

# BACKGROUND

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## Taking the Long View: How to Empower the Coal and Nuclear Industries to Compete and Innovate

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### Abstract

*Both the coal and nuclear industries face the burdens of excessive, ineffective regulations and must compete against taxpayer-subsidized alternative sources of energy. Instead of forcing ratepayers to mitigate the costs of those policies through subsidies and bailouts, Congress and the Administration should address these underlying policy problems that artificially inflate the cost of coal and nuclear power. Congress and the Trump Administration must have the discipline to develop a modern regulatory system that enables an efficient permitting process and enables technological innovation. Congress and the Administration should remove the many government-erected barriers that are thwarting the American coal and nuclear industries.*

In May 2018, a leaked draft memo from the Trump Administration proposed executive actions to unilaterally subsidize uncompetitive coal and nuclear power plants in order to prevent their closure.<sup>1</sup> Although the Administration has not officially proposed action, it is the latest effort of several to rescue specific plants since fall 2017.<sup>2</sup>

The Administration's considered solutions exaggerate concerns of retiring power plants and are counterproductive to the long-term vitality of both industries. By subsidizing coal and nuclear power, the Administration impairs incentives to innovate, entrenches government dependence, and deludes itself that the federal government solved a problem when in fact anti-competitive, ineffective policies and regulations remain.

Many policies contribute to the economic woes of coal and nuclear power plants. Both the coal and nuclear industries face the burdens of excessive, ineffective regulations and must compete

### KEY POINTS

- Both the coal and nuclear industries face the burdens of excessive, ineffective regulations and must compete against government-subsidized alternative sources of energy. Coal and nuclear energy face profound politically induced uncertainty in areas like permitting, plant improvements, and technological innovation.
- Instead of forcing ratepayers to mitigate the costs of those policies through subsidies and bailouts, Congress and the Administration should address these underlying policy problems that artificially inflate the cost of coal and nuclear power.
- While subsidies may appear to benefit the recipients, advantages are short-term, at best. Once these power plants are subject to the realities of the marketplace, they will likely fail.
- Another significant economic drawback of subsidies is that they are an additional barrier to entry for innovative companies, because the federal government is protecting their uneconomic competitors. New entry is challenging enough; the Administration should not add another obstacle.

This paper, in its entirety, can be found at <http://report.heritage.org/bg3341>

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against taxpayer-subsidized alternative sources of energy. Coal and nuclear energy face profound politically induced uncertainty in areas like permitting, plant improvements, and technological innovation. Low natural gas prices make the cost of poor policy more pronounced.

Instead of forcing ratepayers to mitigate the costs of those policies through subsidies and bailouts, Congress and the Administration should address these underlying policy problems that artificially inflate the cost of coal and nuclear power. Furthermore, states should fix anti-competitive energy policies like renewable energy mandates, which have wreaked havoc in the electricity sector by putting politics and special interests over customers. Free enterprise, rather than a subsidized status quo, enables innovation and transformation in the energy sector—to the benefit of energy-consuming businesses and households.

### The Administration's Proposal

The Administration's memo proposes to use the Secretary of Energy's emergency powers in the Federal Power Act (FPA) and Defense Production Act (DPA) over the course of two years to mandate the purchase of electricity from a list of power plants to prevent their closure.<sup>3</sup> The White House also proposes to create a Strategic Electric Generation Reserve to make additional electricity generation available in the event that existing supplies fail.<sup>4</sup> While earlier policy proposals were narrowly focused on subsidizing coal and nuclear power plants in competitive markets in the mid-Atlantic (the territory of the regional transmission organization PJM Interconnection), the Administration's adoption of a national security premise for action could open the door for widespread abuse of these powers.

Productively, the memo identifies some of the policy problems faced by the coal and nuclear industries, which policymakers should, indeed, address. For example, the Trump Administration identifies the problem of coal plant retirements exacerbated by costly regulations. The memo cites the Environmental Protection Agency's (EPA's) Mercury and Air Toxics Standards (MATS), which had significant compliance costs and negligible direct environmental benefits.<sup>5</sup> Ineffective regulations like MATS are exactly what Congress and the Administration should address promptly.

However, rather than discussing solutions to problematic regulations and policies, the memo takes a short cut by framing coal and nuclear power plant closures as a national security threat. According to the argument, the commercial electricity sector is critical infrastructure on which the Department of Defense (DOD) depends for the vast majority of its power and which is required for modern standards of living. Though the memo authors admit that the electric grid is highly reliable,<sup>6</sup> the White House tries to build a case that emergency intervention is necessary to prevent closures of "fuel secure" coal and nuclear power plants. These plants, they argue, are necessary to maintain grid reliability and resilience in the face of extraordinary threats—terrorism, extreme weather, cybersecurity, other "high-impact events"—which it sees as "growing in frequency and scope."<sup>7</sup>

In trying to further amplify the threat, the Administration also brings up a number of national security issues which legitimately deserve attention—for example, the pending and well-understood need for domestically owned and unencumbered sources of uranium enrichment services for defense purposes, or evaluating regional capacity and dependency on

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1. "DOE Coal/Nuke Subsidy plan (1)," draft memo May 29, 2018, <https://www.scribd.com/document/380740746/DOE-Coal-Nuke-Subsidy-Plan-1> (accessed August 16, 2018).
  2. Katie Tubb, "Second Attempt at the Department of Energy's 2017 NOPR Should Be Rejected," Heritage Foundation *Issue Brief* No. 4348, April 5, 2018, <https://www.heritage.org/energy-economics/report/second-attempt-the-department-energys-2017-nopr-should-be-rejected>.
  3. Congressional Research Service, "The Federal Power Act (FPA) and Electricity Markets," March 10, 2017, [https://www.everycrsreport.com/files/20170310\\_R44783\\_dd3f5c7c0c852b78f3ea62166ac5ebdbd1586e12.pdf](https://www.everycrsreport.com/files/20170310_R44783_dd3f5c7c0c852b78f3ea62166ac5ebdbd1586e12.pdf) (accessed August 16, 2018), and Jared T. Brown and Daniel H. Else, "The Defense Production Act of 1950: History, Authorities, and Reauthorization," Congressional Research Service, July 28, 2014, <https://fas.org/sgp/crs/natsec/R43118.pdf> (accessed July 26, 2018).
  4. "DOE Coal/Nuke Subsidy plan (1)," p. 3.
  5. *Ibid.*
  6. *Ibid.*, p. 5.
  7. *Ibid.*
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a single natural gas pipeline connection.<sup>8</sup> But these issues are red herrings for which subsidizing coal and nuclear power plants has no clear connection as a solution. The memo does not clearly differentiate DOD demand for uranium from DOD demand for electricity in general. Only certain platforms specifically require uranium, and those platforms operate their own on-board nuclear reactors, which has little relevance to the plants under study. Furthermore, there is a significant difference between weapons-grade uranium and uranium required for commercial power generation. Although there is some overlap in the nuclear-workforce skillsets and uranium supply, uranium enrichment for the purposes of private-sector energy should be clearly differentiated from enrichment for defense requirements.

More often, the White House has characterized as a crisis what is actually productive market signals that spur investment in new energy sources and innovation in competitive systems.<sup>9</sup> For instance, increased abundant, reliable, and inexpensive natural gas in the marketplace has contributed to the exit of uncompetitive power generators. Or, high prices in response to high-demand periods like the polar vortex of winter 2014 are powerful signals for investors.

### National Security Justifications Fall Flat

The Administration's reliance on the DPA is misguided and strays from the act's intended purpose. The DPA authorizes the President to provide for the creation, maintenance, and expansion of domestic productive capacity, through a variety of mechanisms, in order to ensure that critical items remain available in sufficient quantities and quality to meet defense requirements. The DPA defines three criteria for federal action in the face of a shortage in the defense industrial base:

1. The resource or product must be "essential for national defense";
2. The private sector "cannot be expected" to meet national security needs in the time required; and

3. Action taken to address the shortage must be "the most cost effective, expedient, and practical alternative."<sup>10</sup>

Should the DOD identify an energy security or resilience issue that threatens to inhibit the conduct of military operations, the correct course of action under the DPA would be to evaluate a range of options and proceed with the most cost-effective and sustainable solution. However, the Administration's actions did not originate from the DOD's own vulnerability finding, but from the pleas of industry.

In relying on the DPA, the Administration would depart from the purpose of the law, which is to authorize limited industry protections for the sole purpose of maintaining U.S. national defense and ensuring that the military's strategic needs are met. Contrary to the purposes of the DPA, electricity is not scarce such that it should be subsidized as a national security asset. Energy is critical to the operation of DOD buildings, equipment, and systems, in the same way that food is critical to DOD personnel.

Unlike numerous "single points of failure" identified throughout the defense industrial base, plentiful substitutes exist for any single energy source. There are numerous vulnerabilities within the DOD's supporting infrastructure and industries, of a more immediate and direct nature, that should receive priority consideration over general issues of energy security.

The Trump Administration has not estimated the costs of its national security initiative, which would fall on ratepayers, to ensure that it is the most cost-effective and practical alternative. Just because the DOD uses certain products, materials, and technologies, it does not follow that the companies producing them should be shielded from market competition. The DPA is not a bailout program, and should not be treated as such.

