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# ADVERSE HEALTH IMPACTS OF GRANDFATHERED POWER PLANTS AND THE CLEAN AIR ACT: TIME TO TEACH OLD POWER PLANTS NEW TECHNOLOGY

RACHEL H. CEASE\*

## INTRODUCTION

On December 5, 1952, the residents of London, England awoke to the dawn of a five-day reign of death. A temperature inversion had trapped the coal smoke from the city's furnaces, fireplaces, and industrial smokestacks, creating a "killer fog" that hovered near the ground. People began to die from respiratory and cardiopulmonary failure. Not until the weather system that had trapped London's pollution finally loosened its grip and the soot-filled air cleared out did death rates return to normal. The end of the episode saw more than three thousand dead; a five-fold increase over the normal death rate.

While incidents like London's "killer fog" of 1952 clearly demonstrate a link between air pollution and death, only in the past decade have tremendous advances in medical science and epidemiology allowed researchers to quantify the health impacts of everyday air pollution levels. In studies conducted in cities throughout the world, epidemiologists have consistently found that more people are hospitalized and die from respiratory and cardiac failure in proportion to elevated levels of soot, or "fine particles," and other pollutants. The consistent worldwide findings, combined with a much clearer understanding about how we are exposed to outdoor air pollution, have convinced most experts that these results are not a coincidence.<sup>1</sup>

This note will explore the failure of the Clean Air Act<sup>2</sup> to protect citizens from the dangers associated with power plant pollution, specifically pollution from coal-fired power plants. "In 1999, 51% of U.S. energy needs were met by coal-fired power

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<sup>1</sup> John D. Spengler, *Foreword to Conrad G. Schneider, Death, Disease & Dirty Power: Mortality and Health Damage Due to Air Pollution from Power Plants* (Maria Padian ed., 2000), available at <http://www.psnhpollutes.com/DIRTYPOWER.pdf>.

<sup>2</sup> 42 U.S.C. §§ 7401-7671q (2001) [hereinafter CAA].

plants.”<sup>3</sup> “Worse still, most of the electricity produced by coal-fired power plants is produced by plants that were built before 1980, and emit more pollution than newer coal-fired plants.”<sup>4</sup> The focus of this note will be on the mortality and health effects of these older, “grandfathered,” power plants. Under the CAA, power plants that were in existence prior to the Act are exempt from the emission standards imposed upon those plants built after the statute. As a result, these grandfathered facilities are free to emit pollution while post CAA power plants must comply with the Act’s emission standards. In so doing, these grandfathered facilities are adversely affecting public health in ways that could be prevented. Recent studies show that if these older facilities were brought under the command of the CAA standards for new power plants, a reduced risk of death, fewer asthma attacks, fewer emergency room visits, and fewer daily incidents of upper respiratory symptoms would result.<sup>5</sup> Through analysis of two recent studies conducted by the Harvard School of Public Health, as well as the writings of other experts in the area, the conclusion that these grandfathered power plants should be forced to comply with new power plant pollution control standards will become clear.

“Most people in America do not associate electricity use with air pollution. But the light switch, air conditioner control, and production line are wire-linked to the largest sources of acid rain, smog, regional haze, nitrification, toxic metals and climate change pollutants.”<sup>6</sup> In 1999, coal-fired power plants in the United States emitted 11.3 million tons of sulfur dioxide (“SO<sub>2</sub>”), 6.5 million tons of nitrogen oxides (“NO<sub>x</sub>”), and 1.9 billion tons of carbon dioxide (“CO<sub>2</sub>”).<sup>7</sup> This equates to approximately 60% of all SO<sub>2</sub> emissions, 25% of all NO<sub>x</sub> emissions, and 32% of all CO<sub>2</sub> emissions nationwide.<sup>8</sup> One study estimates that requiring grandfathered coal-fired electric utility plants to comply with new

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<sup>3</sup>Shi-Ling Hsu, *Reducing Emissions from the Electricity Generation Industry: Can We Finally Do It?*, 14 TUL. ENVTL. L.J. 427, 434 (2001).

<sup>4</sup>*Id.* Nearly four-fifths of the coal-fired power plants in the United States were constructed before the 1977 implementation of New Source Review, and are thus “grandfathered out of emissions controls required for plants built thereafter.” Pamela Najor, *Government Sues Electric Companies Over New Source Review at 17 Power Plants*, 30 ENV’T REP. 1269 (1999).

<sup>5</sup>Ann Brewster Weeks, *Advising Nature: Can We Get Clean Air From the Old Dirties?*, 33 NEW ENG. L. REV. 707, 709-12 (1999).

<sup>6</sup>David R. Wolley, *Environmental Comparability*, 12 SPG NAT. RESOURCES & ENV’T 276 (1998).

