



February 28, 2018

Missouri Public Service Commission
Chairman
Daniel Hall
200 Madison Street, PO Box 360
Jefferson City, MO 65102

A nonprofit organization
devoted to discovering,
developing, and
promoting free-market
solutions to social and
economic problems.

Dear Daniel,

Ameren still insists it will retire the coal-fired Meramec power plant and replace it with more expensive, less reliable sources of electricity.

Enclosed is a fourth *Policy Study* on this topic. It explains:

- There are no free markets for electricity generation.
- Federal regulations on coal, not market mechanisms, have led to many of the coal-fired power plant closures.
- Federal and state government policies unfairly favor renewable energy sources at the expense of coal-fired power.

CHAIRMAN
Herbert J. Walberg
1994 – current

David H. Padden
1984 – 1994

PRESIDENT
Tim Huelskamp
2017 – current

Joseph L. Bast
1984 – 2017

The study provides a roadmap for state and federal policymakers to level the energy playing field and let all sources of energy compete for market share without the government picking winners and losers.

Daniel, please consider meeting with representatives from The Heartland Institute to learn how you can protect businesses in Missouri from these harmful policies.

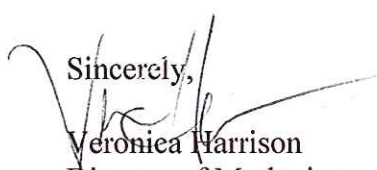
Chris Talgo, a member of Heartland's marketing team, will call you in the next week to ask if we can talk about this important issue. Please take his call, or give me a call at 312/377-4000.

Arthur B. Robinson
Center on Climate and
Environmental Policy

Michael Parry Mazur
Library

Andrew Breitbart
Freedom Center

Sincerely,


Veronica Harrison
Director of Marketing

3939 North Wilke Road
Arlington Heights, Illinois
60004
phone: 312/377-4000
fax: 312/277-4122
think@heartland.org
www.heartland.org

No. 148 – February 2018

How to Prevent the Premature Retirement of Coal-Fired Power Plants

By Isaac Orr and Fred Palmer*
Fourth and Final in a Series

Introduction

The eight-year tenure of the Obama administration inflicted intentional, serious damage on the country's capacity to provide the electricity that runs our computers, heats, cools, and lights our homes, powers our factories, and fuels our economy. The coal industry has been

the principal target of the assault. It is, however, possible to reverse the policies that have caused this harm and allow the markets for electricity again to best meet consumer needs.

The premature closure of coal-fired power plants will cost consumers billions of dollars in higher electricity prices and lost economic opportunities.

More than 250 coal-fired power plants have been retired since 2010, taking more than 34,000 megawatts (MW) of power generation capacity offline.¹ As a result, coal's share of the electricity generation market fell from 50 percent in 2008 to around 31 percent in 2017.²

* Isaac Orr is a research fellow and Fred Palmer, a senior fellow, with The Heartland Institute. For more complete bios, see page 29. Many people reviewed early drafts of this manuscript; see page 29.

© 2018 The Heartland Institute. Nothing in this report should be construed as supporting or opposing any proposed or pending legislation, or as necessarily reflecting the views of The Heartland Institute.

¹ Trevor House, *et al.*, *Can Coal Make a Comeback?* Center on Global Energy Policy, April 2017.

² U.S. Energy Information Administration, "Short Term Energy Outlook," September 12, 2017.

Most of the retired plants, 88 percent, were older, smaller units with a generating capacity of less than 250 MW.³ However, newer, more efficient coal-fired power plants with larger generating capacities also have been slated for retirement. The premature closure of these plants will cost consumers billions of dollars in higher electricity prices and lost economic opportunities.

These coal-plant closures are being driven by three factors: 1) Obama-era Environmental Protection Agency (EPA) regulations on carbon dioxide (CO₂) and other emissions; 2) national and state government policies that mandate the use and subsidize the producers of renewable energy sources; and 3) competition for electricity generation from low-cost natural gas.

EPA regulations and market-distorting subsidies and mandates for renewable energy provide zero measurable economic or environmental benefits, and they put the reliability and affordability of the U.S. energy supply at great risk.

Low natural gas prices are the result of hydraulic fracturing and horizontal drilling, technological innovations that have made the United States the largest

producer of natural gas in the world. By making previously unrecoverable natural gas resources economically accessible, the “fracking revolution” has changed the nation’s energy marketplace in ways that significantly benefit consumers and businesses.

By contrast, EPA regulations on CO₂, mercury, ozone, and small particulate matter, as well as market-distorting subsidies and mandates for renewable energy at the state and national level, provide zero measurable economic or environmental benefits. Worse, they put the reliability and affordability of the U.S. energy supply at great risk. In order to reverse the damage, the Trump administration, Congress, and state elected officials must move swiftly to revoke these policies and preserve the coal-fired electricity fleet.

The first *Policy Study* in this series, “How the Premature Retirement of Coal-Fired Power Plants Affects Energy Reliability, Affordability,” describes how the reliability and affordability of the U.S. electricity supply are jeopardized by the retirement of coal-fired power plants. The study offers South Australia and California as case studies of the damage done by anti-coal policies.⁴

The second *Policy Study* in the series, “How Obama-Era Regulations Are Shutting Down Perfectly Good Power Plants,” drills down, explaining in detail how the Obama-era Endangerment Finding and regulations on greenhouse gases and traditional emissions have resulted in the premature retirement of coal-fired power plants and why these regulations were based on faulty scientific assumptions.⁵

³ Benjamin Storrow, “Coal: Big, Younger Plants Are Closing. Is it a New Trend?” *E&E News*, April 27, 2017.

⁴ Isaac Orr and Fred Palmer, “How the Premature Retirement of Coal-Fired Power Plants Affects Energy Reliability, Affordability,” *Heartland Policy Study*, The Heartland Institute, February 2018.

⁵ Isaac Orr and Fred Palmer, “How Obama-Era Regulations Are Shutting Down Perfectly Good Power Plants,” *Heartland Policy Study*, The Heartland Institute, February 2018.

The third *Policy Study* in the series, “Public Policy and Coal-Fired Power Plants,” describes how prematurely shuttering coal-fired power plants could result in electricity prices rising 27 percent, costing consumers \$114 billion per year in higher electricity costs⁶ and threatening to destroy 1 million jobs and \$158 billion in GDP within three years—a loss of up to \$845 in income every year for every U.S. household.⁷

This final study in the series has three parts:

Part 1 is a brief history of electric utilities and how efforts to deregulate them in the 1990s led to more, not less, regulation. There is no “free market” in electricity today.

Part 2 describes four Obama-era zombie regulations on coal that must be eliminated.

Part 3 describes six subsidies and mandates favoring renewable energy (primarily wind and solar) that must be eliminated.

Part 4 is a brief summary and conclusion.

Roadmap to Sound Energy Policy

1. Repeal Regulations that Unnecessarily Disadvantage Coal

1. Eliminate the Endangerment Finding
2. Eliminate the Clean Power Plan
3. Reform New Source Review (NSR)
4. Eliminate CO₂ emissions from NSR

2. Repeal Subsidies and Mandates that Improperly Advantage Renewables

1. Rescind the wind production and solar investment tax credits
2. Eliminate negative pricing
3. Repeal renewable energy mandates
4. Eliminate feed-in tariffs
5. Eliminate interconnection tariffs for new generating capacity
6. End net-metering policies

⁶ Isaac Orr and Fred Palmer, “Public Policy and Coal-Fired Power Plants,” *Policy Study*, The Heartland Institute, February 2018.

⁷ Lawrence Makovich and James Richards, *Ensuring Resilient and Efficient Electricity Generation*, IHS Markit, September 2017.

Part 1

There Is No Free Market in Electricity Today

The history of the electricity power industry reveals not a failure of free markets, but rather a failure to ever *have* free markets. The domestic electric utility industry has been heavily regulated almost since its inception.

The history of the electricity power industry reveals not a failure of free markets, but rather a failure to ever *have* free markets.

Historically, utilities have been vertically integrated, owning all components of the supply chain, including the power plants, transmission lines, power grids, and distribution systems.⁸ This enabled them to internalize the risk of changes in the price or availability of supply and gave

them a financial interest in maintaining the grid and encouraging economic growth to increase demand for their product.⁹

Today, in about half the country, utilities are still vertically integrated.¹⁰ Because these utilities exercise considerable market power, they are regulated by state regulators serving on public utility commissions as well as by regional and national regulatory agencies. These public utilities are compensated according to a cost-of-service formula. (See Figure 1.) To ensure prudent, reliable operation, the formula attempts to balance rates of return for utilities (r in the formula), operating expenses (OE), depreciation of assets (D), and taxes (T).

In recent decades, the vertically integrated model has fallen out of favor in some areas of the country. This is in part because basing prices on cost encouraged utilities to construct more power plants than were needed, producing excess generating capacity regardless of whether it was needed to provide power to consumers. By increasing their spending (their rate base, shown as “C” in the formula), the utilities could increase the amount of revenue they received. Also driving deregulation was the emergence of derivative markets offering financial instruments that could enable utilities and their customers to manage risk almost as well as physical vertical integration.¹¹

⁸ Coley Girouard and Danny Waggoner, “How Much Do You Know About Your Electric Utility,” *Advanced Energy Economy* (blog), February 17, 2015.

⁹ Jim Johnston, Letter to the Editor, *Public Utilities Fortnightly*, April 2004.

¹⁰ Travis Kavulla, “There is No Free Market For Electricity: Can There Ever Be?” *American Affairs Journal*, Summer 2017.

¹¹ Jim Johnston, “Which Industries Are Regulated?” *Regulation*, December 1996.

