

ARTICLE

THE AESTHETICS OF WIND ENERGY SYSTEMS¹

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It is something to be able to paint a particular picture, or to carve a statue and so to make a few objects beautiful; but it is far more glorious to carve and paint the very atmosphere and medium through which we look, which morally we can do. To affect the quality of the day, that is the highest of arts.²

I. INTRODUCTION

According to the United States Department of Energy, [f]ossil fuels—coal, oil and natural gas—currently provide more than 85% of all the energy consumed in the United States, nearly two-thirds of our electricity, and virtually all of our

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¹ Although “wind energy systems” can refer to “electricity-generating wind turbines as used predominantly in the arrays of windfarms and, in much smaller numbers and sizes, for distributed generation and as a component of hybrid power systems,” Nat’l Wind Coordinating Comm., *Wind Energy Series: Wind Performance Characteristics* (Jan. 1997), at <http://www.nationalwind.org/publications/wes/wes10.htm> (last visited Jan. 10, 2005), the focus of this Article is on the aesthetic impact on the landscape of large utility-scale wind farms. Some of the arguments, however, may also apply to the visual impact of single or small clusters of wind turbines used to generate electricity for single homes, farming cooperatives, or small communities.

² HENRY DAVID THOREAU, WALDEN 61 (Owen Thomas ed., W.W. Norton & Co. 1966) (1854).

transportation fuels. Moreover, it is likely that the nation's reliance on fossil fuels to power an expanding economy will actually increase over at least the next two decades³

³ U.S. Dep't of Energy, *Fossil Fuels*, at http://www.doe.gov/engine/content.do?BT_CODE=FOSSILFUELS (last visited Dec. 8, 2004); see also Donald A. Brown, *Climate Change, in STUMBLING TOWARD SUSTAINABILITY* 273, 294 (John C. Dernbach ed., 2002) (stating that, over the next twenty years, U.S. oil consumption will increase by thirty-three percent, and demand for energy will increase forty-five percent) (citing UNITED STATES, REPORT OF THE NATIONAL ENERGY POLICY DEVELOPMENT GROUP, NATIONAL ENERGY POLICY (2001)); Simon Romero, *Why the Saudis May Not Rescue Oil Markets This Time*, N.Y. TIMES, May 16, 2004, at BU5 ("Global demand for oil is growing faster than at any time in the last 15 years, fueled by robust economies in China and India and a recovery in the United States"); Matthew L. Wald, *Cooling Your House, Draining Your Wallet*, N.Y. TIMES, June 17, 2004, at F1, F7 ("Natural gas heats about two-thirds of American homes, and it generates about 15 percent of the country's electricity. . . . About half of electricity comes from coal"); Power Scorecard, *Electricity from: Coal* ("The nation's fleet of over 100 coal plants is responsible for 57 percent of the electricity generated in the U.S., more than any other single electricity fuel source."), at http://www.powerscorecard.org/tech_detail.cfm?resource_id=2 (last visited Dec. 6, 2004); Power Scorecard, *Electricity from: Oil* ("Oil is the largest source of energy in the United States, providing close to 40 percent of all of the nation's entire power needs."), at http://www.powerscorecard.org/tech_detail.cfm?resource_id=8 (last visited Dec. 6, 2004).

Natural gas—"the cleanest of all fossil fuels"—causes the least environmental impact. Power Scorecard, *Electricity from: Natural Gas*, at http://www.powerscorecard.org/tech_detail.cfm?resource_id=6 (last visited Dec. 6, 2004). It produces less carbon dioxide and mercury than coal or oil combustion and virtually no particulate matter or sulfur dioxides. *Id.* As a result, some view natural gas as a "transitional" fuel between the other fossil fuels—coal and oil—and renewable energy sources. See, e.g., BILL MCKIBBEN, *THE END OF NATURE* 15, 144 (1989); Howard A. Learner, *Cleaning, Greening and Modernizing the Electric Power Sector in the Twenty-First Century*, 14 TUL. ENVTL. L.J. 277, 299 (2001); Power Scorecard, *Electricity from: Natural Gas*, *supra*. But because natural gas, like other fossil-based fuels, is limited and is therefore not a renewable resource, it cannot be regarded as a long-term solution. In addition, natural gas combustion produces considerable nitrogen oxides, carbon monoxides, and methane. Consequently, natural gas combustion can contribute to climate change. *Id.* Although "methane remains in the atmosphere for a relatively short time, perhaps a dozen years, compared with 50–100 years for CO₂," Adam Serchuk, *The Environmental Imperative for Renewable Energy: An Update*, SPECIAL EARTH DAY REPORT (Renewable Energy Policy Project, Washington, D.C.), Apr. 2000, at 15, available at http://www.repp.org/repp_pubs/articles/envImp/envImp.pdf, methane is a very potent greenhouse gas containing twenty-one to twenty-three times the global heat effect as carbon dioxide. See Intergovernmental Panel on Climate Change, *Climate Change 2001: Working Group 1: The Scientific Basis: Sources of Greenhouse Gases*, at http://www.grida.no/climate/ipcc_tar/wg1/130.htm (last visited Jan. 16, 2004); see also Serchuk, *supra*, at 15. As a result, natural gas cannot be considered on

This news is discouraging because fossil fuel-based energy results in “scarring or pollution of the environment during extraction of the fuels and contributes to local air pollution and smog formation, regional acid rain production and global warming as the fuels are burned.”⁴

For environmental reasons, including human health,⁵ as well as for economic and foreign policy reasons, this country needs to reduce its dependence on fossil fuels and rely more heavily on renewable energy sources like wind, solar, geothermal, hydrogen, and biomass.⁶ Fortunately, the technology for these renewable

par with renewable energy technologies, which “tap into natural cycles and systems, turning the ever-present energy around us into usable forms,” and which “do not deplete our natural resources or destroy our environment.” Union of Concerned Scientists, *Clean Energy: Renewable Energy*, at http://www.ucsusa.org/clean_energy/renewable_energy/index.cfm (last visited Nov. 29, 2004).

⁴ Price & Levine, *Production and Consumption of Energy*, in STUMBLING TOWARD SUSTAINABILITY, *supra* note 3, at 79, 80.

⁵ Because the author of this Article considers “human health” to be an “environmental” issue, the Article uses the phrase “environmental, *including* human health,” rather than “environmental *and* human health.” This Article will introduce the issue of whether we should include a human component in our conception of “environment,” “landscape,” and “nature” in Part IV and will discuss this issue in greater detail in Part V.

⁶ Although this Article in general, and Part II in particular, will focus on the environmental (including human health) reasons for reducing our reliance on fossil fuels, the economic and foreign policy reasons for lessening this dependence should not be overlooked. Many people believe that decreasing fossil fuel use will have negative economic repercussions for this country. *See, e.g., infra* Part II.A and note 38. While it is true that some sectors of this country could be hurt by a sudden and drastic reduction in fossil fuel use, it is inaccurate to conceive of renewable energies as trading economic stability for environmental, including human health, benefits. For a general discussion of the economic benefits of transitioning to renewable energies, including, but not limited to wind energy, see John C. Dernbach & the Widener University School Seminar on Global Warming, *Moving the Climate Change Debate from Models to Proposed Legislation: Lessons from State Experience*, 30 Env'tl. L. Rep. (Env'tl. L. Inst.) 10,933 (2000) (“Because of the savings and the economic activity created by a transition to more renewable energy and greater energy conservation, nearly 900,000 new jobs would be created with a net increase in wages and salaries of \$27 billion.”); Learner, *supra* note 3, at 278 (“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.”). For a discussion of the economic effect of global warming on tourism, see *infra* Part II.A. For an overview of the economic benefits of wind energy, see *infra* Part III.B.

With respect to the foreign policy reasons for transitioning to renewable

energy sources is not light-years away.⁷ In fact, wind power—the focus of this Article—has been used for thousands of years to move ships, grind grain, and pump water.⁸ As Shane Thin Elk explains in his legislative note, *The Answer is Blowing in the Wind: Why North Dakota Should Do More to Promote Wind*

energies, consider that the United States imports fifty-five percent of its oil. Keith Bradsher, *China Set to Act on Fuel Economy*, N.Y. TIMES, Nov. 19, 2003, at A1; Editorial, *China's Message on Energy*, N.Y. TIMES, Nov. 19, 2003, at A28. By 2015, the United States is expected to import twenty-five percent of its oil from Africa, mostly from unstable countries like Angola, whose population has suffered from decades of “catastrophic civil war” and “grinding poverty.” For discussions of and anecdotes about how fossil fuel dependence impacts both energy security and national security, see DAVID W. ORR, *THE LAST REFUGE: PATRIOTISM, POLITICS, AND THE ENVIRONMENT IN AN AGE OF TERROR* 12, 46 (2004) (stating that the administration’s plan to build more “power plants would only create more targets for terrorists” and that “[t]here would be no better first step to ensure our security and that of others than a resolute decision that we will end our dependence on foreign oil—and all fossil fuels—by tapping technological ingenuity to increase our energy efficiency, harness renewable energy, and build a more resilient, less centralized energy system”); Dernbach, *supra*, at 10,948 (discussing how reducing net greenhouse gas emissions can help protect national security); Thomas L. Friedman, *Dancing Alone*, N.Y. TIMES, May 13, 2004, at A25 (questioning why the administration did not “use 9/11 as a spur to launch a Manhattan project for energy independence and conservation, so we could break out of our addiction to crude oil, slowly disengage from this region and speak truth to fundamentalist regimes, such as Saudi Arabia”); see also Anthony Richter & Svetlana Tsalik, *Making Sure The Money Goes Where It's Supposed To*, N.Y. TIMES, Dec. 4, 2003, at A39 (discussing how the United States’ need for oil is so great that it often overlooks problems of governance in oil-rich countries which “undermines, rather than enhances, American energy security, since repressive regimes are prone to being violently overthrown by people who resent the United States for supporting their oppressors”); Union of Concerned Scientists, *Clean Energy: Energy and Security* (“US dependence on oil, particularly foreign oil, carries significant economic and political risks. . . . [T]he nations dominating the world oil market are located in historically unstable regions of the world, creating complex and delicate relationships for US foreign policy.”), at http://www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=49 (last visited Nov. 29, 2004). Other regions of the world also share concerns about energy security. See, e.g., Wayne Arnold, *As Oil Prices Rise, a Sense of Alarm*, N.Y. TIMES, June 10, 2004, at W1 (discussing how Asia is also concerned about energy security because it counts on the Middle East for no less than half of its oil).

⁷ See, e.g., Learner, *supra* note 3, at 297-300 (discussing developing renewable energy resources in the Midwest).

⁸ Wind & Hydropower Technologies Program, U.S. Dept. of Energy, *History of Wind Energy* [hereinafter *History of Wind Energy*] (“Wind energy propelled boats along the Nile River as early as 5000 B.C. By 200 B.C., simple windmills in China were pumping water, while vertical-axis windmills with woven reed sails were grinding grain in Persia and the Middle East.”), at <http://www.eere.energy.gov/wind/web.html> (last updated Mar. 2, 2004).

Energy Development:

Although the ultimate source of wind's kinetic energy is of extraterrestrial origin, the concept of harnessing the wind for energy is by no means alien to humankind. By 5,000 B.C., the Egyptians were using the wind to sail along the Nile. . . . [T]he Babylonian Emperor Hammurabi proposed using wind mills [sic] to pump water for use in irrigation around 2,000 B.C. In 200 B.C., windmills were in use in Persia and became widely established there by 600 A.D. It seems that this technology was widely diffused in the East by the time of the Crusades, and that as the marauding Crusaders returned home, they may have helped to spread the use of windmills across Europe. This technology was especially utilized and refined in Holland, and the Dutch brought their use of windmills with them when they immigrated to North America.⁹

As the Natural Resources Defense Council further illustrates:

By the early twentieth century, small windmills were used for pumping water and electric power generation in Europe, the United States, Africa, and elsewhere. In addition to thousands of small wind electric generators, a few larger systems were built in North America and Europe.

⁹ Shane Thin Elk, Legislative Note, *The Answer is Blowing in the Wind: Why North Dakota Should Do More to Promote Wind Energy Development*, 6 GREAT PLAINS NAT. RESOURCES J. 110, 112 (2001); see also MICHAEL BROWER, COOL ENERGY: RENEWABLE SOLUTIONS TO ENVIRONMENTAL PROBLEMS 71 (1992) ("Wind, one of the oldest energy sources known to humanity, has been used for millennia to pump water, thresh grain, and propel ships."); ROBERT L. THAYER, JR., GRAY WORLD, GREEN HEART: TECHNOLOGY, NATURE, AND THE SUSTAINABLE LANDSCAPE 273 (1994) ("Wind . . . has been powering human activity for thousands of years."); Michael Bergey, *A Primer on Small Turbines*, ("The wind has been an important source of energy in the U.S. for a long time. . . . Back in the 1920's and 1930's . . . farm families throughout the Midwest used 300-3,000 watt wind generators to power lights, radios, and kitchen appliances. The modest wind industry that had built up by the 1930's was literally driven out of business by government policies favoring the construction of utility lines and fossil fuel plants. In the late 1970's and early 1980's intense interest was once again focused on wind energy as a possible solution to the energy crisis."), at <http://www.bergey.com/School/Primer.html> (last visited Nov. 2, 2004); Nat'l Renewable Energy Lab., *Introduction to Wind Energy* ("We have been harnessing the wind's energy for hundreds of years. From old Holland to farms in the United States, windmills have been used for pumping water or grinding grain."), at http://www.nrel.gov/clean_energy/wind.html (last visited Dec. 8, 2004); *History of Wind Energy*, *supra* note 8 (describing the use of wind energy from 5000 BC until the early twentieth century).

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In the 1970s, increases in the price of oil and other fossil fuels helped wind power return as an economically viable, alternative source of energy.¹⁰

Since the 1970s, continued efforts to improve wind turbines have made wind energy “the fastest growing source of electricity generation in the world.”¹¹ Although the wind energy industry has developed steadily in the United States, the majority of this growth has been in Europe, especially in Denmark.¹² While this

¹⁰ Natural Res. Def. Council, *Wind Energy: Alternative Energy Technologies Hold the Key to Curbing Air Pollution and Global Warming*, at <http://www.nrdc.org/air/energy/fwind.asp> (last visited Dec. 8, 2004); see also ARI REEVES & FREDRIC BECK, WIND ENERGY FOR ELECTRIC POWER: A REPP ISSUE BRIEF 8 (July 2003) (“Harnessing the wind for large-scale electric power generation is a relatively recent development. Wind had been used for hundreds of years to power sailing vessels and to drive windmills, but it wasn’t until the late 19th century that the first wind turbine for electricity generation came into use.”), available at http://www.repp.org/articles/static/1/binaries/wind%20issue%20brief_FINAL.pdf; Energy Info. Admin.; U.S. Dep’t of Energy, Wind Power Milestones (providing a chronology of wind power developments from the early 1900s to 1995), at <http://www.eia.doe.gov/cneaf/solar.renewables/renewable.energy.annual/backgrnd/chap10l.htm> (last visited Dec. 8, 2004). Note, however, that while “[t]he oil crisis of 1973 boosted interest in large wind turbines and sparked several government-sponsored research programs in Germany, Sweden, Canada, the U.K. and the U.S.,” REEVES & BECK, *supra*, at 8, this was mostly “because renewables were a means of increasing energy supply, not because they were a way of reducing emissions of pollutants of greenhouse gases.” Shi-Ling Hsu, *Reducing Emissions From the Electricity Generation Industry: Can We Finally Do It?*, 14 TUL. ENVTL. L.J. 427, 437 (2001).

¹¹ *History of Wind Energy*, *supra* note 8; see also Learner, *supra* note 3, at 284 (“Wind power is the world’s fastest growing energy source.”); Christine Real de Azua, *The Future of Wind Energy*, 14 TUL. ENVTL. L.J. 485, 486 (2001) (“Wind is now the fastest growing commercial scale energy technology in the world.”); Elinor Burkett, *A Mighty Wind*, N.Y. TIMES, June 15, 2003, § 6 (Magazine), at 49 (“Wind is the world’s fastest-growing energy resource.”); *Discuss Wind Power Based on Facts*, BURLINGTON FREE PRESS, Feb. 1, 2004 (“Wind power [is] the world’s fastest growing electricity source.”), available at <http://www.glebmountaingroup.org/N010104/Bdiscuss020104.doc>; Mary Grady, *Reaping the Wind In a Brand New Age*, CONSERVATION MATTERS (Conservation Law Found.), Spring 2003 (“Wind power is the world’s fastest growing source of electricity.”), <http://www.clf.org/general/index.asp?id=405>; REEVES & BECK, *supra* note 10, at 9.

¹² See *History of Wind Energy*, *supra* note 8; see also JOSEPH M. COHEN & THOMAS A. WIND, NAT’L WIND COORDINATING COMM., DISTRIBUTED WIND POWER ASSESSMENT 5-13 (2001) (discussing the growth of wind generation in Denmark and Germany and comparing this progress with the development of wind energy in the United States), available at http://www.nationalwind.org/pubs/distributed/distributed_wind.pdf; Svend Auken, *Answers in the Wind: How*

difference in the use of wind power is due in part to governmental policies in Europe that favor the use of wind energy,¹³ wind energy

Denmark Became a World Pioneer in Wind Power, 26 FLETCHER F. WORLD AFF. 149, 150 (2002) (“Wind energy today provides 14 percent of Denmark’s electricity consumption.”); Richard L. Ottinger & Mindy Jayne, *Global Climate Change Kyoto Protocol Implementation: Legal Frameworks for Implementing Clean Energy Solutions*, 18 PACE ENVTL. L. REV. 19, 37 (2002) (“Wind [p]ower has become a big business for Denmark; it exports windmills to thirty-five countries and Denmark now accounts for more than 50% of all the devices manufactured in the world.”); Kenneth Chang, *As Earth Warms, The Hottest Issue Is Rethinking Energy*, N.Y. TIMES, Nov. 4, 2003, at F1 (“Wind power is already practical in many places like Denmark, where 17 percent of the electricity comes from wind turbines. The newest turbines, with propellers as wide in diameter as a football field, produce energy at a cost of 4 or 5 cents a kilowatt-hour. Further refinements like lighter rotors could drop the price by another cent or two, making it directly competitive with natural gas.”); Warren Hoge, *Samso Journal: In This Energy Project, No Tilting at Windmills*, N.Y. TIMES, Oct. 9, 1999, at A4 (“Wind energy today covers 7 percent of Danish electricity consumption and will rise to 50 percent by 2030.”); Douglas Jehl, *Curse of the Wind Turns to Farmers’ Blessing*, N.Y. TIMES, Nov. 26, 2000, at 1 (“In Denmark, wind already supplies 10 percent of the country’s electricity, while in Germany’s northernmost state, Schleswig-Holstein, it supplies some 14 percent of all electricity.”); Mark Landler, *With Gas Prices Already High, Europe is Less Rattled by Jump*, N.Y. TIMES, June 1, 2004, at C1, C4 (reporting that “Germany is the world’s largest producer of wind energy, with 15,800 turbines generating 15,000 megawatts of electricity, or 6 percent of its total supply” and that “wind energy is growing in Germany and Denmark,” but that “it has been hobbled in France because the electric utility does not want other energy companies using its power grid” and that, “[i]n Britain, until recently, builders of windmills could not obtain permits from local authorities to erect turbines”); Soren Krohn, *Danish Wind Turbines: An Industrial Success Story* (“Danish wind companies have a market share of half the world market.”), at <http://www.windpower.org/en/articles/success.htm> (last visited Nov. 4, 2004); MOORE & IHLE, *supra* note 6, at 3 (“Europe’s interest in renewable energy policy seems to go well beyond current U.S. policy. . . . Denmark’s government has designed programs that coaxed its wind industry and wind technologies into commercial maturity—so much so that the Danish wind industry is the most competitive in the world with over half the world’s sales and 16,000 domestic jobs.”); Virinder Singh et al., *A Message from the Staff of the Renewable Energy Policy Project* (1999) (“Once the leader in installed wind capacity, the U.S. has fallen behind Denmark and Germany, with other nations closing in fast.”), available at http://www.repp.org/repp_pubs/articles/issuebr14/REPOutUS.pdf.

¹³ *History of Wind Energy*, *supra* note 8; see also Auken, *supra* note 12, at 149-51 (discussing how “one of the most important elements in the development of wind power [in Denmark] has been active governmental policy,” which included setting a target of ten percent wind energy by 2005 (which the country has already achieved), a subsidy scheme for installation of wind turbines, a fixed pricing system for selling electricity to the national grid, and research and development in wind power); Hsu, *supra* note 10, at 441 (“In addition to a 30% capital investment subsidy, wind energy [in Denmark] was aided both by a governmental effort to ensure that electricity produced by wind turbines could be

efforts in the United States have often met resistance from individuals claiming that the turbines are “stark intrusions in the ‘natural’ landscape.”¹⁴

This Article examines the opposition to wind farms on visual or aesthetic grounds and argues that such antagonism is inconsistent with the aesthetic sensibility we bring to our appreciation of fine art. For example, seventeenth-century Dutch painters, such as Jacob Isaackz van Ruisdael, Rembrandt van Rijn, Aelbert Cuyp, and Aert van der Neer, depicted windmills—precursors to today’s wind turbines—in their landscape paintings. The Bulgarian-born, United States-based artist, Christo Javacheff (known simply as “Christo”),¹⁵ has engaged in grand-scale, site-

distributed on the national energy grid, and by establishment of a central test station for wind turbines as a condition to grid connection. These investments have removed some of the nonfinancial barriers to adoption of wind energy and stimulated its development.”); COHEN & WIND, *supra* note 12, at 10-13 (discussing policies and incentives in Denmark and Germany, which include “feed-in-tariffs,” “national targets for wind capacity (in Denmark), general public funding of national research and development programs, direct investment subsidies for turbine installations, and the development of standard market procedures such as loan application/approval processes and resource assessment approaches”); MOORE & IHLE, *supra* note 6, at 8 (discussing how the initial steps taken in Denmark to build the wind turbine industry included research and development, turbine certification, capital subsidies, and mandated electricity purchases). For a discussion of the national policies of Germany, Japan, the Netherlands, and the United Kingdom, see *id.* at 3-4, 10-19.

¹⁴ Power Scorecard, *Electricity from: Wind*, at http://www.powerscorecard.org/tech_detail.cfm?resource_id=11 (last visited Oct. 13, 2004); see *infra* Part III.E.

¹⁵ Many of Christo’s works are attributed to “Christo and Jeanne-Claude.” Jeanne-Claude (born Jeanne-Claude Denat de Guillebon) is Christo’s wife-collaborator; the two met in Paris in 1958 and have engaged in an artistic partnership since their first outdoor temporary work, *Dockside Packages, Cologne Harbor* (1961). See Interview by James Paglisotti with Christo and Jeanne-Claude (Jan. 4, 2002), at <http://www.christojeanneclaude.net/eyeLevel.html> (last visited Dec. 6, 2004). For much of their careers, however, their works have been attributed solely to Christo. According to Christo:

The decision to use only the name “Christo” was made deliberately when we were young because it is difficult for one artist to get established and we wanted to put all the chances on our side. Therefore, we declared that Christo was the artist and Jeanne-Claude was the manager, the art dealer, the coordinator and the organizer. And, this served us very well for many years.

Of course, all our collaborators always said, “Christo and Jeanne-Claude”, but for the public and the media, it was “Christo.” By 1994, though . . . we decided we were mature enough to tell the truth, so we officially changed the artist name “Christo” into the artists “Christo and Jeanne-Claude.”

specific environmental art projects¹⁶ that have altered the

All works created to be indoors, from 1958 until today, such as Wrapped Objects and Packages, drawings, collages, scale models and lithographs are works by “Christo.” All works created to be outdoors, and the large scale indoor temporary installations, are works by “Christo and Jeanne-Claude.”

Id. Jeanne-Claude states that, “[i]n the beginning it was hard enough trying to explain that each project was a work of art. Trying to explain that it was a work by two artists would have been out of the question.” BURT CHERNOW, CHRISTO AND JEANNE-CLAUDE: A BIOGRAPHY 198 (2002). In 1994, when the artists “announced and publicly clarified their long-standing artistic interdependence, acknowledging their past and present coauthorship of the projects . . . [t]hey stated that [Christo] had produced all the drawings, collages, prints, and models, while she had prepared the taxes unassisted.” *Id.* at 196. But they also maintained that “every decision—including all economic, social, political, and aesthetic ones related to the projects—were arrived at jointly.” *Id.* At the time, Christo remarked: “The drawings are the scheme for the project. After that, we do everything together: choose the rope, the fabric, the thickness of the fabric, the amount of fabric, the color; we argue, and we think about it. Everybody knows that we have worked together for over thirty years. There’s no point in arguing about who does what. The work is all that matters.” *Id.* Despite these assertions, critics disagree over the degree of Jeanne-Claude’s involvement. The artists’ biographer, Burt Chernow, writes that,

[i]n the twenty-five years between [*Wrapped Coast, One Million Square Feet, Little Bay, Sydney, Australia, 1968-69*] and their announced artistic partnership, Christo was seen as the genius, a visionary who reigned supreme Jeanne-Claude, among other things, did everything possible to allow him enough freedom from time-consuming everyday details to produce the art objects that financed their mutual dreams.