The Administration's logic also misinterprets an informed decision by the DOD to choose civilian electricity. As the White House quotes in the leaked memo, the DOD has "recognize[d] the risk of outages affecting its missions and has tasked installation commanders to understand the vulnerabilities and risk."<sup>11</sup> In other words, the DOD has in many cases

8. Ibid., pp. 20 and 22.

9. Ibid., pp. 26 and 27.

10. The Defense Product Act, as amended, 50 U.S. Code App. § 2061 et seq.

11. "DOE Coal/Nuke Subsidy plan (1)," p. 24. Quoting DOD FY 2016 annual energy management report.

made a strategic decision to accept a certain amount of risk from civilian electricity sources in stewarding its funds and mission priorities, in exchange for the lower cost won through market competition. Strategy, by definition, is applying scarce resources to achieve a desired outcome. The Trump Administration's proposal is certain to be exorbitantly expensive for little, if any, strategic gain.

The Administration's approach also ignores other DPA authorities that are designed to help the military respond to exactly the type of scenario to which the memo refers. Should a shortage or supply disruption ever occur, the DPA authorizes the President to prioritize federal contracts. This provides additional assurances that the military will retain access to the resources it needs to execute its defense mission, even in the event of a commercial disruption.

Reinforcing the White House's DPA prescription is the Federal Power Act, authorizing the Department of Energy (DOE) to intervene in an electricity-reliability emergency by temporarily requiring certain power plants to generate and deliver power. The threshold for action is wartime; an emergency due to a sudden increase in electricity demand; or an emergency due to shortage of supply of facilities or of fuel.<sup>12</sup>

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## The Defense Production Act is not a bailout program, and should not be treated as such—particularly in the electricity sector, where numerous and plentiful substitutes exist.

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But no such emergency exists. Many of the power plants at risk of early retirement are in the northeast region in competitive electricity markets. Most

of them are in the area of the PJM Interconnection, which serves 13 eastern states and the District of Columbia. PJM—whose sole responsibility is to maintain reliability in the markets under its jurisdiction—finds “no immediate threat to system reliability.” The Federal Energy Regulatory Commission (FERC) and PJM's independent market monitor have echoed that sentiment.<sup>13</sup> As the mandatory independent market review of PJM stated: “The fact that some [coal and nuclear] plants are uneconomic does not call into question the fundamentals of PJM markets.”<sup>14</sup> Through public comments and testimony, grid operators from around the country are similarly ensuring that the grid is reliable and resilient, highlighting their ability to adapt to changing energy mixes.<sup>15</sup>

PJM has not been afraid to call on the DOE to use Section 202(c) of the FPA to act for the sake of grid reliability. In fact, in June 2017, PJM petitioned the DOE for the authorization to keep two Virginia coal power plants running during times of peak demand as companies completed PJM-ordered transmission upgrades.<sup>16</sup> Arguing that an “electric reliability emergency exists,” and in keeping with the purposes of the FPA, PJM requested authority to keep those plants on for 90 days at a time with potential for renewals.<sup>17</sup> Defying definitions of an “emergency,” the Trump Administration has proposed action for at least two years in the draft memo.

Even if the national security case to subsidize coal and nuclear plants were sound, the near-term and long-term economic costs of doing so are counterproductive to the national security mission the Administration claims to prioritize. It is prudent to plan for contingency scenarios to an extent. However, providing financial protections to every energy source or company supplying the DOD would be prohibitively expensive and have long-term consequences. An industry dependent on preferential treat-

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12. The Federal Power Act, 16 U.S. Code, ch. 12, § 202(c).

13. Tubb, “Second Attempt at the Department of Energy's 2017 NOPR Should Be Rejected.”

14. Monitoring Analytics, “PJM State of the Market-2017,” *Report*, Vol. 1 (March 8, 2018), p. 2, [http://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2017.shtml](http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2017.shtml) (accessed April 24, 2018).

15. U.S. House of Representatives, Committee on Energy and Commerce, Subcommittee on Energy, “Powering America: A Review of the Operation and Effectiveness of the Nation's Wholesale Electricity Markets,” July 27, 2017, <https://energycommerce.house.gov/hearings/powering-america-review-operation-effectiveness-nations-wholesale-electricity-markets-2/> (accessed July 26, 2018).

16. PJM Interconnection LLC, “Request for Emergency Order Pursuant to Section 202 (c) of the Federal Power Act,” June 13, 2017, [https://www.energy.gov/sites/prod/files/2017/07/f35/PUBLIC-DOE%20FPA%20202%28c%29%20Emergency%20Application%20Dominion%20Yorktown%201%20%202%20-6-13...\\_0.pdf](https://www.energy.gov/sites/prod/files/2017/07/f35/PUBLIC-DOE%20FPA%20202%28c%29%20Emergency%20Application%20Dominion%20Yorktown%201%20%202%20-6-13..._0.pdf) (accessed July 26, 2018).

17. *Ibid.*

ment may generate some assurances in the short term, but it removes the incentives to compete in the marketplace without subsidies. Additional government intervention will ultimately result in an electricity grid that is less resilient and reliable and less responsive to dynamic market factors. Customers value grid resilience and reliability, and producers have a strong financial incentive to keep the power on for their consumers. As prices change and energy demand changes, the private sector responds in kind. Free, competitive electricity markets that properly price grid reliability will generate economic growth while improving national security.

### **Economic Costs of Government Intervention**

There are the obvious and immediate costs of mandating purchasing from certain power plants as the Administration proposes. Principally, the federal government would be forcing pricier energy on families and businesses. Requiring the purchase of electricity from nuclear plants in the mid-Atlantic PJM region, for instance, would require running four plants with operating costs of \$25.95 per megawatt hour (MWh). PJM's other 15 nuclear plants have an average operating cost of \$18.73 per MWh.<sup>18</sup> A July 2018 report by the Brattle Group estimates that the bailout would cost households and businesses \$34 billion over a two-year period.<sup>19</sup> Costs for this alleged national security mandate (the supposed benefits of which would be enjoyed by all Americans) would be borne by a select few ratepayers, given that DPA funds would be insufficient to cover costs.

However, and more important, there are system-wide, long-term consequences of shielding certain plants and energy sources from competition, as the Trump Administration's proposals would do. Bailouts to uncompetitive power plants fundamentally misalign incentives and, in the case of restructured competitive electricity markets, forfeit the benefits to customers of market competition where there is less out-of-market intervention from politicians. In short, the White House's proposal would re-monopolize aspects of competitive electricity markets, causing significant, lasting economic damage in the process.

**Misaligned Incentives.** A system designed with the central premise that market competition yields better results for customers in the immediate and long term is fundamentally incompatible with top-down measures to protect certain players from competition. The proposed bailouts share the faults of all targeted energy subsidies and preferential treatment from the government, principally that a company or industry profits less by understanding and meeting customer needs and more by influencing politics to protect its narrow interests. This breeds cronyism, stifles innovation, and disincentivizes companies to be cost-competitive with other power-generating sources.

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While subsidies may appear to benefit the recipients, any advantages are short term, at best. Once these power plants are subject to the realities of the marketplace, they will likely fail. Another significant economic drawback of the bailout is that innovative companies would face an additional barrier to entry because the federal government is protecting their uneconomic competitors. New entry is challenging enough; the Administration should not add another obstacle.

**Taking Choices and Benefits Away from Consumers.** Competitive electricity markets have served customers well. Some states have accomplished transition from monopolies to competition more successfully than others, and additional free-market reforms are necessary to spur more entrepreneurial activity in electricity markets. However, when the underlying structure of competition is sound, the benefits to energy consumers are unambiguously positive:

- **Markets are customer-centric.** Competition in electricity services allows greater customer choice through the power of the consumers' own

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18. Monitoring Analytics, "PJM State of the Market-2017," p. 333.

19. Metin Celebi, Marc Chupka, Kelly Oh, and Richard Sweet, "The Cost of Preventing Baseload Retirements: A Preliminary Examination of the DOE Memorandum," The Brattle Group, July 2018, [https://info.aee.net/hubfs/Brattle\\_AEE\\_Final\\_Embargoed\\_7.19.18.pdf](https://info.aee.net/hubfs/Brattle_AEE_Final_Embargoed_7.19.18.pdf) (accessed August 16, 2018).

dollars rather than through the disconnected votes of a small panel of public utility commissioners. Consumer choice comes not only in the form of resource choice (renewables, conventional fuels, or a mix) but also in financial choices (for example, fixed rates, risk preferences, indexed rates, or short-term or long-term contracts). In the end, because electricity providers have to work for their customers, prices are competitive and quality improves.<sup>20</sup> PJM's competitive markets have saved customers roughly \$3 billion a year since 1997, and the Midwest market operator MISO reported savings of over \$3 billion in 2017.<sup>21</sup>

The White House's proposal would override customer choice by forcing ratepayers to fund federally mandated use of coal and nuclear power plants. Far from being consumer-focused, the proposal rewards political connections and cronyism.