Figure 1
Revenue Formula for “Cost-of-Service” Regulated Utilities

$$RR = r(C) + D + OE + T, \text{ where}$$

- RR = the annual “revenue requirement”
r = the regulator-authorized rate of return
C = “rate base,” the total amount of undepreciated capital investment made by the utility
D = depreciation, or the return of the utility’s capital investment
OE = operating expenses, such as labor, fuel, etc.
T = taxes, including all income taxes the utility will pay on its share holders’ return

Cost-of-service regulated utilities are compensated according to the revenue formula. In this system, public utility commissions authorize a rate of return, typically between 7 and 9 percent, on the capital spent by the utility. *Source:* Travis Kavulla, “There is No Free Market For Electricity: Can There Ever Be?” *American Affairs Journal*, Summer 2017.

In some states, these trends led to a restructuring of the electricity market in the 1990s to establish a competitive auction process where power plants compete with one another upstream and customers downstream have a choice of retail supplier not owned by public utilities.^{12,13} The competitive markets are referred to as Independent Systems Operators (ISOs) or Regional Transmission Operators (RTOs). There are seven regional wholesale power markets in the United States (see Figure 2).¹⁴

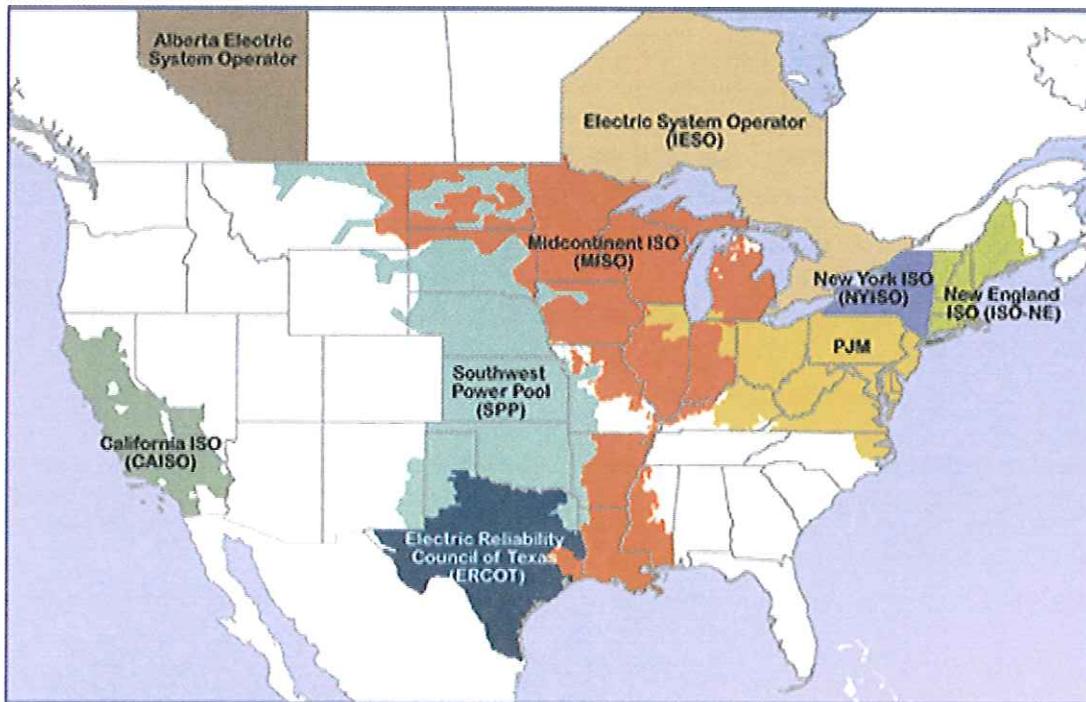
Despite the introduction of competitive elements into these wholesale markets for electricity, the marketplace is still designed and regulated by government entities such as the Federal Energy Regulatory Commission (FERC). FERC uses its regulatory powers to ensure electricity rates are “just and reasonable,” a subjective determination. Markets also are subject to state laws mandating the use of renewable energy sources like wind and solar, distorting wholesale power markets by picking winners and losers. These mandates act as subsidies by forcing states to source electricity from renewables that are more expensive than traditional sources of energy like coal.

¹² John S. Moot, *Subsidies, Climate Change, Electric Markets and the FERC*, for the Consortium for Energy Policy Research, Energy Policy Seminar Series, Harvard Kennedy School, September 14, 2015.

¹³ Travis Kavulla, *supra* note 10.

¹⁴ Federal Energy Regulatory Commission, “Regional Transmission Organizations (RTO)/Independent Systems Operators (ISO)” (website), May 11, 2017.

Figure 2
Wholesale Electricity Markets in the United States



Wholesale electricity markets began in the 1990s in response to consumer dissatisfaction with vertically integrated electric utilities. There are seven ISO/RTO regions in the United States. Each of these regions is regulated by the Federal Energy Regulatory Commission (FERC). *Source:* Federal Energy Regulatory Commission, "Regional Transmission Organizations (RTO)/Independent Systems Operators (ISO)" (website), May 11, 2017.

Although it may seem counterintuitive, many of these competitive markets attract more regulation than their vertically integrated counterparts. Competitive markets are regulated by a complex and lengthy system of "tariffs," rules that control the prices or practices of a monopoly utility or a market operator like an ISO. The tariffs that govern the ISOs are approved by FERC, which has responsibility for wholesale energy trading. The tariffs governing these "markets" are enormously complex, several times the length of tariffs that govern the vertically integrated monopolies, whose charges are regulated by state utility commissions.¹⁵

¹⁵ Travis Kavulla, *supra* note 10.

Wholesale electricity markets are further distorted by federal subsidies that allow wind and solar generators to submit bids below their marginal operating costs and still make money.¹⁶ Such manipulation and interference have largely reversed the competitive elements introduced in the past three decades. Even competitive markets now more closely resemble a command-and-control style of regulation than a free market. Early critics of electric utility deregulation warned of this outcome.¹⁷

Policymakers must understand there are no free markets for electricity.

Governments have long been picking winners and losers through cost-of-

service and “just and reasonable” rate regulation as well as regulations on pollutants such as sulfur dioxide and particulate matter. State and national governments also massively subsidize renewable energy sources, and many states mandate that utilities use costly and less reliable renewable energy.¹⁸ The results for consumers and the economy are wasteful investments and higher prices.

Policymakers must understand there are no free markets for electricity.

Part 2

Repeal Regulations that Unnecessarily Disadvantage Coal

The United States has the most reliable supply of electricity and among the lowest industrial electricity rates in the world, due largely to the use of coal for electricity generation.¹⁹

Policymakers should strive to maintain these important competitive advantages. To do so, and to help restore competition to domestic energy markets, policymakers must repeal regulations that unnecessarily disadvantage coal.

The Obama administration conducted an open and explicit war on coal, employing two major public policy weapons. The first weapon, addressed in this section, is to promulgate regulations intended to drive coal plants into premature retirement. These anti-coal government policies must be reversed in order to keep the country competitive in global energy markets, ensure the continued reliability of electric generation, and keep electricity prices low for all consumers, including families, small businesses, and manufacturers.

¹⁶ This process is described in more detail in the third *Heartland Policy Study* in this series, *supra* note 6.

¹⁷ Jim Johnston, “Why California’s Restructuring Failed,” *Capitalism Magazine*, March 21, 2001.

¹⁸ Travis Kavulla, *supra* note 10.

¹⁹ Isaac Orr and Fred Palmer, *supra* note 6.

1. Eliminate the Endangerment Finding

The Endangerment Finding is the basis for several Environmental Protection Agency regulations that impose onerous restrictions on the use of fossil fuels. The Endangerment Finding is seriously flawed, and its conclusions are not a scientifically sound basis for public policy.²⁰

The Endangerment Finding is seriously flawed, and its conclusions are not a scientifically sound basis for public policy.

Prior to 2009, the consensus of scientists, U.S. presidents, members of Congress from both major political parties, and the heads of national government agencies was that EPA did not have the authority to regulate carbon dioxide (CO₂) under the

Clean Air Act. That changed when Barack Obama was elected president. He immediately weaponized EPA to wage his war on coal.

The Endangerment Finding was issued by the Obama administration in December 2009. EPA claimed increasing atmospheric concentrations of several greenhouse gases, including CO₂, methane, and nitrous oxide, “threaten the public health and welfare of current and future generations,” and therefore emissions must be regulated under the Clean Air Act.²¹ The process by which this dramatic change of direction took place lasted only a matter of months, a timetable without precedent for such a major regulatory finding.

In its rush to judgment, and probably fearing a likely reversal, EPA violated its own procedures and didn’t submit the decision to its Science Advisory Board for approval. Objections from prominent scientists, even from experts within EPA,²² and petitions from outside groups of scientists and industry groups were summarily rejected. This highly unusual and probably illegal process calls into question the validity of the Endangerment Finding. EPA Administrator Scott Pruitt acknowledged as much in an interview with *Time* magazine: “So it really draws into question, did this agency engage in a robust, meaningful discussion with respect to the endangerment that CO₂ poses to this country? And I think by any definition about process, they didn’t.”²³

EPA is required by law to provide scientific and economic justifications for the rules and regulations it creates. In the case of the Endangerment Finding, it failed to do so. The agency’s *Technical Support Document for the Endangerment Finding* relies heavily on the 2007 Fourth

²⁰ Sam Kazman, “CEI Submits Letter to EPA on Burdensome Endangerment Finding,” Coalition Letters, October 17, 2017.

²¹ Benjamin DeAngelo, *et al.*, “Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act,” U.S. Environmental Protection Agency, December 7, 2009.

²² Christine Hall, “EPA Whistleblower Criticizes Global Warming Science and Policy in New Peer-Reviewed Study,” Competitive Enterprise Institute, April 1, 2011.

²³ Justin Warden, “EPA Head Scott Pruitt Says Oil and Coal Companies He Met With Aren’t ‘Polluters’,” *Time*, October 20, 2017.

