

BACKGROUND

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EPA Power Plant Regulations: A Backdoor Energy Tax

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Abstract

The Environmental Protection Agency's (EPA's) proposed greenhouse gas regulations for new power plants, and forthcoming regulations for existing plants, will inflict higher energy costs on American families and businesses. The regulations, which will provide no meaningful environmental benefit, have a weak scientific underpinning and face much legal scrutiny. Three Heritage Foundation energy policy experts explain why Congress should remove the EPA's and any other agency's authority to regulate carbon dioxide and other greenhouse gas emissions.

The Environmental Protection Agency (EPA) has re-proposed its desired regulation of carbon dioxide and other greenhouse gas (GHG) emissions for future power plants. The agency also plans to finalize standards for existing plants by summer 2015. If implemented and combined with other proposed and newly implemented regulations, these GHG regulations would significantly reduce the use of coal as a power-generating source in America.

Doing so would result in a backdoor energy tax that would drive up energy bills for American households and businesses and strangle economic growth. To make matters worse, the scientific basis for GHG regulations is dubious at best, but what is certain is that these regulations will raise energy prices and destroy jobs—with no noticeable climate impact. Industry groups and state attorneys general will undoubtedly challenge the GHG regulations in court, and rightly so, but Congress should intervene and prevent the executive branch from implementing this regulatory monstrosity.

KEY POINTS

- The Environmental Protection Agency (EPA) re-proposed its regulation for greenhouse gas emissions for new power plants. The agency set separate limits for coal-fired and natural gas-fired power plants and would effectively prohibit the construction of new coal-fired plants.
- The EPA also wants to regulate greenhouse gas emissions from existing plants, aiming to propose a draft regulation by June 1, 2014. These two proposals serve as the regulatory equivalent of cap-and-trade legislation.
- These regulations will act as a major energy tax that would negatively impact American households. Americans will suffer through higher energy bills, but also through higher prices for goods and services, slowing the economy and crippling the manufacturing sector.
- Industry and states will challenge the EPA's authority and assumptions in the proposed rule. Congress should act, too, and prevent federal agencies from regulating greenhouse gas emissions.

This paper, in its entirety, can be found at <http://report.heritage.org/bg2863>

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The EPA's Greenhouse Gas Regulations

Originally proposed in March 2012, with a standard threshold of 1,000 pounds of carbon dioxide (CO₂) equivalent per megawatt hour, the EPA's new source performance standards (NSPS) re-proposed on September 20, 2013, set a limit for new coal-fired power plants of 1,100 pounds of CO₂ equivalent per megawatt hour (1,000 pounds to 1,050 pounds over a seven-year period), 1,000 pounds of CO₂ per megawatt hour for larger gas-fired plants, and 1,100 for smaller ones. No set date exists for the finalization of the rule, which does not include biomass plants that can use up to 10 percent coal. For modified and existing power plants, the EPA expects to introduce GHG regulations by June 1, 2014, with a final rule expected June 1, 2015.¹

The EPA's new rule will effectively ban the construction of new coal-fired power plants, because the average coal-fired power plant emits nearly 1,800 pounds of carbon per megawatt hour. Even the newest, most efficient, supercritical power plant² in West Virginia emits 1,700 pounds per megawatt hour.³ While there is much uncertainty about how the EPA will structure regulations for existing and modified sources, the result will be the same: early closures of well-functioning power plants that will needlessly take affordable energy permanently off-line.

The Basis of EPA Regulations, the Uncertainty of EPA Claims. In December 2009, the EPA published an endangerment finding in the *Federal Register*, which, pursuant to section 202(a) of the Clean Air Act, defined carbon dioxide and five other greenhouse gases as pollutants that threaten public health and public welfare. Then-EPA Administrator Lisa Jackson did not draw this conclusion on the grounds that carbon dioxide and other greenhouse gas emissions cause direct and measurable adverse public health impacts, but because of an alleged greenhouse gas contribution to global warming that will result in harmful effects to human health and the environment. Using assessments from the U.S. Global Climate Research Program (USGCRP), the Intergovernmental Panel on Climate Change (IPCC), and the National Research Council (NRC), the endangerment finding concluded that human-induced increases in greenhouse gas emissions will cause global warming, and that this warming will lead to:

- Adverse changes in air quality;
- Higher sea level and increases in extreme weather events;
- Threats to ecosystems, wildlife, and infrastructure;
- Net negative impacts on mortality (increase in heat-related deaths outweighs the decrease in cold-weather mortality);
- Net adverse effects on agricultural production in the United States;
- Increases in ambient ozone, pushing more areas of the country to nonattainment (that exceed the regulated threshold for air quality); and
- Higher rates of food and water-borne pathogens.⁴

Policymakers and regulators should not ignore the abundance of climate data and research that counter the claims that manmade greenhouse gas emissions will lead to such problematic circumstances. Proponents of carbon caps often argue that there is no longer such a debate and that 97 percent of the climate literature agrees that manmade emissions are causing warming. While a near-universal consensus does exist that manmade emissions have some warming effect, that is simply not the point of controversy.⁵ The controversy is about whether human activity is the *primary driver* of climate change, and about the magnitude of climate change induced by GHG emissions.

While carbon dioxide and other greenhouse gas emissions may have contributed in some capacity to climate variations, the available climate data simply do not indicate that the earth is heading toward catastrophic warming with dire consequences for human health and public welfare, nor do the data indicate that the dominant driving force behind climate change is human-induced GHG emissions. Such a view does nothing to account for the shortcomings of climate models, models that are the underlying foundation for carbon policies and regulations. While some climate models have forecast such a catastrophe, data of observed climate reality has shown these models and the assumptions on which they are built to be incorrect.

