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The Twilight of Coal-Fired Power?

The EPA's New Standards for Greenhouse Gases

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EXECUTIVE SUMMARY

ACTION »

The EPA proposed the first numerical limit on greenhouse gas emissions from U.S. power plants. Comments are due June 12, 2012.

IMPACT »

New power plants would be required to emit less than 1,000 pounds of carbon dioxide per megawatt-hour. The construction of new coal-fired power plants in the U.S. would effectively be banned under the proposed regulation.

BACKGROUND »

In December 2010, EPA settled a lawsuit with a group of environmental groups and states by committing to develop standards for both new and existing power plants and for refineries. So far, the agency has only released proposed rules for new power plants.

WINNERS AND LOSERS »

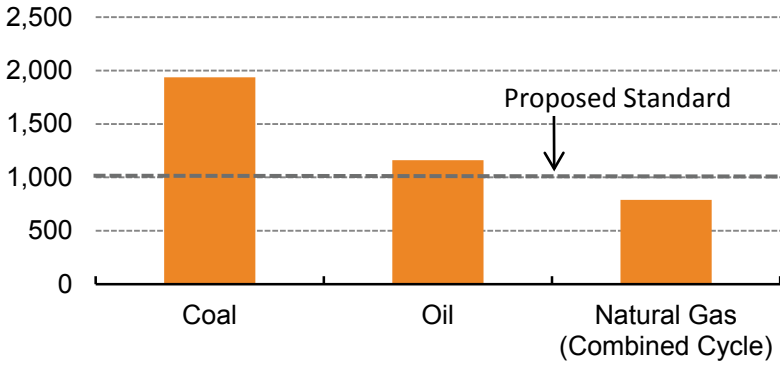
Natural gas will probably gain market share in the power sector because the fuel is relatively cheap. This rule would guarantee that as older coal-fired power plants retire, conventional coal plants wouldn't replace them.

The Environmental Protection Agency last month published a proposed rule setting greenhouse-gas emissions standards for fossil-fuel power plants. It represents the first federally mandated numerical limit for carbon dioxide emissions for power plants.

New coal, natural gas, and oil power plants would be required to meet a standard of 1,000 pounds of carbon dioxide per megawatt-hour (lbs CO_2/MWh). Peaking power plants, typically smaller plants that burn natural gas, would be exempt from the rule.

Typical Emission Rate for New Power Plants

Displayed in study as Figure 1



Source: Bloomberg Government

This Bloomberg Government Study finds:

- New coal plants would effectively be banned because their emission rate is almost double that of the proposed standard.
- The new policy probably wouldn't shift current investment patterns in the power sector. Natural-gas plants already have a compelling price advantage.
- Although the rule makes room to build coal plants that incorporate carbon capture and storage technology, coal plants with CCS probably won't be built unless Congress enacts new programs to subsidize them.

After a comment period, the EPA will issue a final rule, expected late this year at the earliest.

SECTION 1: NO NEW COAL WITHOUT CARBON CAPTURE AND STORAGE

The Environmental Protection Agency on April 13 published a proposed regulation in the Federal Register that would require new fossil fuel power plants to meet new-source performance standards for greenhouse gas (GHG) emissions.[1] With a few caveats (see Table 1), the proposal specifies that new coal, natural gas and oil-fired power plants must meet a standard of 1,000 pounds of carbon dioxide per megawatt-hour (lbs CO_2 per MWh). While GHG emissions are already regulated under the New Source Review provisions of the Clean Air Act,[2] this proposal represents the first numerical limit for greenhouse gas emissions applied to the power sector.

Table 1: Key Provisions of the Proposed Regulation

Provision	Description
Scope	Electric power sector
Limit	1,000 pounds of CO_2 per MWh
Applicability	New fossil fuel — coal, natural gas, and oil — power plants that are larger than 25 megawatts
Exemptions	Peaking power plants[3]
Alternative Compliance	New coal power plants that later install carbon capture and storage may use a 30-year average emission rate to meet the standard.
Existing Plants	Existing power plants and plants under construction aren't subject to the proposed rule.

Source: Bloomberg Government

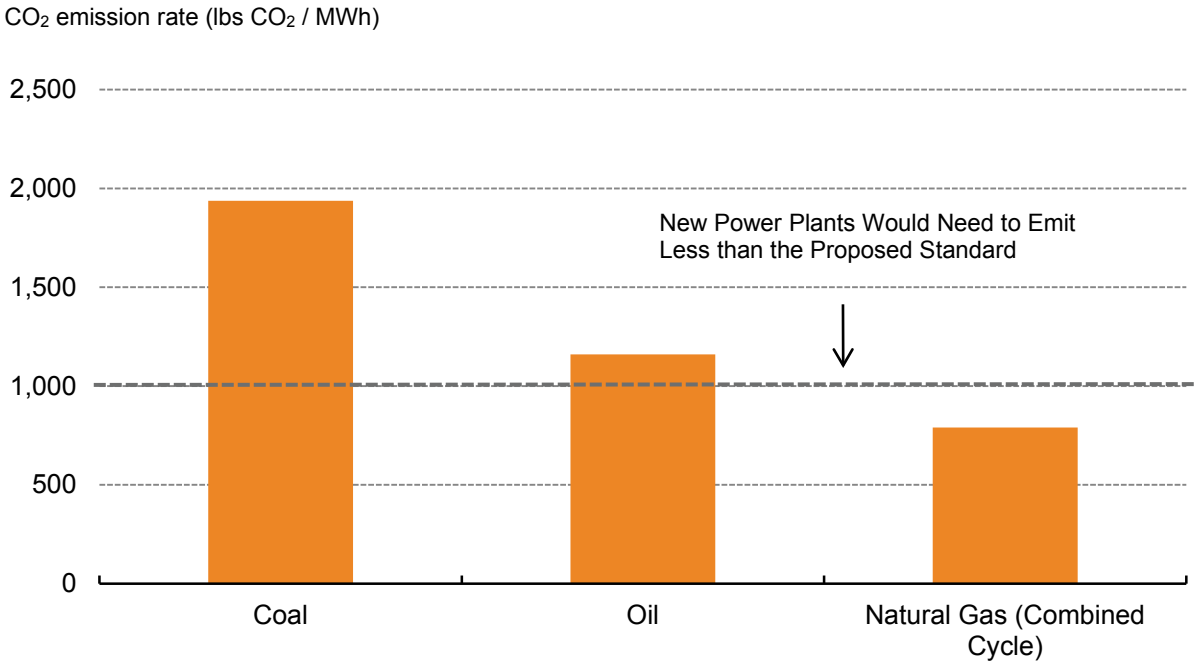
Conventional coal plants have an average emission rate of just below 2,000 pounds of CO_2 per MWh, which means new conventional plants would effectively be banned under the proposed 1,000-pound standard. (See Figure 1.) The rule would also prohibit the construction of new baseload oil-fired power plants.[4] On the other hand, a typical new natural gas plant is capable of meeting the standard; a natural gas combined-cycle power plant has an emission rate just below 800 pounds of CO_2 per MWh, or about 60 percent below coal.[5] (See Appendix 1 for a more detailed discussion of CO_2 emission rates for power plants.)