Assessment Report (AR4) of the United Nations' Intergovernmental Panel on Climate Change (IPCC). But that source is controversial, has been heavily criticized, and was not peer-reviewed.²⁴ According to an EPA Inspector General report issued in 2011, the Endangerment Finding failed to meet Office of Management and Budget (OMB) requirements for peer review for highly influential scientific assessments.²⁵ In reply to that criticism, the Obama EPA simply denied against all facts and common sense that the Endangerment Finding was a decision that would lead to regulations costing more than \$500 million and therefore didn't require a highly influential scientific assessment.²⁶

Even if IPCC were a credible source, its computer models have been falsified by real-world data and so cannot be cited as a line of evidence in favor of the Endangerment Finding. As shown in Figure 3, on average, the 102 models used by IPCC to forecast future temperatures have consistently and dramatically overestimated the amount of future global warming. Those models are off by two to three times the actual temperatures observed with satellite measurements and weather balloons.²⁷

Eliminating the unjustified Endangerment Finding is the single most important action the Trump administration can take to preserve useful coal facilities.

The models cannot accurately predict short-term temperature trends, and they cannot be expected to produce reliable projections of future climate change. They are not a legitimate scientific basis for long-term policy decisions.²⁸

Eliminating the unjustified Endangerment Finding is the single most important action the Trump administration can take to preserve useful coal facilities. If the Endangerment Finding is not vacated, the United States will remain vulnerable to renewed regulation of CO₂ emissions by future administrations.

²⁴ See InterAcademy Council, *Climate Change Assessments: Review of the Processes & Procedures of IPCC*, Committee to Review the Intergovernmental Panel on Climate Change, October; Donna Laframboise, *The Delinquent Teenager Who was Mistaken for the World's Top Climate Expert* (Toronto, Canada: Ivy Avenue Press, 2011).

²⁵ Office of Inspector General, Environmental Protection Agency, *Report: Procedural Review of EPA's Greenhouse Gases Endangerment Finding Data Quality Processes, Report #11-P-0702, September 26, 2011*

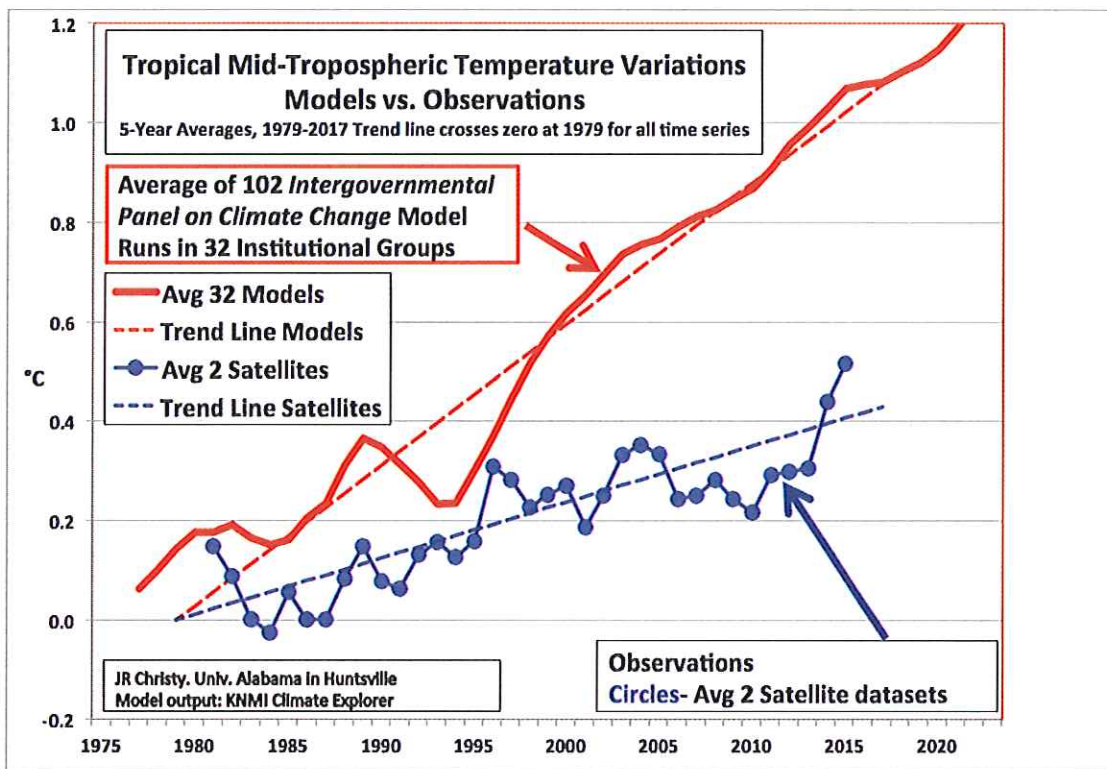
²⁶ *Ibid.*

²⁷ Pat Michaels and Chip Knappenberger, "Climate Models Versus Climate Reality," *Climate Etc.* (blog), December 17, 2015.

²⁸ Kesten Green and J. Scott Armstrong, "Global Warming: Forecasts by Scientists versus Scientific Forecasts," *Energy and Environment* 18 (2007): 997–1021; Kesten Green, J. Scott Armstrong, and Willie Soon, "Validity of Climate Change Forecasting for Public Policy Decision making," *International Journal of Forecasting* 25 (2009): 826–32.

Additionally, if the Endangerment Finding is not vacated, Trump’s efforts to reverse Obama-era climate policies will continue to be subject to lawsuits by organizations such as the Sierra Club and Natural Resources Defense Council, which have already successfully filed suit to delay infrastructure projects based on their implications for greenhouse gas emissions. These suits have affected FERC approvals of multiple pipeline projects. Any efforts by the agency to restructure electric rates to compensate coal-fired power plants for their reliability and resiliency attributes, as suggested in the Department of Energy’s recently released Notice of Proposed Rulemaking (NOPR), will likely face similar lawsuits.²⁹

Figure 3
Climate Models Consistently and Dramatically Overestimate Warming



Climate models have consistently overestimated the amount of future global warming. When compared to satellite and weather balloon temperature measurements, it is apparent climate models are not a solid basis for forming public policy. The 2016 increase in observed temperatures was due to a record-breaking El Niño. *Source:* John Christy, University of Alabama Huntsville, personal communication, November 20, 2017.

²⁹ U.S. Department of Energy, “Grid Resiliency Pricing Rule,” Notice of Proposed Rulemaking, September 28, 2017.

2. Eliminate the Clean Power Plan

On October 10, 2017, EPA Administrator Scott Pruitt announced plans to rescind the Clean Power Plan (CPP), a suite of regulations enacted by the Obama administration to reduce CO₂ emissions from the existing electricity generation fleet by 2030.³⁰ Pruitt's action is an essential first step in ensuring the future reliability and affordability of the grid by preventing the premature retirement of coal-fired power plants.

The Obama mandates represented a new and unprecedented interpretation of EPA's regulatory power and were a key reason the U.S. Supreme Court stayed CPP even before it was implemented.

On October 10, 2017, EPA Administrator Scott Pruitt announced plans to rescind the Clean Power Plan.

Pruitt and numerous others contend CPP violated the Clean Air Act because it forced states to build new electricity generating facilities rather than allowing upgrades at individual plants to achieve CO₂ emission reductions in the most technically feasible and cost-effective way.

CPP would have imposed massive costs on the economy for no measurable environmental benefit. Even the lowest estimates of the annual cost of compliance with CPP were around \$8.4 billion. Other analyses have found CPP would have cost consumers \$39 billion per year and resulted in electricity bills increasing 11 percent to 14 percent annually.³¹ Despite the high price tag, CPP at best would have averted only .019 degrees C of potential future warming by 2100.³² This amount is too low to be accurately measured with even the most sophisticated scientific equipment.

Analysis based on Energy Information Administration (EIA) data indicate CPP would have reduced manufacturing production by \$45.4 billion annually.³³ Further, CPP would have resulted in 68,000 people losing their jobs in manufacturing each year. Taking into account the multiplier effect—other jobs in the economy that are supported by manufacturing jobs—the losses would have been nearly 350,000 jobs annually.

EPA understood averting just .019 degrees C of potential warming nearly 100 years into the future was no justification for imposing large costs on the U.S. economy. The agency sought to justify CPP's enormous costs not by addressing how much warming would be averted, but

³⁰ U.S. Environmental Protection Agency, "EPA Takes Another Step To Advance President Trump's America First Strategy, Proposes Repeal Of 'Clean Power Plan,'" news release, October 10, 2017.

³¹ NERA Economic Consulting, *Energy and Consumer Impacts of EPA's Clean Power Plan*, November 7, 2015.

³² Paul Knappenberger and Patrick Michaels, "0.02 Degrees C Averted: The Vital Number Missing from EPA's 'By the Numbers' Fact Sheet," *Cato at Liberty* (blog), June 11, 2014.

³³ Deroy Murdock, "Obama's Disastrous Clean Power Plan," *The National Review*, October 8, 2015.

instead by claiming the cost of the regulations was justified by health “co-benefits” to be achieved by reducing criteria pollutants, including particulate matter.³⁴

EPA agency sought to justify CPP’s enormous costs by claiming co-benefits of reducing criteria pollutants, including particulate matter.

For example, EPA claimed CPP would prevent up to 6,600 deaths each year allegedly caused by fine particulate matter (PM_{2.5})—dust or soot particles much smaller in diameter than the width of a human hair—without offering compelling evidence of the threat to human health.³⁵

EPA’s claim of health benefits is grounded in two long-term epidemiologic studies: the Harvard Six Cities study³⁶ and the American Cancer Society study.³⁷

Both studies attempt to identify a link between particulate matter and health. They calculate a relative risk (RR) ratio—a key measure of causation—for people living in cities with high reported levels of air pollution compared to those living in cities with low reported levels of air pollution. The Harvard Six Cities study reported an RR of 1.26; the ACS study reported an RR of 1.17. Both figures are far below the RR of 2.0 considered appropriate for determining causation in legal matters³⁸ and the 3.0 or even 4.0 RR suggested by epidemiologists.³⁹ Such low RR levels suggest there is virtually no cause-effect relationship between particulates and health.