- **Markets enable organic innovation.** Technology and energy-source neutral competition in electricity markets allows the endless creativity of people to meet customer energy needs and preferences *while* protecting customers from unwise investments. In contrast, regulated monopoly power regions are a "fundamentally permission-based system" where investments require highly political negotiations and approval from commissioners, or are mandated from legislatures chasing the latest technology flavor of the day.<sup>22</sup> Political interventions destroy investment confidence in the face of ever-changing and arbitrary political winds. Further, while "top-down, integrated resource planning approaches are tempt-

ing because it is easy to think that experts know exactly the right mix and location of generation resources," experts are often wrong or slow to change and ratepayers have to foot the bill.<sup>23</sup>

An example is the contrast between the experiences of customers in Georgia's monopolized electricity sector and the competitive market in Texas. Customers in Georgia have no choice but to cover the ballooning costs of two new nuclear reactors regardless of what markets may be communicating about their value. Ratepayers in Georgia are now on the hook for a projected \$23 billion project.<sup>24</sup>

At the same time, NRG Energy abandoned two nuclear reactor projects in Texas in response to abundant, inexpensive natural gas and regulatory uncertainty after the Fukushima Daiichi accident in Japan. Despite the potential to qualify for the same federal subsidies as the Georgia project, NRG investors halted construction because the company could not pass costs on to customers who are captive to one provider, as in Georgia. Consequently, investors rather than customers absorbed the cost of two cancelled reactors at the South Texas plant, losing roughly \$481 million.<sup>25</sup>

The Trump Administration has proposed mechanisms to guarantee contracts and prices for coal and nuclear power plants as they are today, which would calcify these industries by eliminating incentives to innovate.

- **Markets efficiently align incentives.** Technology-neutral competitive markets allow prices to

20. For example, Texas has been a model for how competition benefits consumers. See Chuck DeVore, "California Government Mandates Send Electricity Prices Skyrocketing, But Texas Free Market Policies Keep Prices Low," FoxNews, November 16, 2017, <http://www.foxnews.com/opinion/2017/11/16/california-government-mandates-send-electricity-prices-skyrocketing-but-texas-free-market-policies-keeps-prices-low.html> (accessed July 26, 2018).

21. News release, "PJM Marks 20 Years of the Competitive Electricity Market," PJM, March 27, 2017, <http://www.pjm.com/-/media/about-pjm/newsroom/2017-releases/20170327-pjm-marks-20th-anniversary-of-competitive-electricity-market.ashx> (accessed July 26, 2018), and MISO, "MISO Value Proposition 2017," <https://cdn.misoenergy.org/2017%20VP%20One-Pager119239.pdf> (accessed July 26, 2018).

22. Michael Giberson and Lynne Kiesling, "The Need for Electricity Retail Market Reforms," *Regulation* (Fall 2017), pp. 34–70, <https://object.cato.org/sites/cato.org/files/serials/files/regulation/2017/9/regulation-v40n3-4.pdf> (accessed July 27, 2018).

23. See Monitoring Analytics, "State of the Market Report for PJM: January through June," August 14, 2014, [http://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2014/2014q2-som-pjm.pdf](http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2014/2014q2-som-pjm.pdf) (accessed July 26, 2018).

24. Kristi E. Swartz, "Vogtle Costs Too Much for Customers to Bear, PSC staff says," *Energy Wire*, December 4, 2017, <https://www.eenews.net/stories/1060067953> (accessed August 20, 2018).

25. Eileen O'Grady, "NRG Energy Abandons Texas Nuclear Expansion Plan," *Reuters*, April 19, 2011, <https://www.reuters.com/article/us-nuclear-nrg/nrg-energy-abandons-texas-nuclear-expansion-plan-idUSTRE7317E620110419> (accessed August 18, 2018).



communicate accurate information to producers and consumers about the value and cost of electricity generation and delivery. Consequently, competitive markets force power suppliers and investors to consider the costs and benefits to their customers, and incentivize the discipline to be more efficient—in operations, investments, and regulatory compliance—than competitors. Monopoly structures on the other hand guarantee that some, if not all, costs of service are negotiated by utilities and public utility commissions, incentivizing the utility to increase spending within the margin of what is politically feasible so as to increase profits.<sup>26</sup>

For example, nuclear power plants in competitive markets aggressively reduced the amount of time spent offline for refueling and adopted efficiencies to increase production.<sup>27</sup> Competitive markets have also resulted in the efficient exit and entry of electricity providers to meet customers' needs, while monopolized regions have held on to old, expensive units longer.<sup>28</sup>

The White House's proposal would block market efficiencies from occurring and in fact reward inefficient power producers for no apparent national security benefits.

### **Policy Recommendations for a More Competitive Coal and Nuclear Industry**

The market should determine the fate of the coal and nuclear industries. The federal government should not attempt to prop them up; however, policymakers should not ignore all that has been done to increase the costs of supplying, building, and operating coal and nuclear power plants. At the federal and state levels, enormous mandates and subsidies to alternative sources of energy and burdensome regulations that have little or no direct environmental benefit have exacerbated economic factors contributing to the financial struggles of the coal and nuclear industries.

Early plant closures should be a wake-up call to take concentrated action to accomplish deep reform. Policy action now will not undo years of bad policy nor will it necessarily be enough to save uncompetitive plants immediately. Congress and the Trump Administration should offer free-market, limited-government, principled solutions that address underlying government-induced problems if there are ever to be strong, innovative coal and civilian nuclear industries.

#### **Eliminating Favoritism in the Energy Sector.**

The federal government uses a number of mechanisms to support the production of specific energy sources. With direct expenditures, targeted tax breaks, mandates, loan guarantees, liability protection, and other preferential treatment, special endorsement from the government gives one technology an unfair price advantage over others. Rather than expanding the reach of government subsidy programs, the Trump Administration and Congress should be working to eliminate market distortions.

**1. Eliminate bias in the tax code.** Despite the important improvements in the tax code secured by the Tax Cuts and Jobs Act, the tax code still discourages investment and unfairly benefits renewable-energy producers. Congress has used the tax code to make renewable technologies artificially more attractive in electricity markets, implicitly raising barriers to competition for other energy suppliers. The wind production tax credit in particular has distorted electricity prices by enabling wind-power producers to bid negative prices (that is, *paying* grid operators to take electricity) and still make a profit by falling back on the tax credit. The solar-investment tax credit has distorted energy infrastructure investment as financiers are enriched through tax-equity arrangements that allow them to take federal tax credits.

Congress should permanently eliminate all preferential treatment for all energy sources and technologies, including an early sunset of the 10-year payment window for the current solar and wind tax

26. As Vice Chairman of the Montana Public Service Commission Travis Kavulla writes, "A utility earns a return even on the cost of decorating the C-suite." Travis Kavulla, "There Is No Free Market for Electricity: Can There Ever Be?" *American Affairs*, Vol. I, No. 2 (Summer 2017), pp. 126-150, <https://americanaffairsjournal.org/2017/05/no-free-market-electricity-can-ever/> (accessed July 26, 2018).

27. Devin Hartman, "Environmental Benefits of Electricity Policy Reform," R Street, January 25, 2017, pp. 3 and 4, <https://www.rstreet.org/2017/01/25/environmental-benefits-of-electricity-policy-reform/> (accessed August 16, 2018), and Devin Hartman, "The Market Advantage: A Q&A with Joe Bowring," R Street, June 28, 2017, <https://www.rstreet.org/2017/06/28/the-market-advantage-a-qa-with-joe-bowring/> (accessed August 16, 2018).

28. Devin Hartman, "Enhancing Market Signals for Electric Resource Adequacy," R Street *Policy Study* No. 123, December 2017, <http://2o9ub0417chl2lg6m43em6psi2i.wpengine.netdna-cdn.com/wp-content/uploads/2017/12/Final-123.pdf> (accessed August 20, 2018).

credits.<sup>29</sup> This also includes eliminating the preferential treatment in the tax code for coal and nuclear plants. Further, Congress should make permanent, and expand upon, the measures (such as expensing) in the Tax Cuts and Jobs Act.<sup>30</sup>

**2. Use the bully pulpit to discourage state subsidies and anti-competitive bans.** States have done damage to their own energy sectors by installing recommended and mandatory portfolio standards requiring renewable energy use.<sup>31</sup> States have further distorted energy markets with their own renewables subsidies unfairly incentivizing certain energy technologies, while imposing ill-informed bans on others, such as nuclear power or natural gas infrastructure.<sup>32</sup> The definition of “renewable” in these policies often excludes nuclear power, but that is a secondary point. If renewables are cost-competitive or will lower electricity rates for consumers, they will not need policies that mandate their production and consumption. These policies do not put consumers first, and open the door for special interests. It is dangerously shortsighted to position electricity markets around politically privileged resources rather than a principled framework to get the most reliable, affordable, efficient, clean energy to customers.<sup>33</sup> Federal, regional, and state policies should create an environment that expands access, reduces ineffective regulations for existing power sources and new entry, and promotes fuel-neutral competition and choice.