The fact that many of the models that the federal government relied on to promulgate these regulations projected a 0.3 degree Celsius warming over the past 17 years, when in reality no warming occurred (while CO₂ emissions have increased), is one of several serious problems with basing policy on such models. Since 2011, 16 experiments published in peer-reviewed literature found that the equilibrium climate sensitivity (the effect that a doubling of carbon dioxide in the atmosphere would have), is close to 2 degrees Celsius, much lower than projected by the IPCC.⁶

Adding to these and other serious scientific questions that need to be answered is the political manipulation of science to attribute extreme weather events to global warming. Dr. Roy Spencer, meteorologist and principal research scientist at the University of Alabama, and Dr. Roger Pielke, a professor at the Center for Science and Technology Policy Research at the University of Colorado, recently testified before the Senate Environmental Public Works Committee on this issue. Dr. Spencer told the committee:

There is little or no observational evidence that severe weather of any type has worsened over the last 30, 50, or 100 years, irrespective of whether any such changes could be blamed on human activities, anyway. Long-term measurements of droughts, floods, strong tornadoes, hurricanes, severe thunderstorms, etc., all show no obvious trends, but do show large variability from one decade to the next, or even one year to the next.⁷

Dr. Pielke concurred, saying, “It is misleading and just plain incorrect to claim that disasters associated with hurricanes, tornadoes, floods or droughts have increased on climate timescales either in the U.S. or globally.”⁸ Even the IPCC acknowledges that disastrous climate results are unlikely and that there is no connection to higher levels of greenhouse gas emissions and extreme weather events.⁹

In fact, the impacts of global warming may be as beneficial as they could be costly. In its endangerment finding and the resulting greenhouse gas regulations, the EPA may be drastically underestimating the benefits of increased carbon dioxide in the atmosphere. Although the agency acknowledges that increases in greenhouse gas emissions will yield better crop results, the endangerment finding asserts

that extreme weather events and other temperature changes attributed to climate change will adversely affect agricultural yield, including crop failure, irrigation problems and difficulty in managing livestock.¹⁰ However, a new study from the Center for the Study of Carbon Dioxide and Global Change calculates that the monetary benefit from atmospheric carbon dioxide enrichment for crop production was \$3.2 trillion from 1961 to 2011 and will yield another \$9.8 trillion in benefits from now until 2050.¹¹ Not only is the EPA’s assertion about human-induced greenhouse gas emissions and extreme weather events wrong, it also considerably underestimates the potential positive externalities that more greenhouse gas emissions generate. Policymakers and regulators should not ignore or undervalue these positive gains.

Coal: An Abundant Supply and Important to States

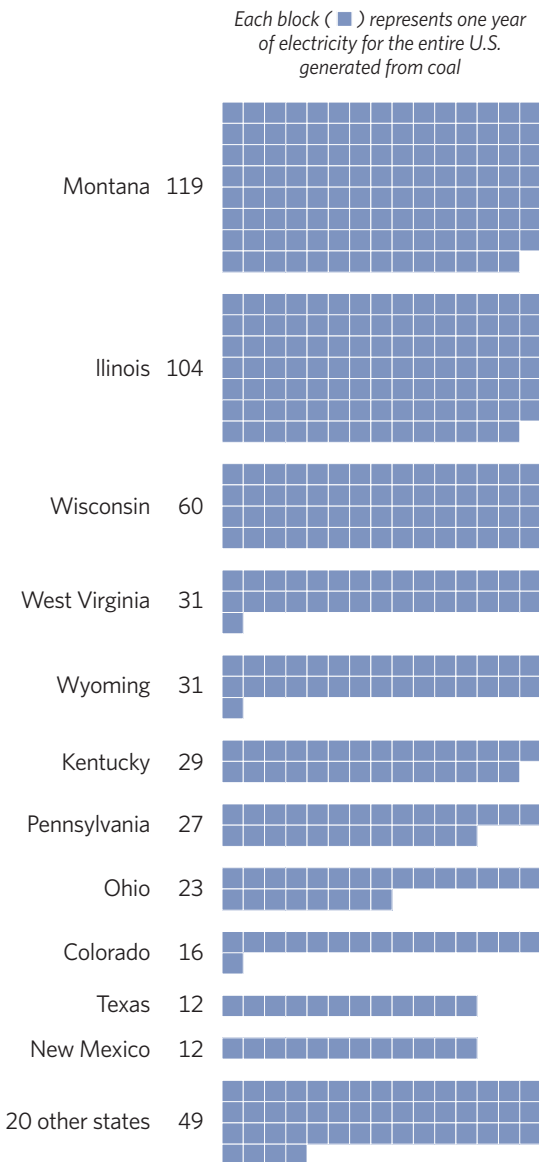
Coal production and consumption play a vital role for American families and businesses in many regions of the country. Used to power nearly half of all electricity generation for years, coal is the single largest electricity source in America. With 487 billion short tons¹² of coal recoverable with today’s technology in the United States—enough to provide electricity for over 500 years at current consumption rates—coal has the potential to be an important resource in the near term as well as in the future.

Coal production has historically been an important cog in the U.S. economy. Since 1996, the United States has produced roughly one billion short tons of coal per year.¹³ Just one million short tons of coal could yield enough energy to power 190,000 homes annually.¹⁴ Illinois alone has enough reserves to power America for more than a century. Plentiful reserves can also be found in Colorado, Kentucky, Montana, North Dakota, Ohio, Pennsylvania, West Virginia, Wyoming, and many other states. Additionally, 21 states receive 50 percent or more of their electricity from coal, 12 of which receive 70 percent or more of their electricity from coal. Kentucky and West Virginia depend on coal for 93 percent and 96 percent of their electricity, respectively.¹⁵ Not only does the consumption of an inexpensive dependable power source benefit families, it also makes for an attractive location for manufacturers and other energy intensive industries to locate.

CHART 1

An Abundance of Coal

The U.S. has enough coal to power the country for 513 years at current consumption rates. Montana, Illinois, and Wisconsin have the most coal, 283 years' worth, or 55 percent of the U.S. total.



