

## EPA's Proposed Power Plant Carbon Dioxide Standards

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### *Introduction*

In an effort to limit emissions of future coal- and gas-fired power plants in the United States, the Environmental Protection Agency (EPA) has proposed new source performance standards for the emissions of carbon dioxide.<sup>1</sup> These proposed standards attempt to limit power plant emissions of carbon dioxide (CO<sub>2</sub>), a greenhouse gas, for the first time under §111 of the Clean Air Act (CAA).<sup>2</sup> The limits include mandating that future coal- and gas-fired power plants emit less than 1,100 pound of carbon dioxide per megawatt hour.<sup>3</sup> However, despite the limits included in the standards, the EPA found that the standards would result in negligible environmental and economic impact, positive or negative.<sup>4</sup>

Notwithstanding these findings, the EPA's proposal has run into resistance from coal industry groups. They contend that the carbon capture and storage technology necessary to limit carbon dioxide emissions is not only commercially unproven, but would also be too costly to implement.<sup>5</sup> However, environmental groups, such as the Natural Resources Defense Council

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<sup>1</sup> *Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units*, ENVTL. PROT. AGENCY, 1 (Sept. 20, 2013), available at <http://www2.epa.gov/sites/production/files/2013-09/documents/20130920proposal.pdf> [hereinafter *2013 Proposed Standards*].

<sup>2</sup> *Id.* at 298.

<sup>3</sup> *Reducing Carbon Pollution From Power Plants, Details About the Proposal for New Sources*, ENVTL. PROT. AGENCY, 2–3 (Sept. 20, 2013), available at <http://www2.epa.gov/sites/production/files/2013-09/documents/20130920technicalfactsheet.pdf> [hereinafter *2013 Fact Sheet*].

<sup>4</sup> *2013 Proposed Standards*, *supra* note 1, at 16–17.

<sup>5</sup> Matthew L. Wald & Michael D. Shear, *Challenges Await Plan to Reduce Emissions*, N.Y. TIMES (Sept. 20, 2013), available at [http://www.nytimes.com/2013/09/21/business/energy-environment/challenges-await-plan-to-reduce-emissions.html?\\_r=1&adxnnl=1&pagewanted=all&adxnnlx=1381888673-RhDTa6UCg6B8AlZrN8AwAA&](http://www.nytimes.com/2013/09/21/business/energy-environment/challenges-await-plan-to-reduce-emissions.html?_r=1&adxnnl=1&pagewanted=all&adxnnlx=1381888673-RhDTa6UCg6B8AlZrN8AwAA&).

and the Sierra Club,<sup>6</sup> have hailed the proposed standards as an important step towards cleaner air and cleaner energy.<sup>7</sup>

This paper will first examine how these proposed standards developed through the CAA and recent Supreme Court holdings regarding the EPA's power to regulate carbon dioxide. Next, this paper details the proposed standards' regulatory requirements and their potential environmental and economic impacts. Finally, this paper analyzes the arguments for and against the proposed standards.

### *History of the Clean Air Act and Proposed Power Plant Regulation*

In 1970, the federal government passed legislation authorizing comprehensive state and federal regulations designed to control common air pollutants and limit emissions of stationary and mobile sources of these pollutants.<sup>8</sup> This legislation, collectively referred to as the CAA, was placed under the purview of the EPA, which was created specifically to implement the requirements of this body of legislation and regulation.<sup>9</sup> The CAA granted the EPA the power to declare National Ambient Air Quality Standards (NAAQS) and New Source Performance Standards (NSPS).<sup>10</sup> From the legislative authority regulating NAAQS and NSPS, the EPA derived its 2013 proposed carbon dioxide pollution standards.<sup>11</sup>

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<sup>6</sup> Conway Irwin, *EPA's Proposed Carbon Pollution Standards: Industry and Environmental Groups React*, BREAKING ENERGY (Sept. 23, 2013), available at <http://breakingenergy.com/2013/09/23/epas-proposed-carbon-pollution-standards-industry-and-environmental-groups-react/>.