**3. Address FERC court cases and price-formation initiatives.** A number of pending FERC court cases and initiatives could fix some of the market distortions in capacity and wholesale markets. For instance, New England’s forward-capacity market allows 200 megawatts of new subsidized renewable power generation to be offered at zero cost, despite the long-standing practice of all new entrants having to bid into the market at its unsubsidized cost. This

exemption clearly gives renewable power an advantage over competing energy-generating sources.<sup>34</sup>

Proper price formation that relies on market signals will efficiently align the need for a secure, stable grid with the willingness to pay for it. FERC should use its authority to ensure that prices accurately reflect the supply and demand for electricity and are technology neutral. This would provide a financial incentive to keep coal, nuclear, or other energy resources necessary in times of peak demand online and available.

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## Early plant closure should be a wake-up call to take concentrated action to accomplish deep reform.

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**4. Eliminate DOD energy mandates.** The Defense Department is obligated to generate 25 percent of its electricity using renewable sources by 2025.<sup>35</sup> This mandate is forcing the Pentagon to expend scarce resources on renewable energy rather than on military capability. Congress should end it immediately. Such mandates undermine the incentive for renewable-energy producers to develop competitively priced products, thereby actually impeding the availability of alternatives to carbon-based fuels. Forcing the military to purchase more expensive alternatives leaves fewer resources for training, modernization, and recapitalization, resulting in a less-capable military. The federal government should ensure that energy programs for defense applications prioritize national security requirements over political interests. The Pentagon should pursue any energy sources only if they increase capabilities or reduce costs without sacrificing performance.

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29. Nicolas D. Loris, “No More Energy Subsidies: Prevent the New, Repeal the Old,” Heritage Foundation *Backgrounders* No. 2587, July 26, 2011, <https://www.heritage.org/environment/report/no-more-energy-subsidies-prevent-the-new-repeal-the-old>.

30. Adam N. Michel, “Four Priorities for Tax Reform 2.0—and Seven Supporting Reforms,” Heritage Foundation *Issue Brief* No. 4888, July 16, 2018, <https://www.heritage.org/taxes/report/four-priorities-tax-reform-20-and-seven-supporting-reforms>.

31. NC Clean Energy Technology Center at North Carolina State University, “Database of State Incentives for Renewables and Efficiency,” <http://www.dsireusa.org/> (accessed September 6, 2017).

32. *Ibid.*

33. Jonathan Lesser, “America’s Electricity Grid: Outdated or Underrated?” Heritage Foundation *Backgrounders* No. 2959, October 29, 2014, [http://thf\\_media.s3.amazonaws.com/2014/pdf/BG2959.pdf](http://thf_media.s3.amazonaws.com/2014/pdf/BG2959.pdf).

34. United States Court of Appeals for the District of Columbia Circuit, *NextEra Energy Resources, LLC, et al. v. Federal Energy Regulatory Commission*, February 1, 2018, [https://www.ferc.gov/legal/court-cases/briefs/2018/DC17-1110NextEraEnergyResourcesLLC\(finalbrief\).pdf](https://www.ferc.gov/legal/court-cases/briefs/2018/DC17-1110NextEraEnergyResourcesLLC(finalbrief).pdf) (accessed July 26, 2018).

35. Title 10 U.S. Code § 2911(e).



## Policy Proposals for Coal Energy

With 1.2 trillion short tons of proven recoverable coal in the United States, coal has the potential to be an important resource long into the future. American coal can also be a critical source of energy to meet the world's energy needs. Along with China and India, Bangladesh, Indonesia, Pakistan, South Africa, Thailand, Turkey, Vietnam, Zimbabwe, and many others are building or proposing to build new coal plants at a rapid clip.<sup>36</sup>

Coal's share as a source of electricity in the United States has shrunk in large part due to inexpensive abundant natural gas, but also due to increased use of heavily subsidized renewable power. Federal regulations are also to blame. A host of federal regulations have increased the costs of building new coal plants, led to fuel switching, made it prohibitively expensive to update, or resulted in withdrawn permit applications. Further, despite remarkable improvements in coal-mining operations and mining safety, the permitting process for mining and regulations for worker safety have been costly and failed to produce the desired effects of improving worker safety and health.

Attempting to subsidize coal through its economic woes and to exist in a world with stringent climate-change regulations has not worked out very well. The federal government has heavily subsidized carbon capture and sequestration technology. Years and billions of dollars in cost overruns later, the fact remains that carbon capture and sequestration is a taxpayer-funded boondoggle. Southern Company's Kemper plant in Mississippi, a stimulus-handout recipient, has been plagued with delays and cost overruns. Congress should overhaul the regulatory approach to coal to create a framework that eliminates costly regulations that are devoid of meaningful environmental benefit and empowers states to protect air and water quality.

**1. Repeal New Source Review (NSR).** NSR is a vaguely written rule that disincentivizes efficiency improvements in power plants and other major industrial plants. In areas that meet air-quality standards, plants must follow Prevention of Significant Deterioration (PSD) rules to demonstrate that the construction and operation of new projects and major modifications will not increase emissions above a specified threshold. There are several problems with NSR and PSD. What

constitutes a significant modification is subjective under the rules. The amendment excludes routine maintenance, repair, and replacement, but what falls under the definition of "significant modification" remains murky, despite multiple administrative attempts to clarify the meaning.

Plant upgrades can improve efficiency and reduce operational costs, thereby lowering electricity costs, increasing reliability, and providing environmental benefits. Nevertheless, NSR requirements for upgrades discourage these activities. Increasing the efficiency of a plant will cause it to run longer, and consequently cause the plant's emissions to rise. NSR does not account for the emission reduction that would occur if a less efficient plant reduced its hours of operation to compensate for increases in operation of a more efficient plant.

The lack of clarification also forces companies into years of litigation over NSR violations. For instance, in 1999, the EPA filed a complaint against Cinergy Corporation, which was later bought by Duke Energy, claiming that modifications to two of the plants at the Gallagher Generating Station in New Albany, Indiana, violated the NSR and PSD "nonattainment" provisions of the Clean Air Act (CAA). Duke maintained that the upgrades were part of the routine maintenance exclusion, but after 10 years of litigation, the company entered into a consent decree to either retire two of the plants or spend \$85 million to convert them to natural gas plants, and \$6.25 million on environmental mitigation projects, and to pay a \$1.75 million civil penalty. While the EPA is taking productive steps to make NSR less of a nuisance, Congress should ultimately reform the CAA and eliminate NSR.

**2. Stop climate regulations that have little or no impact on temperature.** The Obama Administration proposed and implemented a series of climate change regulations to reduce greenhouse gas emissions from vehicles, heavy-duty trucks, airplanes, hydraulic fracturing, and new and existing power plants. Since conventional carbon-based fuels provide more than 80 percent of America's energy, these restrictions on using abundant, affordable energy sources will only inflict economic pain on households and businesses. They will produce no discernable climate benefit, at the cost of hundreds of thousands of jobs and trillions of dollars of gross domestic product.<sup>37</sup> Congress should

36. Christine Shearer et al., "Boom and Bust: 2017 Tracking the Global Coal Plant Pipeline," CoalSwarm, Sierra Club, and Greenpeace, March 2017, <http://endcoal.org/wp-content/uploads/2017/03/BoomBust2017-English-Final.pdf> (accessed August 9, 2018).

37. Nicolas D. Loris, "The Many Problems of the EPA's Clean Power Plan and Climate Regulations: A Primer," Heritage Foundation *Backgrounder* No. 3025, June 7, 2015, <https://www.heritage.org/environment/report/the-many-problems-the-epas-clean-power-plan-and-climate-regulations-primer>.

prohibit the regulation of carbon dioxide (CO<sub>2</sub>) and other greenhouse gas emissions.

**3. End use of the “social cost of carbon.”** The EPA is using three statistical models, known as integrated assessment models, to estimate the value of the social cost of carbon, defined as the economic damage that one ton of CO<sub>2</sub> emitted today will cause over the next 300 years. However, these models derive a value for the social cost of carbon arbitrarily. Subjecting the models to reasonable inputs for climate sensitivity and discount rates dramatically lowers the estimated social cost of carbon figure. Artificially increasing the estimates boosts the projected benefits of climate-related regulations in agency cost-benefit analyses. By placing a significantly high arbitrary price on a ton of CO<sub>2</sub> emitted into the atmosphere, the agency can inflate the benefits of regulation or inflate the costs of a new project, claiming that the project will emit x tons of CO<sub>2</sub> over its lifetime and inflict y damage on the environment. Congress should prohibit all federal agencies from using the social cost of carbon for any purpose, especially regulatory rulemaking.

**4. Prohibit federal agencies from abusing cost-benefit analysis to justify costly air regulations (co-benefits abuse).** When the EPA issues a rule to reduce emissions of a certain air pollutant, the direct benefits of reducing those emissions should exceed the costs. However, the EPA has for years used an improper end-run around this commonsense requirement. Even when the stated objective of a rule has little or no benefits, but instead has massive costs, the EPA points to the “co-benefits” of reducing particulate matter as justification for the rule. This co-benefits abuse has gotten so bad that the EPA has issued major rules without even bothering to quantify whether there are benefits associated with the regulatory objectives of rules, instead relying solely or primarily on particulate matter co-

benefits.<sup>38</sup> Under the CAA, criteria pollutants, such as particulate matter, are addressed through their own specific statutory scheme and should not be addressed through other means,<sup>39</sup> such as through unrelated air regulations developed under other sections of the CAA.