Sources: Heritage Foundation calculations based on data from National Mining Association, U.S. Coal Reserves by State and Type, 2011, http://www.nma.org/pdf/c_reserves.pdf (accessed November 17, 2013); and U.S. Department of Energy, U.S. Energy Information Administration, "State Electricity Profiles 2010," January 27, 2013, <http://www.eia.gov/electricity/state/pdf/sep2010.pdf> (accessed November 17, 2013).

The 487 billion short tons of recoverable coal is less than half of the actual amount of coal that the United States has under its soil. Domestically, 10.3 trillion short tons of coal exist as an in-place resource, which does not factor in economic or technological recoverability. As is the case with oil, natural gas, and virtually all mineral extraction, the private sector finds ways to turn in-place resources to recoverable ones as prices change and technology improves. Contrary to claims of resource scarcity, markets respond and innovators develop new extraction techniques and better equipment to more effectively locate resources.

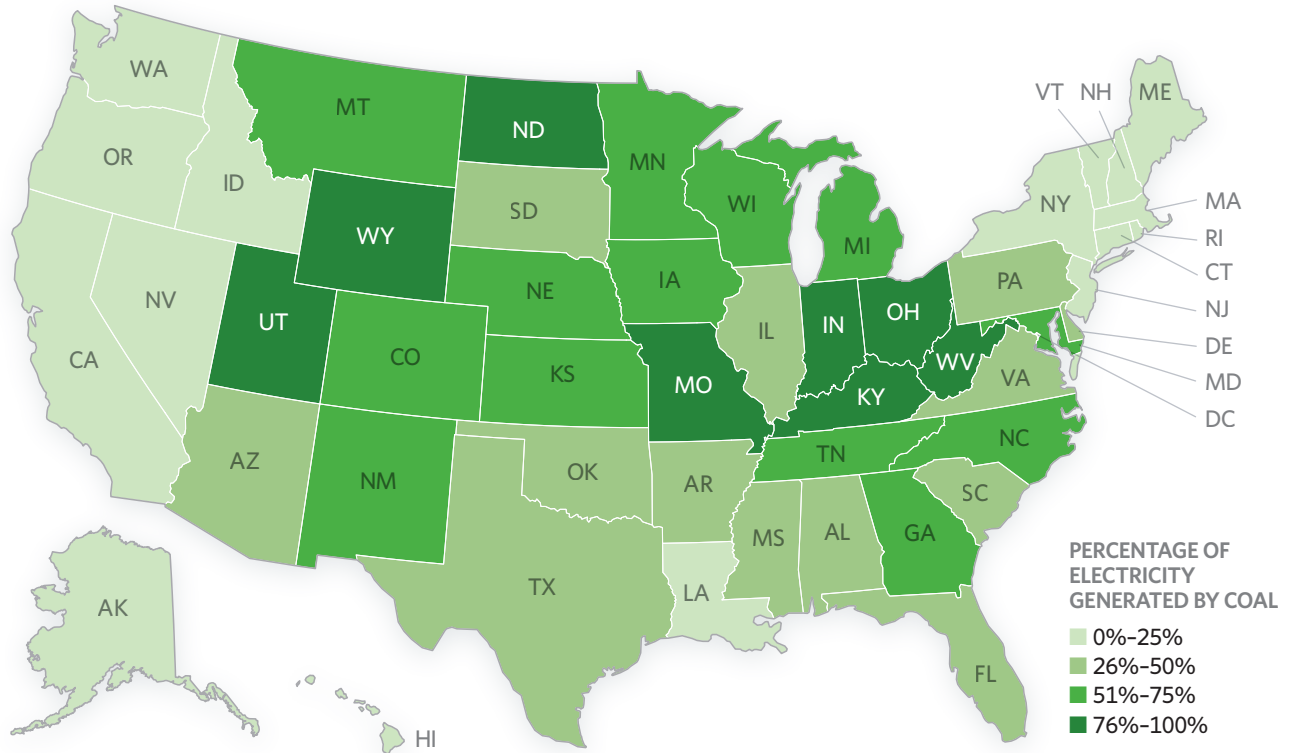
Emissions Caps: Wrong for the Economy and the Environment. Both economically and environmentally, the EPA's greenhouse gas regulations, as well as similar attempts and commitments from other countries around the world to do likewise, take standards of living in the wrong direction.

The EPA's New Source Performance Standards (NSPS) and regulation of existing plants will drive up energy prices for families and businesses. It will cost more to heat, cool, and light homes, and to cook meals. These higher energy prices will also have rippling effects throughout the economy. As energy prices increase, the cost of making products rises. Higher operating costs for businesses will be reflected in higher prices for consumers. Because everything Americans use and produce requires energy, consumers will take hit after hit. As prices rise, consumers buy less, and companies are forced to shed employees, close entirely, or move to other countries where the cost of doing business is lower. The result is fewer opportunities for American workers, lower incomes, less economic growth, and higher unemployment.

The Environmental Protection Agency's regulations of greenhouse gas emissions are not the only regulations threatening coal. The EPA, along with the Office of Surface Mining Reclamation and Enforcement (OSMRE) in the Department of the Interior, and the Mine Safety and Health Administration (MSHA) in the Department of Labor, have all introduced or finalized new rules that will adversely impact the coal industry and drive up costs for consumers and which are devoid of substantial environmental benefit.¹⁶ Cumulatively, these regulations will substantially reduce the use of coal in America. Heritage Foundation analysts modeled the effects of what killing coal would do to

