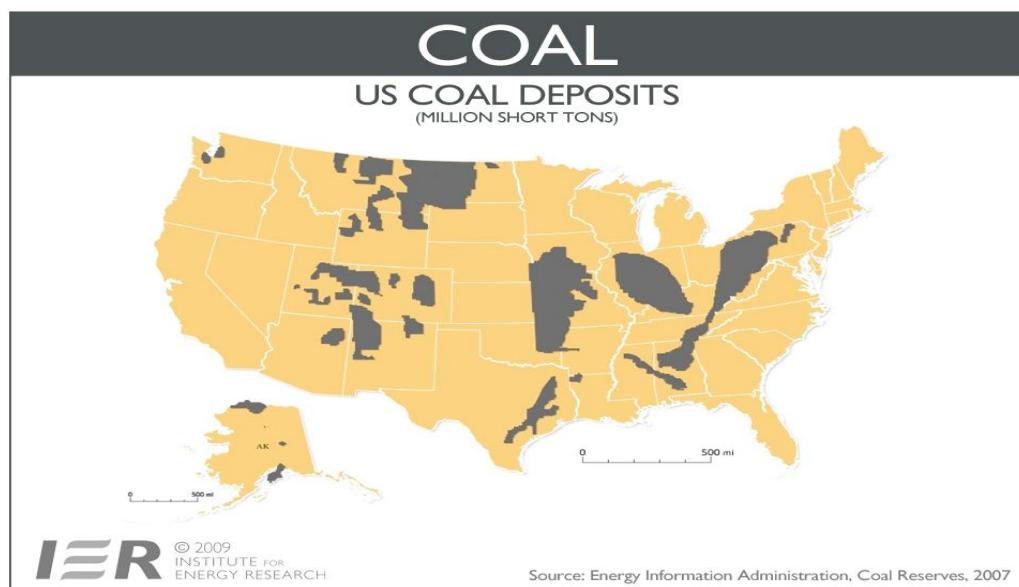
As the first concentrated energy source to be used by man, coal fueled the Industrial Revolution and lifted the burden of labor from the backs of men and animals. The Industrial Revolution was begun in England, the first nation to employ its coal resources to increase human productivity, in turn becoming the first economic and political superpower of the energy age.

For over a century, coal served as the chief transportation energy source and fed the world's commerce with railroads and steamships. Its transformation from an abundant but useless rock into a valuable energy source created an explosion of intellectual creativity that changed the course of human events. Currently, coal is used to meet almost 20 percent of America's total energy demand and generate about 40 percent of all its electricityⁱ.

The United States has enough coal reserves to last at least another 250 years, with reserves that are over one-and-one-half times greater than our nearest competitor, Russia, and over twice that of China.ⁱⁱ America's known coal reserves, 261 billion tons, alone constitute 27 percent of the entire world's coal reserves.