<sup>7</sup> Wendy Koch, *EPA Proposes Strict Emissions Limits on New Power Plants*, USA TODAY (Sept. 20, 2013), available at <http://www.usatoday.com/story/news/nation/2013/09/19/epa-limits-emissions-coal-power-plants-carbon-capture-technology/2838391/>.

<sup>8</sup> *Clean Air Act Requirements and History*, ENVTL. PROT. AGENCY, <http://www.epa.gov/air/caa/requirements.html> (last visited Oct. 27, 2013).

<sup>9</sup> *History of the Clean Air Act*, ENVTL. PROT. AGENCY, <http://www.epa.gov/air/caa/amendments.html> (last updated Aug. 15, 2013).

<sup>10</sup> *Id.*

<sup>11</sup> *2013 Proposed Standards*, *supra* note 1.

However, before these changes were enacted, the EPA underwent two expansions under the 1977 and 1990 amendments to the CAA.<sup>12</sup> These amendments expanded NAAQS provisions, increased enforcement authority, and established a program to phase out ozone depleting chemicals.<sup>13</sup>

The EPA's authority further expanded in 2007 when, in the seminal case *Massachusetts v. EPA*,<sup>14</sup> the Supreme Court ruled "CO<sub>2</sub> and other greenhouse gasses qualify as pollutants under the Clean Air Act, and the EPA was ordered to determine if these pollutants pose a threat to public health and welfare, and thereby require regulation."<sup>15</sup> Additionally, in 2009, the EPA found that "six greenhouse gases taken in combination endanger both the public health and the public welfare of current and future generations."<sup>16</sup>

In 2012, the EPA, buoyed with the increased statutory authority resulting from a federal rule clarification by the Supreme Court and armed with their 2009 findings on greenhouse gasses, drafted the 2012 Proposed Carbon Pollution Standard for New Power Plants.<sup>17</sup> This proposed standard, a precursor for the 2013 proposed standards, set uniform national limits for the first time on the amount of carbon power plants could produce.<sup>18</sup>

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<sup>12</sup> *History of the Clean Air Act*, *supra* note 9.

<sup>13</sup> *Id.*

<sup>14</sup> *Massachusetts v. EPA*, 549 U.S. 497 (2007).

<sup>15</sup> Matthew J. Kotchen & Erin T. Mansur, *How Stringent is the EPA's Proposed Carbon Pollution Standard for New Power Plants?*, YALE SCH. OF FORESTRY & ENVTL. STUDIES, 1 (Aug. 3, 2012), available at <http://environment.yale.edu/kotchen/wpapers/CPS.pdf>.

<sup>16</sup> *40 CFR Chapter I: Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act; Final Rule*, ENVTL. PROT. AGENCY, 2 (Dec. 15, 2009), available at [http://www.epa.gov/climatechange/Downloads/endangerment/Federal\\_Register-EPA-HQ-OAR-2009-0171-Dec.15-09.pdf](http://www.epa.gov/climatechange/Downloads/endangerment/Federal_Register-EPA-HQ-OAR-2009-0171-Dec.15-09.pdf).

<sup>17</sup> *EPA FACT SHEET: Proposed Carbon Pollution Standard for New Power Plants*, ENVTL. PROT. AGENCY (Mar. 27, 2012), available at <http://www2.epa.gov/sites/production/files/2013-09/documents/20120327factsheet.pdf>.

<sup>18</sup> *Id.*

### *Proposed Regulatory Requirements*

After considering more than 2.5 million comments on the 2012 proposed standard, noting changes in the electricity sector, and taking into account new technical concerns from industry,<sup>19</sup> the EPA rescinded their 2012 proposal and, in 2013, set forth a new proposal putting “standards of performance [limiting carbon dioxide output] for new . . . fossil fuel-fired electric utility steam generating units and stationary combustion turbines.”<sup>20</sup> Should this 2013 proposal be enacted, the EPA will impose limitations on power plant emissions of a greenhouse gas for the first time ever.<sup>21</sup>

The EPA divided power plants into three subcategories, each of which has separate standards of performance: (1) natural gas-fired stationary combustion turbines with a heat rating greater than 850 MMBtu/h; (2) natural gas-fired stationary combustion turbines with a heat rating less than or equal to 850 MMBtu/h; and (3) for fossil fuel-fired utility boilers and integrated gasification combined cycle (IGCC) units.<sup>22</sup>

Broadly, the U.S. Energy Information Administration defines a natural gas-fired stationary combustion turbine as “[a] plant in which the prime mover is a gas turbine.”<sup>23</sup> A turbine usually has a chamber where “liquid or gaseous fuel is burned and the hot gases are passed to the turbine and where the hot gases expand drive the generator” to generate electricity.<sup>24</sup>

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<sup>19</sup> *2013 Fact Sheet*, *supra* note 3, at 2.