MAP 1

Coal Provides Majority of Electricity in 21 States



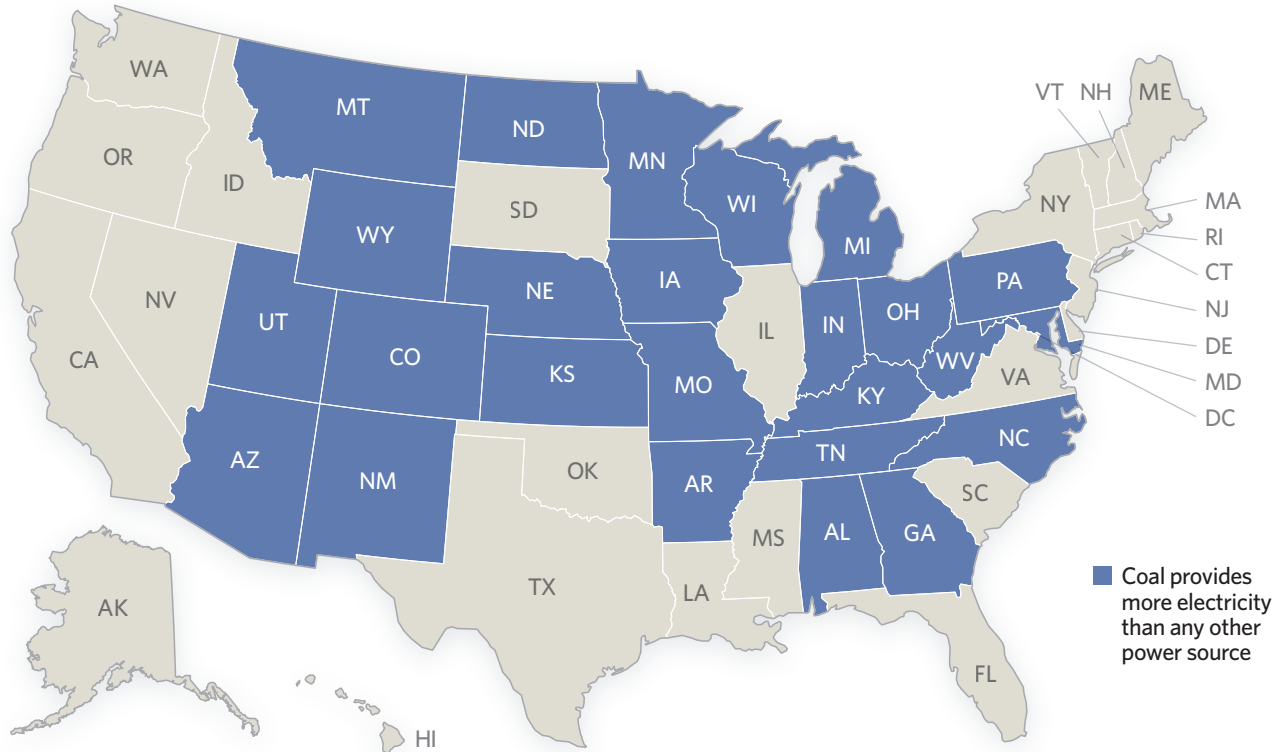
PERCENTAGE OF ELECTRICITY GENERATED BY COAL	
West Virginia	96.7%
Kentucky	92.7%
Indiana	89.7%
Wyoming	89.3%
Ohio	82.1%
North Dakota	81.9%
Missouri	81.3%
Utah	80.6%
Iowa	71.8%
New Mexico	70.7%
Colorado	68.1%
Kansas	67.8%
Nebraska	63.8%
Wisconsin	62.5%
Montana	62.4%
Michigan	58.8%
North Carolina	55.9%
Maryland	54.3%
Georgia	53.3%
Tennessee	53.0%
Minnesota	52.3%
Pennsylvania	48.0%
Illinois	46.5%
Arkansas	46.2%
Delaware	45.6%
U.S. average	44.8%
Oklahoma	43.6%
Alabama	41.4%
Arizona	39.1%
Texas	36.5%
South Carolina	36.2%
Virginia	34.9%
South Dakota	32.8%
Florida	26.1%
Mississippi	25.0%
Louisiana	23.3%
Nevada	19.9%
Massachusetts	19.4%
Hawaii	14.3%
New Hampshire	13.9%
New York	9.9%
New Jersey	9.8%
Alaska	9.2%
Washington	8.2%
Connecticut	7.8%
Oregon	7.5%
California	1.0%
Idaho	0.7%
Maine	0.5%
Vermont	0.1%
Rhode Island	0.0%

Source: U.S. Department of Energy, Energy Information Administration, "State Electricity Profiles 2010," January 2012, <http://www.eia.gov/electricity/state/pdf/sep2010.pdf> (accessed November 17, 2013).

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MAP 2

Coal Is Largest Source of Electricity in Half of U.S. States



Sources: U.S. Department of Energy, Energy Information Administration, "State Electricity Profiles 2010," January 2012, <http://www.eia.gov/electricity/state/pdf/sep2010.pdf> (accessed November 17, 2013); and U.S. Department of Energy, Energy Information Administration, "State Renewable Electricity Profiles 2010," March 2012, <http://www.eia.gov/renewable/state/pdf/srp2010.pdf> (accessed November 17, 2013).

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our economy. Using the Heritage Foundation Energy Model, a derivative of the National Energy Model System (NEMS),¹⁷ and analyzing a phase-out of coal between 2015 and 2038, by the end of 2023:

- Employment falls by nearly 600,000 jobs.
- Manufacturing loses over 270,000 jobs.
- Coal-mining jobs drop 30 percent.
- A family of four's annual income drops more than \$1,200 per year, and its total income drops by nearly \$24,400 over the entire period of analysis.
- Aggregate gross domestic product (GDP) decreases by \$2.23 trillion over the entire period of the analysis.