One of the most egregious abuses of using co-benefits that particularly harmed coal power plants was the Obama Administration’s MATS to regulate mercury emissions from coal-fired and oil-fired power plants. The EPA said the mercury regulation for power plants could cost \$9.6 billion annually.<sup>40</sup> But the agency justified that cost saying the health benefits would range from \$37 billion to \$90 billion per year. Upon closer inspection, the monetary benefits from the mercury reduction were a paltry \$4 million to \$6 million per year.<sup>41</sup>

The EPA exaggerated the environmental benefits by including estimated benefits from reducing other particulates (co-benefits). Those co-benefits account for 99.99 percent of the agency’s estimated benefits. In June 2015, the Supreme Court struck down MATS, saying that the EPA improperly ignored the costs when promulgating the regulation. The problem, however, is that the court’s decision was symbolic because states had already gone down the irreversible, costly path that closed power plants and destroyed jobs. In fact, in PJM’s June 2017 request to the DOE to keep coal-fired power plants online, PJM cited the fact that the plants’ extensions to comply with MATS had been “requested, granted, and exhausted.”<sup>42</sup>

The regulation was not a choice of environment at the expense of jobs. It was just a jobs and coal killer. Congress should prevent similar abuses from happening. Furthermore, Congress should re-examine existing regulations like MATS that have insignificant environmental benefits and return standards to levels that have lower compliance costs while suffi-

38. Anne E. Smith, “An Evaluation of the PM2.5 Health Benefits Estimates in Regulatory Impact Analyses for Recent Air Regulations,” NERA Economic Consulting, December 2011, [http://www.nera.com/content/dam/nera/publications/archive2/PUB\\_RIA\\_Critique\\_Final\\_Report\\_1211.pdf](http://www.nera.com/content/dam/nera/publications/archive2/PUB_RIA_Critique_Final_Report_1211.pdf) (accessed July 26, 2018).

39. See, for example, C. Boyden Gray, “EPA’s Use of Co-Benefits,” *Engage*, Vol. 16, No. 2 (July 2015), <https://fedsoc.org/commentary/publications/epa-s-use-of-co-benefits> (accessed January 30, 2018), and United States Court of Appeals for the District of Columbia Circuit, *Murray Energy Corporation, et al. v. United States Environmental Protection Agency, et al.*, Brief of Amicus Curiae Cato Institute in Support of Petitioners, November 25, 2016, <https://www.scribd.com/document/332581815/Murray-Energy-Corp-v-EPA> (accessed January 30, 2018). Other CAA statutory sections arguably preclude consideration of criteria pollutants.

40. The Supreme Court of the United States, *Michigan et al. v. Environmental Protection Agency et al.*, [https://www.americanbar.org/content/dam/aba/publications/supreme\\_court\\_preview/BriefsV4/14-46\\_pet\\_mi.authcheckdam.pdf](https://www.americanbar.org/content/dam/aba/publications/supreme_court_preview/BriefsV4/14-46_pet_mi.authcheckdam.pdf) (accessed July 26, 2018).

41. *Ibid.*

42. PJM Interconnection LLC, “Request for Emergency Order Pursuant to Section 202 (c) of the Federal Power Act.”

ciently protecting air and water quality. Even though utilities have already spent the money complying with MATS and other regulations, establishing a more reasonable standard will prevent future power plant operators from needlessly installing equipment that yields negligible environmental benefits.

**5. Withdraw the 2015 ozone standards and freeze the standard in place.** In October 2015, the EPA set a new standard for ground-level ozone (one of six major air pollutants regulated by the EPA) nearly to background levels; the standard is currently being contested by states in court. The ozone standard has become increasingly controversial as it becomes more expensive to meet tighter standards with smaller margins of tangible benefits.

States and anti-coal organizations have tried to use ozone to shutter existing power plants. In 2016, Connecticut petitioned the EPA to restrict ozone emissions from a Pennsylvania coal-fired power plant, arguing that the plant violated the CAA's "good neighbor" provision where emissions from one state cannot contribute significantly to a neighboring state's ability to meet attainment. The coal plant installed a natural gas connection to combust natural gas during times of higher levels of ozone. The EPA rejected Connecticut's petition, arguing that the coal power plant "does not currently emit nor is it expected to emit pollution in violation of the good neighbor provision for the 2008 ozone NAAQS."<sup>43</sup> Nevertheless, facing a lawsuit from the Sierra Club, the power plant's owner agreed to stop burning coal for good by the end of 2028.<sup>44</sup> States, environmental organizations, and future Administrations could similarly use more stringent ozone standards as a way to shutter coal plants.

National average ozone levels have fallen 32 percent since 1980, and are on track to continue decreasing.<sup>45</sup> Withdrawing the 2015 standard would unlock economic activity at the state and local level even as progress is made as states continue to meet attainments of the 1997 and 2008 standards. According to the Congressional Research Service, "109 million people (one-third of the

U.S. population) lived in areas classified as 'nonattainment' for the 75 ppb [parts per billion] ozone NAAQS set by EPA in 2008." When a third of the nation's population lives in areas that have not met the current standard, adopting an even more stringent standard is at best premature. The EPA is increasingly setting American *economic* policy as it sets *environmental* policy, enjoying nearly unfettered power to set ozone standards and, indirectly, economic activity and land use.

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## National average ozone levels have fallen 32 percent since 1980, and are on track to continue decreasing.

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**6. Prohibit retroactive vetoes.** Under Section 404 of the Clean Water Act, the Army Corps of Engineers administers permits for activities, including coal mining that discharge dredge or fill material into U.S. waters and wetlands. The EPA also reviews, comments on, and can veto the permit application. However, the EPA is abusing its ability to place holds on permit applications. The EPA held nearly 200 permit applications—many in the final stages of processing by the Army Corps—in a state of limbo and altered the permit requirements in violation of its authority under the Clean Water Act as determined by the courts. For example, in an unprecedented move, in January 2011, the EPA revoked a water permit for a West Virginia mine four years after the Corps issued the permit.<sup>46</sup> That the EPA continues to wield this power creates economic uncertainty and threatens new investment.

## Policy Proposals for Nuclear Energy

FERC Chairman Ken McIntyre testified in Congress: "Certainly, nuclear compliance and everything associated with the prospect of building a new nuclear generating facility today makes for enormous costs that probably has an all but prohibitive effect at short-

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43. Environmental Protection Agency, "Response to June 1, 2016 Clean Air Act Section 126(b) Petition from Connecticut," *Federal Register*, Vol. 83, No. 36 (February 22, 2018), <https://www.federalregister.gov/documents/2018/02/22/2018-03679/response-to-june-1-2016-clean-air-act-section-126b-petition-from-connecticut> (accessed July 26, 2018).

44. Anthony Salamone, "Facing a Lawsuit, Talen Agrees to End Coal Burning at Its York County Power Plant," *The Morning Call*, February 14, 2018, <http://www.mcall.com/business/mc-biz-talen-energy-brunner-island-20180214-story.html> (accessed July 26, 2018).

45. U.S. Environmental Protection Agency, "Air Trends: Ozone Trends," June 26, 2018, <https://www.epa.gov/air-trends/ozone-trends> (accessed July 26, 2018).

46. Hal Quinn, "EPA Mining Policies: Assault on Appalachian Jobs—Part I," testimony before the Subcommittee on Water Resources and Environment, Committee on Transportation and Infrastructure, U.S. House of Representatives, May 5, 2011, [https://nma.org/wp-content/uploads/2016/09/050511\\_quinn.pdf](https://nma.org/wp-content/uploads/2016/09/050511_quinn.pdf) (accessed July 27, 2018).

term competition with natural gas prices.<sup>47</sup> America has surfaced as “the most extreme case” of increasing construction costs, where building reactors counter-intuitively has become more expensive as more were built, according to a 2016 comparative study of seven nuclear power countries.<sup>48</sup> After years of decreasing costs in the 1950s and early 1960s, the nuclear industry experienced a “rapid increase in cost” of 50 percent to 200 percent following the accident at Three Mile Island in 1979, suggesting that regulatory changes and delays “are a significant contributor to the rising [overnight construction cost] trend.”<sup>49</sup>

Instead of addressing underlying policy problems, government and industry have focused on mitigating the cost of those policies through subsidies, leading to a predictable path of failure: While such an approach may spur some amount of commercial activity, it is limited only to what is subsidized. The failed nuclear renaissance is just one example, where new nuclear construction commenced on four reactors in America—effectively all (and no more) of the new nuclear capacity the Energy Policy Act 2005 promised to subsidize.<sup>50</sup>

Over the past six decades, the nuclear industry has safely operated more than one hundred reactors with only one significant accident at Three Mile Island, which itself resulted in no deaths or known radiological health issues amongst the public, and demonstrated that the U.S. nuclear industry could control an emergency situation safely. Nuclear plants in America today continue to exhibit superior safety performance<sup>51</sup> unmatched by any other electricity-generating technology. Regulation should reflect this track record.