Id. at 197-98. The late art critic, Lawrence Alloway, paints Jeanne-Claude in a more prominent light:

I see her role as very much part of what Christo has achieved. I imagine the packages and storefronts were his product singularly, with her encouragement. Whereas *Wrapped Coast* and the big environmental works are absolutely as much Jeanne-Claude’s as Christo’s. I don’t know if they would use a word like *collaboration*. But I can’t see the major projects without Jeanne-Claude. She realized the potential of using the media to give form to the work. I think that’s especially hers. Their art grows out of a thing that Christo was doing singularly as an artist. She had joined him and enhanced it.

Id. at 198. Without taking a position on the degree of Jeanne-Claude’s involvement and without diminishing her influence and contribution, this Article will refer to the works discussed below as the product of “Christo,” rather than “Christo and Jeanne-Claude.” The reason is that all of the works described below pre-date 1994. In addition, while many readers may have heard of Christo, they may be unfamiliar with Jeanne-Claude; the choice of just “Christo” is intended to avoid any possible confusion.

¹⁶ “Site-specific” artworks are “works created from their inception to be interdependent with their location.” Robert Russell, *A Beginner’s Guide to Public Art*, 57 (4) ART EDUC. 19, 22 (July 2004). For a discussion of how

landscape much the way wind turbines do. This Article contends that if Dutch painters did not regard windmills as an intrusion on the landscape (and in some instances made them the *subject* of their aesthetic contemplation), and if we accept and admire Christo's works, despite the fact that they change our views of mountains, valleys, and waterbodies, then we should apply a similar aesthetic to our appraisal of wind farms. In other words, this Article suggests that we look to art to guide us in our aesthetic assessment of wind turbines.

This is not to suggest that a change in aesthetics will, by itself, allow wind energy to reach its full potential. Jeffrey C. Ellis writes that there is a "well-established tendency in environmental discourse to identify the single most important and fundamental cause of the many environmental problems that have become increasingly apparent in recent decades."¹⁷ This tendency results in extensive examination of one cause of a particular environmental problem, to the exclusion of all others. This Article does not contend that "aesthetic" differences are at the root of the failure of renewable energy in general, and wind energy in particular, to become more widespread in this country. Many factors have contributed and will continue to contribute to the slow growth of wind energy as an alternative to fossil fuels. For

Christo's site-specific works differ from other kinds of site-specific works, see *id.*

Christo accepts the term "environmental art" to describe his work, but rejects the term "conceptual art":

[A] conception on paper is not the Christos' idea of art. They want to build their projects—they could save a lot of money by not building them, by just keeping them on paper—as conceptual artists do. The Christos want to SEE their project realized because they believe it will be a work of art of joy and beauty. The only way to see it is to build it.

Christo & Jeanne-Claude, *Common Errors: Christo and Jeanne-Claude Respond* [hereinafter *Common Errors*], at <http://christojeanneclaude.net/errors.html> (last visited Nov. 6, 2004). The term "environmental art" is acceptable because "they [have] created many works in Cities—in Urban environments—and also in Rural Environments but NEVER in deserted places, and always sites already prepared and used by people, managed by human beings for human beings." *Id.* Note, however, that, while Christo accepts the moniker "environmental artist," he is not enamored with labels. "[L]abels are important, but mostly for bottles of wine." *Id.*; see also Interview by James Paglisotti with Christo and Jeanne-Claude, *supra* note 15.

¹⁷ Jeffrey C. Ellis, *On the Search for a Root Cause: Essentialist Tendencies in Environmental Discourse*, in UNCOMMON GROUND: TOWARD REINVENTING NATURE 256, 267 (William Cronon ed., 1995) [hereinafter UNCOMMON GROUND].

example, individuals often express concern over the intermittency of the wind energy resource.¹⁸ Some attempts at wind energy projects have fallen through due to high initial capital costs.¹⁹ Thus, increased public education about wind energy in general, and its reliability in particular, as well as greater governmental (financial) support are vital to the future of the wind energy market in the United States.²⁰ This Article makes reference to a number of these federal and state policies that affect or could affect the growth of wind energy. Those concerns aside, this Article is designed to help proponents of wind energy, including attorneys, policymakers, and developers, comprehend the aesthetic debate regarding wind farms and to provide them with some tools for addressing the concerns of those who object to wind farm projects on aesthetic grounds. This is not an easy task, and this Article certainly does not profess to present and discuss all of the aesthetic positions on wind energy systems. Indeed, “[a]esthetic appreciation . . . is a creative act, one that takes developed skill and thoughtful determination, very much the same abilities that the artist employs in her work.”²¹ This Article simply hopes to help broaden the understanding of the aesthetics of wind turbines and to propose some suggestions for removing this obstacle in the path towards greater reliance on wind energy.

A discussion of aesthetics and art may seem like an odd topic for a law review article. But Agenda 21, described as the environmental action plan for the twenty-first century (agreed to at

¹⁸ See *infra* note 97.

¹⁹ See *id.* For a discussion of whether “there will always be economic considerations that will override the preservation of anything,” see EUGENE C. HARGROVE, FOUNDATIONS OF ENVIRONMENTAL ETHICS 104 (1989).

²⁰ See, e.g., Jeffrey J. Rachlinski, *The Psychology of Global Climate Change*, 2000 U. ILL. L. REV. 299, 318 (2000) (“Developing alternatives to fossil fuels . . . requires governmental intervention.”); Commentary, *There’s Opportunity in the Wind*, BENNINGTON BANNER, Oct. 5, 2002 (arguing that public education is crucial to helping people “understand the opportunity for good jobs and clean energy that are riding in our wind”); Robin Palmer, *Blowin’ in the Wind*, RUTLAND HERALD, Dec. 1, 2002 (reporting a suggestion that “education regarding wind turbines would enhance public acceptance”), at <http://www.vce.org/wind.html> (last visited Dec. 6, 2004); see also OFFICE OF UTIL. TECH., RENEWABLE ENERGY TECHNOLOGY CHARACTERIZATIONS (1997), available at <http://www.eere.energy.gov/consumerinfo/pdfs/techchar.pdf>; *infra* Part III.C.

²¹ ARNOLD BERLEANT, LIVING IN THE LANDSCAPE: TOWARD AN AESTHETICS OF ENVIRONMENT 164 (1997).

the 1992 United Nations Conference on Environment and Development and re-affirmed at the 2002 World Summit on Sustainable Development in Johannesburg),²² encourages creative, interdisciplinary approaches to solving environmental problems.²³ Chapter 36 states: “Both formal and non-formal education are indispensable to changing people’s attitudes so that they have the capacity to assess their sustainable development concerns.”²⁴ This Article embraces this challenge by advocating that aesthetic education can help support wind energy.

Part II of this Article will present the need to reduce our dependence on fossil fuels, outlining the consequences of climate change and air pollution, including acid rain, as well as other environmental impacts, including human health impacts, resulting from the extraction, production, and combustion of coal, oil, and natural gas.

Part III of this Article will begin by briefly describing the structure and components of a wind turbine and how wind turbines capture the wind’s energy. Next, Part III.B will compare the environmental impact of wind energy generation to the extraction, production, and consumption of fossil fuels discussed in Part II. This Section will then summarize how wind energy projects can benefit farmers and individual landowners, the manufacturing sector of the work force, rural economies, and the national economy. In Part III.C, this Article will highlight some of the state and federal governmental policies supporting wind energy, providing an overview of tax incentives, renewable portfolio standards and public benefit funds, and subsidies. In Part III.D, this Article will argue that some federal governmental policies have inhibited the growth of wind energy in the United States. Part III.E will continue the discussion of the hurdles to wind energy, focusing on how some large utility-scale wind projects have encountered opposition from individuals, including some

²² See A. Dan Tarlock, *Water Law Reform in West Virginia: The Broader Context*, 106 W. VA. L. REV. 495, 532 (2004); see also DAVID HUNTER ET AL., *INTERNATIONAL ENVIRONMENTAL LAW & POLICY* 202 (2d ed. 2002) (describing Agenda 21 as “a comprehensive and detailed blueprint for the future implementation of sustainable development”).

²³ See Agenda 21, Report of the United Nations Conference on Environment and Development, Annex II, ¶ 36.3, U.N. Doc. A/Conf.151/26/Rev.1 (Vol. I) (1992).

²⁴ *Id.*

environmentalists, most frequently out of concern for avian mortality and on aesthetic grounds. Although Part III.E does not focus on the debates surrounding a particular project, it introduces the analysis of the concerns over avian mortality and visual impairment by briefly examining the controversy surrounding the proposed wind farms on Horseshoe Shoal, off the Cape Cod shore in Massachusetts, and on the Glebe Mountain ridgeline in Londonderry, Vermont.²⁵ Part III.E will also discuss measures that wind developers have taken to mitigate their visual impact.

Part IV continues the discussion of the aesthetic concerns described in Part III.E. It begins by offering a definition of aesthetics and then sets forth the argument that art can influence our aesthetic appreciation of “environment,” “landscape,” and “nature.” In Part IV.A, this Article looks at how windmills, the historical antecedents to modern turbines, were depicted in select seventeenth-century Dutch landscape paintings, drawings, and prints. In so doing, it discusses both the aesthetic and symbolic significance of windmills in these works of art and urges that we should follow the lead of our Dutch precursors and accept wind turbines as they did their windmills. In Part IV.B, this Article looks at some of the works of Christo, comparing not only the visual effect of his works with that of wind turbines, but also how Christo’s projects and wind farm projects have encountered similar opposition on aesthetic and environmental grounds. This Part also addresses some of the potential criticisms of looking to the art of Dutch painters and Christo as an aesthetic model for how to regard wind turbines. This Part concludes that, while wind farms may disrupt a particular view, by not contributing to fossil fuel emissions, wind farms allow vegetation and wildlife around that disrupted view to persist. While the survival of vegetation and wildlife is important in its own right, it is also crucial to current and future generations’ enjoyment of that particular environment. In addition, this Part stresses that wind farms ensure clean air so that current and future generations can spend time outdoors and allow other individuals in other areas of the world, both now and in the future, to enjoy their local, particular environments.

In Part V, this Article explores whether the aesthetic debate

²⁵ For an example of where an individual encountered opposition on aesthetic grounds in his attempt to erect a single wind turbine, see *In re Halnon*, 811 A.2d 161 (Vt. 2002).

regarding wind turbines might reflect different beliefs regarding what constitutes “environment,” “landscape,” and “nature.” Although this Part does not provide a complete overview of the discourse involving these concepts, it hopes to remind environmental attorneys and policymakers that: (1) “environment,” “landscape,” and “nature” are indeed *concepts*, not just locations, and that these concepts are in flux; (2) these concepts mean different things for different cultural and ethnic groups; and (3) these concepts increasingly include a *human* component. This Part argues that a rejection of wind turbines on aesthetic grounds really amounts to a denunciation of a conception of “environment,” “landscape,” and “nature” that contains a human presence. It takes this exclusionary position to task, arguing for a more capacious understanding of these concepts. Such a broader idea of “environment,” “landscape,” and “nature” is crucial not only to the future of wind energy, but to other seemingly unrelated environmental issues.

II. THE ENVIRONMENTAL IMPACTS OF FOSSIL FUELS, INCLUDING IMPACTS ON HUMAN HEALTH

*Sensitivity, not just to the beauties of environment but also to the offenses and injuries to environment, is a precondition to recovering the fullness of the world.*²⁶

The production and consumption of coal, oil, and natural gas adversely affect the environment, including human health. As Shi-Ling Hsu explains in her article, *Reducing Emissions from the Electricity Generation Industry: Can We Finally Do It?*:

Emissions of particulate matter [PM], SO₂ [sulfur dioxide], NO_x [nitrogen oxide] and mercury [from the burning of fossil fuels] have had well-documented adverse effects upon human health. In addition, SO₂ and NO_x emissions have caused acid rain, the result of the chemical formation of sulfuric acid in the lower atmosphere and its subsequent deposition into the ecosystem. Acid rain has caused widespread damage in numerous lakes and rivers, and stimulated the release of heavy metals into the environment. Emissions of these pollutants have a number of other adverse environmental effects, including impacts on a wide variety of vegetation, agriculture, and visibility. Finally, the disproportionately large contribution of coal-fired power

²⁶ BERLEANT, *supra* note 21, at 3.

plants to global warming is reason enough to induce their retirement.²⁷

This Part provides an overview of the consequences of climate change²⁸ and air pollution, including acid rain, and outlines other environmental impacts resulting from the extraction and combustion of fossil fuels. This Article will not review environmental regulation of fossil fuel emissions, although this Part will make reference to recent attempts to regulate carbon dioxide (CO₂) and mercury and Part III will discuss the Bush administration's attempts to relax key components of the Clean Air Act's New Source Review rules.

A. Climate Change

*Some say the world will end in fire, / Some say in ice.*²⁹

Thus begins Robert Frost's poem, "Fire and Ice." Although Frost was not writing about the threat of climate change, his words possess a disturbing resemblance to many of the predictions of what might happen to this planet because of our past and current reliance upon fossil fuel energy. Kenneth Chang paints the following picture:

Suppose that over the next decade or two the forecasts of global warming start to come true. Color has drained from

²⁷ Hsu, *supra* note 10, at 430.

²⁸ Although the terms "climate change" and "global warming" are frequently used interchangeably, "climate change" is a more accurate term than "global warming" because "[s]ome regions of the world may experience a substantial cooling effect as a result of climate change." HUNTER ET AL., *supra* note 22, at 3. In addition, research has indicated that focus groups respond with greater concern to the potential for "climate change" than to the possibility of "global warming." Alex Williams, *The Alchemy of a Political Slogan*, N.Y. TIMES, Aug. 22, 2004, § 9 (Sunday Styles), at 2 ("Every time we'd use the term [global warming] in the winter, people would say 'It doesn't feel that warm to me.' So the talk these days is about 'climate change,' which sounds scarily permanent." (quoting Celinda Lake, a pollster with Lake, Snell, Perry & Associates)). Some commentators, however, insist on using the phrase "global warming," but make efforts to note that "global warming" can result in cooler temperatures in some regions. See, e.g., Paul R. Epstein, *Global Chilling*, N.Y. TIMES, Jan. 28, 2004, at A25 ("Global warming doesn't mean that every place on the globe gets warmer. The weather history that can be read in polar ice-core samples indicates that previous periods of warming affected North America and Europe far differently than they did the tropics—the Northern Hemisphere got a lot colder.").

²⁹ ROBERT FROST, COLLECTED POEMS OF ROBERT FROST 268 (1986).

New England's autumns as maple trees die, and the Baltimore oriole can no longer be found south of Buffalo. The Dust Bowl has returned to the Great Plains, and Arctic ice is melting into open water. Upheavals in weather, the environment and life are accelerating around the world.³⁰

When fossils fuels are burned, they emit CO₂—a greenhouse gas (GHG). Carbon dioxide is termed a greenhouse gas because it “cause[s] the earth’s atmosphere to act like a greenhouse, allowing warming energy from the sun to pass through the earth’s surface and, subsequently, trapping a portion of that energy before it is radiated back out into space.”³¹ Because GHGs trap solar energy in the atmosphere in proportion to their concentration,³² if left unchecked, GHGs could increase global temperatures leading to

³⁰ Chang, *supra* note 12. “[G]lobal warming and climate change over the coming century will affect people and their health differently depending on where they live.” Kirk Johnson, *From Smog To Sun, Climate Scientists Zoom In On Changes*, N.Y. TIMES, Dec. 9, 2003, at B1. Johnson suggests that the poor may “suffer more under a hotter climate than the rich.” *Id.* at B4. For predictions of how global warming may impact different states, see Environmental Protection Agency (EPA), *Global Warming: State Impacts*, at <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ImpactsStateImpacts.html> (last visited Dec. 8, 2004). For a discussion of the climate future for California, see Union of Concerned Scientists, *Confronting Climate Change in California*, at http://www.ucsusa.org/global_environment/global_warming/page.cfm?pageID=961 (last visited Nov. 29, 2004); for Connecticut, see THE POCANTICO CONFERENCE CENTER OF THE ROCKEFELLER BROTHERS FUND, LEADING BY EXAMPLE: CONNECTICUT COLLABORATES TO REDUCE GREENHOUSE GAS EMISSIONS (2002), available at http://www.ctcleanenergy.com/pdf/Leading_by_Example.pdf; for Illinois, see Rachlinski, *supra* note 20, at 305-06; for New England, see Conservation Law Found., *Heritage in Peril: New England and Global Warming*, available at http://www.clf.org/uploadedFiles/CLF/General/Publications/Heritage_In_Peril.pdf (last visited Nov. 16, 2004); for Wisconsin, see Kelly Mella & Julia Barrett, *Warming Trends: What Global Climate Change Could Mean for Wisconsin*, WISC. NAT. RESOURCES (Apr. 2000), <http://www.wnrmag.com/supps/2000/apr00/global.htm>.

³¹ HUNTER ET AL., *supra* note 22, at 2, 589; see also Chang, *supra* note 12 (“When the atmosphere is rich in carbon dioxide, heat is trapped, producing a greenhouse effect.”); Serchuk, *supra* note 3, at 13 (“Visible sunlight passes through Earth’s layer of ‘greenhouse gases’ unhindered, but much of the resultant heat (characterized by infrared wavelengths longer than those of visible light) radiating upward from the warming planet cannot. Instead, the gas layer absorbs and re-emits some of the heat back down to Earth’s surface.”).

³² Dernbach, *supra* note 6, at 10,933 (“Greenhouse gases, including carbon dioxide (CO₂), trap solar energy in the atmosphere in proportion to their concentration, rather like the way glass windows in a greenhouse or a parked car trap solar heat.”).

many of the catastrophes that Chang describes.³³ Professor Roberta Mann envisages the following slew of environmental disasters: “the thawing of the permafrost; rising sea levels, resulting in flooding of islands and coastal regions; increased

³³ This “‘greenhouse effect’ is a natural process; without it the energy from the sun would be lost in space, leaving the earth as cold and lifeless as Mars.” HUNTER ET AL., *supra* note 22, at 2; *see also* MCKIBBEN, *supra* note 3, at 11 (“If there were no carbon dioxide, our world might resemble Mars—it would probably be so cold as to be lifeless. A little bit of greenhouse is a good thing, then—the plant that is life thrives in its warmth.”). The problem, however, is that “human activity has interfered with [this] homeostatic process[], releasing carbon dioxide and other greenhouse gases into the atmosphere more quickly than [sic] are absorbed by natural ‘sinks,’ primarily oceans and forests. The result is that concentrations of these gases are increasing in the atmosphere.” HUNTER ET AL., *supra* note 22, at 2; *see also* Darcy Frey, *George Divoky’s Planet*, N.Y. TIMES, Jan. 6, 2002, § 6 (Magazine), at 28 (“[O]ur endless consumption of fossil fuels is pumping vast amounts of carbon dioxide and other heat-trapping gases into the atmosphere, causing global temperatures to rise.”); Andrew C. Revkin, *Panel of Experts Finds Anti-Pollution Laws Outdated*, N.Y. TIMES, Jan. 30, 2004, at A15 (“Carbon dioxide is the main heat-trapping greenhouse gas linked by most scientists to global warming.”); Andrew C. Revkin, *New View of Data Supports Human Link to Global Warming*, N.Y. TIMES, Nov. 18, 2003, at F2 (“[E]missions of carbon dioxide and other heat-trapping greenhouse gases are noticeably altering climate.”); Conservation Law Found., *supra* note 30, at 1 (stressing the need to reduce anthropogenic greenhouse gas emissions because, “[t]hrough the combustion of oil, coal, and other fossil fuels to power our factories, transportation, and homes, human activities release over seven billion tons of carbon into the atmosphere each year”); Serchuk, *supra* note 3, at 13 (“[M]any scientists . . . conclude that human activity has altered natural climactic processes at a geologically rapid pace by boosting atmospheric concentrations of several greenhouse gases.”).

Currently, carbon dioxide is not regulated by the Environmental Protection Agency (EPA). *See* Roberta Mann, *Waiting to Exhale?: Global Warming and Tax Policy*, 51 AM. U. L. REV. 1135, 1147 & n.61 (2002) (“CO₂ has not been designated a ‘criteria pollutant’ under the Clean Air Act,” which “require[s] the EPA to publish a list of air pollutants that reasonably can be anticipated to endanger public health.” (citing Clean Air Act, 42 U.S.C. § 7412(b) (1994))); *see also* *Clarity on Clean Air*, N.Y. TIMES, Feb. 5, 2004, at A30 (“Present law does not address carbon emissions.”). *See generally* Danny Hakim, *California Weighs Tighter Fuel Economy*, N.Y. TIMES, June 9, 2004, at C1 (“The Bush administration has moved away from regulating global-warming emissions.”). In 2003, the EPA issued an administrative ruling denying that it had the authority to control carbon dioxide on the grounds that CO₂ does not meet the Clean Air Act definition of “pollutant.” *See* Control of Emissions from New Highway Vehicles and Engines, 68 Fed. Reg. 52,922 (Sept. 8, 2003); Danny Hakim, *States Plan Suit to Prod U.S. on Global Warming*, N.Y. TIMES, Oct. 4, 2003, at C1. In response, twelve states, several cities, and over a dozen environmental groups have filed suit against the EPA, asserting that the EPA does have jurisdiction under the Clean Air Act to regulate global warming emissions and that it must comply with the law and do so. *See* Hakim, *supra*.

intensity and frequency of severe storms, changes in the amount and frequency of precipitation, changes in ocean currents; and increased tropical diseases such as malaria, cholera, and dengue fever.”³⁴ With respect to rising sea levels, for example, consider that “[s]mall island states, such as the Maldives and the Seychelles, and highly urbanized low-lying coastal areas are particularly vulnerable to inundation and resulting population displacement.”³⁵ For the United States, rising sea levels and increasing temperatures will hurt agriculture and tourism in states like Hawaii and Maine.³⁶ Thus, the “failure to take measures to control the causes of climate change—primarily the burning of fossil fuels such as coal and oil”³⁷—will have economic impacts, in addition to environmental, including human health, impacts. The fact that climate change

³⁴ Mann, *supra* note 33, at 1143. At least one commentator has noted that “the warming estimates [of increased global temperatures] are *not* worst-case scenarios. They are the middle ground. It is ‘equally likely’ . . . that the warming forecasts are too low as that they’re too high.” MCKIBBEN, *supra* note 3, at 31.

³⁵ HUNTER ET AL., *supra* note 22, at 3.

³⁶ See Jennifer 8. Lee & Andrew C. Revkin, *Senate Defeats Climate Bill, but Proponents See Silver Lining*, N.Y. TIMES, Oct. 31, 2003, at A14; see also MCKIBBEN, *supra* note 3, at 124 (“[T]he northern reaches of the Soviet Union and Canada will be able to grow more food and the Great Plains of the United States less—not so little that America couldn’t feed itself but enough below present production that U.S. food exports, which earn the country between \$35 billion and \$40 billion in a good year, might fall by 70 percent. ‘It has been suggested . . . that a future with soil moisture change would translate to a loss of comparative advantage of U.S. agricultural products on the world market’—a phrase to make an economist shiver on an August day.” (internal citation omitted)); Rachlinski, *supra* note 20, at 300 (“Coping with adverse climate change has the potential to drain the resources of wealthy nations and dash the prospects for economic improvements in poor ones.”); Jennifer 8. Lee, *The Warming is Global but Legislating, in the U.S., Is All Local*, N.Y. TIMES, Oct. 29, 2003, at A20 (noting that some states are addressing global warming because of “predictions that global warming could damage local economies by harming agriculture, eroding shorelines and hurting tourism”); Conservation Law Found., *supra* note 30, at 3-4, (discussing how the rising temperatures from global warming would adversely affect fall foliage-related tourism, hurt maple syrup production, and cause lost revenue to the ski industry). In addition to the impact on agriculture and tourism, the organizations involved in the lawsuit against the EPA predict that, because “[e]xtreme weather events cost Americans nearly \$20 billion in 2002, . . . [this cost] could increase if the U.S. does nothing to curb global warming.” Press Release, Bluewater Network et al., States, Environmental Groups Challenge Bush on Global Warming (Oct. 23, 2003), available at <http://www.climatelaw.org/media/states.challenge.bush/press.release.pdf> (last visited Mar. 17, 2005).

³⁷ HUNTER ET AL., *supra* note 22, at 4.

could have adverse economic effects is especially important (and somewhat ironic) given that the economy is often cited by the Bush administration as the reason for rejecting the Kyoto Protocol and for refusing to support mandatory reductions of CO₂ emissions.³⁸

³⁸ Under the Kyoto Protocol, signed in December 1997, developed countries agreed to reduce their net GHG emissions by at least five percent from 1990 levels by 2008-12. (No comparable commitment was included for developing countries.) Dernbach, *supra* note 6, at 10,938. Most European countries agreed to lower their emissions to eight percent below 1990 levels. HUNTER ET AL., *supra* note 22, at 630. Had the United States ratified the Kyoto Protocol and adopted appropriate implementing legislation, the U.S. commitment would have been seven percent below 1990 levels. Dernbach, *supra* note 6, at 10,939. Because energy-related carbon emissions were, at the time, projected to be thirty-three percent above 1990 levels, the U.S. commitment really would have been to reduce emissions by forty percent from their projected level. *Id.* To reach this goal, the U.S., to a limited degree, could have also used carbon sinks (i.e., photosynthesis) to remove CO₂ from the atmosphere. *Id.* Nevertheless, the Bush administration deemed the risks to the U.S. economy too great. *See, e.g.*, Martin I. Hoffert et al., *Advanced Technology Paths to Global Climate Stability: Energy for a Greenhouse Climate*, 298 SCIENCE 981 (Nov. 1, 2003) (explaining that the United States withdrew from the Kyoto Protocol because its initial cuts were perceived as an economic burden); Andrew C. Revkin, *Bush Offers Plan for Voluntary Measures to Limit Gas Emissions*, N.Y. TIMES, Feb. 15, 2002, at A6 (“Mr. Bush rejected the [Kyoto] treaty [because] it would burden the American economy.”).