<sup>20</sup> *2013 Proposed Standards*, *supra* note 1, at 1. Note that these proposed standards only affect new sources and do not affect existing sources. Existing sources include sources that were under construction prior to the publication of the 2013 proposal. Also unaffected by this proposal are sources undergoing modifications, liquid oil-fired stationary combustion turbine electric utility generating units (EGUs), new EGUs that do not burn fossil fuels, and low capacity factor EGUs that sell less than 1/3 of their power to the grid. *2013 Fact Sheet*, *supra* note 3, at 3.

<sup>21</sup> *Id.* at 298.

<sup>22</sup> *Id.* at 88.

<sup>23</sup> *Glossary*, ENERGY INFO. ADMIN., <http://www.eia.gov/tools/glossary/index.cfm> (then search “gas turbine plant”) (last visited Oct. 27, 2013).

<sup>24</sup> *Id.*

The 850 MMBtu/h division mentioned above is essentially the EPA’s demarcation line between large and small power plants, which is determined by measuring the energy a power plant can put into its turbine over time.<sup>25</sup> Larger gas-fired power plants (heat rating greater than 850 MMBtu/h), “would be required to meet a standard of 1,000 lb CO<sub>2</sub>/MWh” under the proposed regulations.<sup>26</sup> While smaller power plants (equal to or less than 850 MMBtu/h), “would be required to meet a standard of 1,100 lb CO<sub>2</sub>/MWh,”<sup>27</sup> Stated differently, under the proposed regulations, a smaller power plant will be able to release 1,100 pounds of carbon dioxide for every unit of power (MWh) it produces.

The 2013 proposed standards take a slightly different approach for fossil fuel-fired boilers and IGCC units by allowing operators to choose which standard to apply to their plant (these boilers and IGCC units are primarily fired by coal and hereafter will be referred to as coal-fired power plants<sup>28</sup>). New coal-fired power plants, regardless of size, can choose to meet either a “standard of 1,100 lb CO<sub>2</sub>/MWh on a 12-operating-month rolling average” or a “standard on an 84-operating-month rolling average ... [of] between 1,000lb CO<sub>2</sub>/MWh and 1,050 lb CO<sub>2</sub>/MWh.”<sup>29</sup>

In order to meet these limits, the proposed standards dictate that coal-fired power plants are to use carbon capture and storage (CCS) technology.<sup>30</sup> One reason for this requirement is that the EPA found that a new coal-fired power plant’s “CO<sub>2</sub> emission would be approximately

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<sup>25</sup> 2013 Fact Sheet, *supra* note 3, at 3.

<sup>26</sup> 2013 Proposed Standards, *supra* note 1, at 88.

<sup>27</sup> *Id.*

<sup>28</sup> *Frequently Asked Questions: What is U.S. Electricity Generation by Energy Source?*, ENERGY INFO. ADMIN., <http://www.eia.gov/tools/faqs/faq.cfm?id=427&t=3> (last visited Oct. 27, 2013).

<sup>29</sup> 2013 Proposed Standards, *supra* note 1, at 96.