The Heritage economic analysis also estimates that significantly reducing coal's share in America's energy mix would, by 2030, raise natural gas prices by 28 percent. Both coal and natural gas are important, reliable sources of electricity generation, and artificially shrinking the supply of coal would put upward pressure on natural gas prices. Natural gas is not only a critical source of electricity generation; natural gas and liquids produced with natural gas provide a feedstock for fertilizers, chemicals and pharmaceuticals, waste treatment, food processing, fuel for industrial boilers, increasingly used as a transportation fuel, and much more. The chemical-manufacturing base alone is building new operations worth \$95 billion in response to projected low natural gas prices from the boom in domestic resources.¹⁸ As the United States is experiencing a renaissance in manufacturing and energy-intensive

TABLE 1

How EPA Power Plant Regulations Would Affect Employment in 2023

State	ONE-YEAR CHANGE IN EMPLOYMENT IN 2023		ONE-YEAR CHANGE IN EMPLOYMENT IN 2023 PER 100,000 POPULATION	
	Total	Manufacturing	Total	Manufacturing
Alabama	-11,094	-5,543	-206	-103
Alaska	-1,068	-319	-133	-40
Arizona	-8,900	-3,492	-123	-48
Arkansas	-6,100	-3,722	-185	-113
California	-61,261	-28,920	-146	-69
Colorado	-8,929	-3,025	-157	-53
Connecticut	-7,397	-3,889	-183	-96
Delaware	-1,515	-599	-149	-59
District of Columbia	-1,815	-111	-267	-16
Florida	-23,973	-7,269	-113	-34
Georgia	-16,506	-8,152	-151	-75
Hawaii	-1,807	-409	-118	-27
Idaho	-2,615	-1,273	-148	-72
Illinois	-26,999	-13,469	-186	-93
Indiana	-17,698	-10,840	-242	-148
Iowa	-7,838	-4,813	-228	-140
Kansas	-6,553	-3,763	-203	-117
Kentucky	-14,945	-4,963	-305	-101
Louisiana	-7,408	-3,262	-145	-64
Maine	-2,565	-1,292	-171	-86
Maryland	-8,430	-2,640	-129	-40
Massachusetts	-13,054	-5,931	-177	-80
Michigan	-20,023	-11,907	-179	-107
Minnesota	-12,611	-7,025	-211	-117
Mississippi	-5,547	-3,167	-166	-95
Missouri	-11,425	-5,750	-169	-85
Montana	-1,782	-393	-159	-35
Nebraska	-4,146	-2,185	-201	-106
Nevada	-3,505	-892	-115	-29
New Hampshire	-2,863	-1,555	-193	-105
New Jersey	-14,326	-5,874	-144	-59
New Mexico	-2,514	-690	-108	-30
New York	-30,049	-10,666	-137	-49
North Carolina	-18,412	-10,154	-171	-94
North Dakota	-1,832	-555	-241	-73
Ohio	-26,375	-14,891	-202	-114
Oklahoma	-6,500	-3,082	-153	-73
Oregon	-7,430	-3,914	-172	-90
Pennsylvania	-28,469	-13,205	-199	-92
Rhode Island	-1,933	-942	-163	-79
South Carolina	-8,823	-5,024	-169	-96
South Dakota	-1,776	-916	-193	-100
Tennessee	-12,755	-7,095	-178	-99
Texas	-43,988	-19,621	-155	-69
Utah	-5,879	-2,636	-188	-84
Vermont	-1,364	-722	-193	-102
Virginia	-15,465	-5,591	-171	-62
Washington	-12,700	-6,470	-167	-85
West Virginia	-11,494	-1,155	-549	-55
Wisconsin	-15,744	-10,353	-245	-161
Wyoming	-3,514	-214	-552	-34
U.S. TOTALS	-591,714	-274,339	-172	-79

Source: Calculations derived from the Heritage Foundation Energy Model.

industries, the Administration's war on coal could cripple America's competitive advantage.

These regulations will not only drive up the costs of goods and services that promote public health, such as access to affordable heating and air conditioning, but also divert resources from activities that could truly improve America's public health. The EPA ignores the dramatic environmental improvements that have been made and continue to be made when economies grow, standards of living improve, and people are able to adapt to changes and protect themselves from changing environmental circumstances. For example, despite enormous growth in population, the aggregate mortality rate as a result of extreme weather events has declined more than 90 percent globally since the 1920s, and extreme weather-related events account for less than 1 percent of global mortality.¹⁹ At the same time, the world population has increased from 1.8 billion to 7.1 billion.²⁰

Wealth creation, for which affordable, reliable energy is a critical input, has provided Americans with the capacity and wherewithal to care for the environment. When economies are free to grow, environmental quality improves—this is true around the world, not just in the United States. Free economies better equip people to tackle environmental challenges and address climate-related events, whether human-induced or not. America can have economic growth and improved environmental well-being, but the EPA's greenhouse gas regulations will stunt economic growth and have the opposite effect.

Insignificant Impact on Climate. The EPA's New Source Performance Standards and all other regulations aimed at reducing greenhouse gas emissions will have no meaningful effect on global climate change. The EPA admitted this in its own proposed rule writing that "this proposed rule will result in negligible CO₂ emission changes, quantified benefits, and costs by 2022."²¹ Even EPA Administrator Gina McCarthy said that unilateral actions to reduce GHGs will result in minimal effect. In a House Energy and Commerce Committee hearing, Administrator McCarthy stated:

I think what you're asking is can EPA in and of itself solve the problems of climate change. No we cannot. But the authority you gave us was to use the Clean Air Act to regulate pollution;

carbon pollution is one of those regulated pollutants, and we're going to move forward with what we can do that's reasonable and appropriate.²²

While McCarthy stresses that the U.S. needs to be a leader in attracting international commitment to lowering GHG emissions, an international commitment to reducing coal share in the global marketplace is highly unlikely. Even if international commitments to dramatically reduce global GHG emissions were attainable, the EPA's regulations are not sound policy. The reality is that coal is very much a staple in the global energy market, providing 30 percent of the world's energy use and 41 percent of the world's electricity generation.²³ Furthermore, 70 percent of the world's steel production relies on coal.²⁴ While coal is by no means the only source of energy developed across the globe, coal is an important resource to driving economic growth all over the world, and will continue to be so well into the future. There are proposals to build 1,200 coal-fired power plants worldwide, and China and India account for 818 of them.²⁵ In fact, as the U.S. federal government attempts to drive up the cost of coal as an affordable reliable source of energy, the rest of the world's use could propel coal to the planet's number one energy source by 2017, surpassing oil.²⁶