While a conventional coal-fired power plant can't meet the proposed emissions standard, a coal plant that uses carbon capture and storage technology would be able to comply. Carbon capture and storage, or CCS, is the process by which carbon emissions are extracted from a plant's flue gas and stored underground in deep reservoirs, such as depleted oil and gas fields.

This study estimates that a coal plant that captures and stores 90 percent[6] of its CO_2 would emit just over 200 pounds of CO_2 per MWh (see Appendix 1). The proposed rule allows plant developers to use a 30-year average emission rate if they install CCS technology. That means a coal plant could meet the standard even while operating for 10 years without controlling for CO_2 if carbon capture and storage were used in years 11 through 30.[7] While economic factors

make this scenario unlikely, as discussed later in this report, the EPA's proposed rule theoretically doesn't forbid coal because CCS would allow a new coal plant to comply with the proposal.

Figure 1: Typical Emission Rate for New Power Plants



Source: Bloomberg Government

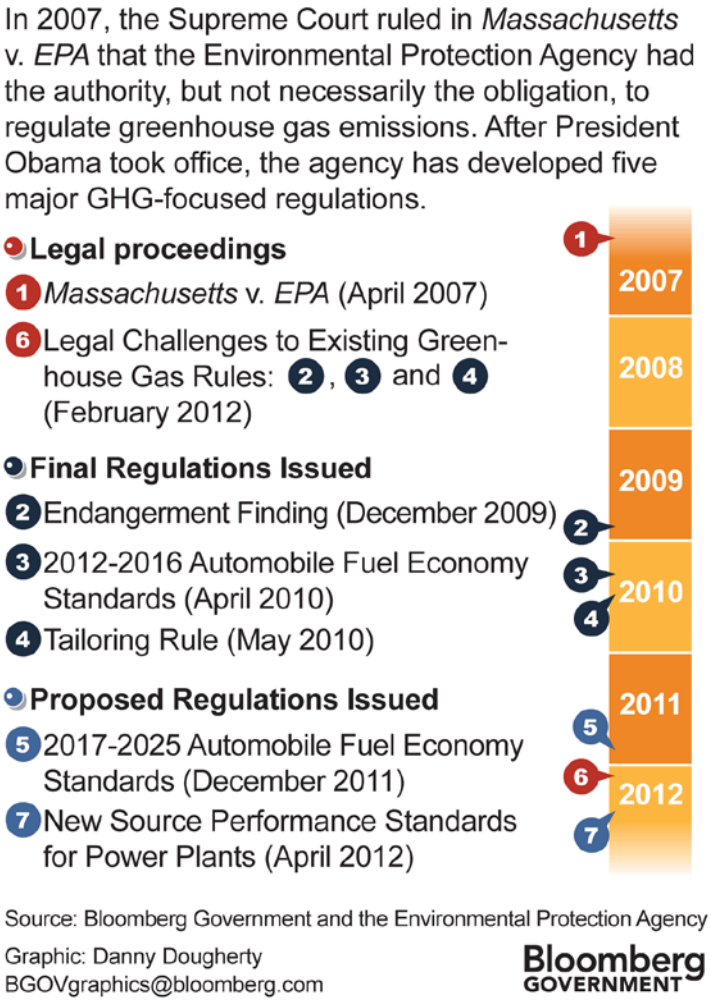
New Regulations Build Upon Existing GHG Regulations

The EPA's proposed new-source performance standard, or NSPS, for greenhouse gas emissions from power plants joins a portfolio of GHG-focused regulations. (See Figure 2.) The new standard is the fifth major regulation focused on reducing GHG emissions issued since President Barack Obama took office.[8] Given the timeframe typically required to complete a new regulation, a final version of the regulation probably won't be issued before the November presidential election.[9] Appendix 2 provides a brief history of EPA GHG regulations.

The EPA's efforts to develop new-source performance standards follow a legal settlement the agency reached with a group of states and environmental groups in December 2010.[10] The original agreement covered both power plants and refineries, and the agency was supposed to issue proposed regulations by December 2011, with final regulations issued by May 2012 for power plants and by November 2012 for refineries.

The comment period on the EPA's proposed regulation doesn't end until June 12,[11] so it's impossible for the agency to issue the final regulation by the deadline established in the previous legal settlement. Missing the deadline may prompt new lawsuits from environmental groups seeking to push the agency to develop new GHG regulations. Even then, the timing of such lawsuits may be delayed until after this year's presidential election.