Some commentators argue that the Kyoto Protocol would not have adversely affected the U.S. economy. *See, e.g.*, Mann, *supra* note 33, at 1154-56 (describing a study commissioned by the Department of Energy, which found that stemming GHG emissions could be good for the U.S. economy); Suzanne Daley, *Europeans Give Bush Plan on Climate Change a Tepid Reception*, N.Y. TIMES, Feb. 15, 2002, at A6 (quoting Chris Hewitt of the Institute for Public Policy Research in Britain for the proposition that “you can cut emissions and still have a healthy economy” and that there is no “inextricable link” between carbon dioxide emissions and economic growth”). Note that “Kyoto takes effect only when it has been ratified by enough nations to account for 55 percent of 1990 emissions.” Erin E. Arvedlund, *Europe Backs Russian Entry Into W.T.O.*, N.Y. TIMES, May 22, 2004, at C1. Because of the United States’ withdrawal, the future of the pact depended on support from Russia, which has a seventeen percent share of total emissions. *Id.* In December 2003, Russia declared that it would not ratify the treaty because it “ran counter to Russia’s national interest.” *Id.*; *see* Steven Lee Myers & Andrew Revkin, *Russia to Reject Pact on Climate, Putin Aide Says*, N.Y. TIMES, Dec. 3, 2003, at A1 (“Without the participation of the United States—which would have been a major buyer of credits—many officials [in Russia] concluded that the potential economic gains were sharply reduced.”). Within a year, however, Russia had reversed its position, and President Vladimir V. Putin ratified the treaty in November 2004. *See* Steven Lee Myers, *Putin Ratifies Kyoto Protocol on Emissions*, N.Y. TIMES, Nov. 6, 2004, at A10. Apparently, Russia’s reversal on Kyoto was key to the European Union’s support of Russia’s entry into the World Trade Organization.

Already we have begun to experience some of these anticipated changes. According to the Intergovernmental Panel on Climate Change:

[R]egional changes in climate, particularly increases in temperature, have already affected a diverse set of physical and biological systems in many parts of the world. Examples of observed changes caused by human releases of GHG include shrinkage of glaciers, thawing of permafrost, later freezing and earlier break-up of ice on rivers and lakes, lengthening of mid-to high-latitude growing seasons, poleward and altitudinal shifts of plant and animal ranges, declines of some plant and animal populations, and earlier flowering of trees, emergence of insects, and egg-laying in birds Associations between changes in regional temperatures and observed changes in physical and biological systems have already been documented in many aquatic, terrestrial, and marine environments. . . .

. . . .

There is emerging evidence that some social and economic systems have been affected by the recent increasing frequency of floods and droughts in some areas.³⁹

Arvedlund, *supra*, at C1. The Kyoto Protocol went into effect on February 16, 2005. See Mark Landler, *Mixed Feelings as Kyoto Pact Takes Effect*, N.Y. TIMES, Feb. 16, 2005, at C1.

³⁹ *Summary for Policymakers*, in INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2001: IMPACTS, ADAPTATION, AND VULNERABILITY 3-4 (James J. McCarthy et al. eds., 2001), available at http://www.grida.no/climate/ipcc_tar/wg2/007.htm; see also HUNTER ET AL., *supra* note 22, at 593 (“The Earth’s climate has changed over the past century, because of the increase in atmospheric concentrations of greenhouse gases. . . . Nineteen ninety-eight was the hottest year on record. The 1990s were the warmest decade on record. Indeed, the seven warmest years on record occurred during the 1990s.”); Camille Parmesan & Gary Yohe, *A Globally Coherent Fingerprint of Climate Change Impacts Across Natural Systems*, NATURE, Jan. 2, 2003, 37, 37 (stating that while “[m]ost short-term local changes are not caused by climate change but by land-use change and by natural fluctuations in the abundance and distribution of species,” it is also the case that “[m]ost field biologists are convinced that they are already seeing important biological impacts of climate change”); Natalie Angier, *Built for the Arctic: A Species’ Splendid Adaptations*, N.Y. TIMES, Jan. 27, 2004, at F1 (“[B]iologists are disturbed by recent evidence that it may be getting harder [for polar bears] to survive as a result of global warming. . . . [Some] polar bears in western Hudson Bay, off the coast of Manitoba, are being forced by the precipitously early thawing of Arctic ice in the spring to come on land and begin fasting two and a half to three weeks earlier than they did 25 years ago.”); Frey, *supra* note 33, at 30 (describing how, from 1975 to 1995, guillemots on Cooper Island of the coast

of Alaska, have laid their eggs five days earlier each decade due to warmer temperatures); Andrew C. Revkin, *Complicating the Hunt for Oil*, N.Y. TIMES, Jan. 13, 2004, at F1 (reporting that, ironically, rising temperatures in the North Slope, “which many scientists say is at least partly driven by smokestack and tailpipe emissions, [are] curtailing the quest for a fossil fuel [oil] that is a prime source of such pollution”); Andrew C. Revkin, *Warming is Found to Disrupt Species*, N.Y. TIMES, Jan. 2, 2003, at A1 (“Global warming is forcing species around the world, from California starfish to Alpine herbs, to move into new ranges or alter habits in ways that could disrupt ecosystems.”); Robert B. Semple Jr., *A Film That Could Warm Up the Debate on Global Warming*, N.Y. TIMES, May 27, 2004, at A30 (discussing “the already observable consequences of warming—coral bleaching, the gradual loss of coastal salt marshes and wetlands, melting permafrost, vanishing glaciers” that are observed in JAMES G. SPETH, *RED SKY AT MORNING* (2004)); cf. Serchuk, *supra* note 3, at 18 (listing a variety of circumstantial evidence consistent with a changing climate, but which neither proves nor disproves a link between human behavior and long-term climate change).

As Donald A. Brown, Director of the Pennsylvania Consortium of Interdisciplinary Environmental Policy further explains:

[B]ecause of the long lag times in the climate system caused by the time it takes for oceans to heat up, the actual climate change that will be experienced due to past emissions will take centuries to fully emerge even if the world were to stabilize GHG emissions at present levels. This is so because . . . after atmospheric concentrations of GHGs stabilize temperatures will continue to rise by a few tenths of a degree per century while sea level will rise for many centuries. Therefore, we have yet to experience the global warming that will be caused by past emissions let alone the adverse impacts that will follow from inevitable continuing buildup of GHG.

Brown, *supra* note 3, at 289. Because of this long lag time, reports stress the importance of addressing climate change sooner rather than later:

Under what is considered a best-case model, global annual emissions of carbon dioxide will have to start declining by 2020 to stabilize atmospheric carbon dioxide at 450 part per million. Even at that level, there would probably be substantial losses . . . including a global die-off of coral reefs.

. . . .
If emissions do not start declining until 2033, carbon dioxide concentrations will plateau at 550 parts per million—more than double preindustrial concentrations. That level raises the likelihood of more calamitous consequences, including intensified storm and drought cycles, wider extinction of species and perhaps the eventual freeing of the West Antarctic Ice Sheet, which could raise sea levels a century or two from now 15 feet or more, inundating coasts where most human settlements are concentrated.

. . . .
Unlike soot or sulfur pollution, which falls out of the atmosphere within days or weeks, molecules of carbon dioxide and other greenhouse gases can circulate for a century or more.

Andrew C. Revkin, *Can Global Warming Be Studied Too Much?*, N.Y. TIMES, Dec. 3, 2002, at F4; cf. Eugene Linden, *Antarctica: Warnings from the Ice*, TIME,

Given these effects, as well as the strong potential for far more serious and widespread negative impacts on the environment, including impacts on human health, and economic systems, one would expect the issue of climate change to receive urgent attention from governments around the world. While many countries are taking steps to reduce their CO₂ emissions,⁴⁰ it seems unlikely that the United States will enact any meaningful legislation in the near future. As mentioned above, the current administration has been reluctant to take steps to reduce significantly CO₂ emissions. In fact, it has questioned the science surrounding climate change⁴¹ and has chosen to play down the

Apr. 14, 1997, at 57-58 (acknowledging that while “[s]ome change in Antarctic climate is already noticeable,” some geophysicists suspect that the “WAIS has been collapsing for thousands of years, and final collapse may not occur for a couple of thousand more”).

⁴⁰ See, e.g., Myers & Revkin, *supra* note 38 (“The European Union has said that, with or without the [Kyoto] protocol, it will proceed in 2005 with a trading plan allowing member states to reach targets by investing in emissions-curbing projects in other states.”). But see Stuart E. Eizenstat & David B. Sandalow, *The Years After Tomorrow*, N.Y. TIMES, July 5, 2004, at A15 (“Progress in the international climate negotiations has been painfully slow.”).

⁴¹ The Bush administration and other opponents of the Kyoto Protocol have stated that there is not enough scientific evidence yet to warrant cutting CO₂ emissions. See, e.g., Mann, *supra* note 33, at 1148 (stating that opponents of the Kyoto Agreement have argued that there is “insufficient evidence about the effects of anthropogenic global warming”); Editorial, *New Players on Global Warming*, N.Y. TIMES, Jan. 15, 2003, at A20 (discussing President Bush’s “let’s-wait-for-more-research stance”); Myers & Revkin, *supra* note 38 (reporting that American officials have stated that the science pointing to risks from global warming remains “murky” and that the only way to solve the problem is with long-term research on new non-polluting energy options); Andrew C. Revkin, *Administration’s Climate Plan Is Criticized as a Risky Bet*, N.Y. TIMES, Feb. 26, 2002, at F1 (discussing how “the president has been saying there is no scientific justification for the specific emissions targets set forth in the Kyoto Protocol”); Andrew C. Revkin, *Bush Climate Plan Rated Somewhat Improved*, N.Y. TIMES, Feb. 19, 2004, at A18 (reporting that President Bush has indicated that more research is needed before he would consider any measures beyond voluntary programs to slow growth in emissions); Andrew C. Revkin, *The Sky is Falling! Say Hollywood and, Yes, the Pentagon*, N.Y. TIMES, Feb. 29, 2004, at WK5 (discussing the Bush administration’s “stated view . . . that the entire matter of global warming requires more study, not action”); *Study Disputes Idea on Global Warming*, N.Y. TIMES, Mar. 18, 2004, at A26 (discussing the research of Dr. Ken Minschwaner, an atmospheric physicist at the New Mexico Institute of Mining and Technology, who suggests that global warming may be less severe than some predictions indicate); J.R. Pegg, *Senate Not Ready to Act on Global Warming*, ENVTL. NEWS NETWORK, Oct. 30, 2003 (citing Sen. James Inhofe, (R-Okla.) for the proposition that “[t]he science is not sound behind the myth, the hoax of global warming [CO₂ is] something that helps us and something

threats of climate change.⁴² Rather than requiring GHG emission reductions, the Bush administration has offered a voluntary plan to slow the growth of GHG emissions.⁴³ In addition, on October 30,

that would be to the benefit [sic] to have more of"; and Sen. Jeff Sessions (R-Ala.) for the proposition that CO₂ is not a pollutant and "it does not hurt our health"), available at <http://www.ens-newswire.com/ens/oct2003/2003-10-30-11.asp> (last visited Nov. 3, 2003). But see Andrew C. Revkin, *U.S. Report, in Shift, Turns Focus to Greenhouse Gases*, N.Y. TIMES, Aug. 26, 2004, at A18 ("In a striking shift in the way the Bush administration has portrayed the science of climate change, a new report to Congress focuses on federal research indicating that emissions of carbon dioxide and other heat-trapping gases are the only likely explanation for global warming over the last three decades."); Editorial, *Warming to Global Warming*, N.Y. TIMES, Aug. 27, 2004, at A20 ("After three years of belittling or suppressing science, the Bush administration appears willing to concede that humans and their industrial activity have been largely responsible for the recent warming of the earth's atmosphere.").

Some commentators have responded to the claim that the science surrounding climate change is murky. McKibben writes: "We have already pumped enough gas into the air so that a significant rise in temperature and a subsequent shift in weather are inevitable." MCKIBBEN, *supra* note 3, at 67. Although McKibben recognizes that there are problems with the "game" of listing the effects that will result from changes in the atmosphere, see *id.* at 132, he compares those who doubt the science on climate change to "those scientists in the pay of the tobacco companies who insist that there is no 'proof' of the link between cigarettes and cancer." *Id.* at 108.

⁴² See, e.g., Editorial, *Backward on Global Warming*, N.Y. TIMES, Feb. 16, 2002, at A18 (discussing how President Bush "does not regard warming as a problem" because he has abandoned "his campaign pledge to limit carbon emissions and [has] renounce[ed] the 1997 Kyoto Protocol committing industrialized nations to mandatory reductions of carbon and other greenhouse gases"); Editorial, *Uses and Abuses of Science*, N.Y. TIMES, Feb. 23, 2004, at A20 (stating that, with respect to the issue of global warming, the Bush administration has "belittled, misrepresented, altered or quashed multiple reports suggesting a clear link between greenhouse gas emissions and the burning of fossil fuels like coal and oil"); Andrew C. Revkin & Katharine Q. Seelye, *Report by EPA Leaves Out Data on Climate Change*, N.Y. TIMES, June 19, 2003, at A1 (describing how the White House edited an EPA draft report on the state of the environment, reducing a long section describing the risks from rising global temperatures to a few paragraphs).

⁴³ In February 2002, President Bush announced a voluntary plan to slow the buildup of gases linked to climate change. President Bush's plan would "us[e] tax breaks and the prospect of a future trade in emissions credits to encourage industry and individuals to trim releases of the warming gases." Revkin, *Bush Offers Plan*, *supra* note 38. Under this plan, President Bush hopes for "an 18 percent reduction, by 2012, in emissions of greenhouse gases for each unit of gross domestic product." Andrew C. Revkin, *U.S. Is Pressuring Industries to Cut Greenhouse Gases*, N.Y. TIMES, Jan. 20, 2003, at A1. The plan has been criticized by industry, governmental, and environmental groups. Industry officials fear that, "without measurable success from voluntary reductions, it will become ever harder in coming years to stave off legislation requiring companies to act." *Id.* Government officials posit that "it is unlikely to lead to

2003, the United States Senate defeated a bill, the Climate Stewardship Act,⁴⁴ sponsored by John McCain (R-Ariz.) and Joseph Lieberman (D-Conn.), to combat climate change that would have restricted the emissions of carbon dioxide and other heat-trapping gasses.⁴⁵

Although the bill failed by a vote of fifty-five to forty-three, it “won a surprising amount of support, signaling that the concept of a policy on global warming has gained traction.”⁴⁶ Indeed, this was the first time the Senate had considered specific legislation to restrict emissions of carbon dioxide and other heat-trapping gasses since 1997 when, shortly before the talks that eventually lead to the Kyoto Protocol, the Senate passed a resolution to reject any treaty that significantly harmed the American economy or failed to include third-world countries.⁴⁷ Although the bill was in fact a much more modest version of the Kyoto accord, which called for a seven percent reduction in greenhouse gas emissions in the United States from 1990 levels by the year 2010,⁴⁸ some supporters of the proposed legislation believe that the vote was a “watershed

improvements much beyond those already taking place as the economy shifts from old-style manufacturing and businesses grow less wasteful.” *Id.* Environmental groups and other critics point out that Bush’s target “is so modest that no matter what industries do to achieve it, it will not help stem climate change.” *Id.* Europeans have also criticized President Bush’s voluntary plan. Philippe Meunier, head of a French intergovernmental task force on global warming, has called the plan “window dressing,” fearing “without sanctions it just won’t work.” Daley, *supra* note 38.

⁴⁴ Climate Stewardship Act, S. 139, 108th Cong. (2003).

⁴⁵ Lee & Revkin, *supra* note 36; Pegg *supra* note 41. *See generally* Eizenstat, *supra* note 40, at A15 (discussing how Sen. McCain and Sen. Lieberman have “sponsored an important bill on the issue”); Semple, Jr., *supra* note 39, at 30 (describing how the “bill would slowly begin to reduce industrial carbon-dioxide emissions”). Although “[t]he legislation did not address the CO2 emissions of the nation’s automobiles, which represent some 20 percent of the U.S. total,” it would have “set a nationwide cap on industrial emissions of carbon dioxide . . . and reduce [sic] those emissions down to 2000 levels by 2010 through an emissions trading system.” Pegg, *supra* note 41.

⁴⁶ Lee & Revkin, *supra* note 36, at A14; *see also* Editorial, *Promising Vote on Global Warming*, N.Y. TIMES, Nov. 1, 2003, at A14 (“The bill . . . found surprising support among Democrats and Republicans from big industrial and coal-producing states, where opposition to any legislation having to do with curbing emissions of carbon dioxide and other greenhouse gases usually runs high.”).

⁴⁷ Lee & Revkin, *supra* note 36, at A14.

⁴⁸ *Id.*

moment in the U.S. debate over the issue of global warming.”⁴⁹ Not everyone, however, feels that a major mandatory program on the federal level to combat climate change is imminent. Opponents of the bill claim that many senators who voted for the bill knew that the bill would never win approval in the House and thus “voted for it only because doing so allowed them to gain points with environmentalists while avoiding the true political costs.”⁵⁰ But regardless of whether one views the defeat of the Climate Stewardship Act⁵¹ as a positive sign that federal legislation is forthcoming or as yet another example of the United States’ irresponsible approach to climate change, the need for increased reliance on renewable energies remains pressing.⁵²

⁴⁹ Pegg, *supra* note 41. The article also mentions that “[e]nvironmentalists [who] hailed the symbolic victory in the vote . . . noted that unlike the federal government, many U.S. states, local governments, investment groups and corporations are acting to combat global warming.” *Id.* For a discussion of state efforts to combat global warming, see Lee, *supra* note 36, at A20.

⁵⁰ Lee & Revkin, *supra* note 36, at A14.

⁵¹ On March 30, 2004, a bipartisan group of twenty members of the House of Representatives, led by Rep. Wayne Gilchrest (R-Md.) and Rep. John Olver (D-Mass.), introduced a companion bill to the McCain-Lieberman Climate Stewardship Act. The House bill, Climate Stewardship Act, H.R. 4067, 108th Cong. (2004), “would set a nationwide pollution limit for major sources of the GHGs that cause global warming, including the industrial, commercial, electricity and transportation sources that combine to produce nearly [eighty] percent of these emissions in the United States.” Natural Res. Def. Council, *Legislative Watch* (Apr. 7, 2004) (on file with author). On July 8, 2004, Sen. McCain (R-Ariz.) and Sen. Lieberman (D-Conn.) attempted to have the Senate vote a second time on their Climate Stewardship Act, filing their bill as an amendment to an unrelated bill on class action lawsuits. Natural Res. Def. Council, *Legislative Watch* (July 15, 2004) (on file with author). But their effort failed when Senate Majority Leader Bill Frist (R-Tenn.) used a parliamentary procedure to block any floor votes on amendments. *Id.*

⁵² See, e.g., ORR, *supra* note 6, at 22 (“We now have to move quickly from fossil fuels to renewable energy There is no political or economic movement presently underway sufficient to stop the process short of a doubling or tripling of the background level of 280 ppm CO₂ in the atmosphere.”); Hoffert, *supra* note 38, at 981 (stressing the importance of energy technology research because “CO₂ is a combustion product vital to how civilization is powered; it cannot be regulated away”); Editorial, *Still Lagging on Warming*, N.Y. TIMES, Dec. 8, 2002, at WK14 (“Every year of delay locks in more outmoded investment, adds to the carbon emissions already in the atmosphere and increases the ultimate costs of protecting the environment.”); Eizenstat, *supra* note 40, at A15 (arguing that “[w]aiting to address global warming would be a reckless gamble” and declaring that “Federal legislation must be enacted to require mandatory limits on heat-trapping gases, to ensure that businesses combat global warming in their capital investments and research spending”); Evar D. Nering, *The Mirage of a Growing Fuel Supply*, N.Y. TIMES, June 6, 2001, at A17 (“If we

want to avoid dire consequences, we need to find the political will to reduce the growth in energy consumption to zero—or even begin to consume less.”); Andrew C. Revkin & Jennifer 8. Lee, *White House Attacked for Letting States Lead on Climate Policy*, N.Y. TIMES, Dec. 11, 2003, at A32 (discussing how states’ actions to curb heat-trapping gases is “no substitute for federal action” and quoting Gov. Gary Locke (D-WA) as saying, “[w]e need a national policy to address global warming”); Revkin, *Bush Climate Plan*, *supra* note 41, at A18 (“[Climate change] is clearly an issue where the science is pretty clearly telling us that the longer we wait to consider some of these issues, the more dramatic the impacts may turn out to be.” (quoting Thomas E. Graedel, professor of industrial ecology at Yale University)); Conservation Law Found., *supra* note 30, at 1, 8 (stating that, “[d]ue to the seriousness and potential magnitude of the risks global warming poses to New England’s natural environment, communities, and economy, we must take action immediately to address the threat” and discussing ways in which New England can take action on climate change “[w]hile the Bush Administration is stonewalling on the United States’ international commitments to reduce the threat of global warming”). *See generally* Keith Bradsher, *China’s Boom Adds to Global Warming Problem*, N.Y. TIMES, Oct. 22, 2003, at A1 (“China’s rapid economic growth is producing a surge in emissions of greenhouse gases that threatens international efforts to curb global warming, as Chinese power plants burn ever more coal while car sales soar.”); Paul Krugman, *The Oil Crunch*, N.Y. TIMES, May 7, 2004, at A31 (“[T]he daily world consumption of oil is 12 million barrels higher than it was a decade ago, roughly equal to the combined production of Saudi Arabia and Iran. . . . [T]he big increases in demand have come from booming developing countries. China, in particular, still consumes only 8 percent of the world’s oil—but it accounted for 37 percent of the growth in world oil consumption over the last four years.”); Jim Yardley, *China’s Economic Engine Needs Power (Lots of It)*, N.Y. TIMES, Mar. 14, 2004, at WK3 (“The fundamental problem is that China is following the path of the United States, and probably the world cannot afford a second United States.” (quoting Zhang Jianyu, program manager for the Beijing office of Environmental Defense)). *But see* Bradsher, *supra* note 6, at A1 (“The Chinese government is prepared to impose minimum fuel economy standards on new cars for the first time, and the rules will be significantly more stringent than those in the United States.”); *China’s Message on Energy*, *supra* note 6 (praising China for its plan “to impose fuel economy standards on new cars and S.U.V.’s that will be significantly stronger than those in the United States”).

Although outside the scope of this Article, it is important to note that in the absence of legislation to curb carbon dioxide emissions, there are steps that individuals and communities can take to reduce carbon dioxide emissions by improving energy efficiency. *See, e.g.*, Ottinger & Jayne, *supra* note 12, at 24-35 (discussing the importance of using more efficient appliances; replacing incandescent light bulbs with compact fluorescent bulbs; ensuring adequate insulation of homes and buildings; planting deciduous trees on the south side of buildings, painting buildings light colors, and whitewashing roofs of buildings to save energy used for air conditioning; recycling; etc.); Chang, *supra* note 12 (“Increased energy efficiency—like better-insulated buildings, more efficient air-conditioners . . . —is not a solution by itself, but it could buy more time to develop cleaner energy.”); Eizenstat, *supra* note 40, at A15 (“Dozens of states and localities have filled the void, starting their own programs to fight global warming, like the regional compact under development in the Northeast.”). *See generally* Jane Jacobs, *The Greening of the City*, N.Y. TIMES, May 16, 2004, § 6

B. Air Pollution and Acid Rain

In addition to carbon dioxide, when fossil fuels are burned, they emit sulfur dioxide (SO₂), nitrogen oxides (NO_x), particulate matter (PM), and mercury.⁵³ Although these pollutants play no significant role in global warming,⁵⁴ “they do contribute to health

(Magazine), at 22 (discussing how “green roofs” conserve energy); Motoko Rich, *Green Gets Real*, N.Y. TIMES, May 6, 2004, at F1 (discussing various types of eco-friendly design, such as energy-efficient light bulbs, appliances and heating systems); Wald, *supra* note 3, at F7 (discussing how horizontal-axis washing machines, new refrigerators, and compact fluorescent bulbs save electricity). For a comparison of energy use in our homes to that of our cars, and whether individuals are more likely to cut greenhouse gas emissions by switching to energy efficient appliances than to hybrid vehicles, see Danny Hakim, *EPA Energy-Saving Spots Give Cars Short Shrift*, N.Y. TIMES, June 25, 2004, at C1. For a discussion of how agriculture can be a weapon against global warming, see David Barboza, *Plan Gives Farmers a Role in Fighting Global Warming*, N.Y. TIMES, Nov. 25, 2003, at F3 (discussing how “conservation tillage” allows plant life and natural debris to decompose, thereby strengthening the soil and rendering it more able to absorb carbon from the atmosphere).