<sup>7</sup>*Id.*

<sup>8</sup>*Id.*

source standards would reduce NO<sub>x</sub> emissions by 18% and SO<sub>2</sub> emissions by 51%.<sup>9</sup>

A study by Abt Associates found that over 30,000 deaths each year are attributable to pollution from U.S. power plants.<sup>10</sup> "The underlying research shows that these people are dying months or years earlier because of power plant air pollution."<sup>11</sup> In fact, deaths from power plant pollution exceed the death toll from other causes commonly understood to be major public policy priorities. For instance, drunk driving caused the death of 17,380 Americans in 2000.<sup>12</sup> In 1998, there were 18,272 homicides reported in the United States.<sup>13</sup> "Moreover, the 18,000 deaths that could be avoided by cleaning up the nation's power plants are three times the number of automobile fatalities avoided each year through the use of safety belts."<sup>14</sup>

Besides the health issues that are the focus of this note, there are other serious problems caused by pollution from these coal-fired power plants. Grandfathered power plants located in the Midwest are responsible for acid rain and smog problems in the Northeast,<sup>15</sup> and raise environmental justice concerns in inner cities.<sup>16</sup> Coal-fired power plants also contribute to possible global warming.<sup>17</sup>

## I. SUMMARY OF THE CLEAN AIR ACT

The CAA creates a framework for the "development of cooperative Federal, State, regional, and local programs to prevent and control air pollution."<sup>18</sup> Pursuant to § 7409(b)(1) of the Act, the Environmental Protection Agency (EPA) sets National Ambient

<sup>9</sup>Todd B. Adams, *New Source Review Under the Clean Air Act: Time for More Market-Based Incentives?*, 8 BUFF. ENVTL. L.J. 1, 35 (2000).

<sup>10</sup>Conrad G. Schneider, *Death, Disease & Dirty Power: Mortality and Health Damage Due to Air Pollution From Power Plants* (Maria Padian ed., 2002) available at, <http://www.psnhpollutes.com/DIRTYPOWER.pdf>. [hereinafter *Death, Disease & Dirty Power*].

<sup>11</sup>*Id.*

<sup>12</sup>Mothers Against Drunk Driving, at <http://www.madd.org/stats>.

<sup>13</sup>National Center for Health Statistics, Homicide, at <http://www.cdc.gov/nchs/fastats/homicide.htm>.

<sup>14</sup>Schneider, *supra* note 10, at 4-5.

<sup>15</sup>Christina C. Caplan, *The Failure of Current Legal and Regulatory Mechanisms to Control Interstate Ozone Transport: The Need for New National Legislation*, 28 ECOLOGY L.Q. 169, 176 (2001).

<sup>16</sup>Adams, *supra* note 9, at 36-37.

<sup>17</sup>*Id.*

<sup>18</sup>42 U.S.C. § 7401(a)(4) (2000).

Air Quality Standards (NAAQS), "the attainment and maintenance of which ... are requisite to protect the public health."<sup>19</sup> "NAAQS must protect not only average healthy individuals, but also sensitive citizens – children, for example, or people with asthma, emphysema, or other conditions rendering them particularly vulnerable to air pollution."<sup>20</sup> In carrying out this purpose, the CAA regulates two kinds of air pollutants: criteria pollutants<sup>21</sup> and hazardous air pollutants.<sup>22</sup> Only six pollutants are directly regulated under the criteria pollutants system: sulfur dioxide, particulate matter, carbon monoxide, ozone, nitrogen dioxide, and lead.<sup>23</sup> These six pollutants have significant adverse environmental and health effects ranging from asthma attacks to cancer.<sup>24</sup>

States are responsible for attaining and maintaining the NAAQS. Each state must submit a State Implementation Plan (SIP) that specifies the manner in which NAAQS will be achieved and maintained within each air quality control region.<sup>25</sup> As summarized by the EPA, "The purposes of a SIP... are to make demonstrations [of how attainment, maintenance, and progress will be achieved] and to provide a control strategy that will achieve the necessary reductions and otherwise meet the requirements of the Act."<sup>26</sup> By virtue of the states' roles in devising a strategy and adopting an implementation plan, the Supreme Court has empha-

<sup>19</sup>42 U.S.C. § 7409(b)(1) (2000).

<sup>20</sup>Am. Lung Ass'n v. EPA, 134 F.3d 388, 389 (D.C. Cir. 1998).

<sup>21</sup>42 U.S.C. § 7408 (2000).

<sup>22</sup>42 U.S.C. § 7412 (2000). There are approximately 189 hazardous air pollutants listed.

<sup>23</sup>EPA Air Programs, 40 C.F.R. § 50 (2001).

<sup>24</sup>See Office of Air Quality Planning and Standards, EPA, *The Plain English Guide to the Clean Air Act* (1993), at <http://www.epa.gov/oar/oaqps/peg-epa/percaa.html> [hereinafter *Guide*]. The *Guide* lists each pollutant and provides the source and the health and environmental impacts of each. The health impacts are: Ozone-breathing problems, reduced lung function, asthma, irritated eyes, stuffy nose, reduced resistance to colds and other infections, and possible speeding up of the aging of lung tissue. Volatile organic compounds (VOCs) - In addition to ozone (smog) effects, many VOCs can cause serious health problems such as cancer and other effects. Nitrogen Dioxide- lung damage, illnesses of breathing passages and lungs. Carbon Monoxide (CO) - reduces ability of blood to bring oxygen to body cells and tissues; cells and tissues need oxygen to work. Carbon monoxide may be particularly hazardous to people who have heart or circulatory problems and people who have damaged lungs or breathing passages. Particulate Matter (dust, smoke, soot)- nose and throat irritation, lung damage, bronchitis, early death. Sulfur Dioxide- breathing problems, may cause permanent damage to lungs. Lead- brain and other nervous system damage; children are at special risk. Some lead-containing chemicals cause cancer in animals. Lead causes digestive and other health problems.

<sup>25</sup>42 U.S.C. § 7407(a) (2000).