Figure 2: Timeline of EPA GHG Regulations



The fate of the refinery new-source performance standards is unknown, but the EPA probably won't issue proposed regulations for them this year. The agency was also required to develop NSPS regulations for existing power plants, and those regulations probably won't come forward this year either. Assuming Obama wins a second term, and absent legislative intervention, the EPA probably will pursue additional rulemakings that target existing power plants and refineries in 2013 and beyond. If Republican Mitt Romney wins the presidential election, his administration probably would seek to slow EPA efforts to regulate GHG emissions.

Legal Challenges are Likely

Once a final regulation is published in the Federal Register, plaintiffs have 60 days to file legal challenges.[12] A variety of companies that produce and use coal probably will file suits against the EPA, even with the limited real-world impact of the rule, because it would establish several precedents. Challengers are likely to raise the following arguments:

Whether a Single Standard Can Be Applied to Coal, Natural Gas and Oil-Fired Power Plants — For other pollutants, separate new-source performance standards are set for different types of power plants. This represents the first time a single new-source performance standard would be applied to coal and natural gas power plants.[13]

Whether a 30-Year Average Emission Rate Can Be Used — The ability to use an annual emission rate, averaged over 30 years for coal-fired power plants that intend to install carbon capture and storage technology, is a concession to the coal industry. Even so, this would be a first under the Clean Air Act and probably will be challenged.[14]

Whether a Separate Endangerment Finding is Necessary — This is a procedural question. Some have suggested that the EPA should have completed a separate endangerment finding — a determination that GHG emissions are a form of pollution that should be regulated — before regulating GHG emissions under the new-source performance standard provisions of the Clean Air Act.[15]

In the past decade, the EPA has had limited success implementing new regulations aimed at power-sector emissions. The Cross State Air Pollution Rule, or CSAPR, is an example; it was the successor to the Clean Air Interstate Rule, which the courts invalidated in July 2008.[16] While the courts never took issue with the EPA's ability to regulate the interstate transport of sulfur dioxide and nitrogen oxides, they turned back the rule based on the agency's particular approach for regulating emissions. A similar outcome for GHG emissions is possible: The courts probably won't weigh in on the EPA's ability to regulate GHG emissions — that power has already been upheld by the Supreme Court — but they could send the rule back to the EPA and require the agency to modify its approach.

Oral arguments challenging the EPA's existing GHG regulations were heard in February. The outcome of these cases, expected sometime this summer, may also affect the EPA's rulemaking process on new-source performance standards. For example, on the off chance that the endangerment finding for existing rules is overturned or sent back to the EPA, all pending GHG-related regulations would be put on hold.

Will the EPA's Standard Affect Existing Power Plants?

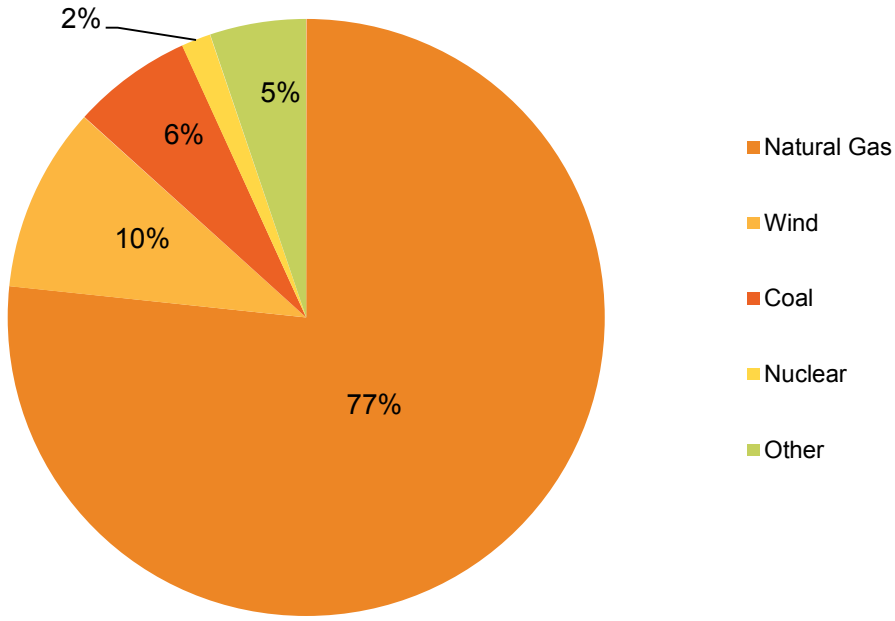
There are also open questions on how and if the EPA's current proposal eventually may be applied to existing power plants. When an existing plant undergoes "significant modification," a process known as new source review, or NSR, is triggered. When NSR is triggered, power plant owners must demonstrate to regulators that they're using the best available control technology for each regulated pollutant. New-source performance standards have traditionally set the minimum standard that can be used to comply with best available control technology, but the EPA's proposal explicitly exempts existing sources from such requirements.

SECTION 2: BUSINESS AS USUAL

Banning the construction of new coal-fired power plants isn't really a departure from business as usual. It's akin to banning cars that fly: While there may be a market for flying cars in the future, there won't be one anytime soon. The same goes for coal power: Things may change in the future, but based on current fuel prices, there are few companies seriously mulling the construction of new coal-fired power plants in the U.S.[17]

Coal really hasn't been the fuel of choice in the power sector for some time. The average U.S. coal-fired power plant is 38 years old, and a majority of plants were built before 1980.[18] Since 1990, coal has been the fuel of choice in just 6 percent of new power plants, while natural gas has powered 77 percent of the additions, as Figure 3 shows.