⁵³ See Hsu, *supra* note 10, at 430 (“In 1999, coal-fired power plants in the United States emitted 11.3 million tons of SO₂, 6.5 million tons of nitrogen oxides (NO_x) . . . and 43 tons of mercury. This accounted for approximately 60% of all SO₂ emissions nationwide and 25% of all NO_x emissions nationwide.”); see also Proposed National Emission Standards for Hazardous Air Pollutants, 69 Fed. Reg. 4652 (Jan. 30, 2004) (to be codified at 40 C.F.R. pts. 60 & 63) (“[C]oal-fired Utility Units in the U.S. emitted approximately 48 tons of Hg [mercury] into the atmosphere in 1999.”); Editorial, *Stirrings on Clean Air*, N.Y. TIMES, Mar. 27, 2004, at A14 (“[t]he country’s 1,100 coal-fired power plants produce 48 tons of [mercury], about 40 percent of the nation’s industrial mercury pollution, every year.”); Michael Janofsky, *Study Finds Mercury Levels In Fish Exceed U.S. Standards*, N.Y. TIMES, Aug. 4, 2004, at A15 (“[Power plants] account for 41 percent of all mercury emissions, more than 90,000 pounds a year, and up to 80 percent of the mercury deposits in some parts of the country, including the Northeast and the Great Lakes region.”); Power Scorecard, *Electricity from: Coal*, *supra* note 3 (“Coal power plants are responsible for 93 percent of the sulfur dioxide and 80 percent of the nitrogen oxide emissions generated by the electric utility industry. . . . Coal plants are also a major source of airborne emissions of mercury, a toxic heavy metal.”); EPA, *What Can Society Do About Acid Deposition* [hereinafter *Acid Deposition*], at <http://www.epa.gov/acidrain/society/index.html> (last updated Jan. 6, 2004) (“Coal accounts for most US sulfur dioxide (SO₂) emissions and a large portion of NO_x emissions.”); *FDA and EPA Release New Guidelines for Eating Fish Containing Mercury for Women and Young Children* (NPR radio broadcast, Mar. 19, 2004) (stating that the nation’s power plants “put about 48 tons of mercury into the air each year”).

⁵⁴ Although carbon dioxide is considered “the largest contributor of anthropogenic climate change and global warming,” HUNTER ET AL., *supra* note 22, at 502, recent studies by NASA scientists at the Goddard Institute for Space Studies have shown that “soot [PM], mostly from diesel engines, is causing as much as a quarter of all observed global warming by reducing the ability of snow

problems and harm the environment.”⁵⁵ Frequently, air pollution of this type is viewed as a local problem; however, it is a local problem of national and, indeed, global proportions.⁵⁶ This Section will provide a brief overview of the pollutants released from the combustion of fossil fuels—SO₂, NO_x, PM, and mercury—and the concomitant environmental problems, including human health problems, that these pollutants can cause. This Section will not review the regulation of these pollutants, which, unlike carbon dioxide, are covered by the Clean Air Act.

SO₂ is “[a] gas that forms from airborne oxygen and the sulfur in fuels such as coal and oil”⁵⁷ and can pose severe threats to asthmatics and other individuals with respiratory or cardiovascular disease.⁵⁸ Like SO₂, NO_x can also cause respiratory problems for

and ice to reflect sunlight.” *Soot Is Cited as Big Factor in Global Warming*, N.Y. TIMES, Dec. 25, 2003 at A21. According to Dr. James E. Hansen and Dr. Larissa Nazarenko, soot, which comes from diesel exhaust in the developed world and from the burning of wood, animal dung, vegetable oil, and coal in small stoves in the developing world, may be twice as potent as carbon dioxide in changing global surface air temperature in the Arctic and Northern Hemisphere. *Id.*; see also James Hansen & Larissa Nazarenko, *Soot Climate Forcing Via Snow and Ice Albedos*, 101 PROC. NAT’L ACAD. SCI. 423, 427 (2004).

⁵⁵ Revkin, *Bush Offers Plan*, *supra* note 38.

⁵⁶ “Environmentalists call sulfur the world’s biggest single contributor to air pollution.” Keith Bradsher, *China Pays a Price for Cheaper Oil*, N.Y. TIMES, June 26, 2004, at C1. According to the Natural Resources Defense Council:

Despite cleanup efforts, air pollution in the United States continues to cause 30,000 premature deaths and several million lost workdays nationwide every year due to asthma and other respiratory ailments. Scientists say these losses will be increasingly compounded by global warming, which accelerates smog formation and increases the risks of fatal heat stress.

Natural Res. Def. Council, *Landmark Pollution Bill Tackles Smog, Global Warming Together*, at <http://www.nrdc.org/globalWarming/fourp/fcpa.asp> (last visited Dec. 8, 2004). David Hunter et al. note that “1.3 billion people live in urban areas that do not meet World Health Organization air pollution standards, resulting in from 300,000 to 700,000 additional deaths each year.” HUNTER ET AL., *supra* note 22, at 498; see also CURTIS A. MOORE, DYING NEEDLESSLY: SICKNESS AND DEATH DUE TO ENERGY-RELATED AIR POLLUTION 1-3 (Feb. 1997) (discussing the problem of air pollution in Europe and in industrializing nations), available at http://www.repp.org/repp_pubs/pdf/issuebr6.pdf.

⁵⁷ Serchuk, *supra* note 3, at 5.

⁵⁸ *Id.*; see also Adam Goodheart, *Something in the Air*, N.Y. TIMES, Feb. 8, 2004, § 6 (Magazine), at 38 (explaining how individuals in Cheshire, Ohio, used to complain of sore throats, burning eyes, and strange blisters from the sulfur dioxide emitted from the town’s massive coal-burning power plant until the owner of the power plant, American Electric Power, paid the entire town to move); MOORE, *supra* note 56, at 6 (“Asthmatics, particularly children, are

healthy adults and acute problems for the elderly, infirm, and children.⁵⁹ According to Christopher A. Moore, Director of International Programs for the American Lung Association, “[m]any children aged twelve and younger who are exposed to NO_x have more respiratory illnesses. Those exposed to high levels of NO_x outdoors have more colds that settle in their chests, chronic wheezing and cough, bronchitis, chest cough with phlegm, and episodes of respiratory illness.”⁶⁰ SO₂ and NO_x can also harm the environment when combined with other chemicals. As discussed below, NO_x is a precursor to the formation of ozone. And when SO₂ and NO_x combine, they can contribute to the problem of acid rain. Finally, SO₂ and NO_x can cause eutrophication and visibility impairment.

PM, commonly known as soot, “includes droplets or particles from smoke, dust, fly ash (i.e., the airborne portion of noncombustible fuel contaminants), or condensing vapors. . . . [It] also encompasses sulfate and nitrate particles formed as a byproduct of SO₂ and NO_x emissions.”⁶¹ PM can cause human respiratory health problems. According to Professor David M. Driesen, particulates are linked to tens of thousands of annual premature deaths in the United States: “they contribute to respiratory illness, but also seem to play a role in triggering heart attacks among the elderly.”⁶²

highly vulnerable to sulfur dioxide. Asthma, which is the leading cause of chronic illness in children, renders its victims especially sensitive to pollution.”). For a discussion of the human health benefits, as well as the economic benefits to society, from a reduction in SO₂ emissions, see LAURINE G. CHESTNUT, HUMAN HEALTH BENEFITS FROM SULFATE REDUCTIONS UNDER TITLE IV OF THE 1990 CLEAN AIR ACT AMENDMENTS (1995), available at <http://www.epa.gov/airmarkets/articles/healtheffects/huhealth.pdf>.

⁵⁹ Serchuk, *supra* note 3, at 6.

⁶⁰ MOORE, *supra* note 56, at 8.

⁶¹ Serchuk, *supra* note 3, at 7.

⁶² David M. Driesen, *Air Pollution*, in STUMBLING TOWARD SUSTAINABILITY, *supra* note 3, at 257, 258; see also HUNTER ET AL., *supra* note 22, at 501 (“[P]articulates exacerbate respiratory illnesses and over the long-term increase chronic bronchitis.”); Driesen, *supra*, at 258 (“NO_x and SO₂ contribute to the formation of fine particulates, which are associated with the most serious health problems.”); Hsu, *supra* note 10, at 430-31 (“There is now widespread agreement that the retirement of older coal-fired power plants would produce substantial health and environmental benefits well in excess of the costs imposed.”); Bruce Barcott, *Changing All the Rules*, N.Y. TIMES, Apr. 4, 2004, § 6 (Magazine), at 38, 42 (“Fine-particulate pollution from power plants shortens the lives of more than 30,000 Americans every year.”); EPA *Identifies* 243

In addition to the pollutants SO₂, NO_x, and PM, power plant combustion can release volatile metals, such as mercury. Mercury emissions from coal-burning power plants are transported through the air and eventually deposited in water and on land. Once mercury enters waters, “it can bioaccumulate in fish and animal tissue in its most toxic form, methylmercury.”⁶³ Individuals who

Counties That Fail Federal Air Standards, N.Y. TIMES, June 30, 2004, at A18 (“[S]oot-filled air annually cause[s] 15,000 premature deaths, 95,000 cases of chronic or acute bronchitis and thousands of hospital admissions because of respiratory or cardiovascular illness.” (citing EPA Administrator Michael O. Leavitt)); Jennifer 8. Lee, *Clear Skies No More for Millions in U.S.*, N.Y. TIMES, Apr. 13, 2004, at A22 (explaining that fine particulate soot “lodges in the lungs and contributes to lung disease, heart attacks and premature death”); Revkin, *Panel of Experts*, *supra* note 33, at A11 (“[S]oot . . . has been shown to be especially harmful.”); American Wind Energy Ass’n, *The Most Frequently Asked Questions About Wind Energy* 14 (2002) [hereinafter *The Most Frequently Asked Questions About Wind Energy*] (stating that particulate matter’s “presence in the air . . . has contributed to make asthma one of the fastest growing childhood ailments in industrial and developing countries alike, and it has also recently been linked to lung cancer”), available at <http://www.awea.org/pubs/documents/FAQ2002%20-%20web.PDF>; Env’tl. Health Action, *Children’s Environmental Health: Asthma* (“Particulate matter, or soot, has been linked to everything from increases in asthma and respiratory ailments to increases in hospitalizations, emergency room visits, illness and death, to decreased lung function and lost days from school and work.”), at <http://www.envirohealthaction.org/children/asthma/> (last visited Oct. 30, 2004); Jonathan Levy et al., *Estimated Public Health Impacts of Criteria Pollutant Air Emissions from the Salem Harbor and Brayton Point Power Plants* 8 (2000) (“Epidemiological and toxicological evidence suggest that exposure to elevated levels of particulate matter (PM) . . . can lead to numerous adverse health effects, ranging from respiratory symptoms to premature death.”), available at <http://www.hsph.harvard.edu/papers/plant/plant.pdf>; MOORE, *supra* note 56, at 5 (“As particulate levels rise, so do runny or stuffy noses, sinusitis, sore throat, wet cough, head colds, hayfever, burning or red eyes, wheezing, dry cough, phlegm, shortness of breath, and chest discomfort or pain, as well as hospital admissions for asthma and bronchitis. . . . Bronchitis and chronic cough increase in school children, as do emergency room and hospital admissions.”); Serchuk, *supra* note 3, at 7 (“High levels of particulate pollution harm the elderly, children, and individuals with cardiopulmonary disease, such as asthmatics.”); Byron Swift, *Cleaner Power: The Benefits and Costs of Moving from Coal to Natural Gas Power Generation* 13 (Nov. 2000) (“NO_x and SO₂ emissions create fine particulate matter that causes severe human respiratory health problems.”), available at <http://www.eli.org/pdf/rccleanerpower00.pdf>. Particulates have such an adverse impact on human health that Byron Swift estimates that a twenty-five percent reduction in the use of coal by the year 2005 and a fifty percent reduction by the year 2010 would result in a \$26.4 billion public health benefit. *Id.* at 14 (“Public health benefits of \$26.4 million are expected from reductions in NO_x and SO₂ due to lowered particulate concentrations.”).

⁶³ EPA, MERCURY WHITE PAPER 1 [hereinafter MERCURY WHITE PAPER], available at <http://www.epa.gov/ttn/oarpg/t3/memoranda/whtpaper.pdf> (last

eat contaminated fish are likely to be at risk from mercury exposure. According to the EPA:

[t]he developing fetus is considered the most sensitive to the effects of mercury. Children born of women exposed to relatively high levels of methylmercury during pregnancy have exhibited a variety of developmental neurological abnormalities, including delayed onset of walking and talking, cerebral palsy, and reduced neurological test scores. Far lower exposures during pregnancy have resulted in delays and deficits in learning abilities in the children.⁶⁴

visited Mar. 17, 2005). “Bioaccumulation means that the concentration of mercury in predators at the top of the food web (for example, predatory fish and fish-eating birds and mammals) can be thousands or even millions of times greater than the concentrations of mercury found in water.” *Id.*; see also Editorial, *Stirrings on Clean Air*, *supra* note 53 (“Mercury is a dangerous contaminant that usually enters the food chain through fish.”); EPA, *Frequent Questions About Mercury* [hereinafter *Mercury FAQ*], at <http://www.epa.gov/mercury/faq.htm> (last updated Apr. 13, 2005); EPA *Announces Rethinking of a Proposal Regarding Mercury Pollution from Coal-fired Power Plants* (NPR radio broadcast, Mar. 16, 2004) (“When [mercury] settles in water, some of it gets absorbed by fish and enters the human food supply. . . resulting [in] ill health effects.”); Nat’l Wildlife Fed’n, *Mercury Pollution & You: How Mercury Affects Human Health*, Feb. 2004 (“Once in the water, mercury can be transformed into methylmercury, a toxic form that is more readily absorbed by animals and people. It can then increase in concentration as it works its way up the food chain from plankton to forage fish to predator fish.”), available at <http://www.nwf.org/resourceLibrary/getData.cfm?officeID=15D39898-FEF7-0077-300221CD0852182F&catID=3E47F8A8-9DF1-323E-CCAC76CCA155C1F9&pageID=741608B1-65BF-1173-530C7816DEDD3B4F>; Serchuk, *supra* note 3, at 8 (“Mercury tends to accumulate in aquatic ecosystems, where it works its way up the food chain to top predators such as tuna, sharks, and swordfish—and to the humans who eat them.”).

⁶⁴ MERCURY WHITE PAPER, *supra* note 63, at 2; see also Barcott, *supra* note 62, at 42 (“Mercury, a highly toxic chemical that is emitted as a vapor when coal is burned, has been found to cause brain disorders in developing fetuses and young children, and unhealthy levels of it have been detected in swordfish and tuna.”); Bradley M. Campell, Comm’r., Dep’t of Env’tl. Prot., N.J., Letter to the Editor, N.Y. TIMES, June 27, 2004, at WK 12 (“Mercury is a toxic chemical that poses significant risks to young children and developing fetuses.”); Michael Janofsky, *EPA Says Mercury Taints Fish Across U.S.*, N.Y. TIMES, Aug. 25, 2004, at A21 (reporting that “virtually all of the nation’s lakes and rivers are contaminated with mercury” and describing mercury as “a highly toxic metal that poses health risks for pregnant women and young children”); Janofsky, *supra* note 53, at A15 (“The kind of mercury scientists have found in fish is a toxin that can harm human health, particularly in women of child-bearing age and young children.”); Paul Krugman, *The Mercury Scandal*, N.Y. TIMES, Apr. 6, 2004, at A23 (“Mercury can damage the nervous system, especially in fetuses and infants.”); Jennifer 8. Lee, *EPA Raises Estimate of Babies Affected by Mercury*

The EPA also states that “there is growing evidence that methylmercury exposure can have adverse cardiovascular effects for adults, resulting in elevated blood pressure and incidence of heart attacks.”⁶⁵ As mentioned above, NO_x, when combined with

Exposure, N.Y. TIMES, Feb. 10, 2004, at F2 (“More than one child in six born in the United States could be at risk for developmental disorders because of mercury exposure in the mother’s womb.”); Jennifer 8. Lee, *Questions About a Market System for Mercury*, N.Y. TIMES, Feb. 24, 2004 at A20 (“[M]ercury, a neurotoxin . . . can harm fetuses and young children.”); Jennifer 8. Lee, *White House Minimized the Risks of Mercury in Proposed Rules, Scientists Say*, N.Y. TIMES, Apr. 7, 2004 at A16 (“[E]xposure to elevated levels of mercury can damage the brains of children and fetuses.”); *New Mercury Rules Get Heavy Response*, N.Y. TIMES, June 29, 2004 at A22 (“Mercury is known to cause a range of adverse health effects, especially for children and pregnant women”); Nat’l Wildlife Fed’n, *supra* note 63 (“When ingested by pregnant women, methylmercury is absorbed and travels to the developing fetus—affecting the development [of] the brain and nervous system. Infants are also exposed to methylmercury from their mothers through breast milk. Exposures at these early stages of development are especially dangerous, and can result in problems in memory, attention, and language development. Higher methylmercury exposures have also been associated with deficits in visual-spatial skills and negative impacts on heart rate variability in children.”); Natural Res. Def. Council, *NRDC’s Earth Action: The Bulletin for Environmental Activists*, Mar. 3, 2003 (on file with author) (“Mercury exposure is particularly dangerous for pregnant women and young children because infants’ and children’s developing brains are highly sensitive to its effects, including learning disabilities, attention deficit disorders, mental retardation and other neurological and development problems.”); Serchuk, *supra* note 3, at 8-10 (stating that “[t]he developing fetus may be particularly vulnerable to mercury” and explaining that children born to women exposed to high levels of mercury may have birth defects and delays in development).

⁶⁵ See *Mercury FAQ*, *supra* note 63; see also Nat’l Wildlife Fed., *supra* note 63 (explaining that for middle-aged men, mercury exposure may diminish cardiovascular benefits of eating fish, and that some studies have shown a link between high blood mercury levels and infertility in both men and women); Serchuk, *supra* note 3, at 8-10 (explaining that mercury’s “[p]otential effects on human health include losses of sensory cognitive ability . . . tremors, and death”).

Currently, mercury emissions from coal-burning power plants are not regulated under federal law. See Jennifer 8. Lee, *U.S. Proposes Easing Rules on Emissions of Mercury*, N.Y. TIMES, Dec. 3, 2004, at A20. The EPA has regulated mercury emissions from other sources, such as municipal waste combustors (MWCs) and hazardous waste combustors (HWCs). See Jennifer 8. Lee, *EPA Plans to Expand Pollution Markets*, N.Y. TIMES, Dec. 15, 2003, at A21; MERCURY WHITE PAPER, *supra* note 63, at 3. In December 2003, the Bush administration proposed a cap and trade program to regulate mercury pollution. See Jennifer 8. Lee, *EPA Drafts New Rules for Emissions From Power Plants*, N.Y. TIMES, Dec. 4, 2003, at A24; Jennifer 8. Lee, *EPA Plans to Expand Pollution Markets*, N.Y. TIMES, Dec. 15, 2003, at A21; Jennifer 8. Lee, *New Policy on Mercury Pollution Was Rejected by Clinton*, EPA, N.Y. TIMES, Dec. 16, 2003, at A27; Jennifer 8. Lee, *U.S. Proposes Easing Rules on Emissions of*

volatile organic compounds (VOCs) (which are emitted from many industrial sources, as well as automobiles) and sunlight, forms tropospheric ozone, or ground-level ozone, also known as “smog.”⁶⁶ “Smog exacerbates asthma, causes eye and nose

Mercury, N.Y. TIMES, Dec. 3, 2003, at A20; EPA, *EPA Proposes Options for Significantly Reducing Mercury Emissions from Electric Utilities* (Jan. 29, 2004), available at <http://www.epa.gov/mercury/mercuryfact12-15final.pdf>; EPA, *Utility Mercury Reductions Rule: Basic Information*, at <http://www.epa.gov/air/mercuryrule/basic.htm> (last updated Mar. 16, 2005). See generally Jennifer 8. Lee, *EPA Raises Estimate of Babies Affected by Mercury Exposure*, N.Y. TIMES, Feb. 10, 2004, at D2 (“Mercury pollution has become a contentious environmental issue with the Bush Administration’s proposal to create a market-based trading-pollution system.”).

In order to create such a trading system, the EPA would have to remove mercury from the Clean Air Act’s list of 189 hazardous air pollutants and reclassify it as a less stringently controlled pollutant. See Jennifer 8. Lee, *New Policy on Mercury Pollution Was Rejected by Clinton EPA*, N.Y. TIMES, Dec. 16, 2003, at A27; Jennifer 8. Lee, *U.S. Proposes Easing Rules On Emissions Of Mercury*, N.Y. TIMES, Dec. 3, 2003, at A20. Because of the specificity of the Clean Air Act’s provision on mercury and power plants, there may not be a legal basis for the Bush administration’s approach. As a result, if the EPA’s rule is made final, it will most certainly be challenged in court. See Felicity Barringer, *Bush Record: New Priorities In Environment*, N.Y. TIMES, Sept. 14, 2004, at A1; Lee, *EPA Plans to Expand Pollution Markets*, *supra*; Lee, *New Policy on Mercury Pollution Was Rejected by Clinton EPA*, *supra*; see also Editorial, *Mercury Wars*, N.Y. TIMES, Apr. 15, 2004, at A32.

⁶⁶ Driesen, *supra* note 62, at 258; see Barcott, *supra* note 62, at 42 (“Nitrogen oxides are major producers of ground-level ozone, or smog.”); Editorial, *Stirrings on Clean Air*, N.Y. TIMES, *supra* note 53 (explaining that nitrogen oxides contribute to smog); Serchuk, *supra* note 3, at 6 (“NOx is a precursor to the formation of ozone.”); Union of Concerned Scientists, *The Hidden Cost of Fossil Fuels* (stating that tropospheric ozone, or smog, “is formed when ozone precursors . . . react in the presence of heat and sunlight”), at http://www.ucsusa.org/clean_energy/health_and_environment/page.cfm?pageID=88 (last visited Nov. 29, 2004); Union of Concerned Scientists, *Clean Energy: Health and Environment* (“Nitrogen oxides and hydrocarbons combine in the atmosphere to form ground-level ozone, the major constituent of smog.”), at http://www.ucsusa.org/clean_energy/health_and_environment/index.cfm (last visited Apr. 8, 2004); Union of Concerned Scientists, *Public Benefits of Renewable Energy Use* (“In the presence of sunlight, nitrogen oxides combine with other chemicals to form ground-level ozone (smog).”), at http://www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=98 (last visited Nov. 29, 2004). Tropospheric ozone should not be confused with stratospheric ozone. See MOORE, *supra* note 56, at 7 (“While ozone at stratospheric levels provides crucial protection from harmful ultraviolet radiation, ozone at ground level is toxic.”). David Hunter et al. explain that

[t]he stratospheric ozone layer is a blanket of diffuse gases encircling the earth at a distance of 12 to 50 kilometers above the surface. . . . [T]he stratospheric ozone layer shields the earth from high-energy ultraviolet (UV-B) radiation from the sun. UV-B radiation is extremely

irritation, chest discomfort, headaches and nausea, worsens coughs, impairs pulmonary functions in people who are exercising, reduces the resistance to lung disease, and causes scarring of lungs over the long term.”⁶⁷ This point is echoed by Professor Driesen, who explains: “Ozone . . . causes very serious public health problems that have been well recognized for a long time. . . . [It] damages lung tissue. It plays a role in triggering asthma attacks, sending thousands to the hospital every summer. It effects [sic] young children and people engaged in heavy exercise especially severely.”⁶⁸ Recently, reports have shown that ozone can also

harmful to human health and the environment.

HUNTER ET AL., *supra* note 22, at 3-4. For example, UV-B can “caus[e] skin cancers and cataracts, damag[e] human immune systems, disrupt[] the food cycle of the ocean, and reduc[e] the productivity of important agricultural crops and other plants.” *Id.* at 537; *see also* MCKIBBEN, *supra* note 3, at 38 (“[t]oo much ultraviolet can damage plant and animal cells, causing, among humans, skin cancer and eye damage, and killing many smaller and more sensitive organisms.”). For a discussion of how chlorofluorocarbons (CFCs) break down ozone molecules, thereby preventing stratospheric ozone from absorbing ultraviolet radiation, *see* HUNTER ET AL., *supra* note 22, at 526-34; MCKIBBEN, *supra* note 3, at 38-44. For a discussion of the international agreements to address ozone depletion, *see* HUNTER ET AL., *supra* note 22, at 534-88.

⁶⁷ HUNTER ET AL., *supra* note 22, at 502.