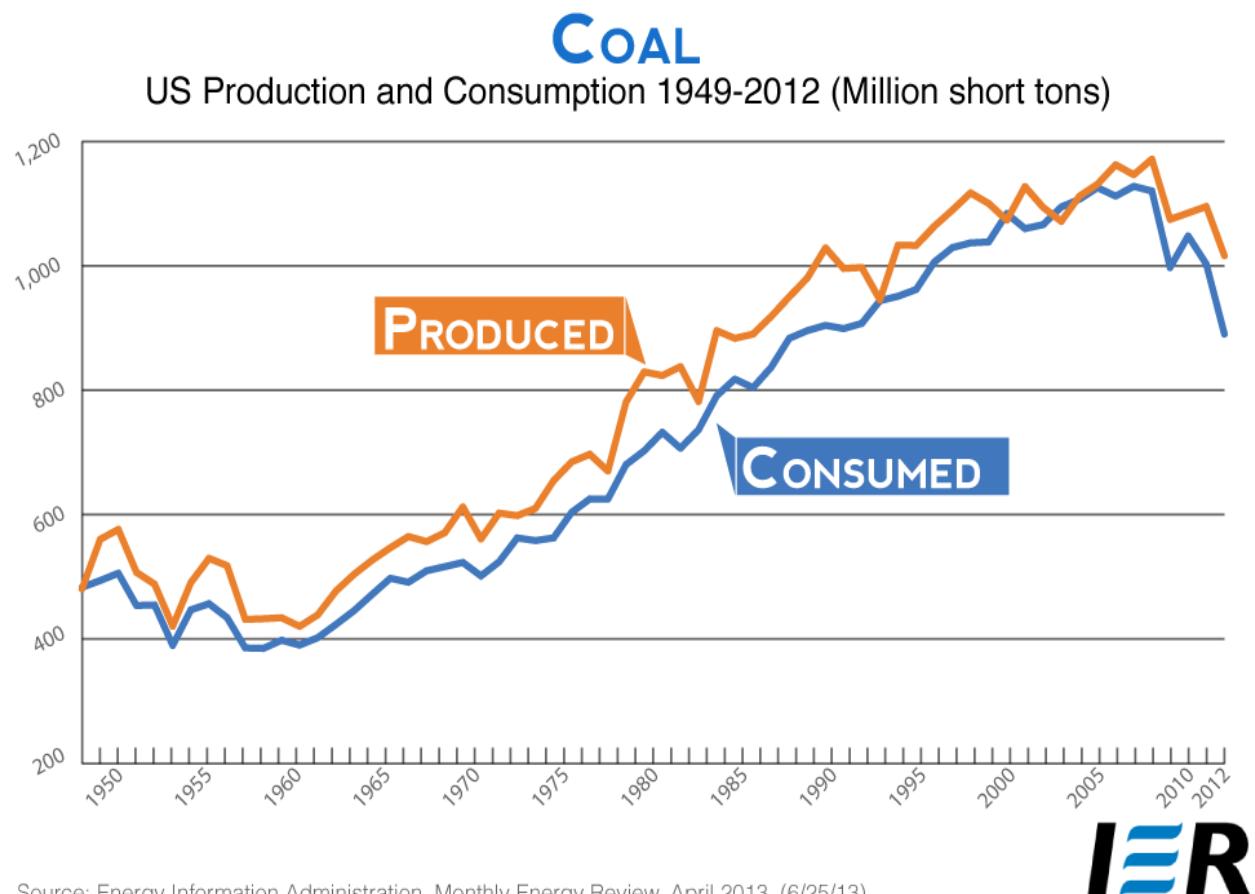


While known reserves are high, actual U.S. coal resources are much higher. “Reserves” represent coal that is readily evident as a result of ongoing mine operations, while “resources” include all those areas known to contain coal but have yet to be actually quantified by direct exposure due to the mining process. In-place U.S. coal resources (the entire estimated volume that is within the earth) totals 10 trillion short tons,ⁱⁱⁱ and would last over 9000 years at today’s consumption levels. Alaska is estimated to hold more coal than the entire lower 48 states. (While the EIA’s estimate of recoverable coal reserves in Alaska is 2.8 billion short tons^{iv}, geological estimates by the U.S. Geological Survey put the in-place figure at over 6 trillion short tons.) The U. S. coal resources are clearly vast.



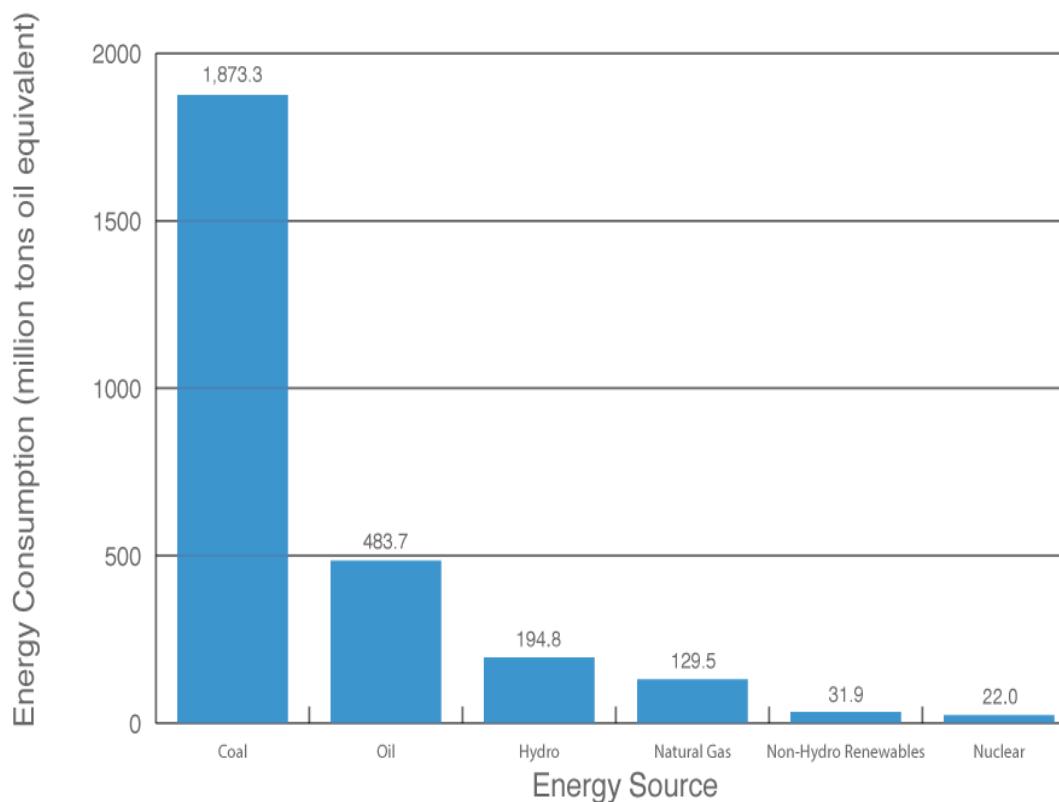
In addition to its pivotal role as an affordable source of electricity, coal can also be converted into liquid fuels – gasoline, diesel, and jet fuel – as well as into an alternative to liquid natural gas (LNG) for use in synthetic and industrial gases. South Africa currently produces much of its liquid fuel from coal, using a process pioneered and used by Germany prior to World War II. Many nations, including our own, are exploring methods by which coal can be utilized in cleaner forms.