Figure 3: U.S. Power Capacity Additions Since 1990



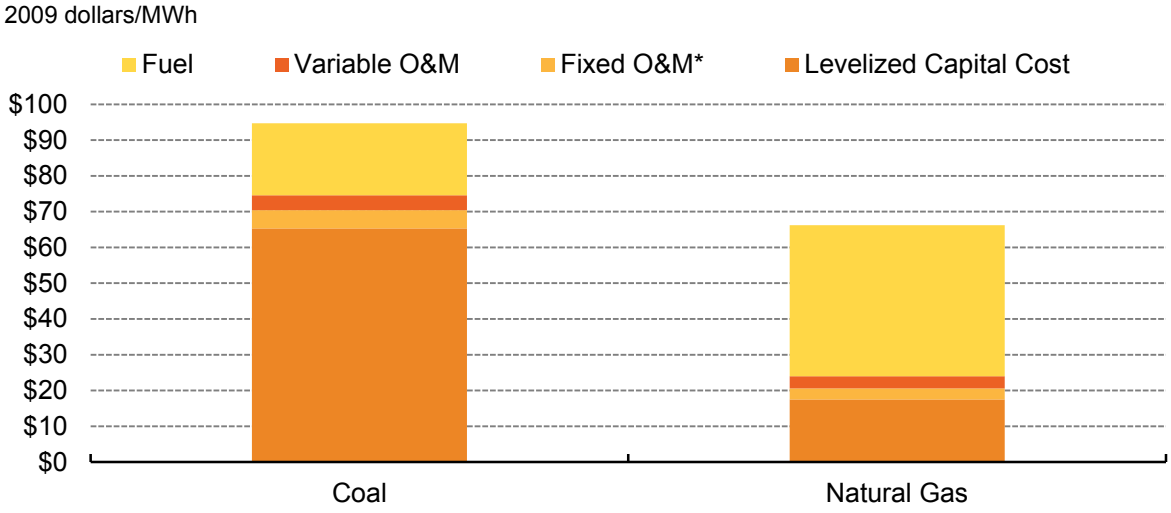
Source: Bloomberg Government and the Energy Information Administration

The Compelling Economics of Natural Gas

Based on current prices, natural gas is the fuel of choice in the power sector. Electricity generated from natural gas has a tremendous price advantage compared with electricity generated from coal. As Figure 4 shows, coal is almost 50 percent more expensive than natural gas over the life of the power plant. This assessment is based on the Energy Information Administration's assessment of the levelized cost of electricity, a technique typically used in the power sector to account for the full-cycle costs of ownership. Appendix 3 provides a more detailed explanation of levelized cost figures.

The levelized cost assessment shown in Figure 4 is based on a long-term real natural gas price of about $6 per million British thermal units (mmBtu). Current prices are hovering below $2 per mmBtu and have generally remained below $6 per mmBtu during the past three years. (See Figure 5.) Coal and other alternatives to natural gas, including wind, solar and other renewables, will have difficulty competing with natural gas on an economic basis unless gas prices go up significantly. The Energy Information Administration and most other industry observers expect that gas prices eventually will rise from current levels.[19]

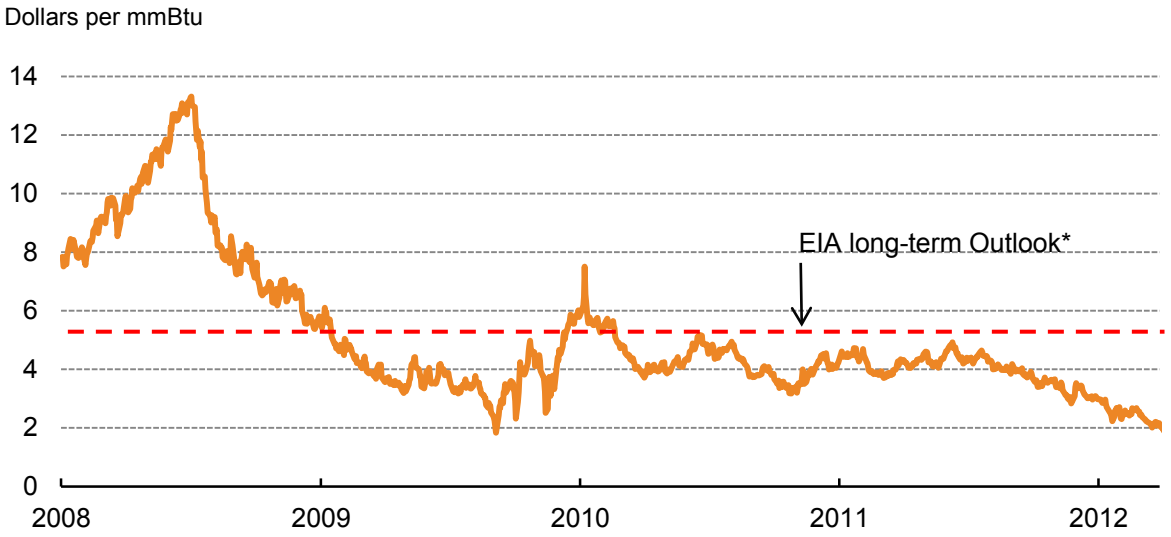
Figure 4: Levelized Cost Assessment for Coal and Natural Gas



Source: Bloomberg Government and the Energy Information Administration

* O&M stands for operation and maintenance costs. Fixed O&M includes transmission investment costs.