<sup>26</sup>State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, 57 Fed.Reg. 13,498, 13,567 (Apr. 16, 1992) (to be identified at 40 C.F.R. § 52 [hereinafter *SIP Preamble for 1990 Amendments*]).

sized that "[i]t is to the States that the CAA assigns initial and primary responsibility for deciding what emissions reductions will be required from which sources."<sup>27</sup>

There are exceptions to that primary responsibility of the states. Since the 1970 Clean Air Act Amendments (1970 Amendments), the CAA has required the states to regulate certain sources of emissions, including, for example, new stationary sources and automobiles,<sup>28</sup> and has established a floor of minimum emissions control standards for such sources, below which SIPs cannot go.<sup>29</sup> State SIPs are subject to EPA review and, if found inadequate, may be disapproved.<sup>30</sup> "The requirement that the States ... develop [SIPs] and submit them to the EPA for review allows for federal oversight of the States' efforts to achieve and maintain the required level of air quality."<sup>31</sup>

Congress remains the ultimate authority. In the 1970 Amendments, Congress required the States to achieve attainment of NAAQS by 1975.<sup>32</sup> In the 1977 Clean Air Act Amendments (1977 Amendments), those deadlines gave way to a new 1982 deadline, with the possibility of extensions until 1987 for certain pollutants.<sup>33</sup> In 1989, based on perceived "widespread failure" to meet air quality standards, Congress again considered amendments to the Act.<sup>34</sup>

The resulting Clean Air Act Amendments of 1990 (1990 Amendments) established a new set of attainment deadlines. In general, the 1990 Amendments contemplated that less serious nonattainment areas would attain NAAQS within five years of enactment and that more serious nonattainment areas would have 10 years to attain NAAQS.<sup>35</sup> As summarized by the Senate Report: "The emphasis in the bill... is not on the deadlines but on

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<sup>27</sup>Whitman v. Am. Trucking Ass'n, 531 U.S. 457, 470 (2001).

<sup>28</sup>See Train v. NRDC, 421 U.S. 60, 79 n.16 (1975).

<sup>29</sup>*Id.*

<sup>30</sup>42 U.S.C. § 7410(i) (2001).

<sup>31</sup>S. REP. NO. 101-228, at 9 (1990), *reprinted in* 1990 U.S.C.C.A.N. 3385, 3395.

<sup>32</sup>See S. REP. NO. 101-228, at 10 (1989), *reprinted in* 1990 U.S.C.C.A.N. 3385, 3396-97.

<sup>33</sup>State Implementation Plans; General Preamble for Proposed Rulemaking on Approval of Plan Revisions for Nonattainment Areas, 44 Fed. Reg. 20372, 20375 (Apr. 4, 1979) (to be codified at 40 C.F.R. § 52).

<sup>34</sup>S. REP. NO. 101-228, at 11 (1990), *reprinted in* 1990 U.S.C.C.A.N. at 3396-97.

<sup>35</sup>See, e.g., 42 U.S.C. § 7502(a)(2)(A) (setting default five and 10-year attainment deadlines); 42 U.S.C. § 7512(a)(1) (setting 1995 and 2000 deadlines for attainment of carbon monoxide NAAQS); 42 U.S.C. § 7513(c) (setting various attainment dates for areas in moderate and serious nonattainment for PM-10, with an outside deadline of December 31, 2001, for serious nonattainment areas).

what happens in the period before deadlines."<sup>36</sup> "[T]he nonattainment provisions of the bill are designed... to require regular and monitored progress toward attainment...."<sup>37</sup>

"As of 1975, many states had air quality control regions<sup>38</sup> ("AQCR") or portions thereof that did not meet the national standards, despite the existence of previously approved SIPs.<sup>39</sup> If any region fails to meet NAAQs, that region is designated as a 'nonattainment area' for the particular pollutant exceeding the applicable standard."<sup>40</sup> Those regions that do meet their NAAQs are classified as attainment areas.<sup>41</sup> "Many urban areas are classified as nonattainment for at least one criteria air pollutant."<sup>42</sup> "It has been estimated that about 90 million Americans live in nonattainment areas."<sup>43</sup>

Different requirements apply depending on an area's attainment status. In nonattainment areas, major emitting stationary sources<sup>44</sup> must, among other things, obtain a permit prior to starting operations,<sup>45</sup> comply with the "Lowest Achievable Emission Rate"<sup>46</sup> ("LAER"), and obtain "offsets" of existing emissions for its new emissions.<sup>47</sup> These requirements also apply to sources that make "modifications" to their facilities or operations.<sup>48</sup>

In attainment areas, the Prevention of Significant Deterioration (PSD) program protects the public health and air quality from unrestricted and unregulated economic growth.<sup>49</sup> Generally, the PSD program requires major air pollution emitting facilities<sup>50</sup>

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<sup>36</sup>S. REP. NO. 101-228, at 12-13 (1990), *reprinted in* 1990 U.S.C.C.A.N. 3385, 3398-99.

<sup>37</sup>*Id.*

<sup>38</sup>42 U.S.C. § 7407 (2001).

<sup>39</sup>*Navistar v. EPA*, 941 F.2d 1339, 1342 (6th Cir. 1991).

<sup>40</sup>*See id.* (citing 42 U.S.C. 7501(2); 42 U.S.C. § 7407(d)(1)(A)-(C)).

<sup>41</sup>*Id.* at 1342.

<sup>42</sup>*Guide, supra* note 24.

<sup>43</sup>*See id.*

<sup>44</sup>42 U.S.C. § 7411(a)(3) (2001).