<sup>30</sup> Lenny Bernstein & Juliet Eilperin, *EPA Moves to Limit Emissions of Future Coal- and Gas-Fired Power Plants*, WASH. POST (Sept. 19, 2013), *available at* [http://www.washingtonpost.com/national/health-science/epa-moves-to-limit-emissions-of-future-coal--and-gas-fired-power-plants/2013/09/19/e71728bc-2139-11e3-a358-1144dee636dd\\_story.html](http://www.washingtonpost.com/national/health-science/epa-moves-to-limit-emissions-of-future-coal--and-gas-fired-power-plants/2013/09/19/e71728bc-2139-11e3-a358-1144dee636dd_story.html).

double” that of a natural gas-fired plant of the same capacity.<sup>31</sup> The EPA found that “partial capture” CCS would be the best emissions reduction system for these fuel-fired plants due to its technical feasibility and ability to reduce plant’s emission of CO<sub>2</sub> between thirty and fifty percent.<sup>32</sup>

### *Economic Impact of Proposed Regulation*

The EPA found that its proposed regulation would have essentially no economic impact.<sup>33</sup> This is largely for two reasons: (1) coal plants, that would have to employ expensive CCS technology, are unlikely to be built, even without the proposed standards, due to the low cost of natural gas, and (2) natural gas plants that are being built, would be able to comply with the CO<sub>2</sub> limits without any additional financial outlay as a result of the proposed standards.<sup>34</sup>

Largely, economists and industry experts agree with both of these assessments.<sup>35</sup> The CATO Institute finds that “smaller coal-fired plants are now more expensive to operate than gas-fired plants, and the price gap is narrowing for large plants as well.”<sup>36</sup> Additionally, a peer reviewed study from Duke University’s Nicholas School of the Environment found that assuming the ratio of natural gas prices to coal stay the same, sixty-five percent of the coal power plants could soon become more expensive to operate than natural gas.<sup>37</sup> Also, Revis W. James, director of the Energy Technology Assessment Center at the Electric Power Research Institute,

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<sup>31</sup> *2013 Proposed Standards*, *supra* note 1, at 26.

<sup>32</sup> *Id.* at 33.

<sup>33</sup> *Id.* at 124.

<sup>34</sup> *Id.*

<sup>35</sup> *See infra* notes 38–40.

<sup>36</sup> Peter Van Doren & Jerry Taylor, *Coal Meets Markets*, CATO INSTITUTE (Feb. 23, 2013), *available at* <http://www.cato.org/publications/commentary/coal-meets-markets>.

<sup>37</sup> Brad Plummer, *Study: The Coal Industry is in Far More Trouble than Anyone Realizes*, WASHINGTON POST (Apr. 8, 2013), *available at* <http://www.washingtonpost.com/blogs/wonkblog/wp/2013/04/08/study-the-coal-industry-is-in-far-more-trouble-than-anyone-realizes/>.

stated that coal plants with CCS were “unlikely to be competitive unless natural gas prices increased by 100 to 150 percent[,] and the construction of nuclear plants was ruled out.”<sup>38</sup>

In summary, the EPA found that due to the current and anticipated economic conditions, no new plants would be built that exceed the proposed limits even if the limits were not enacted.<sup>39</sup> Therefore, the proposed standards would result in negligible costs, monetized benefits, changes in employment and labor market, and macroeconomic impacts.<sup>40</sup>

### *Environmental Impact of Proposed Regulation*

At first blush, it appears that the proposed standards will have a significant environmental impact; at least concerning coal-fired power plants. Currently, the average coal plant emits 1,768 lb CO<sub>2</sub>/MWh while the new standards limit emissions to less than 1,100 lb CO<sub>2</sub>/MWh.<sup>41</sup> Since, coal plants created thirty-seven percent of the power in the United States last year and, to achieve the proposed limits, the coal plants would have to reduce their emissions by forty percent, it would seem that the new standards create significant, nationwide emissions reductions.<sup>42</sup> However, the new standards only apply to *new* power plants, leaving current power plants unaffected.<sup>43</sup>

Natural gas power plants are placed under similar limits by the proposed standards, with both small and large natural gas plants required to emit less than 1,100 lb CO<sub>2</sub>/MWh.<sup>44</sup> However, natural gas plants currently in operation only emit between 800 to 850 lb CO<sub>2</sub>/MWh on

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<sup>38</sup> Matthew L. Wald & Michael D. Shear, *Challenges Await Plan to Reduce Emissions*, N.Y. TIMES (Sept. 20, 2013), available at [www.nytimes.com/2013/09/21/business/energy-environment/challenges-await-plan-to-reduce-emissions.html?\\_r=0&adxnnl=1&pagewanted=all&adxnnlx=1382042867-DJb2RQX9wUYy6nkuyceg](http://www.nytimes.com/2013/09/21/business/energy-environment/challenges-await-plan-to-reduce-emissions.html?_r=0&adxnnl=1&pagewanted=all&adxnnlx=1382042867-DJb2RQX9wUYy6nkuyceg).