Legal Challenges Coming

Many industry groups and state attorneys general have challenged the EPA's regulation of greenhouse gases on a number of fronts. After the District of Columbia Circuit Court affirmed the agency's authority to regulate GHG emissions from stationary sources like power plants, several refineries, large factories, and industry groups appealed the decision. In October 2013, the U.S. Supreme Court agreed to hear the appeals, although what it agreed to hear is narrow in scope. Despite an abundance of scientific research that disagrees with the EPA's endangerment finding and the inability of climate models to accurately project climate sensitivity to increased GHG emissions, the Supreme Court will not reconsider whether carbon dioxide and other greenhouse gases are pollutants. Instead, the Supreme Court will consider whether the EPA's regulation of GHG emissions from motor vehicles, which was the first target for the agency's GHG regulations, triggered regulations for stationary sources.

Industry and states will certainly challenge the legality of the NSPS as well, most likely targeting the EPA's assumptions about carbon capture and sequestration (CCS) technology. The EPA projects negligible cost impacts and emission reductions from NSPS because the EPA assumes that even in the absence of the regulation, electricity generators will choose other technologies and that no new coal-fired units would be built without installing CCS technology—the only way that coal-powered electricity plants could meet the standards.²⁷ Section 111(b) of the Clean Air Act stipulates that NSPS must reflect “the best system of emission reduction” as adequately demonstrated by the EPA administrator. It is highly questionable as to whether CCS meets this standard.²⁸

No credible basis exists to state that CCS is adequately demonstrated today since no large-scale power plant in the United States has CCS. Nor is there any credibility that a generating unit could install the technology to meet the seven-year average required by the EPA in the re-proposed rule. In a similar case argued in 1980, the District of Columbia Circuit Court determined that a rule requiring dry scrubbers to reduce sulfur dioxide was not adequately demonstrated, citing a lack of large-scale implementation.²⁹ Further, the need for sequestering the captured CO₂ imposes geographic as well as economic constraints.

One large-scale CCS project is currently under contract—the Kemper County Integrated Gasification Combined Cycle (IGCC) plant—but it is hardly a model for new coal-fired plants for the rest of the country. Setting aside the fact that the project has had nearly half a billion dollars in cost overruns and received over \$400 million in Department of Energy grants and preferential tax credits,³⁰ the plant is using a lower-grade lignite coal rather than higher-grade bituminous and subbituminous coal found in many parts of the rest of the country. The plant will use IGCC technology as opposed to pulverized combustion and the captured carbon dioxide will serve a purpose for enhanced oil recovery to help finance the plant. New coal-fired plants in other parts of the country will not have those opportunities, so the Kemper plant is not an indicator of adequate demonstration. Further, the fact that the plant is not actually operating disqualifies it as the model.

As identified by the Obama Administration's Interagency Task Force on Carbon Capture and

Storage 2010 report, implementation of CCS has a number of extremely difficult obstacles to overcome. There are questions of technical scalability, regulatory challenges, long-term liability of storing the captured CO₂, and above all, cost.³¹ Even with taxpayer-funded financial handouts to CCS projects, building them will be prohibitively costly, which is why the EPA's regulation of greenhouse gas emissions will effectively ban the construction of new coal-fired generating units. Even if CCS were affordable, it does not justify the EPA's greenhouse gas regulation, since the NSPS is intended to address a non-problem. CCS should be built only if companies believe it is in their economic interest to do so—for instance, if profitable opportunities for enhanced oil recovery exist nearby.

Stop Agency Regulations of Greenhouse Gas Emissions

The most effective approach to halt such harmful, bureaucratic regulatory undertakings would be to permanently prohibit any federal regulators from using GHG emissions as a reason to regulate economic activity. Congress should reform federal policies and regulations to prevent unelected officials from implementing GHG regulations. Bipartisan recognition exists that the EPA is ill suited to regulate greenhouse gas emissions from power plants. In 2010, eight Democratic Senators challenged the EPA's authority to regulate GHG emissions from stationary sources. Even one of the authors of the Clean Air Act as amended in 1990—Representative John Dingell (D-MI)—rejects the argument that the Clean Air Act addresses carbon dioxide, calling the EPA regulations “a glorious mess.”³² Congress should:

- Retract the endangerment finding,
- Prohibit the EPA and other agencies from regulating GHG emissions unless expressly authorized to do so by Congress, and
- Prevent the EPA and other agencies from using any funds to promulgate or enforce any regulation intended to reduce GHGs.

Congress Should Act Now

President Obama's climate plan would have a chilling effect on the economy, not the climate. As the EPA

finalizes regulations for new power plants, the agency will move on to regulating GHG emissions from *existing* plants, which will prevent the construction of new coal-fired power plants and drive out existing ones. The restriction of opportunities for Americans to use such an abundant, affordable energy source will only bring economic pain to households and businesses, with no climate impact to show for it. Lawmakers should exercise leadership and reclaim their authority from the unelected bureaucrats whose regulatory ambitions threaten economic growth and individual prosperity.

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Appendix: Methodology

Overview of Heritage Energy Model. This analysis uses the Heritage Energy Model (HEM), a derivative of the National Energy Model System (NEMS) 2013 Full Release.³³ NEMS is used by the Energy Information Administration (EIA) of the U.S. Department of Energy as well as by nongovernmental organizations for a variety of purposes, including forecasting the effects of energy-policy changes on a variety of leading economic indicators. The methodologies, assumptions, conclusions, and opinions in this *Backgrounder* are entirely the work of statisticians and economists at The Heritage Foundation's Center for Data Analysis (CDA) and have not been endorsed by, and do not necessarily reflect the views of, the developers of NEMS.