The research literature on the health effects of particulate matter is extensive.⁴⁰ EPA ignored it because it did not make the case for CPP.

³⁴ U.S. Environmental Protection Agency, “Fact Sheet: Clean Power Plan Benefits of a Cleaner, More Efficient Power Sector,” EPA Archives, accessed November 20, 2017.

³⁵ “Fact Sheet: Clean Power Plan Overview, Cutting Carbon Pollution from Power Plants,” EPA Archives, 2015.

³⁶ D.W. Dockery, *et al.*, “An Association Between Air Pollution and Mortality in Six U.S. Cities,” *New England Journal of Medicine* 329 (1993):1753–9; and C.A. Pope III, *et al.*, “Lung Cancer, Cardiopulmonary Mortality, and Long-Term Exposure to Fine particulate Air Pollution,” *Journal of the American Medical Association* 287 (2002): 1132–41.

³⁷ C.A. Pope III, *et al.*, “Particulate Air Pollution as a Predictor of Mortality in a Prospective Study of U.S. Adults,” *American Journal of Respiratory Critical Care* 151 (1995): 669–74; C.A. Pope III, E. Ezzati, and D.W. Dockery, “Fine Particulate Air Pollution and Life Expectancy in the United States,” *New England Journal of Medicine* 360 (2009): 376–86; and C.A. Pope III, *et al.*, *ibid.*

³⁸ *Reference Manual on Scientific Evidence*, Third Edition, Federal Judicial Center and National Research Council of the National Academies (Washington, DC: National Academies Press, 2011).

³⁹ Jerome C. Arnett Jr., “The EPA’s Fine Particulate Matter (PM 2.5) Standards, Lung Disease, and Mortality: A Failure of Epidemiology,” *Issue Analysis #4*, Competitive Enterprise Institute, September 2006.

⁴⁰ James E. Enstrom, “Fine particulate air pollution and total mortality among elderly Californians, 1973-2002,” *Inhalation Toxicology* 17: (2005) 803–17; Stanley S. Young and Xia, J. “Assessing geographic heterogeneity and variable importance in an air pollution data set,” *Statistical Analysis and Data Mining*, 2013, DOI:10.1002/sam.

The Clean Power Plan cannot be justified on the basis of phantom “co-benefits” alleged to be associated with reducing the use of coal-powered electricity any more than it can be justified on the basis of CO₂ emission reductions.

Although the Supreme Court stayed implementation of CPP, the regulations weighed heavily in the decision-making process of utilities. Burning coal for electricity generation emits approximately twice as much CO₂ as burning natural gas, and the threat of CPP regulations led many utility companies and state public utility commissions to retire coal-fired generating units or convert them to natural gas.

Pruitt’s proposal to rescind CPP will assuredly face court challenges by environmental groups, underscoring the importance of vacating the Endangerment Finding. Until then, if legal challenges to Pruitt’s efforts are successful, EPA should seek to re-write CPP in a way that allows existing power plants to make reasonable upgrades to become more efficient and reduce both traditional and greenhouse gas emissions, rather than forcing coal-fired power plants to retire and replacing this electricity generating capacity with natural gas or renewables.

Pruitt’s proposal to rescind the Clean Power Plan will assuredly face court challenges by environmental groups, underscoring the importance of vacating the Endangerment Finding.

Additionally, Congress could take action to rescind CPP by passing legislation to prevent future regulations on CO₂ emissions. Unless congressional action is taken, CPP or similar regulations could be reinstated by future administrations.

3. Reform New Source Review

In October 2017, the Trump administration announced it established a New Source Review Reform Task Force to review and simplify the NSR application and permit process. There is an urgent need for such review and reform.⁴¹

New Source Review (NSR) rules affect virtually every major manufacturing facility and power plant in the United States. The rules have played a significant role in the closure of otherwise useful power plants by affecting the decision to retrofit or retire.⁴²

⁴¹ Environmental Protection Agency, “EPA Releases Energy Independence Report,” news release, October 25, 2017.

⁴² Joseph L. Bast, “EPA: Time to Reform New Source Review,” The Heartland Institute, August 1, 2002; Joseph L. Bast and James M. Taylor, “New Source Review: An Evaluation of EPA’s Reform Recommendations,” *Policy Study*, The Heartland Institute, July 10, 2002.

The NSR permitting program requires stationary sources of air pollution—including factories, industrial boilers, and power plants—to get permits before construction starts, whether the unit is being newly built or upgraded.⁴³

The delay, cost, and uncertainty associated with obtaining an NSR permit are important concerns for owners considering retrofitting an existing power plant or adding new components to improve operating efficiency. These modifications may increase total emissions but reduce the volume of emissions released per unit of electricity generated. In other words, the facilities would be more efficient. Upgrades may constitute a “physical change” or lead to a designation of the change as a “major modification,” subjecting the unit to NSR permitting requirements.

The Trump administration should seek to amend New Source Review to make it easier for conventional power plants to retrofit their facilities.

NSR discourages investments in efficiency and installation of equipment that would limit emissions. The delays and uncertainty inherent in the NSR permitting process have created a situation where it is arguably more cost effective to continue to operate older, less efficient

plants with higher emissions than to build newer, more efficient plants or retrofit old plants with better pollution control technology. To the extent this has occurred, NSR rules have delayed the reduction of pollutant emissions such as sulfur dioxide and nitrogen oxides.⁴⁴

The Trump administration should seek to amend NSR to make it easier for conventional power plants to retrofit their facilities. The administration also should remove CO₂ emissions from NSR review: The public health benefits claimed by the Obama administration to justify NSR were attributable to limits on criteria pollutants, such as nitrous oxides, sulfur oxides, and particulates, not CO₂.

4. Eliminate New Source Performance Standards for CO₂

On August 3, 2015, EPA released a final rule to limit greenhouse gases from new, modified, or restructured power plants under Section 111(b) of the Clean Air Act.⁴⁵ Those regulations also established New Source Performance Standards (NSPS) that limit carbon dioxide emissions based on EPA’s assessment of available technologies.⁴⁶

⁴³ U.S. Department of Energy, *Staff Report to the Secretary on Electricity Markets and Reliability*, August 2017.

⁴⁴ Art Fraas, *et al.*, “EPA’s New Source Review Program: Time for Reform?” *Environmental Law Reporter*, 2017.

⁴⁵ U.S. Environmental Protection Agency, “Final Limits on Carbon Pollution from New, Modified, and Reconstructed Power Plants,” EPA Fact Sheet, EPA Archive, accessed November 20, 2017.

⁴⁶ Center for Climate and Energy Solutions, “EPA Regulation of Greenhouse Gas Emissions From New Power Plants” (website), accessed September 20, 2017.

Those regulations effectively enacted a moratorium on new coal-fired power plants and made it nearly impossible to retrofit existing facilities.⁴⁷ The rules stipulated that new or modified coal-fired power plants can emit no more than 1,400 pounds of carbon dioxide per megawatt hour of electricity generated. To meet that goal requires the use of carbon capture and sequestration (CCS) technologies,⁴⁸ which are expensive, energy-intensive, and largely untried.

The Trump administration should take action to reverse the NSPS rules to allow for the construction of new, high-efficiency low-emissions (HELE) coal-fired power plants, which are more efficient and generate more electricity while burning less coal than conventional plants.

The Trump administration should take action to reverse the New Source Performance Standards to allow for the construction of new, high-efficiency low-emissions coal-fired power plants.

Part 3

Repeal Subsidies and Mandates that Improperly Advantage Renewables

In addition to promulgating regulations intended to drive coal plants into premature retirement, the Obama administration massively subsidized wind and solar power producers, giving these producers an unfair advantage in electricity markets. State governments added to the assault with renewable energy mandates and their own subsidies. These policies have distorted electricity markets against coal.

1. Rescind Wind Production and Solar Investment Tax Credits

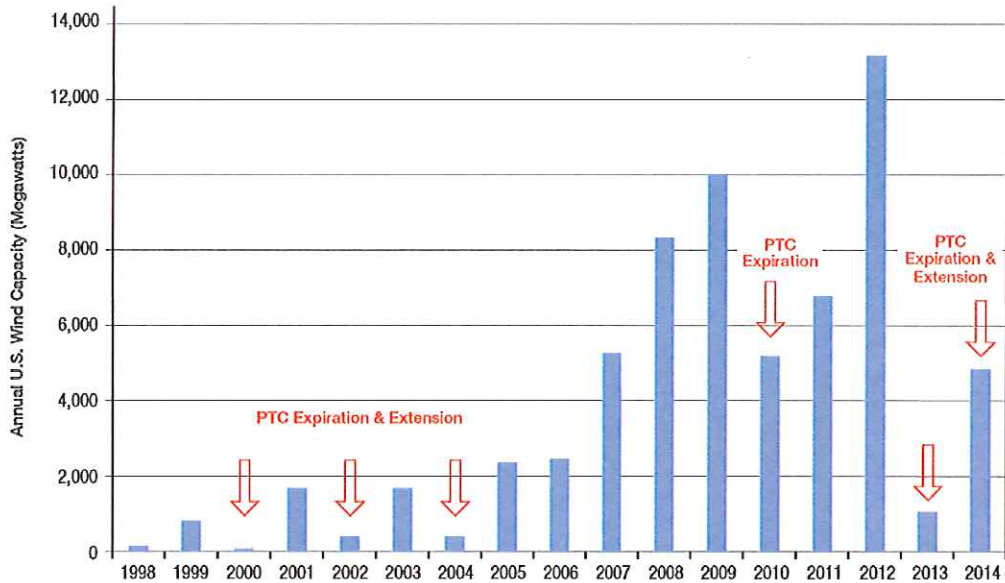
Federal subsidies for wind and solar power in the form of the wind Production Tax Credit (PTC) and solar Investment Tax Credit (ITC) have had a two-fold negative impact on coal-fired power plants.