⁶⁸ Driesen, *supra* note 62, at 258; *see also* THAYER, JR., *supra* note 9, at 191 (“Ozone, an essentially colorless gas, builds up in excess at the surface levels of the earth’s atmosphere but thins out dramatically and invisibly in the stratosphere, leaving only the potential of increasing sunburn and skin cancer as its visible trace.”); Felicity Barringer, *Critics Says Clean-Air Plan May Be a Setback for Parks*, N.Y. TIMES, May 31, 2004, at A12 (“Nitrogen oxide cooks in the sun with other chemicals to form ozone pollution, which . . . pains . . . lungs.”); Johnson, *supra* note 30, at B4 (“Smog . . . can aggravate respiratory problems like asthma, which is endemic in many urban lower-income neighborhoods.”); *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 14 (“[U]rban smog has been linked to low birth weight, premature births, stillbirths and infant deaths.”); Earthjustice, *Earthjustice Newsroom: Court Voids DC Smog Cleanup Delay* (Feb. 3, 2004) (“[O]zone (smog) [is] a severe lung irritant that is particularly dangerous to children, persons with asthma, and senior citizens. Elevated ozone levels have been linked to increased hospital and emergency room visits, and symptoms such as chest pain, nausea, and pulmonary congestion.”), at <http://www.earthjustice.org/news/display.html?ID=773>; EPA, *Effects of Acid Rain: Human Health* (“Ozone impacts on human health include a number of morbidity and mortality risks associated with lung inflammation, including asthma and emphysema.”), at <http://www.epa.gov/acidrain/effects/health.html> (last updated Nov. 12, 2003); EPA, *Health and Environmental Impacts of Ground-level Ozone* [hereinafter OZONE] (describing the symptoms of short-term ozone exposure to both health people and individuals with respiratory problems and explaining the risks of long-term exposure), at <http://www.epa.gov/air/urbanair/ozone/hlth.html> (last

exacerbate the problem of climate change, discussed above. As Andrew C. Revkin explains in his article, *Ozone May Offset Capacity of Trees to Sop up Carbon*:

Trees sop up the heat-trapping greenhouse gas through photosynthesis and stash it in the soil. The more carbon dioxide there is in the air, the more that forests, in theory, can lock up in the earth.

But a new experiment has shown that fairly common concentrations of ozone, the eye-stinging ingredient in smog, can sharply impede this process.⁶⁹

Finally, ground-level ozone can cause agricultural damage. The United States Environmental Protection Agency (EPA) reports that ground-level ozone “reduces crop and forest yields and increases plant vulnerability to disease, pests, and harsh weather.”⁷⁰

NO_x and SO₂ can also contribute to the transboundary problem of acid rain.⁷¹ “Acid rain is formed when sulfur

updated Dec. 20, 2004); MOORE, *supra* note 56, at 4 (explaining that ozone “literally burns holes through the cells of the lung, leaving children and adults alike unable to breathe normally”); Power Scorecard, *Electricity from: Coal*, *supra* note 3 (“Coal emissions also cause urban smog, which has been linked to respiratory ailments.”); Serchuk, *supra* note 3, at 6 (“Ozone damages the lungs, increases susceptibility to infection, and decreases ability to exercise. Studies correlate emergency room visits and hospital visits for respiratory causes to elevated ozone levels. Children playing outdoors are particularly vulnerable.”); Union of Concerned Scientists, *Clean Energy: Health and Environment*, *supra* note 66 (“Human exposure to ozone can produce shortness of breath and, over time, permanent lung damage.”); Union of Concerned Scientists, *The Hidden Cost of Fossil Fuels*, *supra* note 56 (“Human exposure to ozone can produce shortness of breath and, over time, permanent lung damage.”); Union of Concerned Scientists, *Public Benefits of Renewable Energy Use*, *supra* note 56 (stating that “ozone can irritate the lungs, cause bronchitis and pneumonia, and decrease resistance to respiratory infections”).

⁶⁹ Andrew C. Revkin, *Ozone May Offset Capacity of Trees to Sop up Carbon*, N.Y. TIMES, Oct. 16, 2003, at A18; *see also* Driesen, *supra* note 62, at 258 (mentioning that “[o]zone harms crops and trees”).

⁷⁰ OZONE, *supra* note 68; *see also* Union of Concerned Scientists, *Clean Energy: Health and Environment*, *supra* note 66 (stating that ground-level ozone can reduce crop yields); Union of Concerned Scientists, *The Hidden Cost of Fossil Fuels*, *supra* note 56 (stating that ozone can reduce crop yields).

⁷¹ HUNTER ET AL., *supra* note 22, at 498-99; *see also* MCKIBBEN, *supra* note 3, at 37 (“Under the right conditions, sulfur dioxide and nitrogen oxides in the emissions are transmuted into nitric and sulfuric acid that eventually drift to the ground or fall in the rain. And there they weaken the trees and acidify the lakes to the point of sterility.”); Driesen, *supra* note 62, at 258 (“NO_x and SO₂,

dioxide . . . and nitrogen oxides . . . combine with oxygen and moisture to create sulfuric and nitric acids. These acids may combine with rain, snow, fog, or frost and be blown hundreds of miles from their initial source.”⁷² According to the EPA:

Acid rain causes a cascade of effects that harm or kill individual fish, reduce fish population numbers, completely eliminate fish species from a waterbody, and decrease biodiversity. As acid rain flows through soils in a watershed, aluminum is released from soils into the lakes and streams located in that watershed. So, as pH in a lake or stream decreases, aluminum levels increase. Both low pH and increased aluminum levels are directly toxic to fish. In addition, low pH and increased aluminum levels cause chronic stress that may not kill individual fish, but leads to lower body weight and smaller size and makes fish less able to compete for food and habitat.⁷³

contribute to acid rain, which is not easily reversible.”); Barcott, *supra* note 62, at 71 (stating that nitrogen oxides “interact in the atmosphere with sulfur dioxide, water and oxygen to form acid rain”); Editorial, *Stirrings on Clean Air*, N.Y. TIMES, *supra* note 53 (explaining that sulfur dioxide and nitrogen oxides contribute to acid rain); Serchuk, *supra* note 3, at 6 (“SO₂ emissions harm ecosystems through acid rain, fog, snow, mist, and dry deposition. . . . Atmospheric NO_x can turn to nitric acid, a component of acid rain.”); Swift, *supra* note 62, at 13 (“Emissions of SO₂ in particular, but also NO_x, are the cause of acid rain and snow that causes acidification of water bodies and other ecosystem damage, as well as economic losses.”); Union of Concerned Scientists, *Clean Energy: Health and Environment*, *supra* note 66 (stating that “nitrogen oxides and sulfur oxides are important constituents of acid rain”); Union of Concerned Scientists, *The Hidden Cost of Fossil Fuels*, *supra* note 56 (“Nitrogen oxides and sulfur oxides are important constituents of acid rain. These gases combine with water vapors in clouds to form sulfuric and nitric acids, which become part of rain and snow.”)

⁷² Jennifer Yelin-Kefer, Note, *Warming Up to an International Greenhouse Gas Market: Lessons from the U.S. Acid Rain Experience*, 20 STAN. ENVTL. L.J. 221, 235 (2001).

⁷³ EPA, *Effects of Acid Rain: Lakes & Streams* [hereinafter *Lakes & Streams*], at <http://www.epa.gov/acidrain/effects/surfacewater.html> (last updated Nov. 12, 2003); see also THAYER, JR., *supra* note 9, at 191 (“Acid rain silently and invisibly kills fish in Canadian lakes, leaving little perceptible trace of its devastating effect on ecological food chains.”); Yelin-Kefer, *supra* note 72, at 235 (“When acid precipitation percolates through the ground and into surface waters, it can deplete soil nutrients (with corresponding effects on local forests) and kill fish in rivers and lakes.”); EPA, *Effects of Acid Rain* [hereinafter *Effects of Acid Rain*] (“Acid rain causes acidification of lakes and streams.”), at <http://www.epa.gov/acidrain/effects/index.html> (last updated Nov. 12, 2003); Power Scorecard, *Electricity from: Coal*, *supra* note 3 (stating that acid rain “rob[s] previously pristine streams of brook trout and other fish species in the

To make matters worse, “it takes many years for ecosystems to recover from acid deposition, even after emissions are reduced and the rain becomes normal again.”⁷⁴

In addition to the impacts on lakes and streams, their aquatic life and biodiversity, acid rain “contributes to damage of trees at high elevations (for example, red spruce trees above 2,000 feet) and many sensitive forest soils.”⁷⁵ Acid rain can also have adverse impacts on human-made objects, such as buildings, bridges, cultural objects (statutes, monuments, and tombstones), and cars,

Adirondacks, upper Midwest and Rocky Mountains”); Union of Concerned Scientists, *Clean Energy: Health and Environment*, *supra* note 66 (stating that acid rain destroys lakes and rivers); Union of Concerned Scientists, *Public Benefits of Renewable Energy Use*, *supra* note 56 (stating that acid rain “can make lakes and rivers too acidic for plant and animal life”). For a description of the impacts of acid rain on the Adirondack Park in New York, see Bernard C. Melewski, *Acid Rain and the Adirondacks: A Legislative History*, 66 ALB. L. REV. 171, 173 (2002).

⁷⁴ *Acid Deposition*, *supra* note 53; see also American Wind Energy Ass’n, *New Studies on Acid Rain and Global Warming Underscore Need for More Wind Energy, Now*, May 2, 2001 (reporting that, in the northeastern United States, “ecosystems are not recovering as expected from acid rain damage”), at <http://www.awea.org/news/news010502ara.html> (last visited Dec. 10, 2004).

⁷⁵ *Effects of Acid Rain*, *supra* note 73; see also Power Scorecard, *Electricity from: Coal*, *supra* note 3 (mentioning that acid rain “eat[s] away red spruce forests in the Northeast and Appalachia”); Serchuk, *supra* note 3, at 10 (“Trees such as red spruce at high elevations and lakes suffer the most [from acid rain].”). As the EPA explains:

Acid rain does not usually kill trees directly. Instead, it is more likely to weaken trees by damaging their leaves, limiting the nutrients available to them, or exposing them to toxic substances slowly released from the soil. . . .

Scientists know that acidic water dissolves the nutrients and helpful minerals in the soil and then washes them away before trees and other plants can use them to grow. At the same time, acid rain causes the release of substances that are toxic to trees and plants, such as aluminum, into the soil. Scientists believe that this combination of loss of soil nutrients and increase of toxic aluminum may be one way that acid rain harms trees. . . .

. . . [T]rees can be damaged by acid rain even if the soil is well buffered. Forests in high mountain regions often are exposed to greater amounts of acid than other forests because they tend to be surrounded by acidic clouds and fog that are more acidic than rainfall. Scientists believe that when leaves are frequently bathed in this acid fog, essential nutrients in their leaves and needles are stripped away. This loss of nutrients in their foliage makes trees more susceptible to damage by other environmental factors, particularly cold winter weather.

EPA, *Effects of Acid Rain: Forests*, at <http://www.epa.gov/acidrain/effects/forests.html> (last updated Nov. 12, 2003).

by corroding metals like bronze and deteriorating paint and stone (for example, marble and limestone).⁷⁶ As a result, maintenance costs to clean buildings dirtied by the dry deposition of acidic compounds have increased.⁷⁷ The price of cars has also risen. As the EPA explains, “[t]o reduce damage to automotive paint caused by acid rain and acidic dry deposition, some manufacturers use acid-resistant paints, at an average cost of \$5 for each new vehicle (or a total of \$61 million per year for all new cars and trucks sold in the U.S.).”⁷⁸

Finally, the emission of SO₂ and NO_x can cause eutrophication and visibility impairments. Eutrophication—the enrichment of waters with nutrients—is caused by the deposition of air-borne NO_x, which reaches water bodies, causing “explosive growth of algae and other plants.”⁷⁹ These algal blooms can result in a number of problems, including “falling oxygen levels, resulting in die-off of more complex plants and animals; the proliferation of nuisance algal species, which may prove toxic to fish, humans, and other mammals; and through surface algae growth, decreased sunlight and photosynthesis for species below.”⁸⁰ As the EPA further explains, “[t]hese ecological

⁷⁶ See *Effects of Acid Rain*, *supra* note 73; EPA, *Effects of Acid Rain: Materials* [hereinafter *Materials*], at <http://www.epa.gov/acidrain/effects/materials.html> (last updated Nov. 12, 2003); EPA, *The Effects of Acid Rain on Automotive Coatings* [hereinafter *Coatings*], at <http://www.epa.gov/acidrain/effects/carcoatings.html> (last updated Nov. 12, 2003); see also *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62; Union of Concerned Scientists, *The Hidden Cost of Fossil Fuels*, *supra* note 56; Union of Concerned Scientists, *Public Benefits of Renewable Energy Use*, *supra* note 56. Note, however, that “it has been difficult to quantify the specific contribution of acid rain to paint finish damage relative to damage caused by . . . the improper application of paint or by deficient paint formulations.” *Coatings*, *supra*.

⁷⁷ *Materials*, *supra* note 76.

⁷⁸ *Id.* For a discussion of what individuals can do to reduce acid deposition, see *Acid Deposition*, *supra* note 53. For a discussion of the federal government’s attempt to address the problem of acid rain through reductions in emissions of SO₂ and NO_x, see Melewski, *supra* note 73, at 174-75; Yelin-Kefer, *supra* note 72, at 234-41; EPA, *Acid Rain Program: Overview* [hereinafter *Acid Rain Program*], at <http://www.epa.gov/airmarkets/arp/overview.html> (last updated Oct. 25, 2002).

⁷⁹ Serchuk, *supra* note 3, at 11.

⁸⁰ *Id.*; see also *Lakes & Streams*, *supra* note 73 (“The symptoms of eutrophication include blooms of algae (both toxic and non-toxic), declines in the health of fish and shellfish, loss of seagrass beds and coral reefs, and ecological changes in food webs.”). Eutrophication has caused “especially severe problems in estuaries such as the Chesapeake Bay and Long Island Sound.” Swift, *supra*

changes impact human populations by changing the availability of seafood and creating a risk of consuming contaminated fish or shellfish, reducing our ability to use and enjoy our coastal ecosystems, and causing economic impact on people who rely on healthy coastal ecosystems, such as fishermen and those who cater to tourists.”⁸¹ And with respect to visibility impairment, Byron Swift of the Environmental Law Institute writes that “[p]articulates derived from emission of SO₂ and NO_x result in haze which causes significant visibility impairments over our National Parks and other areas,”⁸² thereby impeding the ability of current and future generations to appreciate their environment.⁸³

C. Other Environmental Impacts

In addition to the environmental impacts caused by the consumption of fossil fuels, the extraction and production of fossil

note 62, at 13. Note, however, that, “[a]lthough nitrogen loading may also stimulate plant growth, this effect is countered by the damage to plants caused by the ozone created from NO_x emissions [mentioned above]. EPA estimates that crop damage due to ozone amount to several billion dollars annually.” *Id.*

⁸¹ *Lakes & Streams*, *supra* note 73. For an in-depth discussion of why eutrophication is a concern, see PETER H. LEHNER ET AL., STORMWATER STRATEGIES: COMMUNITY RESPONSES TO RUNOFF POLLUTION 42 (Natural Res. Def. Council 1999), available at <http://www.nrdc.org/water/pollution/storm/stoinx.asp>.

⁸² Swift, *supra* note 62, at 13; see also EPA, *Acid Rain*, at <http://www.epa.gov/acidrain/index.html> (last updated Jan. 3, 2005); *Acid Rain Program*, *supra* note 78; *Effects of Acid Rain*, *supra* note 73; EPA, *Effects of Acid Rain: Visibility Reduction*, at <http://www.epa.gov/acidrain/effects/visibility.html> (last updated Nov. 12, 2003); Serchuk, *supra* note 3, at 7 (mentioning that PM reduces visibility).

⁸³ A recent *New York Times* editorial illustrates how haze impacts visibility:

It is mainly the views that lure nine million visitors a year to Great Smoky Mountains National Park. The problem is that on some days, no one can see anything. Over the last few decades, average visibility in summer months has shrunk from 77 miles to 15, and it is not at all unusual for visitors who climb to Look Rock, high on the park’s northern edge, to find themselves cocooned in a uniform, whitish haze. This haze is not to be confused with the blue mists that arise after rainstorms and give the Smokies their name. It is man-made, consisting mostly of sulfates produced by coal-fired power plants upwind of the park.

Editorial, *Rescuing the National Parks*, N.Y. TIMES, May 16, 2004, at WK 12; see also Barringer, *supra* note 68 (stating that, in the Great Smoky Mountains National Park, visitors on summer days “can see perhaps 14 miles, instead of the 77-mile range afforded the continent’s first settlers on a clear summer day. In 2002, the air in the park was unhealthy on a record 42 days . . .”).

fuels also have enormous environmental consequences.⁸⁴ Power Scorecard, a rating system sponsored by a number of groups including American Rivers, Environmental Defense, Natural Resources Defense Council, and the Union of Concerned Scientists, assesses the environmental impact of different types of electric generation and describes the other environmental impacts of coal and oil. With respect to coal, Power Scorecard states:

The mining, processing, and transporting of coal also insults the environment. In the West, about 87 percent of coal is removed from the earth through strip mining, which can contaminate soils with heavy metals and destroy near-surface aquifers. In the East, coal is sometimes mined by removing entire mountain tops to more easily extract the subsurface mineral reserves.

Coal combustion also results in huge quantities of solid wastes. Enormous quantities of waste heat require large amounts of water for cooling. The collection of this water from major water bodies threatens local aquatic life, including the killing of fish on the screens designed to keep such organisms out of the power plant.⁸⁵

Power Scorecard's report on oil is no more encouraging:

The operation of oil-fired power plants also impacts water, land use and solid waste disposal. Similar to the operations of other conventional steam technologies, oil-fired conventional

⁸⁴ In addition, the construction of power plants themselves is an energy-intensive activity, resulting in significant emissions. See REEVES & BECK, *supra* note 10, at 15 (noting that the construction of power plants is itself an energy-intensive activity, resulting in significant emissions).

⁸⁵ Power Scorecard, *Electricity from: Coal*, *supra* note 3; see also Serchuk, *supra* note 3, at 19-22 (describing the severe environmental costs of coal mining, including disruption of land and damage to aquatic ecosystems from acid drainage, as well as the high amount of water used by and the huge quantities of solid waste produced from coal combustion); Union of Concerned Scientists, *Clean Energy: Health and Environment*, *supra* note 66 ("[S]trip-mining for coal deposits devastates landscapes by lopping off whole mountaintops and filling-in [sic] valleys and streams."); Union of Concerned Scientists, *The Hidden Cost of Fossil Fuels*, *supra* note 56 ("Coal mining, especially strip mining, affects the area that is being mined. Characteristically, the material closest to the coal is acidic. After the mining is completed, the land will remain barren unless special precautions are taken to ensure that proper topsoil is used when the area is replanted. Materials other than coal are also brought to the surface in the coal mining process, and these are left as solid wastes. As the coal itself is washed, more waste material is left. Finally, as the coal is burned, the remaining ash is left as a waste product.").

steam plants require large amounts of water for steam and cooling, and can negatively impact local water resources and aquatic habitats. Sludges and oil residues that are not consumed during combustion became a solid waste burden and contain toxic and hazardous wastes.

Drilling also produces a long list of air pollutants, toxic and hazardous materials, and emissions of hydrogen sulfide, a highly flammable and toxic gas. All of these emissions can impact the health and safety of workers and wildlife. Loss of huge stretches of wildlife habitat also occur during drilling. . . . Oil transportation accidents can result in catastrophic damage killing thousands of fish, birds, other wildlife, plants and soil.⁸⁶

Finally, like oil, drilling for natural gas “can negatively impact wilderness habitat, wildlife, and public open space.”⁸⁷ Soil

⁸⁶ Power Scorecard, *Electricity from: Oil*, *supra* note 3; *see also* Serchuk, *supra* note 3, at 15 (“Oil exploration, production, refinement, transportation and storage . . . release methane.”).

For a discussion of the potential effect of drilling on wildlife in the Arctic National Wildlife Refuge, *see, e.g.*, Christopher R. Clements, *No Blood for Oil? United States National Security, Oil, and the Arctic*, 28 WM. & MARY ENVTL. L. & POL’Y REV. 87, 112 (2003); W. Wayt Gibbs, *The Arctic Oil & Wildlife Refuge*, SCI. AM., May 2001, at 63; *Oil and Gas Development in Alaska*, N.Y. TIMES, Jan. 23, 2004, at A13; Jim Robbins, *For Wildlife, Migration Is Endangered Too*, N.Y. TIMES, Mar. 9, 2004, at F4; Union of Concerned Scientists, *Global Environment: The Arctic National Wildlife Refuge: Is loss of a pristine wilderness worth the oil that might be gained?*, at http://www.ucsusa.org/global_environment/archive/page.cfm?pageID=780 (last visited Nov. 29, 2004). For a discussion of a recent proposal to lease rights for oil and gas development in Teshekpuk Lake in the western region of the National Petroleum Reserve-Alaska, *see* Bruce Babbitt, *Another Attack on the Arctic*, N.Y. TIMES, July 8, 2004, at A21.

For a discussion of the damage caused by oil spills, *see* Union of Concerned Scientists, *Clean Energy: Health and Environment*, *supra* note 66 (“Oil spills . . . destroy plant and animal life, and leave waterways and their surrounding shores uninhabitable for long periods of time.”); Union of Concerned Scientists, *The Hidden Cost of Fossil Fuels*, *supra* note 56 (“Oil spills . . . leave waterways and their surrounding shores uninhabitable for some time. Such spills results in the loss of plant and animal life.”). For a discussion of the environmental, as well as economic, impact of the Exxon Valdez spill, *see* Joseph J. Chambers, *In Re Exxon Valdez: Application of Due Process Constraints on Punitive Damage Awards*, 20 ALASKA L. REV. 195, 218 (2003).

⁸⁷ Power Scorecard, *Electricity from: Natural Gas*, *supra* note 3; *see also* Felicity Barringer, *Bush’s Energy Policy Lives Where the Deer and the Antelope Play*, N.Y. TIMES, Dec. 14, 2003, at 41 (discussing natural gas drilling in the Upper Green River Valley near Pinedale, Wyo.); Ralph Blumenthal, *A Gas Boom Has Some Wishing No More Wells*, N.Y. TIMES, Jan. 22, 2004, at A14 (discussing opposition to drilling in Tyler, Tex.); Editorial, *Lands in Need of*

erosion, loss of soil productivity, increased runoffs, landslides, and flooding are other downsides.⁸⁸ In addition, because natural gas contains perhaps ninety percent methane, leaky pipelines can pose economic and environmental problems.⁸⁹

In comparison to coal, oil, and natural gas, “[w]ind plants produce no air pollution. They use no water, and there is no need to tear up the land to extract the wind resource that produces wind power.”⁹⁰ This next Part will provide an overview of what a wind turbine looks like, how it works, and the benefits of wind energy, as well as a brief overview of government policies affecting the growth of wind energy and the impediments to its widespread use.

III. HARNESSING WIND ENERGY AND HAMPERING ITS OPERATION

*It makes far better sense to reshape ourselves to fit a finite planet than to attempt to reshape the planet to fit our infinite wants.*⁹¹

The terms “wind energy” or “wind power” refer to the process by which wind turbines convert the kinetic energy in wind into

Care, N.Y. TIMES, June 1, 2004, at A18 (stating that the potential damage from drilling in the Rocky Mountain front, a 100-mile-long stretch of northern Montana rich in wildlife is enormous; Wyoming’s Upper Green River Basin, which is also rich in wildlife; Utah’s Desolation Canyon, an area ruled off limits in the Clinton years; and New Mexico’s Otero Mesa, which contains fragile grasslands); Natural Res. Def. Council, *NRDC’s Earth Action: The Bulletin for Environmental Activists*, Apr. 28, 2004 (discussing how the Bush administration is pressuring the Forest Service and Bureau of Land Management to expedite oil and gas drilling along Montana’s Rocky Mountain Front) (on file with author). For a discussion of the potential impact of natural gas exploration on ancient rock art in Nine Mile Canyon in Utah, see Felicity Barringer, *When the Bush Energy Policy Confronts Ancient Art*, N.Y. TIMES, June 13, 2004, at 37.

⁸⁸ Power Scorecard, *Electricity from: Natural Gas*, *supra* note 3.

⁸⁹ See MCKIBBEN, *supra* note 3, at 144; Simon Romero, *Fears Drain Support for Gas Terminal Plans*, N.Y. TIMES, May 14, 2004, at C1 (discussing how a leak of liquefied natural gas may have caused an explosion at a gas plant in Skikda, Algeria, which killed more than twenty people in January 2004); Elisabeth Malkin, *In Mexico, Anger Over Gas Terminals*, N.Y. TIMES, June 16, 2004, at W1. In addition, “[n]atural gas, highly explosive and transported in pipes underneath unknowing residents or uncharted along waterways, has been the cause of scores of lethal accidents—fiery explosions caused by misdirected backhoes or wayward boat anchors.” Ian Urbina, *Mapping Natural Gas Lines: Advise the Public, Tip Off the Terrorists*, N.Y. TIMES, Aug. 29, 2004, at 29.

⁹⁰ Power Scorecard, *Electricity from: Wind*, *supra* note 14.

⁹¹ DAVID W. ORR, *EARTH IN MIND: ON EDUCATION, ENVIRONMENT, AND THE HUMAN PROSPECT* (1994).

mechanical power.⁹² As mentioned in Part I, this mechanical power has been used for centuries for specific tasks such as grinding grain or pumping water. Converting this mechanical power into electricity to power homes, businesses, and schools, however, is a far more recent phenomenon, little more than 100 years old.⁹³ Regardless of whether wind is being used to produce electricity for single homes, farming cooperatives, and small communities, or for the retail market,⁹⁴ wind energy has a range of environmental and economic benefits.