American coal production is currently the second highest in the world (behind China)^v, delivering 1.016 billion short tons in 2012.^{vi} China produces over 3.8 billion short tons a year and still needs to import coal.^{vii} While coal use has slightly decreased over the last few years in the United States due to low cost natural gas and government policies against coal use, its share of world energy consumption has increased to 29.9 percent in 2012, the highest since 1970.^{viii}



China and Germany, for example, are ramping up coal-fired electricity generation. The most recent data from the Energy Information Administration show that China consumes nearly as much coal as the rest of the world combined.^{ix} China's coal use has grown by 40 percent over the last decade. According to data from BP's 2013 Statistical Review of World Energy, coal constituted almost 70 percent of China's 2012 energy consumption.^x

CHINESE PRIMARY ENERGY CONSUMPTION BY SOURCE, 2012



Source: BP Statistical Review of World Energy 2013, Historical Data Workbook



In Germany, new coal-fired plants with a capacity of 5.3 gigawatts of electricity will come online this year^{xi} to replace retiring nuclear plants and to back-up intermittent renewable technologies. In total, 10 new coal and lignite power plants are currently under construction in Germany.^{xii}

To fuel these overseas plants, countries are importing U.S. coal. U.S. coal exports totaled 125.7 million short tons in 2012, 17 percent higher than in 2011, and the highest level in the history of the United States.^{xiii} About 75 percent of U.S. coal exports were shipped to Europe and Asia in 2012. Their desirability is continuing. The EIA reports that U.S. coal exports in March 2013 totaled 13.6 million short tons, almost 0.9 million short tons above the previous monthly export peak in June 2012. EIA is projecting a third straight year of more than 100 million short tons of coal exports in 2013.^{xiv} The top five destinations of exported coal (in descending order) during March were China, Netherlands (a large transshipment point), United Kingdom, South Korea,

and Brazil.^{xv} China imports U.S. metallurgical coal that has a high Btu content that the country uses for steelmaking and steam coal for electric generation.

Powder River Basin Coal

The Powder River Basin is located in southeast Montana and northeast Wyoming and is the largest coal-producing region in the nation, accounting for over two-fifths of all coal mined in the United States. In 2011, the Powder River Basin produced 462.6 million short tons of subbituminous coal^{xvi} used mainly for electricity generation. Wyoming is the largest coal producing state, producing more coal than the next six largest coal producing states combined.

Powder River Basin coal seams are thick, facilitating surface mining and making extraction easy and efficient. As a result, the price of Powder River Basin coal at the mine mouth tends to be less than that of coal produced elsewhere in the nation. Powder River Basin coal also has lower sulfur content than other coal varieties, making it attractive for electricity generators that must comply with strict EPA emission standards. More than thirty states receive coal from Wyoming, and several midwestern and southern states are highly or entirely dependent on Wyoming supply. Two railroads, operating the Powder River Basin Joint Line, move coal out of the Powder River Basin.

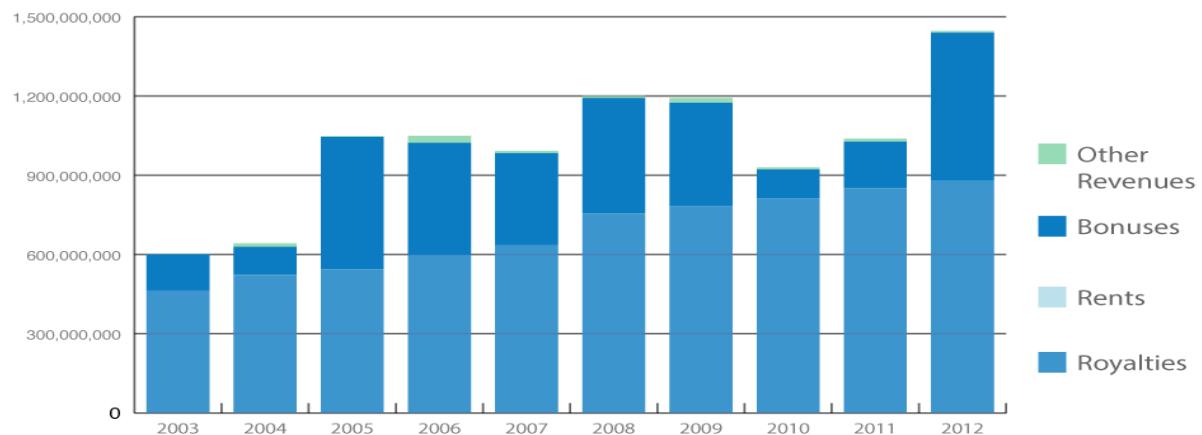
Almost all of the coal in the Powder River Basin is federally owned. Therefore, mine expansions require federal and state approvals and are dependent on actions from the Department of Interior's Bureau of Land Management.

According to a multi-agency government study required by the Energy Policy Act of 2005, the federal government owns 957 billion short tons of coal in the lower 48 states, of which about 550 billion short tons are available in the Powder River Basin.^{xvii} The Bureau of Land Management has under lease or lease application about another 11.6 billion short tons of coal in the Basin. The report found that approximately 1.5 percent of the Federal mineral estate assessed in the Powder River Basin—or 82,000 out of 5.4 million acres—is available for coal mining under standard lease terms, which is about 27 billion tons of Federal coal. Nearly 88 percent of the Federal mineral estate in the basin is available for mining with varying degrees of access restrictions and about 11 percent is prohibited from being leased by statute or because of land-use planning decisions. Clearly, there is plenty of public land yet to be leased.