First, the tax credits encourage investments in wind and solar power facilities to the detriment of existing coal-fired plants. Very few renewable energy facilities would be built without the PTC, which gives wind generators a tax credit worth \$23 for every megawatt hour of electricity they produce, and the ITC, which allows individuals and corporations to deduct from federal income taxes 30 percent of the cost of installing a solar system. Figure 4 shows how reliant wind power investment is on those subsidies.

⁴⁷ Brandon Bell, "New Environmental Rules Keep Pressure on Coal-Fired Generation," *Power* (website), August 10, 2012.

⁴⁸ *Ibid.*

Figure 4
Impact of Production Tax Credit Expiration and Extension
On U.S. Annual Installed Wind Capacity



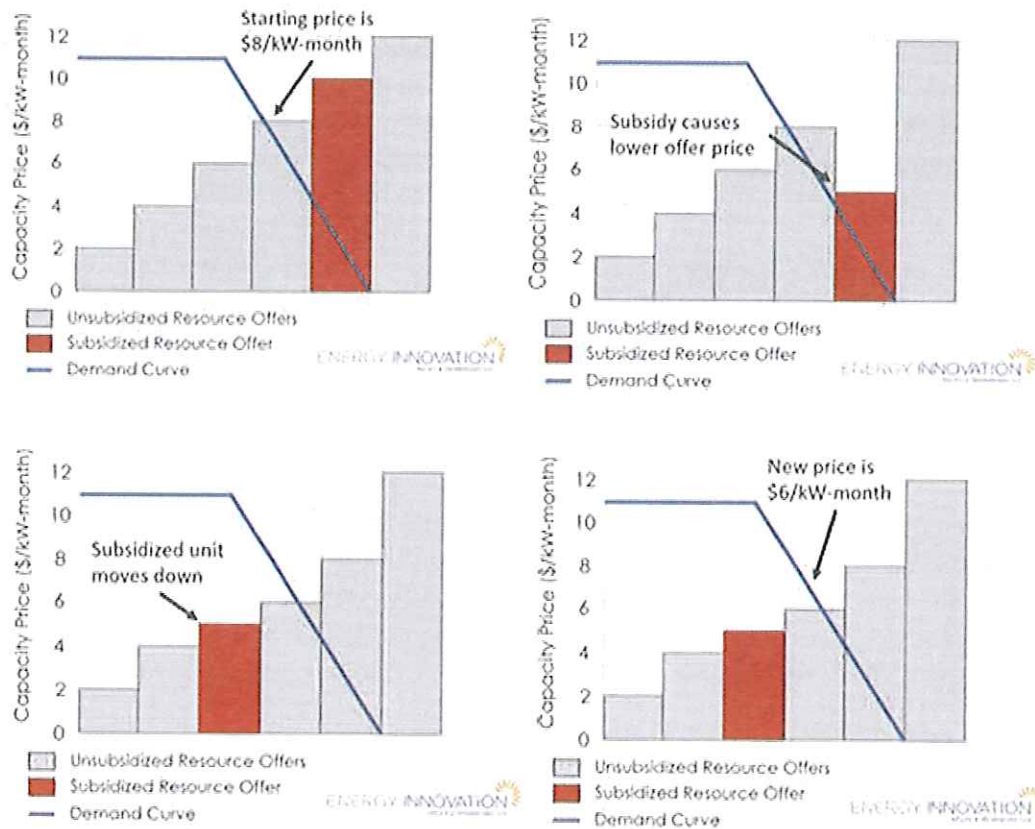
In the years following expiration of the wind Production Tax Credit, installations dropped between 76 and 93 percent, suggesting there is little interest in investing in such installations without federal subsidies. *Source:* Union of Concerned Scientists, "Production Tax Credit for Renewable Energy" (website), accessed September 27, 2017.

Secondly, the PTC and ITC subsidies depress wholesale electricity prices, because wind and solar units receiving subsidies can bid into a power capacity auction at a lower price because they have additional revenue.⁴⁹ These subsidized units are therefore selected more often in the auctions than they otherwise would be, and they effectively reduce the prices all power generators can bid if they want to participate successfully in the auction.⁵⁰ (See Figure 5.)

⁴⁹ See Isaac Orr and Fred Palmer, *supra* note 6.

⁵⁰ Robbie Orvis, "The State of the US Wholesale Power Markets: Is Reliability at Risk From Low Prices?" *Utility Dive* (website), May 22, 2017.

Figure 5
How Subsidized Resources Can Drop Capacity Prices



Prices start at \$8 per Kw-month (Top Left), but subsidies given to one source of generation (wind or solar) allow these sources of power to reduce their bid offer and still reap a profit (Top Right). These subsidized sources are then incorporated into the grid at a reduced price (Bottom Left), and the new price for electricity is \$6/kW-month (Bottom Right). *Source:* Robbie Orvis, "The State of Wholesale Power Markets: What's Wrong with Proposed Changes in Eastern RTOs?" *Utility Dive* (website), June 20, 2017.

Policies that artificially suppress wholesale electricity prices cause disproportionate loss of revenue for coal and nuclear plants that act as baseload power generators because these plants have high fixed costs. They can generate electricity at low prices when selling a large volume of electricity to the grid, but they must operate at a steady, constant output to recoup those costs.

Subsidies for wind and solar generators have even caused electricity prices to turn negative: When there is too much electricity on the grid, coal and nuclear power plants must either curtail their power output or pay customers to use additional electricity.

A well-functioning wholesale marketplace provides price signals that coordinate investment decisions to produce a reliable, resilient, and efficient power supply portfolio. The tax code overhaul approved by the U.S. House of Representatives, the Tax Cuts and Jobs Act, acknowledged these problems and would have reduced the wind PTC to 1.5 cents per kilowatt hour. Reforms were also proposed in the Senate version of this bill.⁵¹ This would have been an important step in eliminating market distortions—but the PTC reduction did not remain in the final tax legislation.⁵² Congress should

Congress should repeal all tax credits for renewable energy resources, allowing all sources of electricity production to compete on a level playing field and restoring price transparency in wholesale electricity markets.

act separately to repeal all tax credits for renewable energy resources, allowing all sources of electricity production to compete on a level playing field and restoring price transparency in wholesale electricity markets.

2. Eliminate Negative Pricing

In the past, negative pricing was rare, occurring usually when unforeseen circumstances caused a temporary oversupply of electricity on the power grid. But instances of negative pricing have become more frequent because subsidies encourage renewable energy providers to produce electricity even when it is not needed. The resulting oversupply of electricity causes prices to plummet, to the detriment of power generators that are not subsidized.

The wind PTC, for example, guarantees wind producers will earn a tax credit of \$23 per megawatt hour (MWh) for the electricity they generate—regardless of whether the electricity is needed to satisfy consumer demand. The tax credit effectively allows wind producers to profit even at prices as low as -\$22/MWh.

In California, the frequency of negative electricity prices has increased every year as a result of the state's renewable energy mandates, which require electricity generated from wind and solar be purchased before other sources of electricity.⁵³ (See Figure 6.)

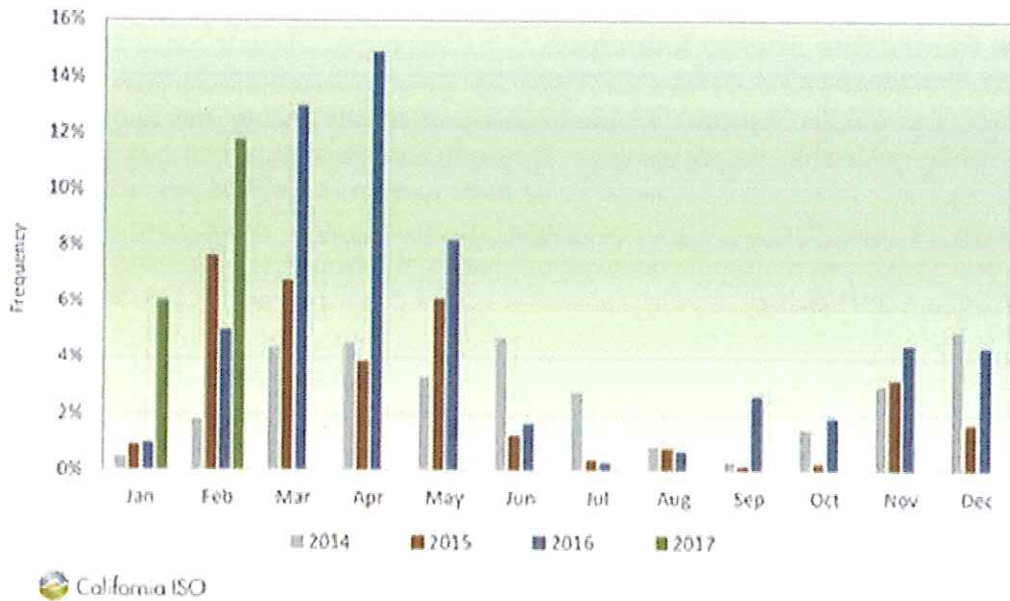
Negative prices harm the reliability of the power grid and affordability of electricity because they force traditional generators to choose between turning off their facilities or paying

⁵¹ Josh Siegel, "Energy Winners and Losers in House GOP Tax Reform Proposal," *The Washington Examiner*, November 2, 2017.

⁵² Adam Michel, "Analysis of the 2017 Tax Cuts and Jobs Act," The Heritage Foundation, December 19, 2017.

⁵³ Herman K. Trabish, "Prognosis Negative: How California is Dealing With Below-Zero Power Market Prices," *Utility Dive* (website), May 11, 2017.