<sup>39</sup> *2013 Proposed Standards*, *supra* note 1, at 16–17.

<sup>40</sup> *Regulatory Impact Analysis for Proposed Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units*. ENVTL. PROT. AGENCY, 124 (2013), available at <http://www2.epa.gov/sites/production/files/2013-09/documents/20130920proposalria.pdf>.

<sup>41</sup> Bernstein, *supra* note 30.

<sup>42</sup> *Id.*

<sup>43</sup> *2013 Fact Sheet*, *supra* note 3, at 3.

<sup>44</sup> *Id.*

average.<sup>45</sup> The EPA’s own findings back this up; finding that of the natural gas power plants starting operation between 2006 and 2010, “nearly 95% of these facilities meet the proposed standards on an annual basis.”<sup>46</sup>

In sum, the EPA found that these proposed standards would “result in negligible CO<sub>2</sub> emission changes”; the very greenhouse gas the standards are targeting.<sup>47</sup> The EPA’s rationale for this finding is based largely on the same analysis done to determine the negligible economic impact.<sup>48</sup> Namely, if the standards target only new power plants and the current economic conditions and the future economic conditions anticipated show that no new plants (large natural gas-fired, small natural gas-fired, or coal-fired) will be built that exceed the proposed limits, then the limits will have almost no effect on CO<sub>2</sub> emissions.<sup>49</sup>

#### *Proposed Regulation Controversy*

Although the EPA found that its proposed standards would result in no negligible economic or environmental changes, the proposed standards are not without controversy. The standards have drawn criticism from coal industry groups.<sup>50</sup> Coal industry groups are primarily concerned that the new standards would require them to implement CCS; a technology they contend is still in a developmental phase.<sup>51</sup> Implementing unproven CCS technology in future coal-fired power plants could require too much investment to make these power plants economically viable.<sup>52</sup> The president of the National Mining Association, Hal Quinn, summed this position up by stating that the proposed standards “effectively ban[] coal from America’s

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<sup>45</sup> Bernstein, *supra* note 30.

<sup>46</sup> *2013 Proposed Standards*, *supra* note 1, at 291.

<sup>47</sup> *Id.* at 16–17.

<sup>48</sup> *Id.*

<sup>49</sup> *Id.*

<sup>50</sup> Wald, *supra* note 5.

<sup>51</sup> *Id.*

<sup>52</sup> *Id.*

power portfolio, leaving new power plants equipped with even the most efficient and environmentally advanced technologies out in the cold.”<sup>53</sup>

Indeed, this sentiment is echoed by CATO Institute Senior Fellow, Peter Van Doren, who believes that the proposed regulation would “basically ban any new coal-fired power plants.”<sup>54</sup> However, he caveats this assertion by stating that this scenario would only happen if the cost of coal becomes significantly less expensive or if the cost of other fuels (natural gas or nuclear) were to become very high.<sup>55</sup>

The coal industry also contends that the CCS technologies have not been adequately demonstrated in a commercial setting.<sup>56</sup> Shortly before the release of the proposed standards, Gina McCarthy, the EPA administrator, held up four CCS projects as models in testimony before the House Energy and Power Subcommittee.<sup>57</sup> However, these four projects are either under construction or in a planning phase.<sup>58</sup> Revis W. James, a director at the Electric Power Research Institute, believes that to consider the CCS technology commercially demonstrated, several of these projects would need to be completed and the “kinks” would have to be worked out.<sup>59</sup>

On the other side of the argument, many environmental advocate organizations have welcomed the EPA’s proposed standards as both an important step forward in reducing CO<sub>2</sub> and as a technological driver.<sup>60</sup> Despite the lack of immediate effect, the proposed standards will have on CO<sub>2</sub> emissions, environmentalists and advocates see these proposed standards as a bridge to standards limiting CO<sub>2</sub> emissions for existing power plant facilities, which the EPA is

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<sup>53</sup> Bernstein, *supra* note 30.