Coal Lease Revenue Statistics

According to the Office of Natural Resources Revenue, revenues from coal leases were the highest ever in fiscal year 2012 at \$1.44 billion dollars, 20 percent higher than in 2008 when coal production on federal and Indian lands hit its peak. Royalty payments (the amount companies pay to produce the coal) were 16 percent higher than in 2008 and bonuses (the amount companies pay to obtain the lease) were 29 percent higher.

FEDERAL COAL REVENUES BY TYPE AND FISCAL YEAR

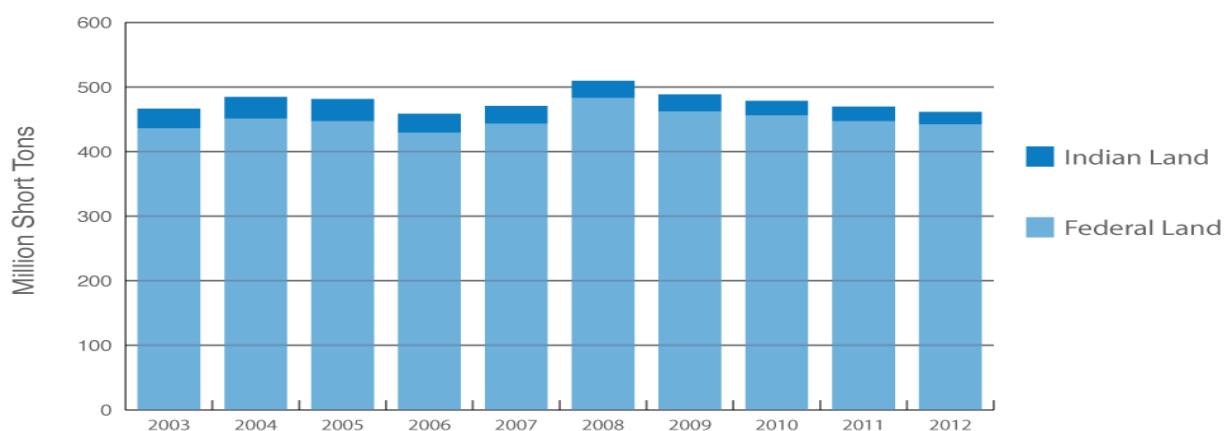


Source: BLM Public Lands Statistics (7/5/13)



Coal production on federal and Indian lands peaked at 509 million short tons in fiscal year 2008 and has been decreasing slightly each year since then. In fiscal year 2012, coal sales from production on federal and Indian lands reached 461 million short tons, a 1.7-percent decrease from fiscal year 2011 and over a 9-percent decrease since the peak in fiscal year 2008.^{xviii} According to data from the Bureau of Land Management, there have been fewer coal lease sales on average under the Obama Administration than there have been under the George W. Bush and the Bill Clinton administrations.^{xix}

COAL PRODUCTION ON FEDERAL AND INDIAN LANDS FY 2003 - FY 2012



Source: BLM Public Lands Statistics (7/5/13)



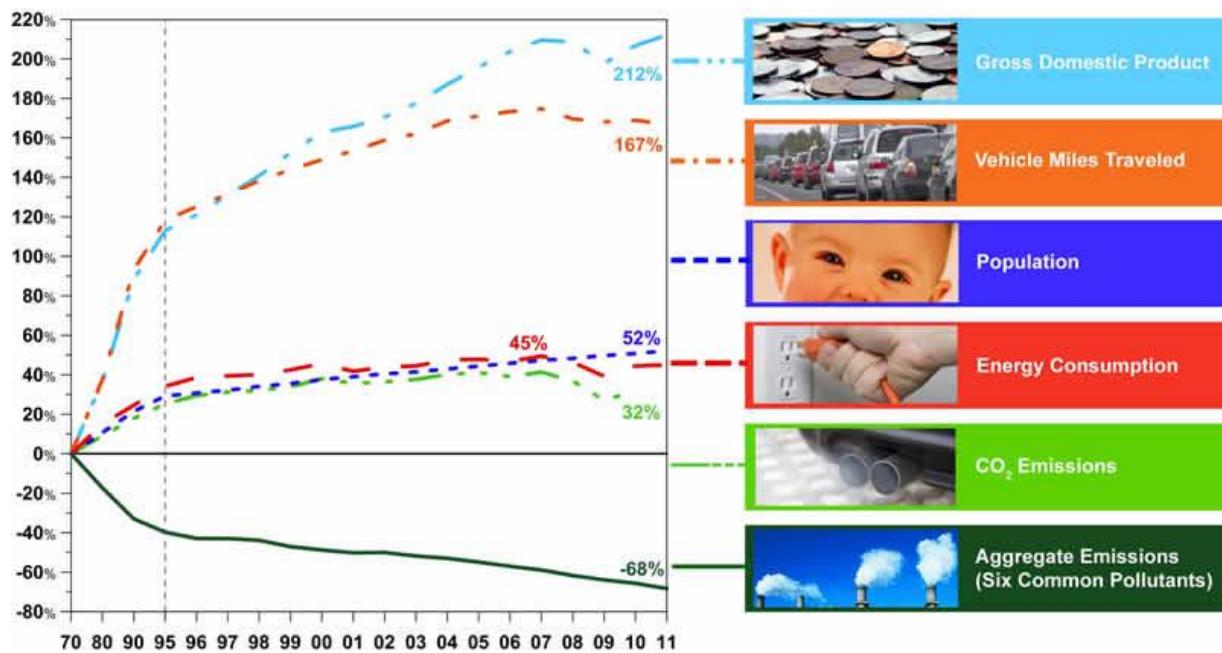
If we evaluated the entire 957 billion short tons of federally owned lower 48 coal at an average price of \$15 per ton for the subbituminous Powder River Basin coal and \$35 per ton for the remainder of the federal lower 48 coal^{xx}, the worth of federally owned coal in the lower 48 states to the economy would be \$22.5 trillion. Most of the coal resources in Alaska are deemed to be federally owned and are estimated to be 60 percent higher than those in the entire lower 48 states but are not included in these estimates. The United States, with the largest estimated coal resource base in the world, does not count Alaska's coal in its resources, *but Alaska has more coal in place than the entire lower 48 states.*