<sup>45</sup>42 U.S.C. § 7503(a) (2001).

<sup>46</sup>42 U.S.C. § 7501(3) (2001). ("The term [LAER] means for any source, that rate of emissions which reflects the most stringent emission limitation, which is contained in the implantation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or the most stringent emission limitation which is achieved in practice by such class or category of source, whichever is more stringent.")

<sup>47</sup>42 U.S.C. § 7503(a)(1)(A) (2001).

<sup>48</sup>42 U.S.C. § 7502(c)(5) (2001).

<sup>49</sup>42 U.S.C. § 7470 (2001).

<sup>50</sup>42 U.S.C. § 7479(1) (2001).

to obtain a permit prior to starting construction,<sup>51</sup> install the best available control technology<sup>52</sup> (BACT), and comply with several other requirements. The PSD requirements also apply to sources that make “modifications” to their facilities or operations.<sup>53</sup>

“LAER and BACT are technology-based standards that apply to individual pollution sources. They must meet or exceed the technology-based New Source Performance Standards (NSPS). NSPS apply to categories of sources ranging from fertilizer plants to municipal solid waste incinerators. Technology-based standards serve several purposes,”<sup>54</sup> which are summarized succinctly in the following excerpt:

First, they assure a modicum of fairness to the regulated community. Every major pollution source and every major modification of a source must install some form of pollution control technology. Similar sources in the same area must install technology meeting the same standards. Second, these technology-based standards force technology, which is one of the basic goals of the CAA. LAER and BACT place the burden on a source to show why it cannot use a particular control technology. In practice, this forces sources to develop and adopt new technologies or to apply proven technologies from one industry or process to a different industry or process. Once a single source adopts a technology, then it may become BACT or LAER for an entire industry. This process improves air quality – or at least re-

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<sup>51</sup>42 U.S.C. § 7475(a) (2001).

<sup>52</sup>42 U.S.C. § 7479(3) (2001) (“The term ‘best available control technology’ means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this chapter emitted from or which results from any major emitting facility, which the permitting authority, on a case by case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of ‘best available control technology’ result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to section 7411 or 7412 of this title. Emissions from any source utilizing clean fuels, or any other means, to comply with this paragraph shall not be allowed to increase above levels that would have been required under this paragraph as it existed prior to enactment of the Clean Air Act Amendments of 1990.”).

<sup>53</sup>42 U.S.C. § 7479(2)(c).

<sup>54</sup>Adams, *supra* note 9, at 8.



duces the deterioration of – air quality.<sup>55</sup>

In conclusion, the Clean Air Act may well be the most important of all environmental statutes.<sup>56</sup> Its effects include a wide range of beneficial consequences for human health and well-being, but also have high costs on the private sector.<sup>57</sup> “The EPA estimates annual costs due to air pollution controls totaled \$37 billion in 1998 alone.”<sup>58</sup> However, annual health and welfare benefits equal \$1.1 trillion.<sup>59</sup> As a result of the Act, there were 184,000 fewer premature deaths among people thirty years of age or older.<sup>60</sup> There were 39,000 fewer cases of congestive heart failure, 89,000 fewer cases of hospital admissions for respiratory problems, 674,000 fewer cases of chronic bronchitis, and 850,000 fewer asthma attacks.<sup>61</sup> In addition, the EPA claims 7,000 annual strokes are prevented each year as a result of these measures.<sup>62</sup>

## II. EXEMPTION OF PRE-EXISTING POWER PLANTS

“[F]ossil-fueled power plants are today the largest industrial sources of nitrogen oxides (NO<sub>x</sub>) and sulfur dioxide (SO<sub>2</sub>), the air pollutants that cause ground-level ozone and acid precipitation. Power plants also are major emitters of carbon dioxide (CO<sub>2</sub>), the greenhouse gas linked to global warming.”<sup>63</sup> “It is the older dirtier coal-fired power plants that emit the most NO<sub>x</sub> and SO<sub>2</sub>.”<sup>64</sup> “Unfortunately, these are the plants most relied on by American electricity consumers.”<sup>65</sup>

“In the Clean Air Act Amendments of 1977, Congress for the first time required new utility generators to comply with air emissions performance standards for these chemicals. However, it effectively exempted then-existing power plants from the same

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<sup>55</sup>*Id.* at 8-9.

<sup>56</sup>Cass R. Sunstein, *Is the Clean Air Act Unconstitutional?*, 98 MICH. L. REV. 303, 307 (1999).

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

<sup>58</sup>Cass R. Sunstein, *Cost-Benefit Default Principles*, 99 MICH. L. REV. 1651, 1657 (2001).

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

<sup>60</sup>Sunstein, *supra* note 56, at 307.

<sup>61</sup>Sunstein, *supra* note 58, at 1657.

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

<sup>63</sup>*See id.*

<sup>64</sup>Weeks, *supra* note 5, at 711.