**1. Instill regulatory discipline at the Nuclear Regulatory Commission (NRC).** Commercial nuclear activities are among the most heavily regulated industries in America, being regulated at the federal level by the NRC, the EPA, FERC, and the Departments of Energy, State, Defense, and Commerce. Regulations are necessary to define parameters for protecting public health and safety and meet nonproliferation objectives. But the sheer burden of compliance warrants a sweeping review of nuclear regulations. Unnecessary compliance measures do not increase safety, and they add costs that make American companies and utilities less competitive.

It takes far too long for the NRC to complete regulatory actions for existing and new nuclear reactors despite the increase in staff and resources in the past decade. A meagre eight reactors have been, or are being, built since 1990. According to congressional testimony from the Nuclear Energy Institute: “Since 2011, the NRC has, on average, nearly doubled the time it takes to review license renewal and power uprate applications. Unfortunately, we have seen a similar trend with the NRC’s review of new plants applications.”<sup>52</sup>

According to the Government Accountability Office (GAO), a license application could have 1,000 “requests for additional information,” and of the roughly 700 licensing actions the Office of Nuclear Reactor Regulation handles per year, each averages five to 10 such requests.<sup>53</sup>

Another lens through which to look at the problem is the cost of compliance. The GAO rated the NRC’s overall cost estimates as only “partially” credible

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47. House of Representatives Subcommittee on Energy, Committee on Energy and Commerce, “Transcript: Oversight of the Federal Energy Regulatory Commission and the FY 2019 Budget,” April 17, 2018, <https://docs.house.gov/meetings/IF/IF03/20180417/108166/HHRG-115-IF03-Transcript-20180417.pdf> (accessed August 16, 2018).
  48. Jessica R. Lovering, Arthur Yip, and Ted Nordhaus, “Historical Construction Costs of Global Nuclear Power Reactors,” *Energy Policy*, Vol. 91 (2016), pp. 371–382, <http://www.sciencedirect.com/science/article/pii/S0301421516300106?via%3Dihub#ec0005> (accessed July 26, 2018).
  49. *Ibid.*, p. 375.
  50. Katie Tubb, “First Nuclear Power Plant in 20 Years: Good News, But No Nuclear Renaissance,” *The Daily Signal*, October 30, 2015, <http://dailysignal.com/2015/10/30/first-nuclear-power-plant-in-20-years-good-news-but-no-nuclear-renaissance/>.
  51. U.S. Nuclear Regulatory Commission, “Fact Sheet on Plant Safety Performance After the TMI-s Accident,” March 2009, <https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-plant-sfty-after-tmi2.html> (accessed July 26, 2018). See also World Nuclear Association, “Safety of Nuclear Power Reactors,” May 2016, <http://www.world-nuclear.org/information-library/safety-and-security/safety-of-plants/safety-of-nuclear-power-reactors.aspx> (accessed July 26, 2018).
  52. Marvin Fertel, “Advanced Nuclear Technology Development Act of 2016: Answers to Questions for the Record Received May 26, 2016,” Energy and Commerce Committee, U.S. House of Representatives, <http://docs.house.gov/meetings/IF/IF03/20160429/104876/HHRG-114-IF03-Wstate-FertelM-20160429-SD027.pdf> (accessed September 5, 2017).
  53. U.S. Government Accountability Office, “Nuclear Regulatory Commission: Efforts Intended to Improve Procedures for Requesting Additional Information for Licensing Actions Are Under Way,” April 2017, <https://www.gao.gov/assets/690/684262.pdf> (accessed July 26, 2018).

and “minimally” accurate.<sup>54</sup> A study by the American Action Forum totaled annual paperwork costs for NRC regulations at \$4.2 million per power plant, much of which was omitted from agency cost-benefit analyses but noted in supporting documents.<sup>55</sup> The Nuclear Energy Institute also reported that industry experience is vastly different than the NRC’s cost projections: Worker-fatigue regulatory requirements were two to three times more expensive in practice than the NRC projected, fire protection rules were six times more expensive, and security requirements 19 times more expensive.<sup>56</sup>

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## Paperwork costs for compliance with NRC regulations are \$4.2 million per power plant—every year.

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Further, the volume of regulatory measures is unreasonable. As the Nuclear Energy Institute found, “in fiscal 2013, the [NRC] issued fewer than 15 rules, but there were more than 50 generic communications, including notices, advisories and other regulatory actions.”<sup>57</sup>

To help reign in regulation and improve accountability, Congress should compel the NRC to:

- Develop standards and regulations that are “based upon measurable and significant risks to public health based on the best-available, peer-reviewed science that employs a weight-of-the-evidence standard and complies with judicial evidentiary standards”<sup>58</sup>;

- Subject to regulatory review from the Office of Information and Regulatory Affairs to improve accountability and accuracy in the NRC’s cost-benefit analyses;
- More rigorously apply the “backfit” rule<sup>59</sup> to stem the tide of costly regulatory tweaks that do not necessarily improve safety beyond what is already in place; and
- Publicly track the number of requests for additional information.

### 2. Correct EPA radiation exposure standards.

The EPA sets generally applicable radiation-exposure standards for nuclear power operations, nuclear waste, uranium mills, the Waste Isolation Pilot Plant (WIPP), and the nuclear waste repository at Yucca Mountain. It also offers guidance for other federal, state, and local agencies.<sup>60</sup> These have profound effects throughout the federal government and industry, informing evacuation plans for nuclear emergencies (such as “dirty bombs” or a nuclear power facility accident), siting nuclear waste facilities, nuclear clean-up costs, and cancer risk assessments.

The EPA has for decades mischaracterized the risk posed by chronic low doses of radiation, maintaining an outdated linear no threshold approach to regulation. This approach presumes that no level of radiation exposure is acceptable—in other words, there is zero risk from zero dose.<sup>61</sup> Low doses of radiation on the order of natural background levels have never been shown to pose a threat to public health and safety,

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54. U.S. Government Accountability Office, “NRC Needs to Improve Its Cost Estimates by Incorporating More Best Practices,” GAO-15-98, December 2014, p. 11, <http://www.gao.gov/assets/670/667501.pdf> (accessed July 26, 2018).

55. Sam Batkins, “The Costs and Benefits of Nuclear Regulation,” American Action Forum, September 8, 2016, <https://www.americanactionforum.org/research/costs-benefits-nuclear-regulation/> (accessed July 26, 2018).

56. News release, “NRC Cost Estimates for Regulations Off the Mark, NEI Says,” NEI, January 30, 2014, <https://www.nei.org/News-Media/News/News-Archives/NRC-Cost-Estimates-for-Regulations-Off-the-Mark,-N> (accessed July 26, 2018).

57. Nuclear Energy Institute, “Prioritization Tool Could Hasten Nuclear Plant Safety Enhancements,” January 21, 2015, <https://www.nei.org/News-Media/News/News-Archives/Prioritization-Tool-Could-Hasten-Nuclear-Plant-Saf> (accessed July 26, 2018).

58. Diane Katz, ed., *Environmental Policy Guide: 167 Recommendations for Environmental Policy Reforms*, (Washington, DC: The Heritage Foundation, 2015), pp. 35-37, <http://www.heritage.org/research/reports/2015/03/environmental-policy-guide?ac=1> (accessed July 26, 2018).

59. United States Nuclear Regulatory Commission, “Backfitting: § 50.109,” <https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0109.html> (accessed July 26, 2018).

60. U.S. Environmental Protection Agency, “Radiation Regulations and Laws,” <https://www.epa.gov/radiation/radiation-regulations-and-laws> (accessed July 26, 2018).

61. Edward Calabrese and Patrick Michaels, “The Search for Truth in Regulatory Science,” Cato Institute Policy Forum, July 20, 2017, <https://www.cato.org/events/search-truth-regulatory-science> (accessed July 26, 2018).

and the EPA's standards for nuclear operations are far lower than justified by a growing body of science and experience.<sup>62</sup>

These standards have built excessively conservative measures into nuclear power plant design and operation, which has unnecessarily increased costs for little or no public health benefit. This also unnecessarily confines innovation in nuclear technology and applications of nuclear beyond electricity generation. Wrongly informed standards dangerously misinform the public about the actual risk. Rightsizing radiation-exposure standards would likely reduce cost drivers in the nuclear industry while also better informing the public.

**3. Review foreign ownership caps.** Congress prohibits the NRC from granting licenses to nuclear facilities “owned, controlled, or dominated” by a foreign entity, or to an entity which “would be inimical to the common defense and security or to the health and safety of the public,” according to the Atomic Energy Act.<sup>63</sup> However, the NRC has taken a conservative interpretation of this vague foreign ownership standard for reactors, ultimately halting nuclear power projects in places like Texas<sup>64</sup> and Maryland.<sup>65</sup> It is hard to argue, as in the case of the Constellation Energy project in Maryland, that a French company is unfit to invest in a U.S. nuclear power plant, France being both an ally and nuclear industry leader committed to nonproliferation. The NRC has been more permissive on foreign ownership of uranium mining and enrichment, a far more proliferation-sensitive technology than nuclear power reactors.<sup>66</sup>

At a minimum, the NRC should clarify guidance with a position on what meets the Atomic Energy Act's standard. Ideally, such guidance would follow the clear intent of the Atomic Energy Act to advance

nonproliferation objectives *while* achieving energy goals. The NRC could maintain a case-by-case approach that permits even complete foreign ownership provided that national security interests are protected, separating the concepts of ownership, construction, and operation.