Coal's Environmental Issues

Until recently, coal had been used to produce 50 percent of the nation's electricity, but is losing market share to natural gas and renewable energy as natural gas prices drop, renewable energy is mandated and subsidized, and new environmental regulations take effect. The Environmental Protection Agency (EPA) has produced regulations that essentially ban new coal plants and make its continued use in existing plants extremely costly. As a result, coal produced only 37 percent of our electricity in 2012^{xxi}.

One of the biggest stated concerns about coal is air pollution. Coal produces more emissions than natural gas when burned. However, due to actions taken by industry and technological advances, our air quality is improving and new coal plants are cleaner than ever before. Pollution control technologies such as flue gas desulfurization, selective catalytic reducers, fabric filters, and dry sorbent injection have greatly reduced coal plant emissions. According to the National Energy Technology Laboratory (NETL), for example, a new pulverized-coal plant (operating at lower, "subcritical" temperatures and pressures) reduces the emission of nitrogen oxides (NOx) by 86 percent, sulfur dioxide (SO₂) by 98 percent, and particulate matter by 99.8 percent, as compared with a similar plant having no pollution controls.^{xxii}

These advances in technology have enabled large improvements in air quality. Since 1970, the total emissions of the six criteria pollutants have declined by 68 percent, even though energy consumption has increased by 45 percent, vehicle miles traveled have increased by 167 percent, and the economy has grown by 212 percent.^{xxiii} (The "criteria pollutants" are carbon monoxide, lead, sulfur dioxide, nitrogen oxides, ground-level ozone, and particulate matter.) The following chart from EPA shows the increase in economic measures compared to the decrease in pollution emissions.^{xxiv}



As technology continues to advance, coal-fired power plants will become even cleaner and air quality will continue to improve. In fact, as the *New York Times* has reported, China is actually constructing some coal plants that are cleaner than those allowed to be built in the United States.^{xxv} An irony of our current regulatory policy may be that China will ultimately become the world's supplier of the most advanced clean coal plants, despite the U.S. coal resource base which dwarfs their own.

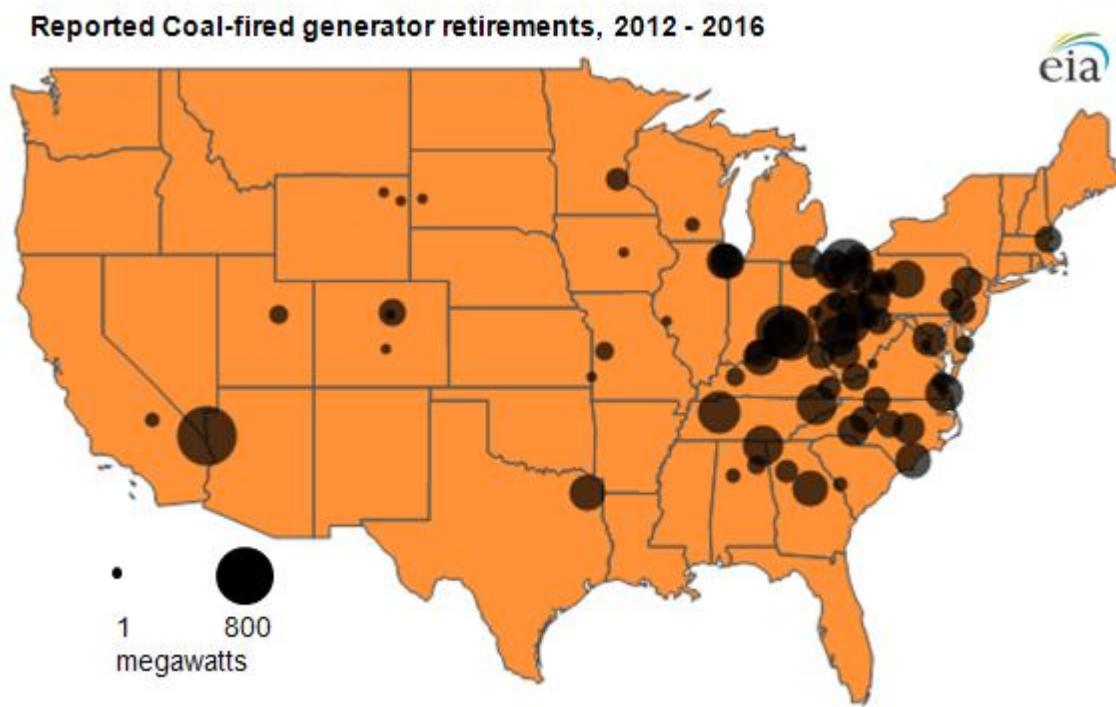
Although coal produces relatively inexpensive energy, many activist groups adamantly oppose coal mining and coal-fired power plants. The Sierra Club, for example, has worked particularly hard to stop coal-fired power plants. They claim that they have prevented 150 new coal-fired power plants from being built.^{xxvi}