HEM is based on well-established economic theory as well as historical data and contains a variety of modules that interact with each other for long-term forecasting. In particular, HEM focuses on the interactions among (1) the supply, conversion, and demand of energy in its various forms; (2) American energy and the overall American economy; (3) the American energy market and the world petroleum market; and (4) current production and consumption decisions as well as expectations about the future.³⁴ These modules include:

- a Macroeconomic Activity Module,³⁵
- a Transportation Demand Module,
- a Residential Demand Module,
- an Industrial Demand Module,
- a Commercial Demand Module,
- a Coal Market Module,
- an Electricity Market Module,
- a Liquid Fuels Market Module
- an Oil and Gas Supply Module,
- a Renewable Fuels Module,
- an International Energy Activity Module, and

- a Natural Gas Transmission and Distribution Module.

HEM is identical to the EIA's NEMS with the exception of the Commercial Demand Module. Unlike NEMS, this module does not make projections regarding commercial floor-space data of pertinent commercial buildings.

Overarching the above modules is an Integrating Module that consistently cycles, iteratively executing and allowing the various modules to interact with each other. Unknown variables that are related (as if they are a component of a particular module) are grouped together, and a pertinent subsystem of equations and inequalities corresponding to each group is solved via a variety of commonly used numerical analytic techniques, using approximate values for the other unknowns. Once these group's values are computed, the next group is solved similarly, and the process iterates. Convergence checks are performed for each price and quantity statistic to determine whether subsequent changes in that particular statistic fall within a given tolerance. After all group values for the current cycle are determined, the next cycle begins. For example, at cycle j , a variety of n pertinent statistics represented by the vector $(x_1^j, x_2^j, \dots, x_n^j) \in R^n$ is obtained.³⁶ HEM provides a number of diagnostic measures, based on differences between cycles, to indicate whether a stable solution has been achieved.

Coal Plant Shutdown Simulations and Diagnostics. We used the HEM to analyze the economic effects of shutting down coal plants over time. HEM is appropriate for this analysis, as similar models have been used in the past to understand the economic effects of other energy-policy proposals.³⁷ In particular, we conducted simulations shutting down all coal plants that were to remain open indefinitely. Our baseline scenario had 1,300 such plants. We took these coal plants and chose to retire them between 2015 and 2038 in a year drawn from a discrete uniform probability distribution based around these years. Due to the nature of the associated probability mass function, plants were proportionally shut down each year. For example, by the end of 2021, approximately 25 percent of all coal plants were shut down; by the end of 2027, approximately 50 percent of all coal plants were shut down; and by the end of

2033, approximately 75 percent of all coal plants were shut down. By the end of 2038, all coal plants were shut down. We ran the HEM for 10 cycles to get consistent feedback into the Macroeconomic Activity Module, which provided us with the figures presented in this study. The diagnostic tests, based on differences between cycles, at the end of the 10 runs suggested that the forecasts provided by the model had stabilized. The 10 cycles were therefore sufficient to attain meaningful convergence, thus providing us with macroeconomic statistics from which

we can make informative inferences. We compared these results to the baseline scenario that had been run for 10 cycles.

In past simulations, we also tried shutting down coal plants over a shorter time horizon, such as from 2015 to 2025.³⁸ HEM could not handle these simulations, however, as they resulted in infeasible linear programs that could not be solved, probably due to the devastating nature of such dramatic shutdown scenarios.