<sup>65</sup>*See id.*

requirements.”<sup>66</sup>

Grandfathering of older units is not explicit under the CAA; there is no single section of the Act in which Congress definitively or expressly declares that all older units are permitted to continue to emit air pollutants at less stringent levels than their newer counterparts.<sup>67</sup> Instead, Title I of the Act includes several layers of provisions applicable only to new units and modifications of existing units.<sup>68</sup> Read together, and as interpreted by [the] EPA in various rulemakings, these provisions allow older electric generating units to continue to emit air pollutants at similar levels as when they were first in operation – in many cases more than thirty years ago. As a result, these older units emit NO<sub>x</sub> and SO<sub>2</sub> at five to ten times the rate of their newer counterparts.<sup>69</sup>

Older power plants also get a break from the New Source Performance Standards (NSPS),<sup>70</sup> which are technology-based limits on air pollutant emissions rates.<sup>71</sup> “New power plants established after these rules came into effect are required to meet more stringent emissions rates than older units.”<sup>72</sup> In addition, “older sources that have been modified also must meet NSPS, but only if the proposed change does not fall within six listed exemptions,<sup>73</sup> and only if the modification results in an increased emissions rate from the unit.”<sup>74</sup>

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<sup>66</sup>*Id.*

<sup>67</sup>*Id.*

<sup>68</sup>*Id.* at n.19. (“Title IV of the CAA, which enacts the Acid Rain Provision, limits SO<sub>2</sub> emissions levels from all plants, old and new, with implementation through an allowance cap and trade system.”). See generally 42 U.S.C. §§ 7651-7651o. Even in the Acid Rain provisions, however, emissions from the new units are more stringently regulated. For example, under Title IV, existing sources are to be granted free emissions allowances, while new sources must purchase all of their required allowances. See 42 U.S.C. § 7651b(f)).

<sup>69</sup>*Id.* at 712.

<sup>70</sup>42 U.S.C. § 7411(a)(2). (“The term ‘new source’ means any stationary source, the construction or modification of which is commenced after the publication of regulations (or, if earlier, proposed regulations) prescribing a standard of performance under this section which will be applicable to such source.”).

<sup>71</sup>Weeks, *supra* note 5, at 712 (citing 40 C.F.R. § 60.14(b) (1997)).

<sup>72</sup>*Id.* at 712.

<sup>73</sup>See 42 U.S.C. § 7411(b). “The following changes to an existing stationary source are exempted from the definition of modification, and therefore do not require the source to meet NSPS: routine maintenance, repair, or replacement; increased production rate (if accomplished without a capital expenditure); increased hours of operation; use of an alternative fuel (including certain conversions to coal for energy supply considerations; addition of pollution control technology; relocation or change in ownership. See 40 C.F.R. § 60.14(e)(1)-(6) (1997). If replacement activity at a source is such that the fixed capital cost of the new components exceeds fifty percent of the fixed capital cost required to construct a comparable new facility, such a project is not routine, but rather constitutes a reconstruction, and NSPS applies. See 40 C.F.R. § 60.15 (1997).” Weeks, *supra* note 5, at n.28.

<sup>74</sup>Weeks, *supra* note 5, at 712-13. (citing 40 C.F.R. § 60.14(a) (1997)).

NSPS is a complicated set of rules that results in a regulatory advantage for older power plants. "This situation derives from an assumption in U.S. environmental policy that there would inevitably occur a natural turnover of power plants. Power plants have typically been built to last thirty to forty years, and environmental policy has been developed with the assumption that thirty year-old plants would be soon phased out of production."<sup>75</sup> However, this assumption ignored the cost advantages that the exempt plants now enjoy. The result is that cost advantage gives the older, dirtier power plants a competitive advantage against newer, cleaner power plants, while at the same time allowing them to emit NO<sub>x</sub> and SO<sub>2</sub> at five to ten times the rate of newer units.<sup>76</sup>

In fact, "[t]his indirect subsidy confers a production cost advantage of between one-half and two cents per kilowatt-hour for older plants, which translates into about \$2.50 to \$10 less each month for a typical \$100 residential utility bill. Since demand for cheaper energy exceeds demand for cleaner power by a factor of about fifteen to one, lower cost translates into an increase in sales."<sup>77</sup>

### III. SPECIFIC LINKS TO ADVERSE HEALTH IMPACTS OF OLDER POWER PLANTS

Two recent studies conducted by the Harvard School of Public Health have made a direct link between specific power plants and adverse health effects. The first study, *Estimated Public Health Impacts of Criteria Pollutant Air Emissions from the Salem Harbor and Brayton Point Power Plants*,<sup>78</sup> looked at the health impact of two Massachusetts coal burning power plants that are exempt from the CAA. The second study, *Estimated Public Health Impacts of Criteria Pollution Air Emissions from Nine Fossil-Fueled Power Plants in Illinois*,<sup>79</sup> also examines the health

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<sup>75</sup>Hsu, *supra* note 3, at 435.

<sup>76</sup>Weeks, *supra* note 5, at 715-16.

<sup>77</sup>David Mallery, *Clean Energy and the Kyoto Protocol: Applying Environmental Controls to Grandfathered Power Facilities*, 10 COLO. J. INT'L ENVTL. L. & POL'Y 469, 474 (1999).

<sup>78</sup>Jonathan Levy, et. al., *Estimated Public Health Impacts of Criteria Pollutant Air Emissions from the Salem Harbor and Brayton Point Power Plants*. (May, 2000) available at <http://www.hsph.harvard.edu/papers/plant/plant.pdf>. [hereinafter *Mass. Study*].