Coal mines, especially in Appalachia, are coming under increasing fire from environmental interest groups and the Obama administration. The EPA revoked a clean water permit that the Army Corps of Engineers had previously awarded, despite the fact that, according to the Army Corps, the permit complies with West Virginia state water law and the federal Clean Water Act.^{xxvii} The problem, according to EPA, is that granting the permit would lead to changes in the conductivity (or salinity) of the water that might be detrimental to mayflies, stoneflies, and caddis flies.^{xxviii} In other words, EPA denied the permit, not because of impacts on human health, but potential impacts on mayflies.

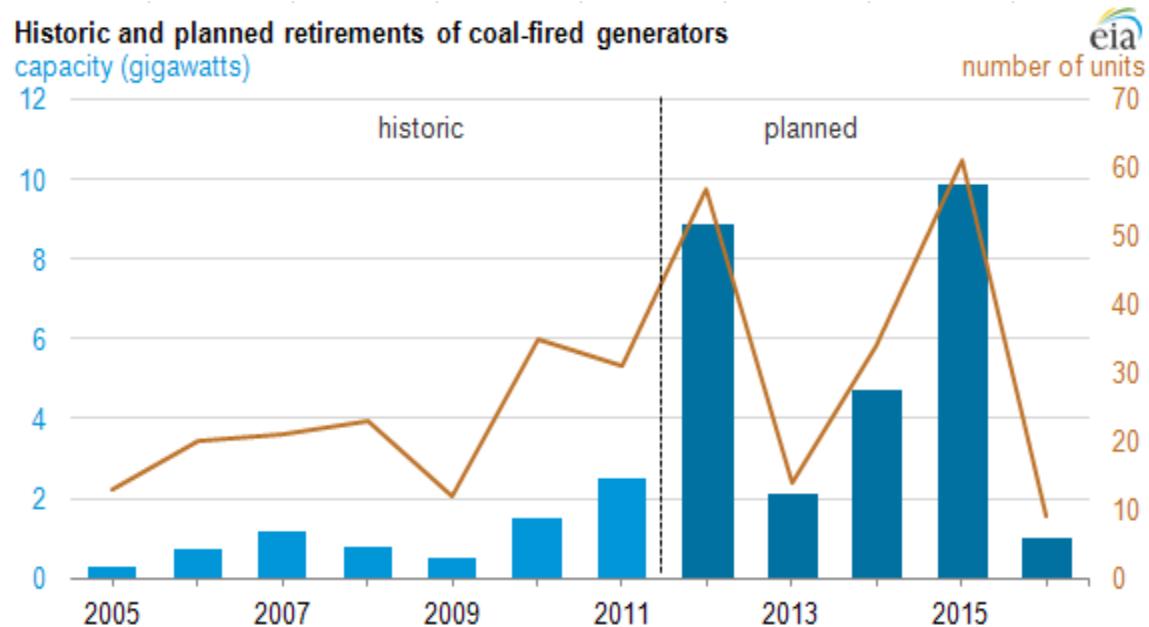
The EPA has promulgated new regulations that target mercury from coal-fired power plants (the Mercury and Air Toxic Standards), which many call Utility MACT because the rule requires “Maximum Achievable Control Technology” for mercury at coal-fired power plants.^{xxix} These technologies must be installed over a tight 3-year period between 2012 and 2015, raising the cost of generating power from existing coal-fired plants where the economics make sense to install the technology, or forcing those plants to retire or to convert to natural gas. The National

Economic Research Associates found compliance costs to be \$21 billion per year and lost jobs to amount to 183,000 per year. Because the increased costs will be passed to consumers through higher electricity rates, businesses will be forced to reduce jobs as well. Studies project that retail electricity prices will increase between 10 and 20 percent in most of the country and over 20 percent in the coal-dependent states in the Midwest.^{xxx}

EIA announced that plant owners and operators expect to retire about 27 gigawatts of coal-fired capacity by 2016 — four times the 6.5 gigawatts of capacity retired between 2007 and 2011 mostly because of the new regulations imposed by the EPA. In 2012, electric generators were expected to retire 9 gigawatts of coal-fired capacity, the largest amount of retirements in a single year in America's history. The 27 gigawatts of retiring capacity is 8.5 percent of total coal-fired capacity (318 gigawatts). The 2012 record retirements are expected to be exceeded in 2015 when nearly 10 gigawatts of coal-fired capacity are expected to retire.^{xxxii} Most of the units retiring are located in the Mid-Atlantic, Ohio River Valley, and Southeastern United States as shown in the map below.