Endnotes

1. Environmental Protection Agency, "Carbon Pollution Standards," October 17, 2013, <http://www2.epa.gov/carbon-pollution-standards> (accessed November 1, 2013).
2. A supercritical power plant generates steam at a higher temperature and higher pressure than traditional subcritical coal-fired plants.
3. Jim Ross, "EPA to Release CO₂ Rules for New Power Plants," *The State Journal*, September 19, 2013, <http://www.statejournal.com/story/23474197/epa-to-release-co2-rules-for-new-power-plants> (accessed October 28, 2013).
4. "Environmental Protection Agency: Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Final Rule," *Federal Register*, Vol. 74, No. 239, December 15, 2009, p. 66496, http://www.epa.gov/climatechange/Downloads/endangerment/Federal_Register-EPA-HQ-OAR-2009-0171-Dec.15-09.pdf (accessed November 1, 2013).
5. Roy W. Spencer, "Statement to the Environment and Public Works Committee of the United States Senate," Environment and Public Works Committee, U.S. Senate, July 18, 2013, http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=16e80c55-9ebf-42e4-852e-1f6e960b0902 (accessed October 28, 2013).
6. Paul C. Knappenberger and Patrick J. Michaels, "Climate Models' Tendency to Simulate Too Much Warming and the IPCC's Attempt to Cover That Up," Cato Institute, October 10, 2013, <http://www.cato.org/blog/climate-models-tendency-simulate-too-much-warming-ipccs-attempt-cover> (accessed October 28, 2013).
7. Spencer, "Statement to the Environment and Public Works Committee of the United States Senate."
8. Dr. Roger Pielke, "Statement to the Environment and Public Works Committee of the United States Senate," Environment and Public Works Committee, U.S. Senate, July 18, 2013, http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=a6df9665-e8c8-4b0f-a550-07669df48b15 (accessed October 28, 2013).
9. Intergovernmental Panel on Climate Change, "Fifth Assessment Report (AR5)," <http://www.ipcc.ch/> (accessed November 1, 2013).
10. "Environmental Protection Agency: Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Final Rule," *Federal Register*.
11. Craig D. Idso, "The Positive Externalities of Carbon Dioxide: Estimating the Monetary Benefits of Rising Atmospheric CO₂ Concentrations on Global Food Production," Center for the Study of Carbon Dioxide and Global Change, October 18, 2013, <http://www.globalwarming.org/wp-content/uploads/2013/10/MonetaryBenefitsofRisingCO2onGlobalFoodProduction.pdf> (accessed October 28, 2013).
12. Each short ton is equivalent to 2,000 pounds.
13. U.S. Energy Information Administration, "Coal," <http://www.eia.gov/coal/data.cfm#consumption> (accessed November 1, 2013).
14. U.S. Department of Interior, Bureau of Land Management, "Electricity Use Conversions," http://www.blm.gov/ut/st/en/prog/energy/coal/electricity_conversion.html (accessed November 1, 2013).
15. America's Power, "Facts & Figures," <http://www.americaspower.org/according-to-eia-data> (accessed October 28, 2013).
16. Nicolas D. Loris, "The Assault on Coal and the American Consumer," Heritage Foundation *Backgrounder* No. 2709, July 23, 2012, <http://www.heritage.org/research/reports/2012/07/the-assault-on-coal-and-american-consumers>.
17. NEMS is used by the Energy Information Administration of the Department of Energy as well as various nongovernmental organizations for a variety of purposes.
18. Marilyn Geewax, "Cheap Natural Gas Pumping New Life Into U.S. Factories," National Public Radio, March 28, 2013, <http://www.npr.org/2013/03/28/175483517/cheap-natural-gas-pumping-new-life-into-u-s-factories> (accessed October 28, 2013).
19. Indur M. Goklany, "Wealth and Safety: The Amazing Decline in Deaths from Extreme Weather in an Era of Global Warming, 1900-2010," Reason *Policy Study* No. 393, September 2011, http://reason.org/files/deaths_from_extreme_weather_1900_2010.pdf (accessed November 1, 2013).
20. U.S. Census Bureau, "International Programs: World Population, Historical Estimates of World Population," http://www.census.gov/population/international/data/worldpop/table_history.php (accessed October 28, 2013).
21. Environmental Protection Agency, "Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units," September 20, 2013, <http://www2.epa.gov/sites/production/files/2013-09/documents/20130920proposal.pdf> (accessed November 1, 2013).
22. Marlo Lewis, "Rep. Pompeo Questions EPA Administrator McCarthy on Obama Climate Plan," GlobalWarming.org, September 18, 2013, <http://www.globalwarming.org/2013/09/18/rep-pompeo-questions-epa-administrator-mccarthy-on-obama-climate-plan/> (accessed October 28, 2013).
23. World Coal Association, "Coal Statistics," <http://www.worldcoal.org/resources/coal-statistics/> (accessed October 28, 2013).
24. Ibid.

25. Ailun Yang and Yiyun Cui, "Global Coal Risk Assessment: Data Analysis and Market Research," World Resources Institute, November 2012, <http://www.wri.org/publication/global-coal-risk-assessment> (accessed September 19, 2013).
26. Bill Chappell, "Coal May Pass Oil as World's No. 1 Energy Source by 2017, Study Says," National Public Radio, December 18, 2012, <http://www.npr.org/blogs/thetwo-way/2012/12/18/167546881/coal-may-pass-oil-as-worlds-no-1-energy-source-by-2017-study-says> (accessed November 1, 2013).
27. Environmental Protection Agency, "Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources."
28. The Clean Air Act, 42 U.S. Code § 7411(a).
29. *Sierra Club v. Costle*, United States Court of Appeals, District of Columbia Circuit, June 1, 1981, http://www.leagle.com/decision/1981955657F2d298_1882 (accessed November 1, 2013).
30. "Kemper County IGCC Fact Sheet: Carbon Dioxide Capture and Storage Project," Massachusetts Institute of Technology, <http://sequestration.mit.edu/tools/projects/kemper.html> (accessed October 28, 2013).
31. Environmental Protection Agency, "Report of the Interagency Task Force on Carbon Capture and Storage," August 2010, <http://www.epa.gov/climatechange/Downloads/ccs/CCS-Task-Force-Report-2010.pdf> (accessed October 28, 2013).
32. "Congress Must Have Say on Anti-Coal Rules," *The Detroit News*, September 15, 2013, <http://www.detroitnews.com/article/20130915/OPINION01/309150005/1008/OPINION01/Congress-must-say-anti-coal-rules> (accessed October 28, 2013).
33. U.S. Department of Energy, Energy Information Administration, "The National Energy Modeling System: An Overview," [http://www.eia.gov/oiaf/aeo/overview/pdf/0581\(2009\).pdf](http://www.eia.gov/oiaf/aeo/overview/pdf/0581(2009).pdf) (accessed April 3, 2013).
34. *Ibid.*, pp. 3-4.
35. HEM's Macroeconomic Activity Module makes use of the IHS Global Insight model, which is used by government agencies and Fortune 500 organizations to forecast the manifestations of economic events and policy changes on notable economic indicators. As with NEMS, the methodologies, assumptions, conclusions, and opinions in this report are entirely the work of CDA statisticians and economists and have not been endorsed by, and do not necessarily reflect the view of, the owners of the IHS Global Insight model.
36. S. A. Gabriel, A. S. Kydes, and P. Whitman, "The National Energy Modeling System: A Large-Scale Energy-Economic Equilibrium Model," *Operations Research*, Vol. 49 (2001), pp. 14-25.
37. The Department of Energy, for example, has used NEMS to evaluate some policy proposals. See, for instance, U.S. Department of Energy, Energy Information Administration, "AEO Table Browser," <http://www.eia.gov/oiaf/aeo/tablebrowser/> (accessed June 5, 2013).
38. David W. Kreutzer, Nicholas D. Loris, and Kevin Dayaratna, "Cost of a Climate Policy: The Economic Impact of Obama's Climate Action Plan," Heritage Foundation *Issue Brief* No. 3978, June 27, 2013, <http://www.heritage.org/research/reports/2013/06/climate-policy-economic-impact-and-cost-of-obama-s-climate-action-plan>.