<sup>79</sup>Press Release, Harvard School of Public Health, Study Details Impact of Pollution on Public Health From Nine Older Fossil Fuel Power Plants in Illinois (Jan. 3, 2001) (on file

impact of grandfathered facilities. These studies considered the effects of emissions of sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), and particulate matter (PM<sub>10</sub>).<sup>80</sup>

Both studies used state of art computer models that show how weather patterns disperse the pollutants.<sup>81</sup> Researchers then took the pollutant dispersion data and used epidemiological data coupled with demographic data to quantify the health effects.<sup>82</sup> The studies baseline damage estimate was derived from actual emissions reported by the power plants.<sup>83</sup> These were coupled with a set of proposed target emission rates for PM<sub>10</sub>, NO<sub>2</sub>, and SO<sub>2</sub>, (based on the emission rates of new coal-fired power plants using BACT) to estimate the target health effects and determine the expected benefits of controlling emissions from these grandfathered power plants.<sup>84</sup>

The Massachusetts study defined a population of interest living in New England, eastern New York and New Jersey, which included approximately 32 million people.<sup>85</sup> It found that if these two plants were to use the Best Available Control Technologies (BACT) as required for newer power plants and retrofits for some older plants, "an estimated 124 premature deaths would be averted per year, along with 1,300 fewer emergency room visits, 34,000 fewer asthma attacks, and 230,000 fewer daily incidents of upper respiratory symptoms."<sup>86</sup>

The Illinois study looked at the emissions' impact upon 33 million people living within 250 miles of the geographic center of the plants.<sup>87</sup> It found that "applying existing emission control technology to the [nine] older [Illinois] plants could reduce the annual mortality risk by approximately 200 premature deaths per year, along with 2,000 fewer emergency room visits, 10,000 fewer asthma attacks and 300,000 fewer daily incidents of upper respiratory problems. They also determined that recent fuel switching and emission controls adopted by a subset of the power plants reduced the mortality risk between 1998 and 2000 by 80 premature

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with Harvard School of Public Health), available at [www.hsph.harvard.edu/press/releases/press1032001.html](http://www.hsph.harvard.edu/press/releases/press1032001.html).

<sup>80</sup> *Mass. Study*, *supra* note 78, at 3.

<sup>81</sup> Mallery, *supra* note 77.

<sup>82</sup> *Mass Study*, *supra* note 78, at 9.

<sup>83</sup> *Id.*

<sup>84</sup> *Id.*

<sup>85</sup> *Id.* at 3.

<sup>86</sup> *Id.* at 5-6.

<sup>87</sup> *Id.*

deaths per year.”<sup>88</sup>

Both studies showed that these risks decrease as distance from the plant increases.<sup>89</sup> In fact, the Illinois study found that “[s]ome 37 percent of the estimated health risks associated with the plant’s pollution is concentrated on the 16 percent of the study population that lives in Cook County.<sup>90</sup> Exposures from the nine plants are greatest near Chicago.”<sup>91</sup> In addition, “[t]hose individuals with pre-existing cardiovascular or respiratory disease in that city represent a special high-risk group within the study.”<sup>92</sup>

Another recent study published by the Clean Air Task Force shows how those populations nearest the power plants are at the highest risk:

By modeling the impact of power plant pollution throughout the lower 48 states, Abt Associates developed health impact estimates for every state and major metropolitan area. Not surprisingly, states with large populations in close proximity to many coal-fired power plants fared the worst. Conversely, states with large populations but without coal-fired plants fared much better. For example, California, which has the nation’s largest population and some of its worst air quality, has very few coal or oil-fired power plants. Abt Associates estimates that only 259 deaths are attributable to power plant pollution in California and the state ranked almost last in per capita impact (1.4 deaths per 100,000 adults). Kentucky, the state with the highest reliance on coal for production of electricity ranked first in related per capita mortality at more than 44 deaths per 100,000 adults, over 30 times higher than California’s per capita mortality rate.<sup>93</sup>

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<sup>88</sup> *Mass Study*, *supra* note 78, at 5-6.

<sup>89</sup> *Id.* at 23.

<sup>90</sup> *Mallery*, *supra* note 77.

<sup>91</sup> *Id.*

<sup>92</sup> *Id.*

<sup>93</sup> *Schneider*, *supra* note 10.

These three studies all show a direct link between grandfathered power plants and increased health risks. The Harvard studies urge that lives will be saved by requiring the grandfathered power plants to meet the BACT standards that are required for new stationary sources.<sup>94</sup> Given that the technology is available and used by other power plants, the results from these studies are particularly disturbing. Given the health risks involved with grandfathered plants and the availability of pollution reducing technology, now is the time to require these grandfathered plants to implement higher pollution control standards.

#### IV. RESOLUTION

With a substantial portion of the world's population still in developing countries, world energy needs are likely to continue to grow for decades to come. "Even in the United States, energy consumption grew by 22% from 1990 to 1999, while the population grew by only 12%. As the demand for energy grows, so does the need to minimize the environmental consequences of producing it."<sup>95</sup> For the long term, the need to pursue development of renewable energy technologies is clear. Meanwhile in the short term, a smart step toward protecting the lives of the public is requiring the grandfathered power plants to comply with the emission requirements applied to new power plants.

Recently, in recognition of the negative consequences of exempting grandfathered power plants, several members of Congress have attempted to eliminate the advantage that grandfathered power plants enjoy. For example, Senate Bill No. 2636, introduced in October of 1998 by Senator Leahy (D-VT) would have required existing generating units to meet New Source Review within ten years, and meet other emissions and efficiency standards for NO<sub>x</sub>, CO<sub>2</sub>, and mercury.<sup>96</sup> House of Representatives Bill No. 2980, introduced in October of 1999 by Representative Allen (D-ME) and Senate Bill No. 2610, introduced in October of 1998 by Senator Lieberman (D-CT) would also have required grandfathered generating units to meet New Source Review.<sup>97</sup> The bills

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<sup>94</sup> Mallery, *supra* note 77; *Mass. Study*, *supra* note 78, at 5-6.