This Part will begin by providing a brief overview of how wind turbines capture the wind's energy.⁹⁵ Next, Part III.B will

⁹² Wind & Hydropower Tech. Program, Dep't of Energy, *How Wind Turbines Work*, at http://www.eere.energy.gov/windandhydro/wind_how.html (last updated Apr. 8, 2004); see also *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 1; RICHARD ANDERSON ET AL., PERMITTING OF WIND ENERGY FACILITIES 5 (Aug. 2002), available at <http://www.nationalwind.org/pubs/permit/permitting2002.pdf>; Cal. Energy Comm'n, *Wind Energy in California*, available at <http://www.energy.ca.gov/wind/overview.html> (last visited Oct. 26, 2004); Catamount Energy Corp., *Frequently Asked Questions*, available at <http://www.catenergy.com/faq.html?mm=4> (last visited Mar. 25, 2004).

⁹³ ANDERSON ET AL., *supra* note 92, at 3; REEVES & BECK, *supra* note 10, at 8.

⁹⁴ Wind turbines used to produce electricity for single homes, farming cooperatives, and small communities are known as "distributed wind systems" or "distributed wind power installations." These systems or installations can range from a single wind turbine to a small collection of turbines. Large utility-scale wind installations, known as "wind farms," "wind parks," or "wind power plants," can contain more than 100 turbines interconnected to the utility grid. Distributed wind systems provide on-site power in either stand-alone or grid-connected configurations. If grid-connected, these systems are interconnected to existing local power distribution lines. Wind farms are always interconnected to the electrical transmission system, which delivers power to distant population centers. See ANDERSON ET AL., *supra* note 92, at 5; JOSEPH M. COHEN & THOMAS A. WIND, DISTRIBUTED WIND POWER ASSESSMENT 2 (Feb. 2001), available at http://www.nationalwind.org/publications/distributed/distributed_wind.pdf; Nat'l Wind Coordinating Comm., *Wind Energy Issue Brief: Wind Performance Characteristics* (Jan. 1997), at <http://www.nationalwind.org/publications/wes/ibrief10.htm>; REEVES & BECK, *supra* note 10, at 23; Windustry, *Wind Project Types*, at http://www.windustry.com/opportunities/project_types.htm (last visited Dec. 8, 2004).

⁹⁵ This Part will not discuss how a wind turbine is installed. For a detailed description of the installation process of a grid-connected, 10 kW, Bergey Excel turbine with a twenty-one foot rotor diameter on a 100-foot tower, see Mike Fischer, *Betting the Farm: Wind Electricity Pays Off*, HOME POWER, Aug. & Sept. 2003, at 35, available at <http://www.bergey.com/Examples/Nichols.Article.HP96.pdf>.

compare the environmental impact of wind energy generation to fossil fuel extraction, production, and consumption. This Section will then outline how wind energy projects can benefit farmers and individual landowners, the manufacturing sector of the work force, rural economies, and the national economy. In Part III.C, this Article will highlight some of the state and federal governmental policies supporting wind energy, focusing on tax incentives, renewable portfolio standards and public benefit funds, and subsidies.⁹⁶ In Part III.D, this Article will argue that some federal governmental policies have impeded the growth of wind energy in the United States. Part III.E will continue the discussion of the barriers to wind energy, focusing on how proposed wind farms have been met with resistance from individuals, often environmentalists, concerned with avian mortality and the visual impact of wind turbines.⁹⁷ The portion of Part III.E devoted to

⁹⁶ For an exhaustive description and evaluation of state wind power policies, see NANCY A. RADER & RYAN H. WISER, NAT'L WIND COORDINATING COMM., STRATEGIES FOR SUPPORTING WIND ENERGY: A REVIEW AND ANALYSIS OF STATE POLICY OPTIONS 21-130 (1999) (discussing tax incentives, including production tax credits, investment tax credits, sales tax reductions, property tax reductions, and accelerated depreciation; direct cash incentives, including direct production incentives and direct investment incentives (grants); low-cost capital programs, including government-subsidized loans, project loan guarantees, and project aggregation; distributed resource policies, including standard contracts for small and distributed wind systems, net metering, and line extension policies; customer choice opportunities, including utility-supplied green pricing options, green marketing from retail electric sellers, aggregated consumer purchases, fuel source disclosure requirements, and certification; general environmental regulations, including externality valuation in resource planning, externality valuation in environmental dispatch, emissions taxes, emissions caps/marketable permits, government purchases of wind power, site prospecting, review and permitting, renewable portfolio standards, auctioned contracts, and performance-based ratemaking), available at <http://www.nationalwind.org/publications/statepolicy/> (last visited Jan. 10, 2005); see also Energy Info. Admin, Dep't of Energy, *Appendix A. State Wind Profiles: A Compendium*, at http://www.eia.doe.gov/cneaf/solar.renewables/rea_issues/windappa.html (last updated Oct. 24, 2002).

⁹⁷ This Article will not assess other barriers to acceptance and use of wind energy, such as concerns over the intermittent nature of the wind resource and the high capital costs of wind-powered generators. For a discussion of the concerns over wind's intermittency, see, e.g., ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, DOE/EIA-0603(95), RENEWABLE ENERGY ANNUAL 1995, at 89 (1995) ("Without storage capacity, wind turbine systems can supply electricity only when the wind blows. The intermittency of wind energy, coupled with the fact that the times of peak availability of wind resources in a given location may not coincide with the times of peak demand for electricity, makes wind energy less attractive to electric utilities than power sources that are available at all

aesthetic concerns will provide the foundation for the argument in Part IV of this Article that there is an aesthetic precedent for wind energy systems in seventeenth-century Dutch landscape paintings, drawings, and prints, as well as in the contemporary art of Christo.

A. *How a Wind Turbine Works*

There are two types of wind turbine designs: the vertical-axis wind turbine, which resembles an upright eggbeater (known as a Darrieus machine) and the horizontal-axis wind turbine, which resembles a windmill.⁹⁸ The horizontal-axis wind turbine, which is

times.”), *available at* <http://tonto.eia.doe.gov/FTPROOT/renewables/060395.pdf>; Real de Azua, *supra* note 11, at 489, 490 (asserting that “wind turbines are very reliable” and explaining that “[t]he technology’s drawback, its ‘intermittency,’ or the fact that power output varies with the force at which the wind is blowing, has proven to be more a psychological obstacle than a technical one”); Chang, *supra* note 12 (“[W]ind power will be hampered because . . . the wind doesn’t always blow. The current power grid is not well suited for intermittent power sources because the amount of power produced at any moment must match the amount being consumed. To exploit the . . . wind, utilities would have to develop devices that could act as giant batteries.”); *Discuss Wind Power Based on Facts*, *supra* note 11 (“Those who oppose wind projects cite reliability as a major weakness. In actuality, wind turbines are extremely reliable and are available to run 98 to 99 percent of the time—as good as just about any other generating source. Reliability shouldn’t be confused with intermittence.”); Bergey, *supra* note 9 (“In the past reliability was the ‘Achilles Heel’ of small wind turbine products. Small turbines designed in the late 1970’s had a well deserved reputation for not being very reliable. Today’s products, however, are technically advanced over these earlier units and they are substantially more reliable. Small turbines are now available that can operate 5 years or more, even at harsh sites, without need for maintenance or inspections and 5-year warranties are available. The reliability and cost of operation of these units is equal to that of photovoltaic systems.”).

For a discussion of the high capital costs of wind-powered generators, see, e.g., JAMIE CHAPMAN & STEVEN WIESE, *EXPANDING WIND POWER: CAN AMERICANS AFFORD IT?* 5 (Renewable Energy Policy Project, Research Report No. 6, 1998) (“Wind-powered generators have high capital costs in comparison with some conventional generating technologies, notably gas-fired combustion turbines.”), *available at* http://www.repp.org/repp_pubs/articles/chapman/chapman.pdf; Real de Azua, *supra* note 11, at 492, 521 (explaining that “if wind plants were financed on the same terms as gas plants, their cost would drop by nearly 40%” and noting that “[m]any consumers can become discouraged from investing in a small wind system because of high up-front costs”); Catamount Energy Corp., *Benefits of Wind* (“[W]ind technology may require a higher initial investment than fossil-fuel generators.”), *at* http://www.catenergy.com/benefits_of_wind.html?mm=4 (last visited Apr. 20, 2005).

⁹⁸ Nat’l Renewable Energy Lab., *Profiles in Renewable Energy: Case Studies of Successful Utility-Sector Projects*, *at* <http://www.nrel.gov/documents/profiles.html> (last visited Dec. 8, 2004); *see also* BROWER, *supra* note 9, at 76-

far more prevalent and the subject of this Article's aesthetic inquiry, consists of a rotor, or set of feather-shaped blades, usually three, mounted atop a high tower and attached to a unit called a nacelle.⁹⁹ As the wind turns the blades, the blades spin a shaft located in the nacelle.¹⁰⁰ The shaft, in turn, is "connected to a gearbox which spins magnets in the generator to produce electromagnetic pulses, as in the generators of conventional power plants."¹⁰¹

Wind is generally slower and more turbulent closer to the ground.¹⁰² "The larger the wind turbine, the more capable it is of generating large amounts of electricity, even though the blades will be spinning much more slowly than with smaller machines."¹⁰³ As a result, utility-scale turbines are much taller than small wind turbines used in distributed wind systems. Whereas a distributed

77; *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 3; ANDERSON ET AL., *supra* note 92, at 5-6; Bergey, *supra* note 9; ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, *supra* note 97, at 85 (stating that the use of the wind energy resource is less than capacity because of its intermittent nature).

⁹⁹ Real de Azua, *supra* note 11, at 488; *see also* BROWER *supra* note 9, at 76-77; *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62; ANDERSON ET AL., *supra* note 92, at 5-6; Bergey, *supra* note 9; Conservation Law Found., *How Does a Wind Turbine Work?* CONSERVATION MATTERS, Spring 2003, available at <http://www.clf.org/general/index.asp?id=425>; Nat'l Renewable Energy Lab., *supra* note 9; OFFICE OF UTIL. TECH., *supra* note 20; REEVES & BECK, *supra* note 10, at 5.

¹⁰⁰ *See* Real de Azua, *supra* note 11, at 488; Conservation Law Found., *supra* note 99; *see also* ANDERSON ET AL., *supra* note 92, at 6.

¹⁰¹ Real de Azua, *supra* note 11, at 488; *see also* Nat'l Renewable Energy Lab., *supra* note 98.

¹⁰² *Id.*; *see also* Bergey, *supra* note 9 ("Turbulence, which both reduces performance and 'works' the turbine harder than smooth air, is highest close to the ground and diminishes with height."); Louise Guey-Lee, *Forces Behind Wind Power* (2001) ("Wind speed generally increases with height above ground."), http://www.eia.doe.gov/cneaf/solar.renewables/rea_issues/wind.html (last modified Aug. 21, 2002); OFFICE OF UTIL. TECH., *supra* note 20 ("The wind resource generally becomes stronger as one moves higher above the ground."). *See generally* Nat'l Wind Coordinating Comm., *Wind Energy Series: Wind Energy Resources* (Jan. 1997) ("Since wind turbines produce much more power in stronger winds, wind turbine designers try to put turbines on the tallest possible towers."), at <http://www.nationalwind.org/publications/wes/wes04.htm>.

¹⁰³ Real de Azua, *supra* note 11, at 488; *see also* *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 3 ("The output of a wind turbine depends on the turbine's size and the wind's speed through the rotor."); ANDERSON ET AL., *supra* note 92, at 7 ("The tower's function is to raise the wind turbine above the ground to intercept stronger winds that provide more energy. Taller towers also usually allow turbines to capture less turbulent winds, unimpeded by nearby trees, buildings, and other obstructions.").

wind system may contain turbines with towers as short as thirty feet,¹⁰⁴ utility-scale turbines may have towers several hundred feet tall. For example, the wind farm in Tucker County, West Virginia, contains turbines that are 228 feet high, each with fiberglass blades 115 feet long.¹⁰⁵ The 200-turbine wind farm to be built by NedPower in Grant County, West Virginia, will have turbines with towers 330 feet high.¹⁰⁶ Catamount Energy Corporation plans to install twenty-seven wind turbines 330 feet tall along a stretch of Glebe Mountain in Londonderry, Vermont.¹⁰⁷ Evergreen Wind Power, LLC has begun the process of permitting a wind energy project in Mars Hill, Maine, which would consist of thirty-three turbines, each 389 feet high.¹⁰⁸ Zilkha Renewable Energy, a wind-farm owner and developer, hopes to build a wind farm with 267 405-foot high turbines on 22,000 acres in McClean County, Illinois.¹⁰⁹ Cape Wind Associates hopes to build the nation's first offshore wind farm, consisting of 130 turbines, spaced a third to a

¹⁰⁴ Note, however, that the AWEA recommends that "turbines should be mounted at least 30 feet above any structures or natural features within 300 feet of the installation" in order to avoid turbulence and capture greater wind energy. American Wind Energy Ass'n, *What is Small Wind?*, at http://www.awea.org/smallwind/toolbox/TOOLS/fs_smallwind.asp (last visited Oct. 28, 2004); see also Bergey, *supra* note 9. For a description of different small wind turbines and their respective tower sizes, see <http://www.bergey.com>.

¹⁰⁵ Katharine Q. Seelye, *Windmills Sow Dissent For Environmentalists*, N.Y. TIMES, June 5, 2003, at A28.

¹⁰⁶ *Id.*

¹⁰⁷ Glebe Mountain Group, *Welcome to the Glebe Mountain Group Web Site!*, at <http://www.glebemountaingroup.org/> (last visited Oct. 27, 2004); see also Allen, *supra* note 6; Editorial, *Let the Wind Blow Free*, BURLINGTON FREE PRESS, May 26, 2004, available at <http://www.glebemountaingroup.org/N010104/Bwind052604.doc>; Justin Mason, *Windmill Opponents Voice Concerns to WRC*, BRATTLEBORO REFORMER, May 27, 2004, at <http://www.glebemountaingroup.org/N010104/Brattleboro052804.htm> (last visited Dec. 8, 2004); Susan Smallheer, *Group Pulls Out of Wind Planning*, RUTLAND HERALD, May 19, 2004, available at <http://www.glebemountaingroup.org/N010104/RPullout051904.doc>; Susan Smallheer, *Wind Power Views Divided*, RUTLAND HERALD, Feb. 19, 2004, at <http://rutlandherald.com/Archive/Articles/Article/79095> (last visited Mar. 9, 2004); Glebe Mountain Group, *Fast Facts*, available at http://www.glebemountaingroup.org/q_&_a.htm (last visited Oct. 27, 2004).

¹⁰⁸ *Wind Power Firm Files Plans for Mars Hill Peak*, CAPE COD TIMES, Jan. 27, 2004, at <http://www.capecodonline.com/special/windfarm/mewind27.htm>; see also Evergreen Wind Power, LLC, *Projects*, at http://www.evergreenwindpower.com/Commonly_Asked_Questions.htm (last visited Dec. 5, 2004).

¹⁰⁹ *News From Home: Illinois*, THE ARIZ. REPUBLIC, Apr. 5, 2004, at A8.

half mile apart, each more than 300 feet tall, on Horseshoe Shoal, less than seven miles off the Cape Cod shore in Massachusetts.¹¹⁰ The Long Island Power Authority has also proposed building the first offshore wind farm outside of Europe; this one would be located 2.5 to 6 miles off Long Island's South Shore, between Fire Island and Jones Beach, consisting of up to fifty turbines, each 488 feet high.¹¹¹

B. *The Environmental and Economic Benefits of Wind Energy*

The environmental benefits of wind energy can best be described by what wind turbines (both small wind systems and large utility-scale wind farms) do not do—generate the type of air and water pollution caused by fossil fuel extraction, production, and consumption, as described in Part II. As Christine Real de Azua explains:

Wind energy generates no emissions, so there is no damage to the environment or public health from emissions of sulfur dioxide, nitrogen oxide, carbon dioxide, particulate matter, mercury, and other toxic heavy metals, all of which are associated with the production of electricity from fossil-fueled power plants. Additionally, wind energy also avoids the environmental costs of mining (including for uranium) or drilling, processing, and shipping the fuel. There is no heavy use of water to cool generators.¹¹²

¹¹⁰ Burkett, *supra* note 11; Jack Coleman, *An Old Wind Blows*, CAPE COD TIMES, July 8, 2003 [hereinafter *An Old Wind Blows*], at <http://www.capecodonline.com/special/windfarm/anold8.htm>; Scott Kirsner, *Wind Power's New Current*, N.Y. TIMES, Aug. 28, 2003, at G1; Jay S. Polachek, *Cape Cod: Twisting in the Wind?*, PUB. UTIL. FORTNIGHTLY, May 15, 2002, at 28, 34 (2002); Conservation Law Found., *supra* note 30, at 10; Save Our Sound, *Frequently Asked Questions*, at <http://www.saveoursound.org/faq.html> (last visited Dec. 8, 2004); E-mail from Lisa L. Tacker, Executive Assistant, Alliance to Protect Nantucket Sound/Save Our Sound, to Avi Brisman (Apr. 28, 2004, 3:40 PM) (on file with author). It is not clear exactly how tall the wind turbines would be. Coleman and Kirsner report that the turbines will rise 426 feet from the water. Tacker and Save Our Sound indicate that the turbines will be 417 feet tall.

¹¹¹ Seelye, *supra* note 105. As with the Cape Cod proposal, the estimates of the actual height of the Long Island project turbines vary. According to the *New York Times*, the project would consist of thirty-five to forty turbines, each 425 feet tall. Bruce Lambert, *Agency Plans to Reap Wind Power Off Jones Beach*, N.Y. TIMES, May 2, 2004, at 41.

¹¹² Real de Azua, *supra* note 11, at 492-93. It is important to note that the manufacturing and installation of wind turbines also have a minimal impact on

Ari Reeves and Frederic Beck of the Renewable Energy Policy Project emphasize the importance of the fact that wind energy neither uses significant amounts of water nor pollutes waterbodies with the water that it does use:

Traditional power generation makes use of large amounts of water for the cooling of condensers and reactors and in mining processes. Overall, the power sector returns about 98% of the water it uses back to the source. However, much of this water is returned to lakes or streams containing heavy metals (from mining) or at significantly higher temperatures, causing damage to local ecosystems. In contrast, wind power makes use of small amounts of water, primarily for cleaning rotor blades.¹¹³

the environment, including on human health. According to Real de Azua, “Wind energy’s only ‘footprint’ is from the manufacturing and installation of the turbines, which requires no more cement, metal, wiring, or even land per kWh than conventional electricity generation.” *Id.* at 493. The American Wind Energy Association underscores the negligible impact manufacturing wind turbines and building wind plants will have on emissions of carbon dioxide. “Several studies have found that even when these operations are included, wind energy’s CO₂ emissions are quite small—on the order of 1% of coal or 2% of natural gas per unit of electricity generated.” *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 15. *But see* Eric Rosenbloom, *A Problem With Wind Power* (stating that each wind turbine “requires a huge hole filled with tons of steel-reinforced concrete” and that “[i]t may be 30 feet deep or more and contain more than 100,000 cubic feet of concrete (production of which is a major source of CO₂)”), at <http://www.kirbymountain.com/rosenlake/wind/index.html> (last visited Dec. 8, 2004).

¹¹³ REEVES & BECK, *supra* note 10, at 15. This point is echoed by the National Wind Coordinating Committee, a collaborative consisting of representatives from the utility, wind industry, environmental, consumer, regulatory, power marketer, agricultural, tribal, economic development, and state and federal government sectors:

Wind-generated power avoids many of the aquatic problems typically associated with traditional fossil-fuel power plants. The process of power plant cooling, in which power facilities take in water, use it to cool plant equipment and release water at a higher temperature, can be particularly harmful to the aquatic life, including both flora and fauna, which are impacted by the discharge of power plant cooling water. In areas where either water quality or the availability and cost of water for power plant cooling are issues, a resource like wind, which does not use water for cooling, has special value.

Nat’l Wind Coordinating Comm., *Wind Energy Series: Incorporating Wind into Resource Portfolios* (Jan. 1997), at <http://www.nationalwind.org/publications/wes/wes08.htm>; *see also* Catamount Energy Corp., *Facts for Communities* (“Virtually no water is required to operate [wind turbines].”), at <http://www.catenergy.com/facts.html?mm=4> (last visited Oct. 26, 2004); Catamount Energy Corp., *Landowner’s Guide to Wind Energy* (explaining that wind farms do not require water), at <http://www.catenergy.com/>

Real de Azua also notes that wind energy has a minimal impact on the land surrounding the turbines:

Conventional electricity generation requires land not only for the power plant itself, but also for mining and transport of fuel, for storage of radioactive and other wastes, or for flooding of rivers behind a dam. Wind turbines, on the other hand, operate while causing little to no disruption to previously existing land use.¹¹⁴

That wind turbines cause little or no disruption to the land surrounding them is one of the chief economic benefits of wind energy. In fact, “farmers can often increase their incomes by 50% or more by leasing a portion of their land for wind turbines and access roads; farming operations on the rest of the land are unaffected.”¹¹⁵ As Reeves and Beck explain:

When a wind development is located on farm or range lands, the landowner typically receives royalties from the wind farm developer. One large wind turbine, occupying just a quarter acre of land, can provide approximately \$2000 to \$4500 in royalties annually. This income effectively increases the land’s economic value and can provide the farmer with a hedge

guide.html?mm=4 (last visited Oct. 26, 2004).

¹¹⁴ Real de Azua, *supra* note 11, at 493. Note, however, that “[e]rosion can be a concern in certain habitats, such as the desert, where hard-packed soil surface must be disturbed to install wind turbines.” *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 15; see ANDERSON ET AL., *supra* note 92, at 26-30; CHAPMAN & WIESE, *supra* note 97, at 6 (noting that early wind farm installations encountered unexpected problems with land erosion); Cal. Energy Comm’n, *supra* note 92 (stating that erosion in desert areas is one of the potential issues associated with windfarm development); Nat’l Wind Coordinating Comm., *Wind Energy Series: Siting Issues for Wind Power* (Jan. 1997) (describing how “[s]oil erosion is another potential problem that may be raised in the siting process” of a wind energy project), at <http://www.nationalwind.org/publications/wes/wes03.htm>; Nat’l Wind Coordinating Comm., *Wind Energy Series: Wind Energy Environmental Issues* (Jan. 1997) (“Some wind power development has led to soil erosion. . . . Observers at Tehachapi Pass in California, for example, have noted deep gullies created by the force of rain sweeping off access roads and around wind turbine foundations.”), at <http://www.nationalwind.org/publications/wes/wes02.htm>. But soil erosion can be “prevented through proper installation and landscaping techniques.” *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 15; see also Catamount Energy Corp., *Frequently Asked Questions* (“Erosion . . . can be prevented through proper installation and landscaping techniques.”), at <http://www.catamenergy.com/faq.html?mm=4> (last visited Oct. 26, 2004).

¹¹⁵ Learner, *supra* note 3, at 297.

against crop price fluctuations. And the land can be used concurrently for both “wind farming” and conventional farming and ranching, since the wind turbines themselves occupy only about 5 to 15% of the land area encompassed by the wind farm.¹¹⁶

While farmers who lease their land for wind projects certainly benefit from these undertakings, such arrangements also expand the local tax base, “keep[ing] energy dollars in the local community instead of spending them to pay for coal and gas produced elsewhere.”¹¹⁷ For example, if NedPower is successful

¹¹⁶ REEVES & BECK, *supra* note 10, at 15; *see also The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 13 (“Wind farms can revitalize the economy of rural communities, providing steady income through lease or royalty payments to farmers and other landowners.”).

Although leasing arrangements can vary widely, a reasonable estimate for income to a landowner from a single utility-scale turbine is about \$3,000 a year. For a 250-acre farm, with income from wind at about \$55 an acre, the annual income from a wind lease would be \$14,000, with no more than 2-3 acres removed from production. Such a sum can significantly increase the net income from farming. Farmers can grow crops or raise cattle next to the towers.

Id.; *see also* BROWER, *supra* note 9 (“[F]armers [can] plant right up to the base of the turbine towers. . . . The leasing of land for wind turbines—far from interfering with farm operations—has brought substantial benefits to landowners in the form of increased income and land values.”); Learner, *supra* note 3, at 281 (“Wind energy is truly a ‘cash crop’ for farmers with typical annual lease payments for windy sites in the Midwest now in the range of \$2000 to \$3000 per turbine.”).