**4. Complete a 123 agreement with Saudi Arabia.** Saudi Arabia is an important new market in the nuclear industry from both a nonproliferation and commercial standpoint. The United States has a unique opportunity to shape and engage with Saudi Arabia at the outset of its nuclear energy program. The Trump Administration has yet to conclude a 123 agreement<sup>67</sup> with Saudi Arabia to secure basic nonproliferation standards and permit a trade relationship that underscores those objectives. A 123 agreement has become controversial amongst some American allies, politicians, and nonproliferation advocacy groups, who are demanding that Saudi Arabia forswear enrichment and reprocessing as a condition of trading with the U.S.—the misnamed “gold standard.” The so-called gold standard implies that anything other than it is deficient or ineffectual, when in fact it may itself be a detriment to advancing America's nonproliferation goals if it causes potential agreement nations to minimize or reject collaborating with the U.S.

Completing such an agreement will also allow the U.S. industry to compete in Saudi Arabia. Even where an American company fails to win a bid to build a reactor, U.S. companies can often compete as valuable parts of a nuclear power plant's extensive supply chain. For example, although South Korea won the contract to build the first nuclear reactors in the United Arab Emirates, American companies have contributed goods and services worth rough-

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62. See, for example, J. Strzelczyk, W. Potter, and Z. Zdrojewicz, “Rad-by-Rad (Bit-by-Bit): Triumph of Evidence Over Activities Fostering Fear of Radiogenic Cancers at Low Doses,” *Dose-Response*, Vol. 5, No. 4 (October 4, 2007), pp. 275-283, <https://www.ncbi.nlm.nih.gov/pubmed/18648568> (accessed July 26, 2018). See also Bill Sacks, Gregory Meyerson, and Jeffrey A Siegel, “Epidemiology Without Biology: False Paradigms, Unfounded Assumptions, and Specious Statistics in Radiation Science,” *Biological Theory*, Vol. 11, (2016), pp. 69-101, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4917595/> (accessed July 26, 2018).
63. 10 Code of Federal Regulations § 50.38. U. S. Nuclear Regulatory Commission, “Foreign Ownership, Control, or Domination (FOCD) of Commercial Nuclear Power Plants,” December 14, 2016, <https://www.nrc.gov/reactors/focd.html> (accessed July 26, 2018).
64. World Nuclear News, “NINA Falls Foul of Foreign Ownership Law,” May 1, 2013, [http://www.world-nuclear-news.org/NN-NINA\\_falls\\_foul\\_of\\_foreign\\_ownership\\_law-0105137.html](http://www.world-nuclear-news.org/NN-NINA_falls_foul_of_foreign_ownership_law-0105137.html) (accessed September 6, 2017).
65. World Nuclear News, “Regulator Rejects Calvert Cliffs Challenge,” March 12, 2013, [http://www.world-nuclear-news.org/NN-Regulator\\_rejects\\_Calvert\\_Cliffs\\_challenge-1203138.html](http://www.world-nuclear-news.org/NN-Regulator_rejects_Calvert_Cliffs_challenge-1203138.html) (accessed July 26, 2018).
66. Sachin Desai and Kathleen Schroeder, “U.S. Nuclear Foreign Ownership Policy Ready for a Refreshed Interpretation,” *Energy Law Journal*, Vol. 37, No. 85 (May 16, 2016), pp. 91 and 100, [http://www.felj.org/sites/default/files/docs/elj371/21-85-134-Desai\\_FINAL.pdf](http://www.felj.org/sites/default/files/docs/elj371/21-85-134-Desai_FINAL.pdf) (accessed July 26, 2018).
67. Named after section 123, titled “Cooperation with Other Nations,” of the U.S. Atomic Energy Act of 1954.
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ly \$2 billion thanks to a 123 agreement completed in 2009.<sup>68</sup> There are major gains to be made that advance America's nonproliferation objectives and help the Saudis achieve their energy goals. The U.S. should promptly negotiate and finalize a 123 agreement with Saudi Arabia.<sup>69</sup>

#### 5. Reform the NRC's cost-recovery structure.

The Omnibus Budget Reconciliation Act of 1990 requires the NRC to recover roughly 90 percent of its budget,<sup>70</sup> which it does through billable hours for licensing services and annual fees on industry. The nuclear industry contributed \$882.9 million to the NRC's fiscal year (FY) 2016 budget<sup>71</sup> and \$805.9 million in FY 2017, a cost that will only increase for individual nuclear reactors as others shut down.<sup>72</sup>

This quasi-business arrangement does not lead to transparency or incentivize efficient use of resources in the NRC, and is a barrier to entry for small, entrepreneurial companies. For example, the NRC recovers some of its costs through exorbitant hourly fees for staff consultation that include "many costs for other internal support services that are necessary to operate the agency, such as human resources, rent, computer support, etc."<sup>73</sup> These fees quickly add up, not just for safety issues and licensing, but also for mundane license amendments. This creates a massive barrier to entry and unnecessary burden once operating. For example, the NRC notes that "the two reactor designs most recently certified by the NRC resulted in fees of between \$45 million and \$70 million."<sup>74</sup> Yet the NRC does not have to justify these costs to Congress or to nuclear industry participants, who are obligated to comply with the NRC safety and licensing requirements. This negates any incentive to rationalize costs.

Americans have decided that it is an appropriate function of the federal government to regulate nuclear energy. Taxpayers should then bear a proportionate amount of the cost in ensuring public health and safety. Congress and the Administration should explore options to reform the NRC's funding sources. For example, the NRC could move to a model where it is entirely funded by taxpayers; licensing activities and other services for the industry could be either purchased through the NRC or from an NRC-approved third party. Congress could also consider as an option a track for companies to forgo public liability coverage under the Price-Anderson Act of 1957 in exchange for private insurance and meeting minimal NRC requirements. This could be particularly attractive for advanced nuclear reactor designs with inherent safety features. Reforming the NRC's budget recovery structure would increase federal spending, but if Americans deem regulating nuclear power to be a public good, taxpayers should pay for it.

**6. Complete the Yucca Mountain long-term waste-repository licensing process.** The Nuclear Waste Policy Act as amended designated Yucca Mountain as the location for a national repository for nuclear waste. However, in 2010, President Obama thwarted the law and ordered the NRC to end its review of the Yucca Mountain project, citing not a scientific basis for the decision but a preference—stating that it was "not a workable option."<sup>75</sup> While the review has since been restarted by court mandate, Congress has failed either to appropriate funds to finish the work or change the law. This unnecessary limbo has been costly to taxpayers and created problematic uncertainty for the current and future nuclear industry.

68. Mark Holt, "U.S. and South Korean Cooperation in the World Nuclear Energy Market: Major Policy Considerations," Congressional Research Service Report for Congress No. 41032, June 25, 2013, <https://fas.org/sgp/crs/row/R41032.pdf> (accessed July 26, 2018).

69. Katie Tubb, "Navigating the Rough Terrain of a U.S.-Saudi Arabia Nuclear Energy Cooperation Agreement," Heritage Foundation *Background* No. 3304, April 5, 2018, <https://www.heritage.org/nuclear-energy/report/navigating-the-rough-terrain-us-saudi-arabia-nuclear-energy-cooperation>.

70. 42 Code of Federal Regulations § 2214.

71. News release, "NRC Amends Licensing, Inspection, and Annual Fees for Fiscal Year 2016," U.S. Nuclear Regulatory Commission, June 27, 2016, <https://www.nrc.gov/docs/ML1617/ML16179A087.pdf> (accessed September 6, 2017).

72. News release, "NRC Amends Licensing, Inspection, and Annual Fees for Fiscal Year 2017," U.S. Nuclear Regulatory Commission, June 30, 2017, <https://www.nrc.gov/docs/ML1719/ML17194A605.pdf> (accessed September 6, 2017).

73. U.S. Nuclear Regulatory Commission, "General Questions about NRC Fees," <https://www.nrc.gov/about-nrc/regulatory/licensing/general-fee-questions.pdf> (accessed September 6, 2017).

74. *Ibid.*

75. Steven Chu, "Statement of Steven Chu Secretary of Energy Before the Committee on the Budget," Department of Energy, March 11, 2009, <https://www.energy.gov/articles/statement-steven-chu-secretary-energy-committee-budget> (accessed July 26, 2018).

The nuclear industry cannot grow without a clear pathway for waste management. For example, the government's failure to collect waste as legally required halted otherwise legitimate licensing activities during the hailed nuclear renaissance (which never quite materialized). The NRC suspended all licensing activities in 2012 as a result of a lawsuit challenging the availability and safety of on-site storage of nuclear waste, which became increasingly important given the federal government's inability to collect waste.<sup>76</sup>

Some states and localities have made construction of a nuclear power plant within their borders contingent on a proved nuclear waste disposal or reprocessing pathway.<sup>77</sup> For others, the waste issue dissuades communities from maintaining or introducing nuclear power, for fear of becoming a de facto nuclear-waste disposal site.<sup>78</sup>

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## Ultimately, Congress must introduce market forces in nuclear waste management for it to be a successful, dynamic part of the fuel cycle and nuclear industry.