<sup>95</sup> *Id.*

<sup>96</sup> S. 2636 105th Cong. (1998).

<sup>97</sup> H.R. 2980 105th Cong. (1997); S. 2610 105th Cong. (1998). "The summary of the bill as introduced reads: Amends the Clean Air Act to require emissions standards of perform-

that have sought to introduce cap-and-trade programs for CO<sub>2</sub>, NO<sub>x</sub>, and mercury include Senate Bill No. 172, introduced by Senator Moynihan (D-NY) in January of 1999, and Senate Bill No. 1369, introduced by Senator Jeffords (R-VT) in July of 1999.<sup>98</sup>

Although none of these bills made it through Congress, the fact that they have been introduced indicates that some lawmakers on Capitol Hill have recognized that it is time for a change in the application of the CAA to grandfathered power plants. These attempts at amending the older power plants are regulated under the CAA are key to protecting the lives and health of citizens affected by the pollution emitted from them.

Arguably, the most effective attempt at protecting health from the effects of these grandfathered power plants, absent an amendment to the CAA, occurred when the EPA and the Department of Justice launched enforcement actions against thirty-two electric power plants in the Midwest and South, alleging violations of the NSR provisions of the Clean Air Act. The plants were all grandfathered under the [A]ct and thus not required to comply with NSPS requirements unless they made "major" modifications, which the government now alleges they did. After an extensive investigation, the EPA and the Department of Justice filed civil suits against seven electric utility companies alleging violations at seventeen plants, an administrative order against one federally operated company alleging violations at seven of its plants, and eight notices of violation to eight plants not targeted in lawsuits. In 2000, "[the] EPA and the Department of Justice expanded the lawsuits by charging another twelve plants owned by the utilities

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ance for new or modified fossil fuel-fired electric utility units to apply to grandfathered units (units that were not subject to standards set forth in Federal regulations pertaining to fossil fuel-fired steam generators which construction is commenced after August 17, 1971, and certain other steam generating units or to subsequent standards for such units) that: (1) have the capacity to generate more than 25 megawatts of electrical output per hour; and (2) generate electricity that flows through transmission or connected facilities that cross State lines. . . . Requires grandfathered units to comply with standards established before this Act's enactment within five years of this Act's enactment. . . .Directs the Administrator of the Environmental Protection Agency, to: (1) establish national annual limitations . . . for each pollutant . . . (2) allocate transferable allowances . . . and (3) require grandfathered units to meet standards by emitting no more of each regulated pollutant than the quantity of allowances held by such units for the year." Mallery, *supra* note 77, at 495-96.

<sup>98</sup>S. 172, 106th Cong. (1999); S. 1369, 106th Cong. (1999). H.R. 25, 106th Cong. (1999) introduced by Rep. Boehler (R-NY) would have implemented a NO<sub>x</sub> cap-and-trade program similar to S. 172, 105th Cong. (1997) as would H.R. 2909, introduced by Rep. Pallone (D-NJ).

with CAA violations.”<sup>99</sup>

In yet another attempt at solving the exemption problem, some states have tried to force grandfathered power plants to meet more stringent regulations. For example, a structuring law passed in Texas requires grandfathered power plants built before 1971 to reduce NO<sub>x</sub> emissions by 50% and SO<sub>2</sub> emissions by 25%.<sup>100</sup> Other states, following the EPA’s directive, are suing the same utility corporations that the EPA has filed suit against. New York has brought suit against seventeen coal-fired power plants located in the Midwest and Mid-Atlantic regions using the same arguments.<sup>101</sup> Like the federal suits, the New York “complaints allege that the companies made major modifications at their plants that triggered NSR permitting requirements, but that the companies failed to apply for the necessary permits and to install BACT as required under the NSR program,” resulting in the annual emission of millions of tons of illegal NO<sub>x</sub>, SO<sub>2</sub> and particulate matter.<sup>102</sup>

Although these grandfathered power plants should be brought under stricter standards, the long term solution to the pollution problem is not found in creating more regulations. Therefore, the second step in solving the pollution problem requires a “clean energy development strategy that implements targeted policies and practices to capture readily achievable public health... benefits. Clean energy development will reduce pollution, improve reliability by diversifying the power supply, create new ‘green’ manufacturing and installation jobs, and provide new renewable wind power and biomass energy ‘cash crops’ for farmers.”<sup>103</sup>

Renewable energy technologies have not been fully developed in the past because of their prohibitive cost. “Significant technological progress has resulted in lower production costs for

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<sup>99</sup>*Id.* at 185-86.

<sup>100</sup>TEX. UTIL. CODE ANN. § 39.264(c) (Vernon 1998).

<sup>101</sup>Peter Lehner, *Clean Air Litigation in a Restructuring Electricity World*, 18 PACE ENVTL. L. REV. 309, 310 (2001). “. . . [t]he New York Attorney General’s office undertook an extensive investigation. We looked at several different publicly available sources of information regarding coal consumption, emissions, and generation. We found the following pattern: first, decreasing coal consumption as the plant aged; second, a sharp decrease, indicating an extended outage; and third, a subsequent increase in coal consumption, generation and pollution. For example, at Paradise, a TVA facility that [the] EPA investigated, a sharp drop in coal consumption and generation occurred in 1983-1984. It turns out that [the] TVA did \$60 million of upgrades at that time. Our investigations uncovered similar patterns at many other power plants.” *Id.* at 312.