Figure 5: Natural Gas Prices



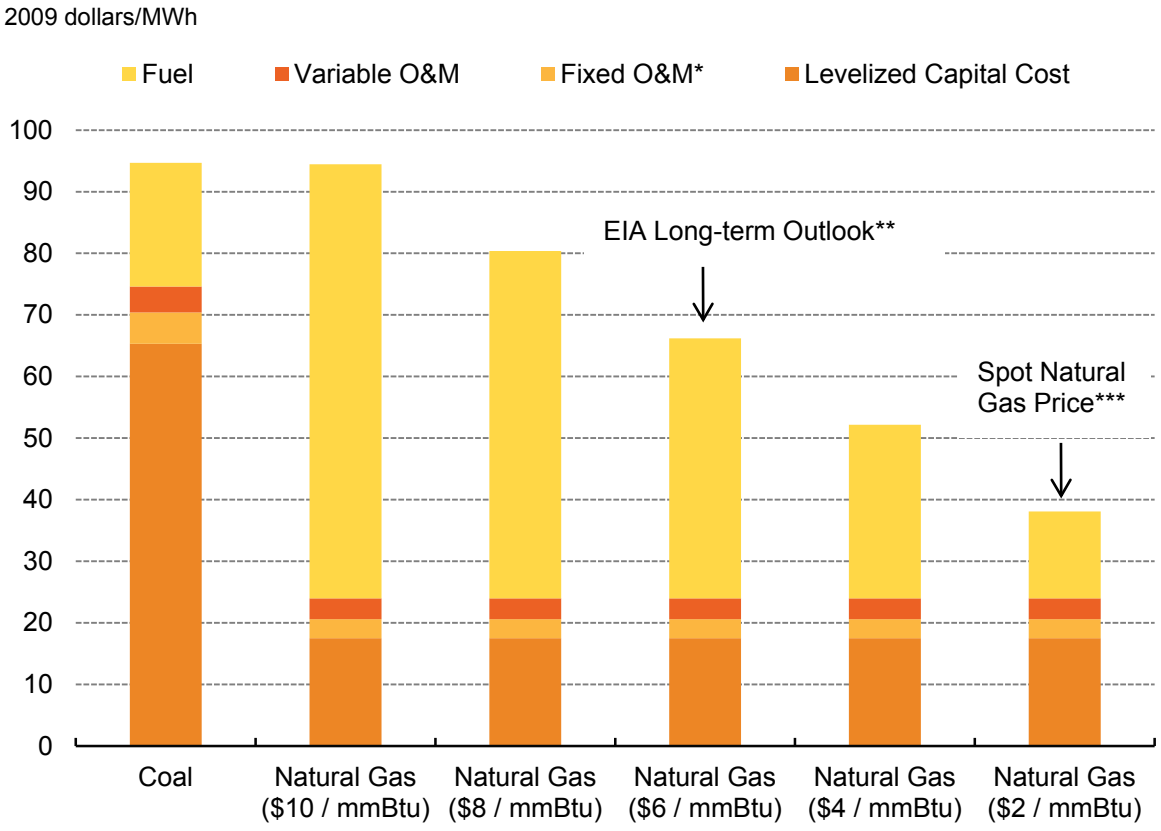
Source: Bloomberg Government and the Energy Information Administration

* EIA used an average real (2009$) natural gas price of about $6 per mmBtu in its levelized cost assessment.

Gas Prices Would Need to Increase Five-Fold to Make Coal Competitive

As discussed above, new coal-fired power plants are uneconomic compared with new natural gas-powered plants even under an assumption that natural gas averages about $6 per mmBtu for the life of the project — triple the current price. Based on the Energy Information Administration assessment of the cost of coal-fired power, natural gas prices would need to increase to almost $10 per mmBtu for a power plant developer to be indifferent between building for coal or natural gas. (See Figure 6.) Furthermore, prices would need to stay at an average $10 per mmBtu for the life of the project — 30 or more years. If coal prices or the construction costs of building a new coal-fired power plant were to decline, coal could be competitive with natural gas at lower prices.

Figure 6: Levelized Cost Assessment for Coal and Natural Gas



Source: Bloomberg Government and the Energy Information Administration

* O&M stands for operation and maintenance costs. Fixed O&M includes transmission investment costs

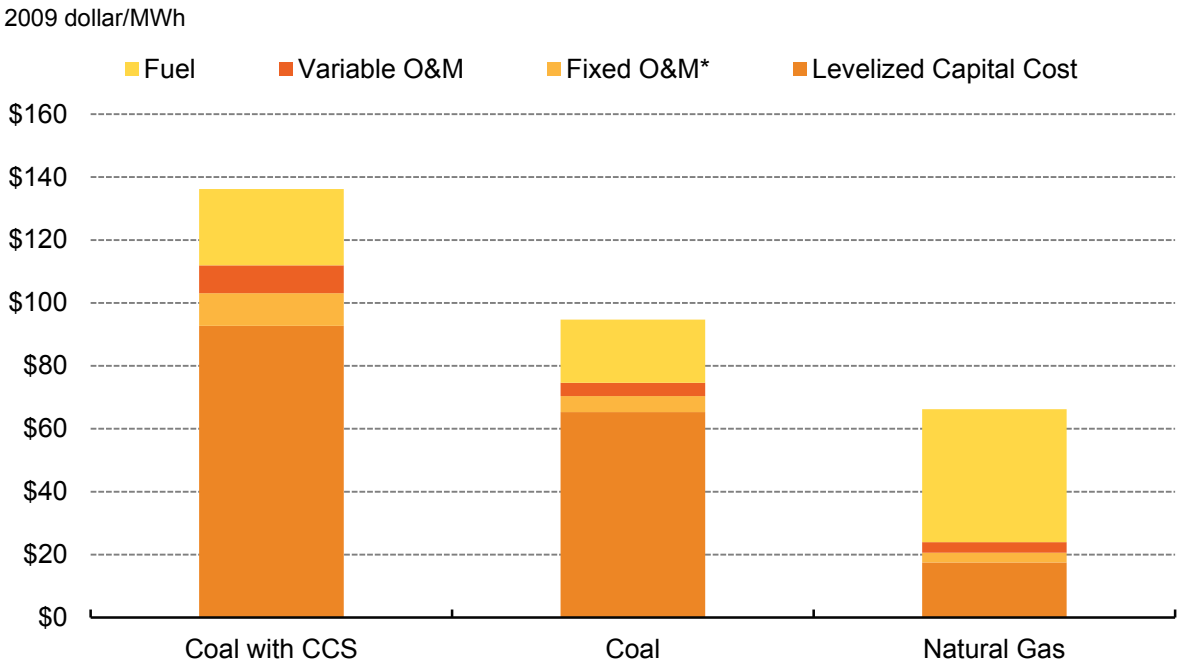
** EIA used an average real natural gas price of about $6 per mmBtu in 2009 dollars.