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Congress needs to provide enough funding for both the DOE and the NRC to complete the license review of a long-term facility at Yucca Mountain. Finishing the review merely brings together all of

the information for Congress, the State of Nevada, and the nuclear industry to make prudent decisions about next steps.<sup>79</sup>

Ultimately, Congress must introduce market forces in nuclear waste management for it to be a successful, dynamic part of the fuel cycle and nuclear industry. Nuclear waste management should be primarily a business activity, not an inherently governmental activity. The federal government has done little to fulfill its legal obligation to collect and manage waste, let alone develop innovative technologies throughout the fuel cycle that take waste management into consideration. Until market forces are introduced into waste management, solutions will at best be prolonged in unrelated political battles, expensive, and narrow in focus rather than an innovative part of the nuclear industry.<sup>80</sup>

**7. Reject uranium tariffs.** The Department of Commerce has opened an investigation under section 232 of the Trade Expansion Act of 1962 to consider trade barriers shielding domestic uranium miners from international competition under the premise of national security.<sup>81</sup> According to petitioners for the case, U.S. companies and national security interests are threatened by uranium imports from Russia, Kazakhstan, and Uzbekistan, which supplied 32 percent of the uranium delivered to domestic nuclear power reactors in 2017. Undeniably, Russia has used energy to leverage politics. The petitioners have requested limits on imports to guarantee roughly 25 percent of the domestic market for U.S. uranium miners and "Buy American" provisions for government purchases.<sup>82</sup>

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76. In September 2014, the NRC determined that dry-cask storage was safe indefinitely and restarted licensing activities. Katie Tubb and Jack Spencer, "Real Consent for Nuclear Waste Management Starts with a Free Market," Heritage Foundation *Background* No. 3107, March 22, 2016, <http://www.heritage.org/environment/report/real-consent-nuclear-waste-management-starts-free-market>.

77. National Conference of State Legislators, "State Restrictions on New Nuclear Power Facility Construction," May 2017, <http://www.ncsl.org/research/environment-and-natural-resources/states-restrictions-on-new-nuclear-power-facility.aspx> (accessed July 26, 2018).

78. David G. Victor, "Examining America's Nuclear Waste Management and Storage," testimony before the Subcommittee on Interior, Energy, and Environment, Committee for Government Reform, U.S. House of Representatives, September 26, 2017, [https://oversight.house.gov/wp-content/uploads/2017/09/Victor\\_Testimony\\_IEE-Nuclear-Waste-Storage\\_09262017.pdf](https://oversight.house.gov/wp-content/uploads/2017/09/Victor_Testimony_IEE-Nuclear-Waste-Storage_09262017.pdf) (accessed July 27, 2018).

79. Katie Tubb, "Yucca Mountain: The Department of Energy Should Take Steps Now While Awaiting Funding," Heritage Foundation *Issue Brief* No. 4705, May 17, 2017, <http://www.heritage.org/nuclear-energy/report/yucca-mountain-the-department-energy-should-take-steps-now-while-awaiting>.

80. Jack Spencer, "Nuclear Waste Management: Minimum Requirements for Reforms and Legislation," Heritage Foundation *Issue Brief* No. 3888, March 28, 2013, <http://www.heritage.org/environment/report/nuclear-waste-management-minimum-requirements-reforms-and-legislation>.

81. News release, "U.S. Department of Commerce Initiates Section 232 Investigation into Uranium Imports," Department of Commerce, July 18, 2018, <https://www.commerce.gov/news/press-releases/2018/07/us-department-commerce-initiates-section-232-investigation-uranium> (accessed July 26, 2018).

82. News release, "Energy Fuels and Ur-Energy Jointly File Section 232 Petition with U.S. Commerce Department to Investigate Effects of Uranium Imports on U.S. National Security," Energy Fuels, January 16, 2018, <http://www.energyfuels.com/news-pr/energy-fuels-ur-energy-jointly-file-section-232-petition-u-s-commerce-department-investigate-effects-uranium-imports-u-s-national-security/> (accessed July 26, 2018).

Rather than depending on any single supplier, American nuclear power operators purchase uranium from 11 countries in a variety of long-term and spot-price contracts. Longtime allies Canada and Australia supplied 52 percent of the uranium delivered to U.S. reactors in 2017.<sup>83</sup> The DOE has determined that its uranium inventory currently meets all government requirements, and future needs are well known. The most immediate need is unencumbered tritium production reactor fuel between 2038 and 2041; new fuel sources for naval reactors are not needed until 2060.<sup>84</sup>

The reality is that the commercial uranium market is saturated and oversupplied in large part due to government policies.<sup>85</sup> Global uranium production from the 1950s to 1990 exceeded commercial requirements after which expected growth in the industry failed to materialize.<sup>86</sup> Nuclear power plants have increased stockpiles, further tamping down demand for uranium.<sup>87</sup> Federal and state governments have also made the U.S. a hostile place for uranium mining, and for the nuclear industry in general, over the years.<sup>88</sup>

Mandating quotas under section 232 of the Trade Expansion Act would increase prices for nuclear power plants, many of which are already struggling economically. Ultimately, the cost would be covered by ratepayers who would shoulder—unfairly—the cost of a presumed national security benefit that all Americans receive. Further, protectionism would only hurt the mining industry in the long term, as the legacy of past protectionist policies demon-

strates.<sup>89</sup> Instead of increasing burdens on nuclear power plants, the Administration should focus on swiftly alleviating regulatory burdens. For example, petitioner Energy Fuels, Inc., writes, “during a period of uranium price increases between 2007 and 2012, domestic uranium mining companies endeavored to bring considerable new production capacity online. Unfortunately, state and federal permitting delays forced U.S. companies to miss the price hike.”<sup>90</sup> These issues should be addressed quickly so that the uranium mining industry can nimbly respond when domestic and international markets recover.

## Conclusion

The federal government is not responsible for leading the coal and nuclear industries out of the doldrums. Nor is it able to—experience has demonstrated that subsidizing the industry only dulls the effects of bad policy until the next crisis. A dependent industry is not a competitive one.

If the Administration desires a strong coal and civilian nuclear industry, it *must* fix the underlying regulatory issues. Subsidizing plants only calcifies existing industry and technology rather than addressing deep government-induced problems for a real, long-term solution. Congress and the Administration need to adopt an entirely new way of thinking about these industries and the electricity sector. Only industries rooted in free markets, supported by predictable and efficient regulation, can yield competitive and innovative coal and nuclear energy

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83. U.S. Information Administration, “2017 Uranium Marketing Annual Report,” May 2018, <https://www.eia.gov/uranium/marketing/pdf/umar2017.pdf> (accessed July 26, 2018).
  84. U.S. Department of Energy, “Report to Congress: Tritium and Enriched Uranium Management Plan Through 2060,” October 2015, <http://fissilematerials.org/library/doe15b.pdf> (accessed July 26, 2018).
  85. James R. Wilch, “GATT and the Half-Life of Uranium Industry Protection,” *Northwestern Journal of International Law & Business*, Vol. 10, No. 1 (Spring 1989), <https://scholarlycommons.law.northwestern.edu/cgi/viewcontent.cgi?article=1277&context=njilb> (accessed August 9, 2018).
  86. Nuclear Energy Agency and the International Atomic Energy Agency, “Uranium 2016: Resources, Production and Demand,” March 2017, pp. 104 and 114, <https://www.oecd-nea.org/ndd/pubs/2016/7301-uranium-2016.pdf> (accessed August 24, 2018).
  87. U.S. Energy Information Administration, “2017 Uranium Marketing Annual Report,” May 2018, <https://www.eia.gov/uranium/marketing/pdf/umar2017.pdf> (accessed July 26, 2018).
  88. For example, news release, “Secretary Salazar Announces Decision to Withdraw Public Lands Near Grand Canyon from New Mining Claims,” Department of the Interior, January 9, 2012, <https://www.doi.gov/news/pressreleases/Secretary-Salazar-Announces-Decision-to-Withdraw-Public-Lands-near-Grand-Canyon-from-New-Mining-Claims> (accessed July 26, 2018), and World Nuclear News, “Supreme Court to Consider Virginia Uranium Ban,” May 22, 2018, <http://www.world-nuclear-news.org/UF-Supreme-Court-to-consider-Virginia-uranium-ban-2205187.html> (accessed July 26, 2018).
  89. Wilch, “GATT and the Half-Life of Uranium Industry Protection.”
  90. News release, “Ur-Energy and Energy Fuels: Utility-Sponsored Paper Misses the Mark on Economic Impact of Remedies Proposed in Section 232 Petition,” Energy Fuels, July 17, 2018, <http://www.energyfuels.com/news-pr/ur-energy-and-energy-fuels-utility-sponsored-paper-misses-the-mark-on-economic-impact-of-remedies-proposed-in-section-232-petition/> (accessed July 26, 2018).

that will be a critical part of America's energy future. Congress and the Trump Administration must have the discipline to develop a modern regulatory system, and address the many government-erected barriers thwarting American coal and nuclear industries.

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