Figure 6
Frequency of Negative System Prices
Has Steadily Increased Year Over Year



Instances of negative pricing in California have steadily increased in California as the share of renewable energy generation has grown. *Source:* Herman K. Trabish, "Prognosis Negative: How California is Dealing With Below-Zero Power Market Prices," *Utility Dive* (website), May 11, 2017.

customers to take their power.⁵⁴ Thus, negative prices erode the underlying economics for baseload generators, encouraging operators to retire those facilities prematurely. But these generating units are still needed to provide electricity when the wind is not blowing or the sun is not shining. California is now having to offer reliability payments to natural gas generators to ensure they will have an adequate supply of electricity, and FERC's NOPR is proposing something similar on a national scale.⁵⁵

Rather than forcing the premature retirement of coal-fired power plants and making reliability payments to ensure natural gas-fired power plants stay running, policymakers should repeal state and federal policies that incentivize or force states to purchase more-expensive power from intermittent renewable sources.

Absent a full repeal of the wind PTC and solar ITC, FERC should take the necessary steps to eliminate negative pricing for electricity auctions by establishing a Minimum Offer Price

⁵⁴ *Ibid.*

⁵⁵ *Ibid.*

Rule (MOPR), setting a price floor with which all generators must comply. Establishing a price floor would be a second-best solution that would prevent subsidized power generators from taking unfair advantage of their subsidies by underbidding for electricity and distorting the market for unsubsidized sources of electricity.

3. Repeal Renewable Energy Mandates

Twenty-nine states and the District of Columbia have renewable energy mandates (REMs) that require the use of renewable energy resources for some portion of the electricity generation mix. (See Figure 7.) These mandates have been the primary driver incentivizing the installation of wind and solar facilities: Since 2000, 62 percent of the growth in U.S. non-hydro renewable generation and 58 percent of all new renewable capacity additions has been used to satisfy mandates for renewable energy.⁵⁶

Many states have backed away from their renewable efforts, freezing REMs at low levels, repealing them altogether, and making these targets voluntary.

With the mandated levels of renewable energy set to rise over the next 13 to 20 years, the large price tags that will accompany compliance with these mandates will not be fully realized for some time. But several states have already experienced the rising costs associated

with REMs, and these experiences have started a trend where some states have backed away from their renewable efforts by freezing REMs at low levels, repealing them altogether, or making their targets voluntary.

Ohio became the first state to “freeze” its REM when the legislature voted in May 2014 to delay for two years the multi-year renewable energy ramp-up schedule, remove the in-state requirement for renewable energy procurement, and push back the final renewable benchmark of 12.4 percent from 2024 to 2026.⁵⁷ The legislature voted in 2016 to extend the freeze, but the effort was vetoed by Gov. John Kasich (R) and the mandates have come back into effect.

On January 22, 2015, West Virginia became the first state in the country to fully repeal its REM, which required utilities to get 25 percent of their power from alternative sources by 2025.⁵⁸ The repeal bill passed unanimously in the Senate and 95–4 in the House.⁵⁹

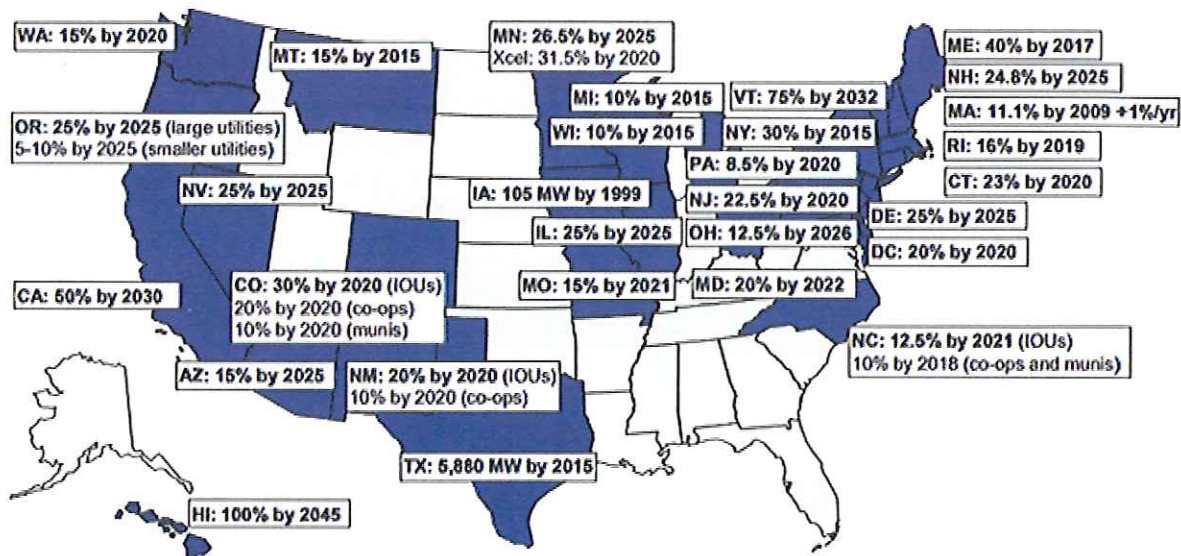
⁵⁶ Galen Barbose, *U.S. Renewable Portfolio Standards: Overview of Status and Key Trends*, Lawrence Berkley National Laboratory, November 5, 2015.

⁵⁷ U.S. Department of Energy, “Alternative Energy Portfolio Standard,” *DSIRE* (website), February 7, 2017.

⁵⁸ Thomas Overton, “West Virginia Moves to Repeal Alternative Energy Mandate [Corrected],” *Power Magazine*, January 23, 2015.

⁵⁹ Alex Fitzsimmons, “State Renewable Mandates are Falling Like Dominoes,” American Energy Alliance, June 1, 2015.

Figure 7
RPS Policies in 29 States and Washington, DC



Source: Berkeley Lab

Notes: Compliance years are designated by the calendar year in which they begin. Mandatory standards or non-binding goals also exist in US territories (American Samoa, Guam, Puerto Rico, US Virgin Islands)

Twenty-nine states have enacted renewable energy mandates, and these mandates apply to 54 percent of total U.S. retail electricity sales. While these mandates initially had limited impacts on electricity prices, the growing number of increasingly high mandates implemented by some states will have severe negative consequences for consumers and businesses. Source: Galen Barbose, *U.S. Renewable Portfolio Standards: Overview of Status and Key Trends*, Lawrence Berkley National Laboratory, November 5, 2015.

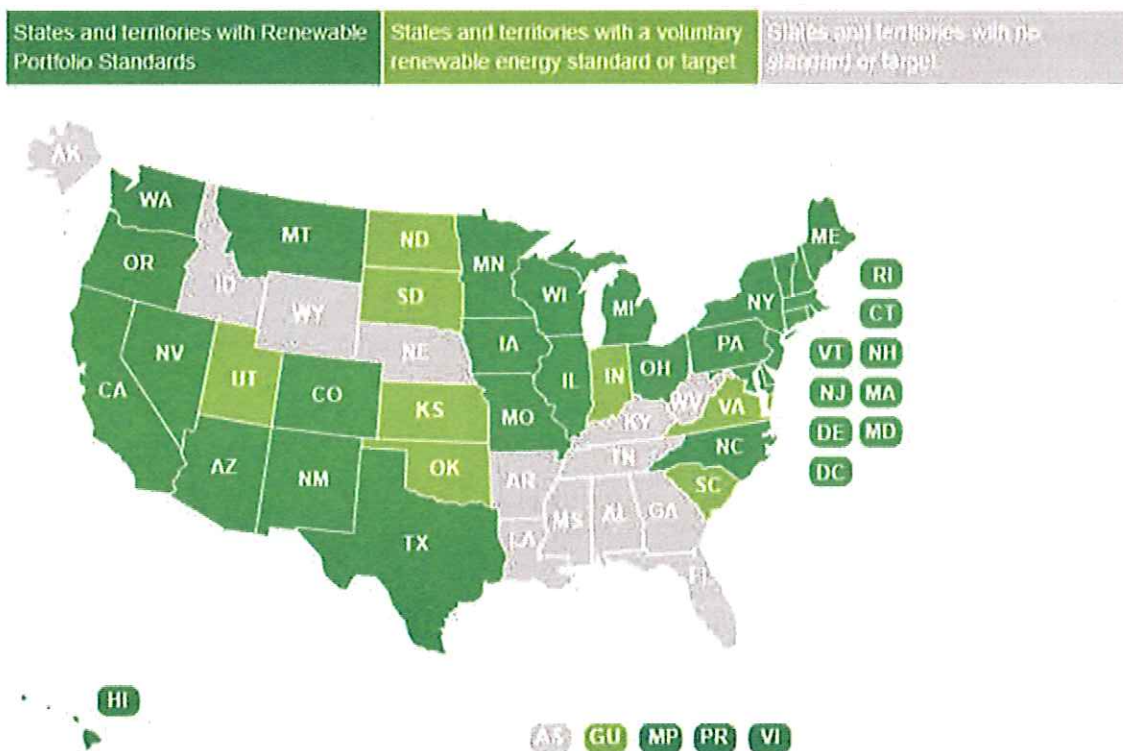
Soon after, Kansas followed suit. The state's REM was adopted in 2009, requiring 20 percent of the electricity generated in the state be sourced from renewable energy by 2020. The mandate was a key driver of wind installations; Kansas now ranks ninth in the country for installed wind capacity. After experiencing electricity cost increases 13 percent higher than those experienced in neighboring states, the Kansas legislature voted in May 2015 to effectively repeal the REM by making the standards voluntary.⁶⁰ The repeal received an overwhelming and bi-partisan vote of

⁶⁰ Donald Bryson and Jeff Glendening, "States are Unplugging Their Renewable-Energy Mandates," *The Wall Street Journal*, July 10, 2015.