*** The average spot price for natural gas in April 2012 was slightly less than $2 per mmBtu.

SECTION 3: PROSPECTS FOR CARBON CAPTURE AND STORAGE

The EPA's proposed emissions standard would allow coal plants with carbon capture and storage technology. This probably won't happen given the economics of the technology. According to Energy Information Administration estimates, electricity generated from coal with CCS is almost 50 percent more expensive than energy generated from conventional coal, and about twice as expensive as natural gas-generated electricity. (See Figure 7.) Essentially, a natural gas plant can comply with the EPA's proposed standard at a much lower cost, which begs the question of why investors would choose to build coal with CCS.

Figure 7: Levelized Cost Assessment for Coal with Carbon Capture and Storage



Source: Bloomberg Government and the Energy Information Administration

*O&M stands for operation and maintenance costs. Fixed O&M includes transmission investment costs.

Previous legislative proposals, such as the Waxman-Markey clean-energy bill that passed the U.S. House of Representatives in 2009, offered significant financial incentives to support the development of carbon capture and storage.[20] From a regulatory perspective, while the EPA may be able to block new coal plants without CCS, there's little the agency can do to offer financial support to new technologies such as CCS. New legislation and incentives would be required to support the development and deployment of CCS. It's doubtful that Congress would tackle the narrow topic of carbon capture and storage incentives without addressing energy issues or the Clean Air Act more broadly.

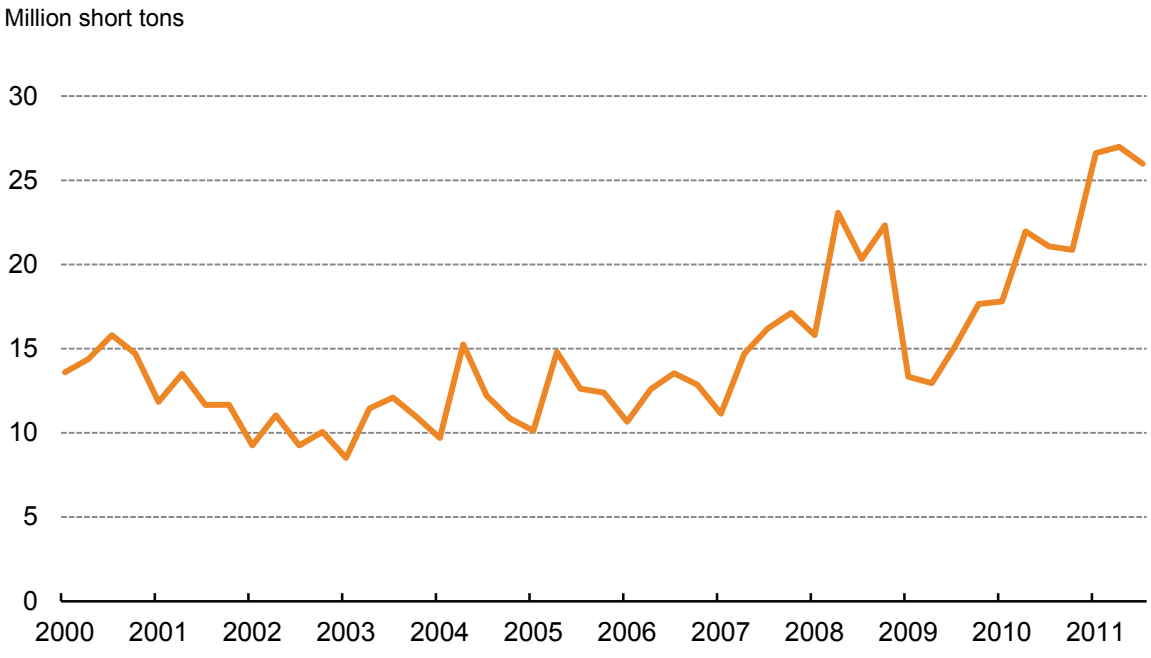
CONCLUSION

Whether the EPA's proposed greenhouse gas emissions standard eventually becomes U.S. law is a moot point in many ways. Natural gas is already the fuel of choice in the power sector, and increased use of natural gas is already putting downward pressure on power-related GHG emissions.

Coal-fired electricity makes up about 45 percent of U.S. electric power generation. Going forward, coal probably will lose market share based solely on the compelling economics of natural gas.[21] This puts higher cost coal producers, typically located in the Eastern half of the U.S., in a tenuous position: With expectations for declining U.S. demand, coal producers will need to seek new markets to survive. Some coal producers have begun to look abroad, to Asia and Latin America; U.S. coal exports have almost doubled during the past five years. (See Figure 8.) This trend will need to continue, or the industry will eventually have to decrease production.

Aside from the legal challenges that will ensue once the regulation is finalized, an important question for the industry is whether the EPA will establish similar regulations for existing power plants, and when. The extent to which requirements for sulfur dioxide, nitrogen oxide and mercury pollution will hasten the retirement of existing coal-fired power plants is also an important issue. Without the construction of new coal plants, coal will lose market share in the U.S., and any rules that necessitate the retirement of existing coal plants would accelerate the decline of coal's use in the power sector.