EIA's numbers are based on current utility expectations. The Edison Electric Institute expects a larger number of forced retirements—about 48 gigawatts of coal units at 231 plants—between 2010 and 2022, or about 15 percent of the coal fleet.^{xxxiii}



Further, pending greenhouse gas regulations will require all new coal-fired plants to reduce their greenhouse gas emissions even though there is no cost effective way to do so. This is essentially a ban on new coal-fired plants because the technology does not exist commercially for them to meet natural gas carbon dioxide levels that are required by the EPA regulation.^{xxxiii}

Most recently, the President's Climate Change Action Plan that he outlined in a speech at Georgetown University on June 25 includes reducing carbon dioxide emissions at existing coal-fired power plants as well as at new plants. According to his action plan, "President Obama is issuing a Presidential Memorandum directing the Environmental Protection Agency to work expeditiously to complete carbon pollution standards for both new and existing power plants."^{xxxiv} Many have indicated that these policies represent a 'war on coal'.

Regulating carbon dioxide emissions for coal-fired plants will force mass coal plant retirements, causing unemployment at coal-fired power plants and coal mines. According to a report from the United Mine Workers of America, job losses associated with the closure of EPA-targeted coal units (due to Utility MACT and tighter greenhouse gas standards) could amount to more than 50,000 direct jobs in the coal, utility and rail industries, and an indirect job loss figure exceeding 250,000.

Some have suggested that these closures are mainly due to the low price of natural gas made possible through shale gas discoveries. Regardless, it would be prudent for policy makers and analysts to consider the consequences of removing one of the major three sources of electrical generation from our fuel mix for electricity. Currently our electrical generation mix is largely coal, natural gas and nuclear power. While natural gas prices are currently low, gas-directed rig activity is also very low, which could have an impact on supplies in the out years. Further, the Wall Street Journal reported on January 29 that pressure is increasing to shutter nuclear power plants.^{xxxv}

If the United States decides that it can provide the vast majority of its electricity from natural gas, it must assure that those supplies will not be threatened by government actions, including the federalization of hydraulic fracturing regulation or other attempts to require federal permission to drill natural gas wells, as many have advocated. The consequences of skyrocketing electricity prices brought on by bad public policies will only exacerbate the economic ills our nation faces going forward. Members of Congress should be concerned about a policy that seeks to put all of our energy eggs in one basket.

Conclusion

The United States has a vast amount of coal resources; its coal reserves are larger than any other country in the world. While the world is using coal for almost 30 percent of its energy consumption needs, the United States' coal consumption was at just 18 percent of its energy demand last year. Low natural gas prices due to hydraulic fracturing and the government's regulatory policies concerning coal have resulted in coal losing a substantial share of the electric generation market. In order for coal producers to keep their employees in jobs, they have turned to the overseas market where coal is increasing in popularity. In Europe, coal is replacing retiring nuclear units and backing up intermittent technologies such as wind and solar. In China, America's metallurgical coal is used to make steel and our steam coal is used for electricity generation.

Similar to the oil and gas industry statistics, coal production on federal and Indian lands is declining; it is over 9 percent less than its peak production in fiscal year 2008. Fewer coal lease sales have taken place on federal lands on average during the Obama administration than during the prior two administrations. Though production is less and lease sales are fewer, coal revenues from coal lease sales and production have been the largest ever in fiscal year 2012.

Thank you for the opportunity to supply this testimony for the Committee's use.

ⁱ Energy Information Administration, Monthly Energy Review, April 2013,
http://www.eia.doe.gov/emeu/mer/pdf/pages/sec7_5.pdf

ⁱⁱ Energy Information Administration, International Energy Statistics,
<http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=1&pid=7&aid=6>

ⁱⁱⁱ Department of the Interior, U.S. Geological Survey, <http://pubs.usgs.gov/dds/dds-077/>

^{iv} Energy Information Administration, <http://www.eia.gov/coal/annual/pdf/table15.pdf>

^v Energy Information Administration, International Energy Statistics
<http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=1&pid=7&aid=1>

^{vi} Energy Information Administration, Monthly Energy Review, April 2013,
http://www.eia.doe.gov/emeu/mer/pdf/pages/sec6_3.pdf

^{vii} Energy Information Administration, International Energy Statistics,
<http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=1&pid=7&aid=1>

^{viii} BP Statistical Review of World Energy 2013, <http://www.bp.com/en/global/corporate/about-bp/statistical-review-of-world-energy-2013.html>

^{ix} Energy Information Administration, China consumes nearly as much coal as the rest of the world combined, January 29, 2013, <http://www.eia.gov/todayinenergy/detail.cfm?id=9751>

^x BP Statistical Review of World Energy 2013, <http://www.bp.com/en/global/corporate/about-bp/statistical-review-of-world-energy-2013.html>