¹¹⁷ *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 13; *see, e.g.*, CHAPMAN & WIESE, *supra* note 114 (“[C]ommunities that develop indigenous renewable energy resources . . . can . . . retain some of the money they would otherwise spend on imported coal, oil and gasoline. . . . Local governments may collect increased tax revenues.”); COHEN & WIND, *supra* note 12, at 19 (explaining how the local property tax base will increase when wind turbines are built); Grover, *supra* note 123 (discussing how tax revenues accruing directly to the Kittias County, Washington government would be approximately \$693,000 annually from wind farm development); Doug Hoffer, *The Economic Benefits of Windfarm Development in Vermont* 5 (Oct. 2002) (discussing how the owners and lessors of wind farms in Vermont would pay business income taxes, and how new jobs from the development and construction of wind farms would generate additional state income tax and sales tax revenue), available at http://www.revermont.org/windfarm_benefits.pdf; Catamount Energy Corp., *Landowner’s Guide to Wind Energy*, *supra* note 113 (“Wind energy projects are . . . responsible for creating additional sources of tax revenue in rural communities, which helps to lighten the tax burden on residents.”); Catamount Energy Corp., *Facts for Communities*, *supra* note 113, (stating that wind energy projects pay property taxes to counties and townships, which benefit local school districts and highways); Union of Concerned Scientists, *Public*

in building its 200-turbine wind farm in Grant County, West Virginia, it will pay \$500,000 in local taxes, which would make it the fifth-largest taxpayer in the county.¹¹⁸ Similarly, the proposed wind farm project on the ridge of Mars Hill Mountain in Maine could increase the town of Mars Hill's tax revenue "by as much as half when the \$68 million project is finished."¹¹⁹ In some cases, the expansion of the local tax base can help stave off undesired urban development.¹²⁰

In addition to the economic benefits to rural communities, "the production of wind equipment is one of the few potentially large sources of new manufacturing jobs on the horizon,"¹²¹ which

Benefits of Renewable Energy Use, *supra* note 56 ("Renewables can contribute heavily to local taxes. Wind farms in California pay \$10 million to \$13 million in property taxes."). *But see* Glebe Mountain Group, *Fast Facts*, *supra* note 107 (stating that the Catamount Energy Corp., which has proposed building a wind farm on Glebe Mountain, has asked for a forty-five percent reduction in their implied property taxes); Eric Rosenbloom, *A Problem With Wind Power*, *supra* note 112 (stating that energy companies' claims that they increase the local tax base are misleading because "the loss of open land, the loss of tourism, the stagnation or decrease in property values throughout a much wider area, the tax credits such developments typically enjoy, and the taxes and fees consumers must pay to subsidize the industry" offset any increase in the local tax base that wind projects might provide). Note, however, that in states that exempt wind facilities from property taxes altogether, it is unlikely that the local tax base will expand significantly with the development of a wind facility. *See* RADER & WISER, *supra* note 96, at 32-35; *infra* note 145.

¹¹⁸ Seelye, *supra* note 105 ("The company has also developed a public-private partnership with two local schools, which will earn royalties from the wind farm of about \$75,000 a year.").

¹¹⁹ *Wind Power Firm Files Plans for Mars Hill Peak*, *supra* note 108.

¹²⁰ REEVES & BECK, *supra* note 10, at 16. *But see* *Wind Power Firm Files Plans for Mars Hill Peak*, *supra* note 108 (discussing the proposed wind farm in Mars Hill, Maine, and reporting that town officials "hope the wind farm will attract additional development").

¹²¹ *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 13; *see also* CHAPMAN & WIESE, *supra* note 114, at 14; COHEN & WIND, *supra* note 12, at 18-20 (describing jobs associated with wind turbine manufacture, wind plant construction, and wind plant operation and maintenance); Catamount Energy Corp., *Landowner's Guide to Wind Energy*, *supra* note 113 ("Wind projects create construction and full time jobs."); Nat'l Wind Coordinating Comm., *Wind Energy Series: The Effect of Wind Energy Development on State and Local Economies* (Jan. 1997) (discussing domestic manufacturing of wind turbine components and related equipment), at <http://www.nationalwind.org/publications/wes/wes05.htm>. *But see* Glebe Mountain Group, *Fast Facts*, *supra* note 107 (stating that the proposed project on Glebe Mountain would create thirty to forty short-term construction jobs, but only four to six permanent operating jobs). For a discussion of how the proposed wind farm at Horseshoe Shoal off the coast of Cape Cod would create jobs in construction and

is especially important given that so many manufacturing jobs in the United States have disappeared, as companies seek cheaper labor overseas.¹²² According to the American Wind Energy Association (AWEA), a national trade association representing wind power developers, wind turbine manufacturers, utilities, and others involved in the wind industry,

every megawatt of installed wind capacity creates about 2.5 job-years of direct employment (short-term construction and long-term operations and maintenance jobs) and about 8 job-years of total employment (direct and indirect). This means that a 50-MW wind farm creates 125 job-years of direct employment and 400 job-years of total employment.¹²³

maintenance of the wind turbines, see John Leaning, *Boaters Protest Wind Farm*, CAPE COD TIMES, Sept. 1, 2003, Access World News Rec. No. 0FD4D744B2E39465; Polachek, *supra* note 110, at 35. But for a discussion of how the same project could result in a job loss in the tourist industry, see John Leaning, *Survey Claims Wind Farm Would Hurt Economy*, CAPE COD TIMES, Oct. 29, 2003, Access World News Rec. No. 0FE7F45439571A84.

¹²² Danny Cahill, *The Global Economy Behind Ohio Prison Walls*, in THE CELLING OF AMERICA 109, 109 (Daniel Burton-Rose et al. eds., 1998) (“Companies have been moving overseas to take advantage of cheap labor . . .”). See generally Al Gore, *How to Debate George Bush*, N.Y. TIMES, Sept. 29, 2004, at A25 (noting that “[a]bout 2.7 million manufacturing jobs have been lost”).

¹²³ *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 12; see also Catamount Energy Corp., *Facts for Communities*, *supra* note 113 (“Wind energy projects help to create badly needed rural employment opportunities. . . . [W]ind energy produces 66% more jobs per kilowatt-hour than natural gas. About 100 construction jobs are created for every 100 megawatts.”); Stephen Grover, ECONorthwest, *Economic Impacts of Wind Power in Kittias County: Final Report*, 9-10 (Nov. 2002) (discussing expected job creation from windfarm development in Kittias County, Washington), available at <http://www.catenergy.com/pdf%20files/Kittias%20wind%20final.pdf?mm=4> (last visited Nov. 6, 2004); Hoffer, *supra* note 117, at 3-4 (discussing expected job creation from windfarm development in Vermont); Nat’l Wind Coordinating Comm., *Wind Energy Issue Brief: The Effect of Wind Energy Development on State and Local Economies*, *supra* note 121 (“[W]ind energy generates 27 percent more jobs . . . [than] a coal plant and 66 percent more jobs than a natural gas . . . plant. . . . For a 50 MW project, the equivalent of 40 full time jobs may be created during the construction period.” Operation and maintenance of a wind power plant generally require between two and five skilled employees for each 100 turbines.). It is not just the wind industry that lauds the job-creation potential of wind energy. According to the United States Department of Energy, “[w]ind energy is a domestic, reliable resource that provides more jobs per dollar invested than any other energy technology—more than five times that from coal or nuclear power.” *History of Wind Energy*, *supra* note 8.

Wind power can also provide an economic benefit to power utilities. Reeves and Beck note that, “[b]y further diversifying the energy mix, wind energy reduces dependence on conventional fuels that are subject to price and supply volatility.”¹²⁴ Furthermore, wind energy can “[p]rovide generation capacity in geographic areas that are underserved by existing generation capacity. This can help to maintain proper voltage and current levels throughout the grid and reduce the need for upgrades to the transmission grid.”¹²⁵

Finally, wind energy benefits the national economy by

¹²⁴ REEVES & BECK, *supra* note 10, at 4; *see also* Nat'l Wind Coordinating Comm., *Wind Energy Issue Brief: The Benefits of Wind Energy* (Jan. 1997) (“Wind energy . . . protects utilities and energy consumers from the economic risks associated with changing fuel prices, new environmental regulations uncertain load growth and other cost uncertainties.”), at <http://www.nationalwind.org/publications/wes/ibrief01.htm>; Nat'l Wind Coordinating Comm., *Wind Energy Issue Brief: Utility Procurement of Wind Resources* (Jan. 1997) (“Because wind resources are not subject to fuel price fluctuations or the risks of potentially expensive environmental regulations (as are traditional fossil fuel generation methods), wind energy offers long-term price stability in addition to pollution-free energy generation.”), at <http://www.nationalwind.org/publications/wes/ibrief06.htm>; Nat'l Wind Coordinating Comm., *Wind Energy Series: The Benefits of Wind Energy* (Jan. 1997) (“Wind energy can help protect utilities and ratepayers from risks associated with changing fuel prices, new environmental regulations, uncertain load growth and other unpredictable costs.”), at <http://www.nationalwind.org/publications/wes/wes01.htm>; Nat'l Wind Coordinating Comm., *Wind Energy Series: Incorporating Wind into Resource Portfolios* (Jan. 1997) (“Wind and other renewables can play a key role in mitigating the risks of fuel price volatility and availability.”), at <http://www.nationalwind.org/publications/wes/wes08.htm>.

¹²⁵ REEVES & BECK, *supra* note 10, at 13. For a description of other economic benefits to power utilities, such as how wind energy can help reduce load forecasting and stranded costs, *see id.* at 13-14; *see also* CHAPMAN & WIESE, *supra* note 114, at 1, 4 (“The incorporation of wind generating capacity can benefit utilities and other energy suppliers by, for example, mitigating fuel-price and regulatory risks; deferring new conventional capacity additions, and; reducing construction finance costs due to conventional capacity additions. In some cases, wind-powered generators may be deployed in distributed systems so as to defer the costs of line extension, reconductoring or voltage support. . . . [I]nvestments in wind energy can mitigate the risk of future taxes or other levies (e.g., a carbon tax) on the pollution, emissions, or hazardous materials associated with the conventional generation sources—all measures which may confront energy producers in coming years.”). For a discussion of how small wind turbines are an inexpensive source of power for remote sites, *see* Natural Res. Def. Council, *Clean Air & Energy: Energy: In Brief: Fact Sheet: Wind Power: Alternative Energy Technologies Hold the Key to Curbing Air Pollution and Global Warming*, *supra* note 10.

“reducing ‘hidden costs’ resulting from air pollution and health care.”¹²⁶ To illustrate, particulate matter, as discussed in Part II, has been linked to increases in asthma and respiratory ailments, resulting in a proliferation of hospitalizations and emergency room visits.¹²⁷ These visits translate into millions of dollars of lost wages from lost days of work.¹²⁸ Wind energy, however, does not create this same financial loss because it is cleaner than fossil fuels and thus does not result in or exacerbate asthma and respiratory ailments that require hospitalization.

Despite these environmental and economic benefits, “only a small portion of the useable wind resource is being tapped.”¹²⁹ As Reeves and Beck explain, “[g]overnment and electrical industry regulations, as well as government incentives, play a large role in determining how quickly wind power is adopted.”¹³⁰ The next two sections provide an overview of the governmental policies that have affected the development of wind energy in the United States.¹³¹

C. Federal and State Policies Supporting Wind Energy

1. Tax Incentives

As part of the Energy Policy Act of 1992, the federal government established the Production Tax Credit (PTC).¹³² The

¹²⁶ *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 13-14; *see also* Jack Coleman, *Cape Wind Eyes Subsidy*, CAPE COD TIMES, July 26, 2003 [hereinafter *Cape Wind Eyes Subsidy*] (citing James Gordon of Cape Wind Associates for the proposition that electricity generated from oil, coal, natural gas and nuclear power bring “external costs” such as pollution, illness, and security needs that must be included in their overall cost), at <http://www.capecodonline.com/special/windfarm/capewind26.htm>.

¹²⁷ *See, e.g.*, Env’tl. Health Action, *supra* note 62.

¹²⁸ *See generally* Bruce Henderson, *Study Ties Utilities to Future Dirty Air Deaths*, CHARLOTTE OBSERVER, Apr. 19, 2002, at 1B; Union of Concerned Scientists, *Public Benefits of Renewable Energy Use*, *supra* note 56.

¹²⁹ REEVES & BECK, *supra* note 10, at 4.

¹³⁰ *Id.* at 4.

¹³¹ For an in-depth discussion of federal policy directly affecting wind energy, *see* Real de Azua, *supra* note 11, at 497-507.

¹³² *Id.* at 499-500; *see also* Jack Coleman, *Tax Credit Doubts Cloud Wind Projects*, CAPE COD TIMES, Dec. 21, 2003 [hereinafter *Tax Credit Doubts*], Access World News Rec. No. 0FF972ACD0CD0C2F5EF; Catamount Energy Corp., *Frequently Asked Questions*, *supra* note 114; Energy Info. Admin., Dep’t of Energy, *Legislation Affecting the Renewable Energy Marketplace* [hereinafter *Renewable Energy Marketplace*], at <http://www.eia.doe.gov/cneaf/>

PTC provides a credit of 1.5 cents for each kWh produced during the first ten years of a plant's operation¹³³ and can be claimed by a business or plant that sells the power generated to an unrelated party, such as a utility or other electricity supplier.¹³⁴ Commentators have been quick to note the importance of the PTC in developing wind energy as a viable alternative to fossil fuels. Real de Azua states that "[t]here is no doubt that the PTC enhances wind energy's competitiveness."¹³⁵ Ryan Wiser and Mark Bolinger, in their report, *Analyzing the Interaction Between State Tax Incentives and the Federal Production Tax Credit for Wind Power*, state that "the federal PTC has been a major stimulus to the recent dramatic growth of the domestic wind power market."¹³⁶

solar.renewables/page/legislation/impact.html (last visited Dec. 7, 2004); ENERGY INFO. ADMIN., DEP'T OF ENERGY, *supra* note 98, at 83; Energy Info. Admin., Dep't of Energy., *Wind Energy Profile* 42 (1996) [hereinafter *Wind Energy Profile*], available at <http://www.eia.doe.gov/cneaf/solar.renewables/page/wind/windprofile.pdf>; Guey-Lee, *supra* note 101; RADER & WISER, *supra* note 96, at 21; REEVES & BECK, *supra* note 10, at 21; Union of Concerned Scientists, *Update: Clean Energy: Wind and Biomass Energy Tax Credit Saved—Again*, at http://www.ucusa.org/clean_energy/renewable_energy/page.cfm?pageID=121 (last visited Nov. 29, 2004).

¹³³ REEVES & BECK, *supra* note 10, at 21; see Real de Azua, *supra* note 11, at 500; Jehl, *supra* note 12, at 1; *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 25; Guey-Lee, *supra* note 101; *Renewable Energy Marketplace*, *supra* note 132; WIND, *supra* note 98, at 83; *Wind Energy Profile*, *supra* note 132, at 42.

¹³⁴ Real de Azua, *supra* note 11, at 500; Ryan Wiser & Mark Bolinger, *Analyzing the Interaction Between State Tax Incentives and the Federal Production Tax Credit for Wind Power* (Sept. 2002), available at <http://eetd.lbl.gov/ea/EMS/reports/51465.pdf>. It is important to note that this is a *production* credit, rather than an *investment* credit. Real de Azua, *supra*, at 499. This means that the federal government does not help businesses to build wind turbines or farms; federal assistance begins once the turbines are generating electricity that is sold to an unrelated party. Some states offer investment tax credits. See *infra* text accompanying notes 145-46. The energy bill (discussed below), which is currently stalled in Congress, would, for the first time, provide "a small wind turbine investment credit to benefit homeowners or small businesses that elect to use wind systems to meet all or part of their electricity needs." Press Release, American Wind Energy Ass'n, *Energy Bill Stalls in Congress: Wind Energy Production Credit Will Expire Without Being Renewed* (Nov. 25, 2003) [hereinafter *Energy Bill Stalls in Congress*], available at <http://www.awea.org/news/news031125ptc.html>.

¹³⁵ Real de Azua, *supra* note 11, at 501-02. Real de Azua explains that as the PTC's expiration date of June 1999 approached, "a total of more than \$1 billion worth of new wind turbines were installed" in Colorado, Iowa, Minnesota, Oregon, Texas, Wisconsin, and Wyoming. *Id.* at 501.

¹³⁶ Wiser & Bolinger, *supra* note 134, at 2.

Forbes Magazine claims that wind energy in the U.S. market “would still be a loser but for the [PTC].”¹³⁷ And Reeves and Beck describe it as “the most significant U.S. policy driving wind power production.”¹³⁸

Unfortunately, the future of the PTC is in limbo. A three-year extension of the PTC, which expired on December 31, 2003, had been included in the Energy Policy Act of 2003.¹³⁹ But on November 24, 2003, Congress abandoned its efforts to enact new energy legislation until sometime in 2004.¹⁴⁰ While Congress could have passed a stopgap measure that would have extended the expiring tax credit until mid-2004, Republican leaders decided that any extension of the PTC would have to wait until discussion of the energy bill as a whole resumed in mid-2004.¹⁴¹ In November 2003, the American Wind Energy Association (AWEA) stated:

The impact of the failure to extend the PTC is already being felt. In North Dakota, a state that had enthusiastically

¹³⁷ David Armstrong, *Blow Hard: Wind-Generated Power is Back. Will It Make Money This Time Around?*, FORBES, Jan. 8, 2001, at 217.

¹³⁸ REEVES & BECK, *supra* note 10, at 21.

¹³⁹ Energy Policy Act, H.R. 6, 108th Cong. § 1901 (2003); *see also* *Energy Bill Stalls in Congress*, *supra* note 134. For an overview of the Energy Policy Act of 2003, see Energy Info. Admin., Dep’t of Energy, *Legislation and Regulations: The Energy Policy Act of 2003*, at http://www.eia.doe.gov/oiaf/aeo/leg_reg10.html (last visited Dec. 8, 2004).

¹⁴⁰ Carl Hulse, *G.O.P. Leaders Dropping Push for an Energy Bill This Year*, N.Y. TIMES, Nov. 25, 2003, at A20.

¹⁴¹ *Energy Bill Stalls in Congress*, *supra* note 134. On February 12, 2004, Senator Pete V. Domenici (R-N.M.), introduced a “revised” version of the energy bill, Energy Policy Act, S. 2095, 108th Cong. (2003). *See* Natural Res. Def. Council, *Legislative Watch* (Apr. 7, 2004) (on file with author). Opponents of this bill (as well as H.R. 6), who objected to the bill’s massive subsidies to the oil, gas, coal, and nuclear industries and lack of significant energy efficiency and renewable energy incentives, have offered a number of smaller, more focused bills, that address critical energy policy needs, such as credits for wind energy. *Id.* Although Senator Domenici had resisted calls to break apart the larger energy bill, on April 5, 2004, he added the energy bill’s tax provisions to a corporate tax bill, Jumpstart Our Business Strength (JOBS) Act, S. 1637, 108th Cong. (2003), which included credits for energy efficiency programs and the use of renewable energy sources, such as wind, solar, and geothermal, but also contained credits and subsidies for the oil, gas, coal, and nuclear industries, as well as incentives for building a natural gas pipeline in Alaska estimated to cost at least eighteen billion dollars. *Id.*; Natural Res. Def. Council, *Legislative Watch* (May 6, 2004) (on file with author); Natural Res. Def. Council, *Legislative Watch* (May 19, 2004) (on file with author). On May 11, 2004, the Senate passed S. 1637. Natural Res. Def. Council, *Legislative Watch* (May 19, 2004) (on file with author).

welcomed the new jobs created by the budding wind energy industry, over half of the employees at West Fargo-based DMI Industries, a manufacturer of wind turbine towers, have been laid off just prior to the holidays. In Texas, Lone Star Transportation of Fort Worth, Tex., would lose as much as \$1.5 million in revenue per month due to the PTC delay. In 2002, a full 20% of Lone Star company revenues came from wind energy by trucking wind turbine blades, towers, generating units and other equipment to development sites. Nationwide, thousands of jobs and billions of dollars in economic activity could be lost due to the delay in securing an extension.¹⁴²

Randall Swisher, executive director of the AWEA, laments that the “[f]ailure to extend the PTC means . . . the momentum that had built up this year in the U.S. wind energy market is once again brought to a halt.”¹⁴³

Fortunately, on October 4, 2004, President Bush extended the PTC until January 1, 2006, for wind energy projects completed by the end of 2004, by signing the Working Families Tax Relief Act of 2004.¹⁴⁴ Nevertheless, the long-term fate of the PTC remains in flux. States, however, continue to provide tax incentives to wind developers. These incentives include investment tax credits, production tax credits, sales and use tax exemptions, and franchise tax exemptions, or reduced property tax valuation.¹⁴⁵ Although

¹⁴² *Energy Bill Stalls in Congress*, *supra* note 134.

¹⁴³ *Id.*

¹⁴⁴ Working Families Tax Relief Act of 2004, Pub. L. No. 108-311, § 313, 118 Stat. 1166, 1181 (2004) (to be codified at 26 U.S.C. § 45); *see also* Catamount Energy Corp., *supra* note 113; Matthew L. Wald, *Wind Power Is Becoming a Better Bargain*, N.Y. TIMES, Feb. 13, 2005, at 17.

¹⁴⁵ *See* Hsu, *supra* note 10, at 441; *see also* Real de Azua, *supra* note 11, at 511-15 (2001); American Wind Energy Ass’n, *Inventory of State Incentives for Wind Energy in the U.S.: A State by State Survey* (2002) (providing a state-by-state analysis of the incentives offered, including economic and financial incentives, such as tax rebates and credits, low-interest loans, and net metering; legislative and regulatory incentives, such as Renewable Portfolio Standards; and research and outreach programs), *available at* <http://www.awea.org/policy/documents/inventory.PDF>; RADER & WISER, *supra* note 96, at 21-39 (discussing and evaluating state production tax credits, investment tax credits, sales tax reductions, property tax reductions, and accelerated depreciation); REEVES & BECK, *supra* note 10, at 21; Wiser & Bolinger, *supra* note 134, at 3. It is worth noting that “[p]roperty tax reduction[s] . . . can generate opposition from local communities that stand to lose important tax revenues [discussed above in Part III.B] if they do not perceive sufficient benefit from the addition of the wind development to offset required local infrastructure investments or other related costs.” RADER & WISER, *supra* note 96, at 33.

“[s]tate policies to support wind power have historically been a critical driving force in the growth of the renewable energy market in the United States,”¹⁴⁶ commentators believe that the U.S. wind industry will be unable to maintain a steady growth rate without the PTC.¹⁴⁷

2. *Renewable Portfolio Standards and Public Benefit Funds*

Renewable Portfolio Standards (RPS) require “each company that generates electricity in the U.S., or in a given state, to obtain part of the electricity it supplies from renewable energy sources such as wind.”¹⁴⁸ Although there currently is no federal RPS, at

¹⁴⁶ Wiser & Bolinger, *supra* note 134, at 2.

¹⁴⁷ See *Energy Bill Stalls in Congress*, *supra* note 134; see also *Tax Credit Doubts*, *supra* note 132 (citing Jim Gordon, president of Cape Wind Associates, the company seeking to build a wind farm off the coast of Cape Cod, for the proposition that the project cannot be built without the PTC); Jack Coleman, *What's in Bill for Wind Farm?*, CAPE COD TIMES, Jan. 3, 2004, Access World News Rec. No. 0FFE0C28B3D225ED; Feder, *supra* note 6 (“[p]ermits for new wind energy projects in the United States are piling up as investors wait anxiously for Washington to renew tax credits that make them more profitable. . . . [T]o compete with coal, wind power generally needs subsidies like the tax credit of 1.8 cents a kilowatt-hour that lapsed at the end of last year.”). It is worth noting that the PTC contained a “double dipping” provision that required that the federal PTC be reduced if a wind project received certain other kinds of support, such as a state production tax credit. RADER & WISER, *supra* note 96, at 21; Wiser & Bolinger, *supra* note 134, at 1. Thus, some projects in some states received reduced federal PTC payments because of state aid. In their study, Wiser and Bolinger found that “state tax incentive policies generally los[t] ~40% of their value through a reduction in the federal PTC, meaning that they retain[ed] a full 60% of their value to wind project owners even after the federal PTC offset.” *Id.* It would follow then that some projects may not be significantly affected by the expiration of the PTC because these state incentives will now be worth 100% of their value. No analysis has been performed, however, on the impact of the expiration of the PTC on state tax incentives.

¹⁴⁸ *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 23; see KEVIN RACKSTRAW & JOHN PALMISANO, NAT’L WIND COORDINATING COMM., CREDIT TRADING AND WIND POWER: ISSUES AND OPPORTUNITIES (May 2002), available at http://www.nationalwind.org/publications/credit/credit_wind.pdf; RADER & WISER, *supra* note 96, at 117-22; see also REEVES & BECK, *supra* note 10, at 21; Union of Concerned Scientists, *Clean Energy: The Renewable Electricity Standard*, at http://www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=46 (last visited Nov. 29, 2004); Union of Concerned Scientists, *Clean Energy: Renewable Energy Standards at Work in the States*, at http://www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=47 (last visited Nov. 29, 2004); Union of Concerned Scientists, *Evaluating the Impacts of Increasing Wisconsin’s Renewable Portfolio Standard*, at <http://www.ucsusa.org/>

least a dozen states have an enforceable RPS in place, and several others have voluntary renewable energy goals.¹⁴⁹

Public Benefit Funds (PBF), which so far also exist only at the state level, are a means to fund renewable energy, energy efficiency, and other energy programs, such as wind development.¹⁵⁰ A PBF will often involve a small per-kWh charge, known as a System Benefit Charge (SBC), which is added to residents' electricity bills.¹⁵¹ The resulting funds can then be used to assist in the development of new wind projects or in the maintenance of existing wind power plants.¹⁵²

3. *Subsidies*

There have been two types of government subsidies in the electricity industry: direct subsidies and indirect or "off-budget" subsidies. Direct subsidies consist of actual expenditures by federal agencies and include funds for research and development and oversight activities (regulation).¹⁵³ Off-budget subsidies include tax credits, such as the PTC discussed above, interest rate

[clean_energy/renewable_energy/page.cfm?pageID=1309](http://www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=1309) (last visited Nov. 29, 2004).