<sup>54</sup> *Counterintuition on EPA, the ‘War on Coal’*, CATO INSTITUTE (Sept. 26, 2013), available at <http://www.cato.org/multimedia/daily-podcast/counterintuition-epa-war-coal>.

<sup>55</sup> *Id.*

<sup>56</sup> Wald, *supra* note 5.

<sup>57</sup> *Id.*

<sup>58</sup> *Id.*

<sup>59</sup> *Id.*

<sup>60</sup> Statement from Howard A. Learner, Exec. Dir., Env’tl. Law & Policy Ctr., EPA Carbon Pollution Standards Offer Clear, Clean Path Forward (Sept. 20, 2013) (on file with author).

scheduled to propose by June 2014.<sup>61</sup> Ned Helme, president of the Center for Clean Air Policy, stated that now that the EPA has proposed standards for future power plants, the “EPA can now move forward without delay to engage stakeholders in crafting guidance to states for setting meaningful and flexible standards that will lower carbon pollution from existing power plants.”<sup>62</sup>

While the critics of the EPA’s proposed standards have questioned the technical efficacy of and monetary cost associated with the implementation of CCS technology, advocates and environmental groups believe that the standards will create demand for the CCS technology and incentivize industry cleanup.<sup>63</sup> Indeed, the Center for American Progress (CAP) states that there are already numerous technologies to capture CO<sub>2</sub> “during industrial processes [that] are well-established outside the power sector and have been successfully demonstrated in pilot-scale testing at power plants.”<sup>64</sup> Additionally, while demand for CCS technology is currently low among the power sector, CAP believes that the proposed standards create “a clear and certain technology-based pollution-reduction target” that incentivizes CCS equipment vendors “to develop new carbon capture systems, and improve existing ones to lower costs and enhance performance.”<sup>65</sup> Even if CCS has not been adequately commercially proven<sup>66</sup> yet as required by §111 of the CAA, CAP cites *Sierra Club v. Costle*<sup>67</sup> as legal precedent in interpreting §111 to mean that the law was intended to “create incentives for new technology” and “stimulate and

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<sup>61</sup> Ken Silverstein, *Interest Groups Deliver Their Reactions to EPA's Carbon Rules for Power Plants*, ENERGYBIZ (Sept. 20, 2013), <http://www.energybiz.com/article/13/09/interest-groups-deliver-their-reactions-epas-carbon-rules-power-plants>.

<sup>62</sup> *Id.*

<sup>63</sup> Koch, *supra* note 7.

<sup>64</sup> Robert Sussman and Daniel J. Weiss, *Coal Survival Depends on the EPA's Carbon-Pollution Standards for Future Power Plants*, CTR. FOR AMERICAN PROGRESS (Sept. 26, 2013), <http://www.americanprogress.org/issues/green/news/2013/09/26/75689/coal-survival-depends-on-epas-carbon-pollution-standards-for-future-power-plants/>.

<sup>65</sup> *Id.*

<sup>66</sup> Howard Herzog of MIT's Carbon Capture and Sequestration Technologies program states, “[a]ll the components [of CCS technology] are commercial. What's not is having a business model where they all work together.” Koch, *supra* note 7.

<sup>67</sup> 657 F.2d 298 (D.C. Cir. 1981).

augment the innovative character of industry in reaching for more effective, less costly systems to control air pollution.”<sup>68</sup>

### *Conclusion*

While EPA’s proposed standards regulating the CO<sub>2</sub> emissions of future natural gas- and coal-fired power plants is undoubtedly a first step in regulating greenhouse gasses with Clean Air Act §111, its proposed regulations do not portend to have any environmental or economic impact on current and future power plants. Despite the lack of change in actual CO<sub>2</sub> emissions resulting from the standards, there is still some controversy over the efficacy of the CCS mandate. Currently, the EPA is soliciting comments for the proposed standards and it remains to be seen what the new commenting period will add to the regulations.

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<sup>68</sup> Sussman, *supra* note 64.