105–16.⁶¹ “This allows some free-market forces to go to work,” said Rep. Dennis Hedke (R-Wichita), chairman of the House Energy and Environment Committee.⁶²

Momentum is building in states that have experienced rising electricity costs due to REMs to scale back these mandates by enacting full repeals and freezes or making these standards voluntary (see Figure 8).

Figure 8
Renewable Energy Mandates



Eight states currently have voluntary renewable energy mandates. As more states begin to experience increasing electricity prices due in part to their REMs, more states will likely freeze their mandates or make them voluntary. *Source:* Jocelyn Durkay, “State Renewable Portfolio Standards and Goals,” National Conference of State Legislatures, August 1, 2017.

⁶¹ Alex Fitzsimmons, *supra* note 59.

⁶² Timothy Carpenter, “House Votes to Repeal Energy Portfolio Standard, Allow Pot Oil for Seizure Victims,” *The Topeka Capital-Journal*, May 7, 2015. See also Donald Bryson and Jeff Glendening, *supra* note 60.

While sunshine and wind grace the planet at no cost, harnessing these sources for generating electricity is not free. New wind and solar facilities are much more expensive than existing fossil fuel-powered facilities. They have high up-front capital costs, high maintenance expenses and replacement costs, and require significant investment in new transmission lines. Moreover, because wind and solar power are intermittent, traditional sources of electricity such as coal or natural gas plants must always be at the ready to provide power when renewables cannot, so investment in renewable energy doesn't necessarily lead to the retirement of fossil fuel-powered generation. Without these traditional sources of energy available on a moment's notice, homes, hospitals, schools, factories, and business of all kinds would face repeated (and often prolonged) power interruptions.

4. Eliminate Feed-In Tariffs

Feed-in tariffs are two-pronged policies that (1) require utilities to grant renewable power generators access to their local power grid and (2) force utilities to purchase the output of renewable power generators at above-market rates. The rates are meant to cover the renewable power generators' costs and give them a "reasonable return" on investment.⁶³ They can be set as a fixed total price for electricity from renewables, a premium to be paid in addition to the market price, or a percentage of retail rates. The higher rates paid to renewable energy generators are passed on to consumers and unnecessarily increase electricity prices and discriminate against other ratepayers.

Feed-in tariffs have been enacted in California, Hawaii, Maine, Oregon, Rhode Island, Vermont, and Washington and require regulators in those states to set rates for renewable power. (See Figure 9.)

Recent legal challenges have called the legality of these tariffs into question

because the Federal Power Act (FPA) authorizes FERC, not individual states, to set interstate wholesale electricity rates.

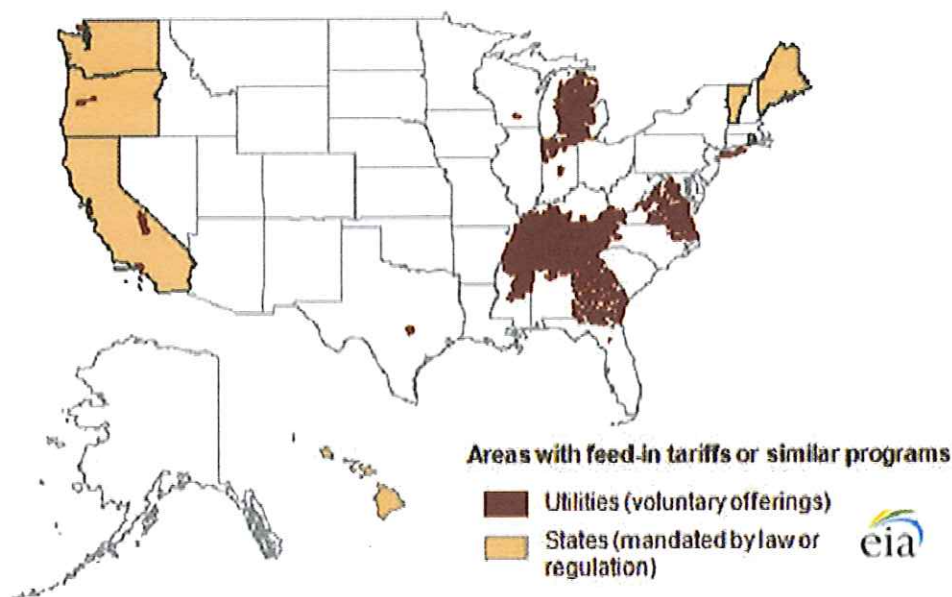
State policymakers should not adopt feed-in tariffs. They result in higher electricity prices, and these policies are also likely unconstitutional.

Because FERC has exclusive rate-setting authority for wholesale transactions under FPA, a state-level feed-in tariff that requires utilities to purchase renewable power at state-mandated rates would be subject to federal preemption under the U.S. Constitution's Supremacy Clause. The Trump administration can and should direct FERC to halt state-level feed-in tariffs that compensate renewable generators at above-market rates.

For economic and legal reasons, state policymakers should not adopt feed-in tariffs. The above-market prices paid to renewable generators are passed along to the consumer and result in higher electricity prices, and these policies are also likely unconstitutional.

⁶³ Felix Mormann, "Constitutional Challenges and Regulatory Opportunities for State Climate Policy Initiatives," *Harvard Environmental Law Review*, May 5, 2017.

Figure 9
States and Utilities with Feed-In Tariffs or Similar Programs



Feed-in tariffs have been challenged as unconstitutional because the power to establish wholesale electricity prices has been granted to FERC, not individual states. *Source:* U.S. Energy Information Administration, "Feed-In Tariff: A Policy Tool Encouraging Deployment of Renewable Electricity Technology," *Today in Energy*, May 30, 2013.

5. Eliminate Interconnection Tariffs for New Generating Capacity

Cost estimates for electricity generated from renewable resources, such as the levelized cost of energy estimates produced by the Energy Information Administration,⁶⁴ do not account for the high cost of the transmission lines needed to connect distant renewable electricity generators to major population centers. For example, the construction of approximately 3,600 miles of high-voltage transmission lines in Texas cost approximately \$7 billion, roughly \$1.9 million per mile and \$950 for each household in the state.⁶⁵

These expensive long-distance transmission lines would not have been needed if not for the large amount of wind power being sent from Northern Texas to major population centers in the state.

⁶⁴ U.S. Energy Information Administration, *Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2017*, April 2017.

⁶⁵ Isaac Orr and Fred Palmer, *supra* note 6.

It stands to reason that the cost of these transmission lines would be paid by the generators that are using them.

However, under the Obama administration, FERC issued Order No. 1000,⁶⁶ a complex rule that among other things required public utility transmission owners to spread the cost of constructing new transmission lines across all customers, rather than assigning the costs directly to wind generators. The rule also required transmission providers to prove they are taking into consideration “needs driven by public policy requirements (e.g., renewable portfolio standards) and evaluating proposed solutions to those transmission needs ...”

State lawmakers and federal regulators also can repeal or modify net-metering policies, which are an additional subsidy to owners of rooftop solar systems.

Order No. 1000 represented a clear departure from FERC precedent with respect to public policy considerations. Under the previous rule, Order No. 890, public utility transmission providers were under no affirmative obligation to consider during the planning process the effect state and federal laws and regulations (“public policy requirements”) have on local and regional transmission needs.⁶⁷

Order No. 1000 has been criticized as an implicit subsidy for wind generators, but FERC initially disagreed. Legal challenges to these policies may provide FERC the opportunity to revisit these findings in light of mounting electricity costs for consumers.

6. End Net-Metering Policies

State lawmakers and federal regulators also can repeal or modify net-metering policies, which are an additional subsidy to owners of rooftop solar systems. Forty-four states have net-metering policies, which allow owners of rooftop solar panels to offset their electricity purchases from the grid with energy generated “behind the meter”—that is, energy they produce themselves.⁶⁸ Net-metering allows residents with solar panels to sell the electricity they produce back to the grid at retail rates, rather than wholesale rates.

Compensating rooftop solar owners at retail rather than wholesale rates unfairly shifts the cost of maintaining the electricity grid to ratepayers who do not have solar panels, because utility companies use the difference between wholesale and retail electricity costs to maintain the overhead of the grid—the generation resources, transmission, and distributions systems.

⁶⁶ Dian M. Grueneich and Blake J. Nelson, *FERC Order No. 1000, Final Rule on Transmission Planning and Cost Allocation: Major Changes Ahead*, July 25, 2011.

⁶⁷ *Ibid.*

⁶⁸ John S. Moot, *supra* note 12.

Because residents with solar panels, who are generally wealthier than those without solar panels, are paying for the “net” difference between electricity they purchase from the grid and electricity they sell to the grid, they are effectively paying less to ensure upkeep of the grid.⁶⁹ However, they still rely on the grid to provide electricity to their homes when their solar panels are not producing enough electricity. They pay lower prices, and customers without solar panels are burdened with the extra costs.

While most states with net-metering policies reimburse solar customers at the retail rather than wholesale rate, this is beginning to change. Some states have recognized the costs net-metering policies unfairly impose on non-solar customers and have amended those policies to reflect the wholesale price of electricity rather than the retail rate.

The power grid is key to the reliable integration of new technology, particularly variable energy resources, and these grid functions support the reliability of the system 24/7.

For instance, Indiana recently adopted legislation that would reduce the compensation rooftop solar owners receive for the electricity they sell to the grid. Instead of receiving the full retail rate, solar owners will be compensated at the utilities’ marginal cost plus 25 percent.⁷⁰

Lawmakers in other states can enact similar measures to make sure solar customers bear their fair share of the cost of the transmission and distribution systems all customers depend on.

It also has been argued that FERC has the discretion to assert jurisdiction over the transmission component of service to customers with their own electricity generation source, known as “distributed generation” customers.⁷¹ One rationale for having FERC assert its regulatory authority would be to ensure distributed generation customers pay a just, reasonable, and nondiscriminatory share of transmission costs.