<sup>102</sup>Caplan, *supra* note 15, at 186.

<sup>103</sup>*See id.*



the five major nonhydroelectric renewable energy technologies: wind, solar photovoltaic, solar thermal, geothermal and biomass."<sup>104</sup> However, "the costs of electricity generation from these technologies are still higher than the cost of new coal and natural gas-fired technologies."<sup>105</sup>

"Per unit of energy produced, natural gas-fired plants are considerably cleaner than coal-fired plants, emitting only 33% of the CO<sub>2</sub>, 10% of the NO<sub>x</sub>, and virtually none of the SO<sub>2</sub>, particulate matter, and mercury emitted by coal-fired plants."<sup>106</sup> Yet, there are problems with gas-fired plants. First, given recent surging natural gas prices, "too abrupt of a switch from all coal-fired capacity to natural gas may result in energy shortages or high electricity prices."<sup>107</sup> Second, natural gas reserves are of limited supply.<sup>108</sup>

Shing-Li Hsu's article on emission reduction in the electric industry succinctly summarizes the pros and cons of five renewable energy resources:

Biomass energy production, which involves the burning of organic or waste material to create pressure to drive turbines, is currently the most productive renewable energy source, largely because of its twenty-four-hour availability (as opposed to intermittent wind and solar resources) and its ability to co-fire with conventional fuels. Geothermal energy may be the most mature of the renewable energy technologies, but this also means that this industry may have less upside in terms of potential for innovation. Wind energy is currently the least expensive and may ultimately prove to be the most promising renewable energy source, as it has been estimated that the Central Plains states contain sufficient wind resources to meet total U.S. energy demand several times over. Wind energy is also promising because wind turbines can share land dedicated

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<sup>104</sup>Hsu, *supra* note 3, at 437-38.

<sup>105</sup>*Id.*

<sup>106</sup>*Id.* at 431.

<sup>107</sup>*Id.* at 431-32.

<sup>108</sup>*Id.* at 432.

to agriculture, a dominant land use in the wind-rich central plain states. Solar thermal energy, which uses sunlight to heat water and create steam to drive a turbine, was surprisingly successful in its only large-scale experience, steadily achieving production cost decreases. Solar photovoltaic, which uses sunlight to stimulate an electrical current in a semiconductor device, remains considerably more expensive than other renewable energy technologies, but may still offer great potential. A substantial amount of research and development would be needed to make solar photovoltaic energy competitive.<sup>109</sup>

Other critics suggest nuclear power as an alternative energy source.<sup>110</sup> However, there are serious risks involved in nuclear energy production as well as in the radioactive byproduct of such production.<sup>111</sup> Again, developing and converting to these types of energy resources will require time and significant costs. However, the need to diversify the country's energy resources is significant and will continue to become more important as the world's population grows.

## V. CONCLUSION

Now, more than ever, there is concrete evidence that links the significant dangers posed to public health by grandfathered power plants. Indeed, there is a property right controversy over the taxpaying and air-breathing public's right to demand that electricity generation firms give up their higher-polluting capital assets and invest in cleaner ones. Unfortunately, resolution of this controversy is not so simple as merely requiring the grandfathered power plants to comply with NSPS.

The public health analysis is not one-dimensional. There are indeed several costs involved in compliance as well as the need to recognize the costs involved in developing renewable and cleaner energy resources. "The continued operation of a source

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<sup>109</sup>*Id.* at 439.

<sup>110</sup>Robert D. McDougal & Neil J. Numark, *Nuclear Power in Deregulated Markets: Performance to Date and Prospects for the Future*, 14 TUL. ENVTL. L. J. 277, 282 (2001).

<sup>111</sup>*Id.*

may provide jobs, taxes, and other benefits to the surrounding community. Jobs provide health care benefits. Taxes support social services including public health programs and education."<sup>112</sup> Indeed, these benefits are not to be undermined. "Nonetheless, those immediately surrounding a source likely suffer an environmental detriment that others do not."<sup>113</sup>

Despite the costs involved, it appears Americans are ready for cleaner, healthier air. "A bipartisan survey by Lake, Soslin, Snell, Perry & Associates found that eighty percent of voters support stricter clean air standards. This level of support occurs in every demographic subgroup, including gender, political party, region and race. Significantly, support for clean air policies is quite strong in the Midwest."<sup>114</sup>

The electricity generation industry argues that they are engaged in a lawful business complying with existing environmental regulations, and that new regulations would be unfair in singling them out. On the other hand, while the industry has successfully fended off legislative challenges to their ability to operate coal-fired power plants, their legal ground is somewhat shakier in light of the EPA lawsuits challenging their grandfathered status: it could be that electricity generation firms with coal-fired power plants that have undergone major modifications are not engaged in a lawful business.<sup>115</sup>

The EPA and the Department of Justice are aware of the threat to public health posed by these old coal-fired power plants. Some members of Congress appear ready to change the law. Given that there are legitimate studies showing a direct link to grandfathered power plants and harmful health effects, it is time for the rest of the population to recognize the need for a change and to ask for it. As seen in the Harvard studies, their lives depend on it.

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<sup>112</sup>*Id.*

<sup>113</sup>Adams, *supra* note 9, at 60-61.

<sup>114</sup>Wolley, *supra* note 6, at 279.

<sup>115</sup>*Id.*