Figure 8: U.S. Coal Exports



Source: Bloomberg Government and the Energy Information Administration

» ABOUT THE ANALYST

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APPENDIX 1: POWER SECTOR CO_2 EMISSION RATES

To estimate a power plant's CO_2 emission rate, two pieces of information are needed: the power plant's heat rate (*HR*) — a measure of the plant's efficiency — and the CO_2 content of the fuel ($CO2_{FUEL}$). Using those metrics, the plant's emission rate as measured in pounds of CO_2 per mega-watt hour can be calculated as follows:

$$CO2Rate = (HR * CO2_{FUEL}) * (2.204/1000)$$

In the formula above, the Heat Rate (HR) is measured in British thermal units (BTU) per kilowatt-hour (KWH) and the CO_2 content of the fuel is measured in kilograms of CO_2 per million British thermal units (mmBtu). (There are 2.204 pounds in a kilogram, 1,000 kilowatt-hours in a megawatt-hour, and 1,000,000 BTU's in an mmBtu.) Using data available from the Energy Information Administration for heat rates for new power plants and the CO_2 content of fuel yields the following CO_2 emission rates:

Table 2: Typical Emission Rate for New Power Plants

Plant Type	Heat Rate (BTU / KWH)[22]	CO_2 Content of Fuel (Kg CO_2 / mmBtu)[23]	CO_2 Emission Rate (lbs CO_2 / MWH)
Coal	9,200	95.52	1,937
Oil	7,196	73.15	1,160
Natural Gas (Combined Cycle)	6,752	53.06	790

Source: Bloomberg Government, the Environmental Protection Agency and the Energy Information Administration

Carbon capture and storage (CCS) technology could be used to lower the CO_2 emission rate of coal-fired power. Typically, a 90 percent capture rate is assumed for CCS projects; a stated objective of the Energy Department's National Energy Technology Laboratory is to support research and development efforts to achieve 90 percent CO_2 capture while increasing the cost of electricity by only 10 percent.[24]

Because CCS plants require additional equipment to capture and store the carbon dioxide, they have lower efficiencies and thus a higher heat rate. To estimate the CO_2 emission rate for a CCS plant, this study assumed that a coal plant with CCS would have a heat rate 25 percent higher than a coal plant without CCS[25] — that is, 11,500 BTU per KWH. Using an 11,500 heat rate, a coal plant that captures 90 percent of its CO_2 would have an emission rate of 242 pounds of CO_2 per MWH.

APPENDIX 2: A BRIEF HISTORY OF EPA GHG REGULATIONS

In April 2007, the Supreme Court's 5-4 decision in *Massachusetts v. EPA* ruled that the agency had the authority, but not necessarily the obligation, to regulate greenhouse gas emissions under the Clean Air Act.[26] Following the court's ruling, the EPA issued a rule, known as the Endangerment Finding, in which it found that greenhouse gases endanger public health and welfare. The agency published its finding as a final rule in December 2009.[27]

Shortly after the EPA issued its proposed Endangerment Finding in April 2009, the Obama administration announced that the National Highway Traffic Safety Administration (NHTSA) and the EPA would work together to increase fuel economy and reduce greenhouse gas emissions from vehicles. In May 2010, the EPA and NHTSA issued a joint, final rule establishing greenhouse gas and fuel economy standards for cars and light trucks covering model years 2012 to 2016. The standards require the fleet of new passenger vehicles to meet a combined average fuel economy of 34.1 mpg in 2016, or about a 20 percent increase from the average achieved by vehicles today.[28]

Almost immediately following publication of the final 2012-2016 rule, the White House announced that efforts would begin to develop standards for vehicles covering model years 2017 to 2025.[29] On Dec. 1, 2011, the EPA and NHTSA published a proposed rule that would require the fleet of new passenger vehicles to meet an estimated combined average fuel economy of 49.6 mpg, about a 70 percent increase from the average achieved by vehicles in 2011.[30]

For large stationary sources, such as power plants and refineries, the EPA in May 2010 issued what's known as the Tailoring Rule.[31] The Tailoring Rule increased the permitting threshold for stationary sources so that only the largest stationary sources — sources that emit more than 75,000 tons of carbon dioxide-equivalent per year — would be subject to GHG regulations under the new source review provisions of the Clean Air Act.[32] Finally, in April 2012, the EPA issued proposed new source performance standards for new power plants — the focus of this paper.

Appendix 3: Levelized Costs of Electricity

Levelized cost of electricity is a measure that accounts for all costs and financial assumptions over the lifetime of a project, including capital expenses, operations and maintenance, cost of fuel and cost of capital. For this study, Bloomberg Government relied on the Energy Information Administration's assessment of levelized costs,[33] shown in Table 3 below.

Table 3: Average Levelized Costs for Plants Entering Service in 2016

Plant Type	Levelized Capital Cost	Fixed O&M	Variable O&M	Transmission Investment	Total System Levelized Cost
Coal	65.3	3.9	24.3	1.2	94.7
Coal with CCS	92.7	9.2	33.1	1.2	136.2
Natural Gas (Combined Cycle)	17.5	1.9	45.6	1.2	66.1

Source: Energy Information Administration

ENDNOTES

[1] The EPA released the proposed regulation on March 27, 2012. It wasn't published in the Federal Register until April 13, 2012. EPA Proposes First Carbon Pollution Standard for Future Power Plants, March 27, 2012. http://yosemite.epa.gov/opa/admpress.nsf/79c090e81f0578738525781f0043619b/9b4e8033d7e641d9852579ce005ae957!OpenDocument (retrieved April 20, 2012). Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units, Federal Register, Volume 77, Number 72, RIN Number 2060-AQ91: April 13, 2012. www.bgov.com/federal_register_documents/2012-7820 (retrieved April 20, 2012).

[2] Big Bark, Small Bite: An Assessment of EPA's Current Regulations on Greenhouse Gases, Bloomberg Government, June 16, 2011. www.bgov.com/media/news/vnSc-3ReAhSSExdRdEYrOw (retrieved April 20, 2012).

[3] The rule doesn't apply to simply-cycle combustion turbine power plants, which are typically used as "peaking" power plants. "Peaking" power plants are used infrequently and typically have low efficiencies, which translates into a high emission rate.