The power grid is key to the reliable integration of new technology, particularly variable energy resources, and these grid functions support the reliability of the system 24/7, all hours of the day all year, not just hours when the meters on buildings with solar panels installed sell more electricity to the grid than they purchase from it.⁷²

In addition to net-metering policies, state and local policies in several states and cities reimburse residential solar customers for more than the cost of purchasing and installing solar panels,

⁶⁹ PowerScout News, “How Wealthy Are Residential Solar Customers?” PowerScout.com, April 19, 2017.

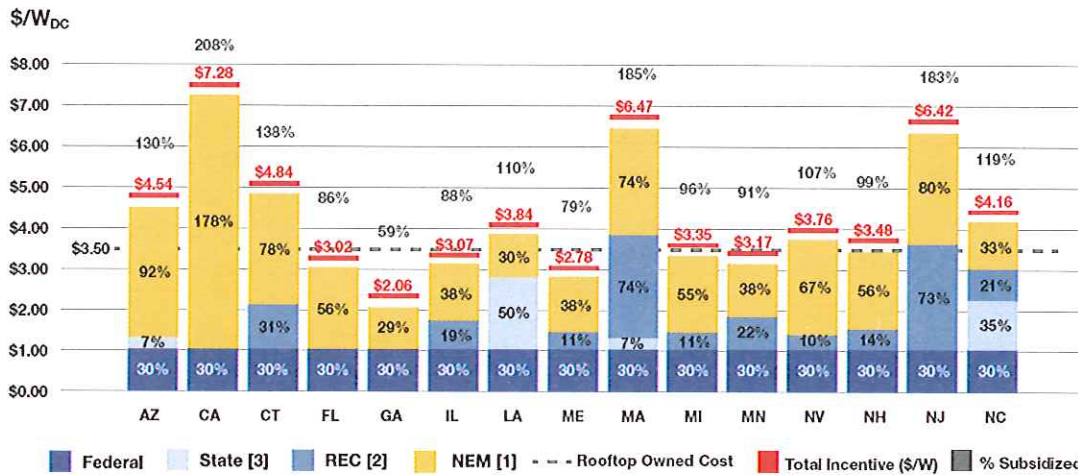
⁷⁰ Robert Walton, “Indiana Will Phase Out Retail Rate Net Metering,” *Utility Dive* (website), May 4, 2017.

⁷¹ John S. Moot *supra* note 12.

⁷² *Ibid.*

making these panels free or virtually free (see Figure 10).⁷³ Such incentives are another way governments distort energy markets, and they should be ended.

Figure 10
Incentives Available for Customer-Owned Residential Solar PV
In Selected States, as a Percentage of Installed Cost (3.9kW)



1. NEM incentive is the difference between the present values of the customer's bill savings and the utility's avoided costs over the facility's life. For the Typical Lease, the incentive flows to the homeowner and is largely passed through to the Third-Party Owner as a lease or PPA payment.
2. Renewable Energy Certificates are incentives available through applicable programs.
3. Incentives mandated by state legislatures are upfront and/or performance-based compensation, often through the state tax code.

Solar customers in Arizona, California, Connecticut, Louisiana, Massachusetts, New Jersey, and North Carolina receive federal and state reimbursements that exceed the cost of solar panels. *Source: Borlick Associates LLC, Incentivizing Solar: An In-Depth Analysis of U.S. Solar Incentives, Consumer Energy Alliance, September 2016.*

⁷³ Borlick Associates LLC, *Incentivizing Solar: An In-Depth Analysis of U.S. Solar Incentives*, Consumer Energy Alliance, September 2016.

Part 4

Concluding Observations

The Obama administration set the United States on a path to accelerated economic decline by crippling the country's capacity to produce electricity, a master resource on which our prosperity and personal well-being depend.

The attempt to regulate coal-fired power plants out of business made no economic sense ... and no environmental sense either. The administration's claims—that carbon dioxide emissions from coal-fired power plants would cause catastrophic global warming, endanger public health, and threaten the environment—were based on fatally flawed science, if they were based on any evidence at all.

While previous reports in this series of *Policy Studies* explained why the premature retirement of coal-fired power plants must be stopped, this *Policy Study* offers a straightforward roadmap for doing so.

The Obama administration and many state governments have launched a multi-front assault on fossil fuels, especially coal. Even the most generous estimates show the harms supposedly headed off by those regulations and subsidies would be too small to measure. By contrast, the damage those policies inflict on American families and the U.S. economy is great.

The Trump administration, with the support of many members of Congress and state elected officials, has begun the battle to restore a free market for energy in the United States. While previous reports in this series of *Policy Studies* explained why the premature retirement of coal-fired power plants must be stopped, this *Policy Study* offers a straightforward roadmap for doing so.

The Heartland Institute has staff and scholars—including the authors of this *Policy Study* series—who are eager to discuss U.S. energy policy with you. Please call 312/377-4000 or send an email to think@heartland.org.

###

About the Authors

Isaac Orr is a research fellow for energy and environment policy at The Heartland Institute. Orr is a speaker, researcher, and writer specializing in hydraulic fracturing, frac sand mining, agricultural, and environmental policy issues. He graduated from the University of Wisconsin Eau Claire with studies in political science and geology, winning awards for his undergraduate geology research before taking a position as an aide in the Wisconsin State Senate, where he served as lead-office writer and as a policy advisor on frac sand mining and agricultural issues.

Since joining Heartland, Orr has written a *Heartland Policy Study* on fracking titled “Hydraulic Fracturing: A Game-Changer for U.S. Energy and Economies” and has coauthored multiple policy studies on frac sand mining, including “Environmental Impacts of Industrial Silica Sand (Frac Sand) Mining” and “Economic Impacts of Industrial Silica Sand (Frac Sand) Mining.”

Orr’s writing has appeared in *The Wall Street Journal*, *USA Today*, the *New York Post*, *The Hill*, *Orange County Register*, and *Washington Times*. His work on fracking is also featured in *Alternative Energy and Shale Gas Encyclopedia*, published by John Wiley & Sons, Inc. He has recorded dozens of podcasts on energy and environment topics for Heartland.

Frederick D. Palmer is a senior fellow for energy and climate at The Heartland Institute. He served from 2001 through June 2015 as Peabody Energy’s senior vice president of government relations. He was Peabody’s representative on the Board of Directors of the World Coal Association and served as its chairman from November 2010 to November 2012. He also represented Peabody on the Board of the FutureGen Alliance from its formation until June 2015.

Prior to joining Peabody Energy, Palmer served as general counsel and chief executive officer of Western Fuels Association, Inc. He served on the Board of Directors of the National Mining Association and served as chair of the NMA Legal Committee. He began his career in 1969 in Washington, DC on the staff of Arizona Congressman Morris K. Udall and was a partner in a Washington, DC-based law firm. He was the 2004 recipient of the Erskine Ramsay Medal Award from the Society for Mining, Metallurgy and Exploration. He is a member of the National Coal Council, Executive Committee, and chairman of the Coal Policy Committee. He is a member of the California and DC Bar Associations.

Palmer attended the University of Arizona, where he earned a Bachelor of Arts degree in 1966 and Juris Doctorate with honors in 1969. He was inducted into the Order of the Coif honor society there in 1969 and served as Symposium Editor of the *Arizona Law Review*.

Acknowledgements

Several people reviewed early drafts of this manuscript. The authors thank Joe Bastardi, Roger Bezdek, H. Sterling Burnett, Alan Carlin, Ken Chilton, Paul Driessen, John Dunn, Peter Ferrara, Ken Haapala, Jay Lehr, Randy Randol, Harrison Schmitt, and David Stevenson for their valuable insights and assistance with this *Policy Study*. Any remaining errors are the authors’ alone.

About The Heartland Institute

The Heartland Institute is a 34-year-old national nonprofit research organization, founded in 1984, dedicated to finding and promoting ideas that empower people.

Mission: Our mission is to discover, develop, and promote free-market solutions to social and economic problems.

Staff: A full-time staff of 39, including 31 working in Arlington Heights, Illinois. Dr. Tim Huelskamp is president and Joseph Bast is CEO. Dr. Herbert Walberg is chairman of the board.

Policy Advisors: Some 500 academics and professional economists serve as policy advisors and more than 250 elected officials pay dues to serve on our Legislative Forum.

Publications: Heartland sends three monthly policy newspapers – *Budget & Tax News*, *Environment & Climate News*, and *School Reform News* – to every national and state elected official in the United States and thousands of civic and business leaders. It also produces books, policy studies, booklets, podcasts, and videos.

Communications: In 2017, Heartland appeared in print, online, and on TV or radio 4,700 times. We hosted 15 websites generating 1.5 million page views, and our policy-oriented Heartland Daily Podcast was downloaded 2.4 million times.

PolicyBot: Heartland hosts an online database and search engine called *PolicyBot* containing the complete text of (not just links to) more than 32,000 reports and commentaries from some 300 free-market think tanks and advocacy groups.

Events: Heartland hosted 31 events in 2017, attended by 1,425 people. We have hosted 12 International Conferences on Climate Change since 2008, attended by more than 5,000 people.

Government Relations: We contacted elected officials 808,446 times in 2017, with 20,487 direct personal contacts with elected officials, including 3,615 face-to-face meetings, 3,801 phone calls, 12,259 personal email contacts, and 812 contacts via personal mail.

Public positions: We focus on issues in education, environmental protection, health care, budgets and taxes, and constitutional reform.

Funding: Our 2017 income came from the following sources: foundations 58%; individuals 28%; businesses 11%; other 3%. Heartland is funded entirely by the tax-deductible contributions of its supporters and a small amount of earned income from the sale of publications and admission to events. It receives no funds from any government at any level.

Contact information: 3939 North Wilke Road, Arlington Heights, IL 60004, phone 312/377-4000, email think@heartland.org. For more information, visit our website at www.heartland.org.