-
- ^{xi} Bloomberg, Germany to Add Most Coal-fired Plants in Two Decades, IWR Says, February 27, 2013, <http://www.bloomberg.com/news/2013-02-27/germany-to-add-most-coal-fired-plants-in-two-decades-iwr-says.html>
- ^{xii} UK government, Outlook for new coal-fired power stations in Germany, the Netherlands and Spain, May 7, 2013, <https://www.gov.uk/government/publications/poyry-report-to-decc-outlook-for-new-coal-fired-power-stations-in-germany-the-netherlands-and-spain>
- ^{xiii} Energy Information Administration, Monthly Energy Review, http://www.eia.gov/totalenergy/data/monthly/pdf/sec6_3.pdf
- ^{xiv} Energy Information Administration, Short-term Energy Outlook, <http://www.eia.gov/forecasts/steo/report/coal.cfm>
- ^{xv} Energy Information Administration, U.S. coal exports set monthly record, June 19, 2013, <http://www.eia.gov/todayinenergy/detail.cfm?id=11751>
- ^{xvi} Energy Information Administration, Annual Coal Report, <http://www.eia.gov/coal/annual/pdf/acr.pdf>
- ^{xvii} Bureau of Land Management, New Report Details Coal Resources on Federal Land In Powder River Basin, September 5, 2007, http://www.blm.gov/wo/st/en/info/newsroom/2007/september/NR_0709_03.html
- ^{xviii} Energy Information Administration, Sales of Fossil Fuels Produced from Federal and Indian Lands, FY 2003 Through FY 2012, May 2013, <http://www.eia.gov/analysis/requests/federallands/pdf/eia-federallandsales.pdf>
- ^{xix} Bureau of Land Management, Total Federal Coal Leases in Effect, Total Acres Under lease, and Lease sales by Fiscal Year Since 1990, http://www.blm.gov/wo/st/en/prog/energy/coal_and_non-energy/coal_lease_table.html
- ^{xx} Energy Information Administration, Annual Energy Review 2011, Coal Prices, http://www.eia.gov/totalenergy/data/annual/pdf/sec7_21.pdf
- ^{xxi} Energy Information Administration, Monthly Energy Review, http://www.eia.gov/totalenergy/data/monthly/pdf/sec7_5.pdf
- ^{xxii} Email from J. Kukielka, NETL to Mary Hutzler, Institute for Energy Research, January 9, 2009. *See also* Institute for Energy Research, The Facts About Air Quality and Coal-Fired Power Plants, <http://www.instituteforenergyresearch.org/2009/06/01/the-facts-about-air-quality-and-coal-fired-power-plants/>
- ^{xxiii} Environmental Protection Agency, Air Quality Trends, January 5, 2012, <http://www.epa.gov/airtrends/aqtrends.html>
- ^{xxiv} Environmental Protection Agency, Air Quality Trends, <http://www.epa.gov/airtrends/aqtrends.html>. The specific graphic is available here: <http://www.epa.gov/airtrends/images/comparison70.jpg>
- ^{xxv} New York Times, China Outpaces U.S. in Cleaner Coal-Fired Plants, May 10, 2009, http://www.nytimes.com/2009/05/11/world/asia/11coal.html?_r=2&
- ^{xxvi} Sierra Club, 150 Coal Plants Unplugged, <http://www.sierraclub.org/coal/150plants/> Also, see U.S. Chamber of Commerce, Project, No Project, <http://www.projectnoproject.com/category/project/coal>
- ^{xxvii} Washington Post, Obama administration cracks down on mountaintop mining, January 13, 2011, <http://www.washingtonpost.com/wp-dyn/content/article/2011/01/13/AR2011011307095.html>
- ^{xxviii} Environmental Protection Agency, Final Determination of the U.S. Environmental Protection Agency Pursuant to § 404(c) of the Clean Water Act Concerning the Spruce No. 1 Mine, Logan County, West Virginia, http://water.epa.gov/lawsregs/guidance/cwa/dredgdis/upload/Spruce_No_1_Mine_Final_Determination_011311_signed.pdf
- ^{xxix} Environmental Protection Agency, <http://www.epa.gov/mats/>
- ^{xxx} Washington Times, Chance to block Obama's war on coal, June 19, 2012, <http://www.washingtontimes.com/news/2012/jun/19/chance-to-block-obamas-war-on-coal/>
- ^{xxxi} Energy Information Administration, [27 gigawatts of coal-fired capacity to retire over next five years](http://www.eia.gov/todayinenergy/detail.cfm?id=7290), <http://www.eia.gov/todayinenergy/detail.cfm?id=7290>
- ^{xxxii} Politico, Who is killing the coal-fired power plant?, December 6, 2011, http://www.politico.com/news/stories/1211/69922_Page2.html
- ^{xxxiii} Technology Review, Will Carbon Capture Be Ready On Time?, June 29, 2012, <http://www.technologyreview.com/news/428355/will-carbon-capture-be-ready-on-time/?ref=rss>
- ^{xxxiv} The White House, The President's Climate Action Plan, June 2013, <http://www.whitehouse.gov/share/climate-action-plan>
- ^{xxxv} Wall Street Journal, Can Gas Undo Nuclear Power?, January 29, 2013, <http://professional.wsj.com/article/SB20001424127887323644904578272111885235812.html>