[4] A "baseload" power plant is generally operated during most of the year. They are typically more complex and larger than "peaking" power plants. Oil-fired power plants are extremely rare; oil makes up less than 1 percent of U.S. power generation. See Table 1.1: Net Generation by Energy Source: Total (All Sectors), 1998 through January 2012: www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_1_1 (retrieved April 20, 2012).

[5] A "combined-cycle" power plant has both a combustion turbine and a steam turbine.

[6] "The overall goal of NETL's CO2 capture RD&D effort is to develop fossil fuel conversion systems that achieve 90 percent CO2 capture at a less than 10 percent increase in the COE for pre-combustion capture at IGCC power plants and a less than 35 percent increase in COE for post- and oxy-combustion capture at new and existing conventional coal-fired power plants." DOE/NETL Carbon Dioxide Capture and Storage R&D Roadmap, December 2010, Page 21: www.netl.doe.gov/technologies/carbon_seq/refshelf/CCSRoadmap.pdf (retrieved April 20, 2012).

[7] "New power plants that use CCS would have the option to use a 30-year average of CO2 emissions to meet the proposed standard, rather than meeting the annual standard each year." EPA Fact Sheet: Proposed Carbon Pollution Standard for New Power Plants, March 27, 2012: www.epa.gov/carbonpollutionstandards/pdfs/20120327factsheet.pdf (retrieved April 20, 2012).

[8] Bloomberg Government is counting the EPA's Endangerment Finding (finalized in December 2009), EPA's 2012-2016 Automobile Fuel Economy Standards (finalized in April 2010), EPA's Tailoring Rule (finalized in May 2010), and EPA's 2017-2025 Automobile Fuel Economy Standards (proposed in December 2011) as the four other significant EPA GHG regulations released during President Obama's administration. EPA's Endangerment Finding: http://epa.gov/climatechange/endangerment.html (retrieved April 20, 2012). EPA's 2012-2016 Automobile Fuel Economy Standards: www.epa.gov/otaq/climate/regulations/420f10014.htm (retrieved on April 20, 2012). EPA's Tailoring Rule: www.epa.gov/nsr/actions.html#may10 (retrieved April 20, 2012). EPA's 2017-2025 Automobile Fuel Economy Standards: www.epa.gov/otaq/climate/regulations.htm (retrieved April 20, 2012).

[9] Typically, the regulatory process can stretch several years from start to finish. For example, with the EPA's Cross State Air Pollution Rule, the proposed rule was issued on July 6, 2010 and the final rule was not issued until Feb. 7, 2012. www.epa.gov/airtransport/actions.html (retrieved April 20, 2012).

[10] "On December 23, 2010, the Environmental Protection Agency entered into two proposed settlement agreements to issue rules that will address greenhouse gas emissions from fossil fuel-fired power plants and refineries." Information on the settlement can be found here: http://epa.gov/carbonpollutionstandard/settlement.html (retrieved on April 20, 2012).

[11] The comment period for EPA's Greenhouse Gas New Source Performance Standard for Electric Generating Units (RIN: 2060-AQ91) ends on June 12, 2012. http://yosemite.epa.gov/opei/rulegate.nsf/byRIN/2060-AQ91 (retrieved April 20, 2012).

[12] Typically, there is a 60 day window for filling legal challenges to a rule once the final rule has been published in the Federal Register. For example, there was a 60 day window for filing legal challenges to the mercury and air toxics rule: www.vnf.com/news-alerts-661.html (retrieved April 20, 2012).

[13] "In the past, EPA has always had separate NSPS for NGCC and coal units, and it continues to have separate categories for those units for non-GHG emissions." Troutman Sanders, LLP, "EPA Proposes Greenhouse Gas Performance Standards for Electric Generators," March 27, 2012: www.troutmansandersenergyreport.com/2012/04/epa-proposes-greenhouse-gas-performance-standards-for-electric-generators/ (retrieved April 20, 2012).

"EPA is likely to be challenged for promulgating a NSPS that does not distinguish between EGUs based on their fuel type." Van Ness Feldman, "EPA Proposes Greenhouse Gas Emission Limits for New Electric Generating Units," March 29, 2012: www.vnf.com/news-alerts-696.html (retrieved on April 20, 2012). "This is the first time that EPA is going to apply a New Source Performance Standard to greenhouse gases. And there's going to be a number of legal issues that arise, but one for example is the fact that EPA is defining New Source Performance Standards for both coal-fired power plants and natural gas power plants together. But it's setting the standard for coal based on the performance of natural gas power plants. So that implicates a doctrine called fuel switching or redefining a source that EPA in the past has said it doesn't have the authority to do and courts have said it doesn't have the authority to do." Roger Martella, partner with Sidley Austin on E&E's OnPoint, April 3, 2012. www.eenews.net/eenewspm/2012/04/03/archive/11 (retrieved April 20, 2012).

[14] Ibid.

[15] Ibid.

[16] EPA v. Utility Air Regulatory Group, Et. Al. decided July 11, 2008: www.epa.gov/cair/pdfs/05-1244-1127017.pdf (retrieved April 20, 2012).

[17] As of January 2013, there were about 6.5 gigawatts of new coal-fired power plants under construction. Most of these projects were developed when gas prices were much higher, and the pace of new projects has slowed due to low natural gas prices. www.netl.doe.gov/coal/refshelf/ncp.pdf (retrieved April 20, 2012).

[18] Energy Information Administration, "Most coal-fired electric capacity was built before 1980," June 28, 2011. www.eia.gov/todayinenergy/detail.cfm?id=1990 (retrieved April 20, 2012).

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[28] EPA's 2012-2016 Automobile Fuel Economy Standards: *www.epa.gov/otaq/climate/regulations/420f10014.htm* (retrieved April 20, 2012).

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