¹⁴⁹ REEVES & BECK, *supra* note 10, at 21; Union of Concerned Scientists, *Clean Energy: Fact Sheet: Renewable Energy Standards at Work in the States*, at http://www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=47 (last visited Apr. 8, 2004). For a discussion of RPS in Connecticut and Maine, see Conservation Law Found., *supra* note 30, at 12; for Wisconsin, see Union of Concerned Scientists, *Clean Energy: Analysis: Evaluating the Impacts of Increasing Wisconsin's Renewable Portfolio Standard*, *supra* note 148. For an in-depth discussion of RPS, see Real de Azua, *supra* note 11, at 515-18; see also Union of Concerned Scientists, *Clean Energy: The Renewable Electricity Standard*, *supra* note 148; Union of Concerned Scientists, *Clean Energy: The Renewable Portfolio Standard*, *supra* note 148. For a discussion of why we need a federal RPS, see Union of Concerned Scientists, *Clean Energy: Renewable Energy Standards at Work in the States*, *supra* note 148. For a discussion of why each midwestern state should establish an RPS, see Learner, *supra* note 3, at 303-04. For a discussion of recent state attempts to implement renewable energy standards, see *Renewable Energy Mandates Gaining State Support* (NPR radio broadcast, Mar. 17, 2004).

¹⁵⁰ REEVES & BECK, *supra* note 10, at 22.

¹⁵¹ *Id.*

¹⁵² *Id.*

¹⁵³ Marshall Goldberg, *Federal Energy Subsidies: Not All Technologies are Created Equal*, available at http://solstice.crest.org/repp_pubs/pdf/subsidies.pdf (last visited Oct. 29, 2004); see also RADER & WISER, *supra* note 96, at 21-130; REEVES & BECK, *supra* note 10, at 21.

discounts, and insurance.¹⁵⁴ Government subsidies (both direct and off-budget) in the electricity industry have proven effective in helping newer fuel sources compete with traditional fossil fuel-powered plants, which often can produce electricity at lower costs to the producer.¹⁵⁵ Unfortunately for wind power, nuclear energy has received the lion's share of federal subsidies for newer fuel sources. From 1943 to 1999, federal subsidies to nuclear, solar, and wind electricity production and technologies totaled approximately \$151 billion.¹⁵⁶ Of this, the nuclear industry received \$145.4 billion (over ninety-six percent of the subsidies).¹⁵⁷ Photovoltaic and solar thermal power accounted for a cumulative total of \$4.4 billion (about three percent), leaving wind technology with about \$1.3 billion (less than one percent).¹⁵⁸

D. Federal Policies Impeding Wind Energy

While tax incentives (on both the federal and state level), RPS, PBF, and subsidies will all play an important role in the continued development of wind energy in the United States, these efforts are undermined by United States government policies that continue to encourage reliance on fossil fuels. For example, Reeves and Beck note that "[s]ubsidies for renewable energy have often been proportionally less than those for conventional

¹⁵⁴ *Id.*; see also Goldberg, *supra* note 153; RADER & WISER, *supra* note 96, at 21-130.

¹⁵⁵ REEVES & BECK, *supra* note 10, at 21. According to Moore and Ihle, "[r]enewable energy technologies cannot currently compete against fossil fuel energy without government subsidies." MOORE & IHLE, *supra* note 6, at 4. The importance of governmental subsidies is echoed by Hsu, who also proposes a subsidy to stimulate investment in renewable energy technologies, in addition to a phased cap-and trade program to make more costly the continued operation of coal-fired power plants and a subsidy program to induce the retirement of high-emitting coal-fired power plants. Anticipating arguments that a subsidy program would create "a reliance on subsidies that is ultimately self-defeating," *id.* at 7, Moore and Ihle explain that, "[w]ith time, the need for subsidies declines. . . . [P]roperly designed and implemented programs can gradually coax an industry and specific technologies into commercial maturity." *Id.* at 4, 7.

¹⁵⁶ Goldberg, *supra* note 153.

¹⁵⁷ *Id.* For a discussion of how nuclear and fossil fuel technologies have enjoyed a considerable advantage in government subsidies in comparison with renewables, see Union of Concerned Scientists, *Clean Energy: Barriers to the Use of Renewable Energy Technologies*, at http://www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=100 (last visited Nov. 29, 2004).

¹⁵⁸ Goldberg, *supra* note 153.

generation.”¹⁵⁹ Thus, any benefit that renewable energies in general, and the wind industry in particular, might have received from federal subsidies is emasculated by the sustained subsidization of fossil fuels.¹⁶⁰ The government, by providing subsidies for both types of energy, sends a mixed message about the importance of transitioning from fossil fuels to wind energy. One reason why the energy bill is stalled in Congress is that while it provides incentives for wind energy, including a first-time investment tax credit for small wind turbines,¹⁶¹ it also provides tax breaks and incentives for the coal and oil industries.¹⁶²

¹⁵⁹ REEVES & BECK, *supra* note 10, at 21. The independent energy consultants, Nancy A. Rader and Ryan H. Wiser, report that “one result of the historical and continuing patterns of subsidies for traditional energy resources (i.e., coal, oil, gas and nuclear fission) is that the energy market is skewed in favor of these resources and against emerging renewable resources such as wind.” RADER & WISER, *supra* note 96, at 7. To illustrate the degree to which the energy market is skewed in favor traditional energy sources, consider that the Energy Policy Act of 2003 (H.R. 6) would have given \$11.2 billion for fossil fuels and \$2.9 billion for renewables. *Cape Wind Eyes Subsidy*, *supra* note 126. In August 2001, the House passed an earlier version of the bill that would have authorized “\$27 billion in subsidies for traditional energy producers and only \$6 billion for conservation.” Editorial, *Enlightenment on Energy*, N.Y. TIMES, Oct. 22, 2001, at A18.

¹⁶⁰ Ottinger and Jayne assert that “[t]he most direct legal remedy to dirty energy is removal of the subsidies provided in law by the United States and other governments for use of fossil fuels, the largest source of pollution and carbon emissions.” Ottinger & Jayne, *supra* note 12, at 20. It is worth noting that had the United States adopted the Kyoto Protocol it would have been required under Article 2 to “reduc[e] or phas[e] out . . . market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors that run counter to the objective of the [United Nations Framework Convention on Climate Change].” Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, U.N. Doc. FCCC/CP/1997/L.7/Add.1, art.2, reprinted in 37 I.L.M. 22, 33 (1998). For more on the Kyoto Protocol, see *supra* Part II.

¹⁶¹ See *Energy Bill Stalls in Congress*, *supra* note 134.

¹⁶² See Editorial, *A Shortage of Energy*, N.Y. TIMES, Nov. 18, 2003, at A24 (stating that the bill’s provisions for fossil fuel alternatives take “baby steps . . . that pale next to the huge tax breaks and generous regulatory rollbacks it gives fossil fuel producers”); *China’s Message on Energy*, *supra* note 6 (calling the energy bill “one of the most depressing legislative initiatives in recent Congressional history” and stating that the bill fails “in any serious way to develop alternatives to fossil fuels. . . . [E]very senator who wants a coal plant seems to get one.”); Carl Hulse, *Consensus on Energy Bill Arose One Project at a Time*, N.Y. TIMES, Nov. 19, 2003, at A18 (discussing how the bill contains loan guarantees for a coal-burning power plant and increases the production of fossil fuels, while also expanding use of wind, solar and geothermal energy); Hulse, *supra* note 140, at A20 (describing how the bill would “provide[] billions

Subsidization of the fossil fuel industry is not the only example of where renewable energy initiatives have been counteracted by federal incentives for or assistance to the fossil fuel industries. In fact, this phenomenon can be found at the core of our national air pollution laws. According to Real de Azua, “[t]he main reason for the continued high use and low price of electricity produced from coal in the United States is that the older power plants remain exempt from the performance standards applied to the new power generators regarding regulated pollutants.”¹⁶³ This point is echoed by Professor Shi-Ling Hsu: “The problem is that environmental laws have ‘grandfathered’ these older coal-fired power plants so that they do not have to comply with many stringent environmental regulations that apply to new plants. This provides a strong incentive to keep old coal-fired power plants operating.”¹⁶⁴

To make matters worse, on December 31, 2002, the Bush administration announced its intention to relax key components of the Clean Air Act’s New Source Review rules, which would allow owners of the country’s oldest and dirtiest power plants, as well as oil refineries, chemical plants, incinerators, iron and steel foundries, pulp and paper mills, cement plants and other factories

of dollars in tax breaks to power producers”); Andrew C. Revkin, *At 1,200 Pages, the Energy Plan Weighs Itself Down*, N.Y. TIMES, Nov. 23, 2003, at WK3 (“The grants, loans, and tax incentives and research dollars for coal in this bill will give an unprecedented demand stimulus to coal-based economies.” (quoting Jack Gerard, President, National Mining Association)); Natural Res. Def. Council, *NRDC’s Earth Action: The Bulletin for Environmental Activists*, Nov. 25, 2003 (on file with author) (criticizing the bill “for proposing to give billions of taxpayer dollars to polluting industries and failing to strengthen U.S. energy security”).

The issue of subsidies to the fossil fuel industries is unlikely to be resolved anytime soon. See generally Driesen, *supra* note 62, at 266 (stating that “phasing out coal-fired power plants poses political difficulties”); Hoffert, *supra* note 38, at 981 (“Present U.S. policy emphasizes domestic oil production, not energy technology research.”); MOORE & IHLE, *supra* note 6, at 3 (“[S]ince Europe has fairly modest fossil fuel resources, coal and oil firms hold less political influence than they do in the U.S.”).

¹⁶³ Real de Azua, *supra* note 11, at 497.

¹⁶⁴ Hsu, *supra* note 10, at 434; see also Editorial, *Still Lagging on Warming*, N.Y. TIMES, *supra* note 52 (declaring that “the private sector . . . will not make serious investments in cleaner plants . . . as long as the rules favor dirtier and more profitable alternatives”); REEVES & BECK, *supra* note 10, at 19 (“Stricter emissions regulations can improve wind power’s competitiveness by forcing fossil fuel-fired generating plants to internalize costs associated with their plants’ emissions.”).

and industrial facilities to make upgrades without installing pollution controls.¹⁶⁵ If this new regulation becomes law, it could lead to significantly more pollution.¹⁶⁶

¹⁶⁵ Prevention of Significant Deterioration (PSD) and Non-attainment New Source Review (NSR): Routine Maintenance, Repair and Replacement, 67 Fed. Reg. 80,290 (Dec. 31, 2002) (to be codified at 40 C.F.R. pts. 51 & 52); *see also* *Clarity on Clean Air*, *supra* note 33 (“[Bush’s] Environmental Protection Agency has sown doubts about his sincerity by undermining important parts of current law before any new rules are put in place.”); Editorial, *Politics and Pollution*, N.Y. TIMES, Aug. 28, 2003, at A28; Editorial, *Presidential Ecospeak*, N.Y. TIMES, Oct. 18, 2003, at A12; Michael Janofsky, *Inspector General Says EPA Rule Aids Polluters*, N.Y. TIMES, Oct. 1, 2004, at A12; Katharine Q. Seelye, *Administration Adopts Rule On Antipollution Exemption*, N.Y. TIMES, Aug. 28, 2003, at A20; Katharine Q. Seelye, *Draft of Air Rule is Said to Exempt Many Old Plants*, N.Y. TIMES, Aug. 22, 2003, at A1 [hereinafter *EPA Exempts*]; Katharine Q. Seelye, *9 Northeast States File Suit Over New Rules on Pollution*, N.Y. TIMES, Jan. 1, 2003, at A1 [hereinafter *9 Northeast*]; Earthjustice, *Accomplishments: Court Blocks Bush Administration From Applying Weakened New Source Review Rules*, at <http://www.earthjustice.org/accomplishments/display.html?ID=175> (last visited Oct. 26, 2004); Natural Res. Def. Council, *Dirty Skies: The Bush Administration’s Air Pollution Plan*, at <http://www.nrdc.org/air/pollution/qbushplan.asp> (last visited Dec. 6, 2004); Natural Res. Def. Council, *Clean Air & Energy: Air Pollution: In Depth: Policy Papers: The EPA’s Changes to New Source Review*, at <http://www.nrdc.org/air/pollution/pnsr.asp> (last visited Dec. 8, 2004); Natural Res. Def. Council, *NRDC’s Earth Action: The Bulletin for Environmental Activists* (Jan. 23, 2003) (on file with author). For a good overview of New Source Review and the Bush administration’s proposed changes to the rule, see Barcott, *supra* note 62.

¹⁶⁶ According to the Clean Air Task Force, the effect of this rule will be to “yield greater pollution and contribute to negative health effects, including 20,000 additional premature births, 400,000 asthma cases and 12,000 additional cases of chronic bronchitis.” *Bare Bones: Industry vs. Clean Air*, EARTH FIRST!, 17 (Nov.-Dec. 2003); *see also* Barcott, *supra* note 62, at 78 (quoting the American Lung Association as stating that the overhauled New Source Review is “the most harmful and unlawful air-pollution initiative ever undertaken by the federal government”); Natural Res. Def. Council, *NRDC’s Earth Action: The Bulletin for Environmental Activists* (Jan. 23, 2003) (on file with author) (stating that the proposed changes “would mean thousands more asthma attacks, hospitalizations, and premature deaths in this country every year”). The rule has also undermined several lawsuits that the U.S. Department of Justice had brought against fifty-one power plants that it claimed were in violation of the New Source Review provision of the CAA because they had made significant upgrades and increased their emissions without installing pollution controls. Seelye, *EPA Exempts*, *supra* note 165; *see also* Linda Greenhouse, *Court Upholds EPA Role in Alaska Case*, N.Y. TIMES, Jan. 22, 2004, at A18 (stating that the Bush administration had “abandoned more than 50 investigations into violations of the Clean Air Act”); Janofsky, *supra* note 165, at A12 (“Before the revision of the rule, the EPA had reached settlements with several industrial companies that agreed to spend hundreds of millions of dollars installing modern pollution controls to reduce emissions, and many other companies were in

In response, twelve states (Connecticut, Maine, Maryland, Massachusetts, New Hampshire, New Mexico, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin) and several cities (including New York City and Washington, D.C.) sued the EPA to try to block the Bush administration's changes to the Clean Air Act.¹⁶⁷ On December 24, 2003, the United States Court of Appeals for the District of Columbia stayed the new regulation.¹⁶⁸ The court will now hear the case on the merits to determine whether the White House has the authority to modify the Clean Air Act by regulation, rather than through the legislative process.¹⁶⁹

settlement talks with the enforcement branch of agency. Once the agency set the new rules, those companies were no longer under pressure to agree to similar settlements.”). “The EPA . . . estimated that if it won all the cases involving the 51 plants, it would cut nearly 7 million tons of pollutants every year. That would [have] amount[ed] to a 50-percent reduction of air pollution generated by all electric utilities in the United States.” Seelye, *EPA Exempts*, *supra* note 165. According to Abt Industries, a consulting firm that has sometimes been contracted by the EPA, the “failure to install pollution controls on the 51 plants [that were sued] is responsible for 5,000 to 9,000 premature deaths and 80,000 to 120,000 asthma attacks every year.” *Id.* Unfortunately, in November 2003, the EPA announced that it was dropping investigations into these power plants for past violations of the New Source Review program because of the exemptions in the new rule. Christopher Drew & Richard A. Oppel Jr., *Lawyers at EPA Say It Will Drop Pollution Cases*, N.Y. TIMES, Nov. 6, 2003, at A1; Richard A. Oppel Jr. & Christopher Drew, *Senators and Attorneys General Seek Investigation Into EPA Rules Change*, N.Y. TIMES, Nov. 7, 2003, at A9; Richard A. Oppel Jr. & Christopher Drew, *States Planning Own Lawsuits Over Pollution*, N.Y. TIMES, Nov. 9, 2003, at A1, A30; *see also* Eliot Spitzer, *Regulation Begins at Home*, N.Y. TIMES, Nov. 17, 2003, at A23. Only if the EPA could prove that a plant was in violation of the new, more lenient standards would the agency continue to pursue an investigation of that plant. Oppel Jr. & Drew, *Senators and Attorneys General Seek Investigation Into EPA Rules Change*, *supra*. In response, the attorneys general of New York, New Jersey, and Connecticut have said that they will fill some of the void left by the EPA, bringing their own suits to force power plants to make pollution-control improvements. Oppel Jr. & Drew, *States Planning Own Lawsuits Over Pollution*, *supra*; *see also* Eliot Spitzer, *Regulation Begins at Home*, *supra*.

¹⁶⁷ *See National Briefing*, N.Y. TIMES, Oct. 28, 2003, at A18; *see also* Jennifer 8. Lee, *Most States Expect Pollution To Rise If Regulations Change*, N.Y. TIMES, Feb. 6, 2004, at A16; Seelye, *9 Northeast*, *supra* note 165.

¹⁶⁸ Christopher Drew & Richard A. Oppel Jr., *How Power Lobby Won Battle Of Pollution Control at EPA*, N.Y. TIMES, Mar. 6, 2004, at A1; Lee, *supra* note 167, at A16.

¹⁶⁹ Katherine Q. Seelye & Jennifer 8. Lee, *Court Blocks U.S. Effort to Relax Pollution Rule*, N.Y. TIMES, Dec. 25, 2003, at A1; *see also* Editorial, *Paralysis on Clean Air*, N.Y. TIMES, Jan. 4, 2004, at WK 6; Earthjustice, *supra* note 165, at <http://www.earthjustice.org/accomplishments/display.html?ID=175> (last visited

Regardless of the outcome of this particular suit, the fact that the Bush administration has attempted to relax the New Source Review rules illustrates the type of impediments wind energy faces. If the United States is serious about wind energy, the federal government will have to eliminate its practice of simultaneously subsidizing the fossil fuel industries and the renewable energy industries and discontinue its promotion of regulations that make it easier for fossil fuel power plants to pollute. It will require massive amounts of support to bring about these changes and, even then, change will not transpire overnight. As a result, it is of paramount importance that those wind energy projects that can proceed under present conditions do so with minimal resistance. Proponents of wind energy must gain the backing of individuals who currently oppose wind farms because of the risk of avian mortality and for aesthetic reasons. This next Section will provide a brief overview of some of the concerns expressed by individuals who fear that wind turbines will result in deaths to migratory birds. It will then examine the arguments made by individuals who oppose wind turbines on aesthetic grounds.

E. *Objections to Wind Projects on Avian Mortality
and Aesthetic Grounds*

Although the federal government has placed roadblocks to more widespread use of wind energy by simultaneously subsidizing the fossil fuel industries and the renewable energy industries and by continuing to support rules and regulations that make it easier for fossil fuel power plants to pollute, its actions are not surprising, given the political influence of the oil and gas industry lobby.¹⁷⁰ What is perhaps more disturbing is that wind energy projects are often opposed by individuals, many of whom might very well support the changes in policy described above and

Oct. 26, 2004).

¹⁷⁰ See, e.g., Drew, *supra* note 168, at A1; Krugman, *supra* note 64, at A23 (stating that for the proposed “cap and trade” system for mercury, “the administration didn’t just take industry views into account, it literally let the polluters write the regulations: much of the language of the administration’s proposal came directly from lobbyists’ memos”). See generally ORR, *supra* note 6, at 28 (arguing that “[w]e must remove the corrupting influence of money from politics beginning with corporate campaign contributions and the hundreds of billions of dollars of public subsidies for cars, highways, fossil fuels, and nuclear power that corrupt the democratic process and public policy”).

favor a growth in wind energy in general. The problem is that these individuals often balk at *specific* wind energy projects, most notably because they find the risk of bird deaths from collisions with wind turbines and the potential for the turbines to disrupt their aesthetic appreciation of the landscape to outweigh the environmental benefits, including human health benefits, of reduced reliance on fossil fuels.¹⁷¹ Because this type of opposition seems to occur with most proposed projects, this Article does not focus on the debates surrounding a particular project. Nevertheless, this divisiveness is particularly pronounced in regions where environmental sensitivity usually runs high. Accordingly, this Article will introduce the analysis of the concerns over avian mortality and visual impairment by briefly examining the controversy surrounding the proposed wind farms off the shore of Cape Cod and on the Glebe Mountain ridgeline in Londonderry, Vermont.

Off the coast of Hyannis in Nantucket Sound, which separates the Cape from Martha's Vineyard and Nantucket, Cape Wind Associates plans to build 130 wind turbines, each over 400 feet high.¹⁷² The project, which would cover twenty-four square miles, has drawn fierce opposition from animal welfare organizations and wildlife protection groups, as well as boaters, business owners, fishermen, and property owners, who are concerned that the wind farm will adversely affect bird and fish ecosystems, and who fear that the wind farm will hurt tourism, create navigational hazards by increasing the danger of vessel collisions with wind turbines, spoil water views, and depress waterfront property values.¹⁷³

¹⁷¹ For example, one Cape Cod resident described herself as "pro-clean energy," and described the turbines that she had seen recently in California as "really pretty," but expressed concern over the proposed Cape Wind project, mentioned above and discussed below, because residents would "lose the view" from the beach. Conor Berry, *Foes Say Wind Farm Should be Less Intrusive*, CAPE COD TIMES, Mar. 4, 2004, Access World News Rec. No. 1012208C98C48BDC.

In Part V, this Article contemplates whether this position really reflects the different conceptions of "environment," "landscape," and "nature."

¹⁷² See sources cited *supra* note 110.

¹⁷³ See, e.g., Burkett, *supra* note 11, at 48-51; Leaning, *Boaters Protest Wind Farm*, *supra* note 121; Polachek, *supra* note 110. For a discussion of the opposition to offshore wind farms by fishermen and recreational boaters, who claim that wind farms harm fisheries, create navigational hazards by increasing the danger of vessel collisions with wind turbines, and cause interference with search and rescue operations, see, e.g., Berry, *supra* note 171; John Leaning,

According to one resident of Hyannis, “[wind turbines] are probably great for the environment, but we shouldn’t have to sacrifice the environment to build renewable energy.”¹⁷⁴ On the other hand, the project has support from a number of environmental organizations, who stress that the turbines would offset fossil fuel production that otherwise would send hundreds of thousands of pounds of harmful emissions into the atmosphere.¹⁷⁵ They recognize that the wind turbines may result in some avian mortality but also note that the exact numbers may be overstated and that there are “negative impacts on birds from burning fossil fuels, which causes environmental problems affecting all life forms.”¹⁷⁶

Similarly, in Londonderry, Vermont, Catamount Energy Corporation’s proposal to build twenty-seven wind turbines 330 feet tall along a three-and-one-half mile stretch of Glebe Mountain has sharply divided the state.¹⁷⁷ Consider the stories of local residents Rob Roy Macgregor and Sam Lloyd. Both “love the outdoors and the ridgeline views in the mountains where they’ve chosen to live. And both are environmentalists concerned about Vermont’s future. But the two men have come down on opposite sides in the debate over a wind turbine project proposed for Glebe Mountain in Londonderry.”¹⁷⁸ Lloyd opposes the project and states: “We’d be giving up something that is quite precious in Vermont—what you might call the purity of Vermont’s

Navigation Could be Risky, CAPE COD TIMES, May 4, 2004, Access World News Rec. No. 1025E81571638F41; John Leaning, *Wind Farm Options Will Be Revealed* Oct. 29, CAPE COD TIMES, Oct. 10, 2004, at <http://www.capecodonline.com/special/windfarm/windfarm8.htm> (last visited Jan. 9, 2005). But see John Leaning, *Wind Farm Risk to Ships Disputed*, CAPE COD TIMES, May 26, 2004, Access World News Rec. No. 102D83E68235697E. For differing perspectives on the potential environmental, economic, and aesthetic impact of the proposed Cape Wind project, compare Save Our Sound, *supra* note 110, with Cape Wind Assoc., *Frequently Asked Questions: Questions about Environmental and Tourism Impact*, at <http://www.capewind.org> (last visited Dec. 8, 2004). Opponents of the proposed wind farm off the coast of Long Island have raised similar concerns. Lambert, *supra* note 111, at 47.

¹⁷⁴ Burkett, *supra* note 11, at 50.

¹⁷⁵ See, e.g., Berry, *supra* note 171; Leaning, *Boaters Protest Wind Farm*, *supra* note 121.

¹⁷⁶ John Leaning, *Birds an Issue in Wind Farm Debate*, CAPE COD TIMES, Jan. 19, 2004, Access World News Rec. No. 1002FCC7C84A8AF4.

¹⁷⁷ Susan Smallheer, *Wind Power Views Divided*, *supra* note 107.

¹⁷⁸ Allen, *supra* note 6.

ridgelines.”¹⁷⁹ In order to prevent such degradation from occurring, he has helped form the Glebe Mountain Group, an organization devoted to fighting the project. In addition to the “reduced scenic environment,” the group cites the potential loss of wildlife habitat (Glebe Mountain is a critical black bear feeding corridor), bird kills, loss of recreational land, and possible negative effects on the region’s tourism and real estate economies as reasons for opposing the installation of the turbines.¹⁸⁰ To counter the Glebe Mountain Group, Macgregor has formed an organization called Fairwind Vermont. His support for the project stems from his belief that Vermont should be a leader in developing wind energy: “If Vermont doesn’t have the social and political vision to take the first steps, what is the incentive for another state to do it?”¹⁸¹ Keith Dewey, a fellow member of Fairwind Vermont, agrees: “What trumps all of the aesthetic conversations is the fact that we’re environmentally doing some very nasty things to the planet.”¹⁸²

The fact that “[b]oth [Vermont] groups believe they might be working to avert an environmental crisis”¹⁸³ highlights the rift that wind energy projects can cause. While each proposed project will create its own set of issues, avian mortality and aesthetics are two recurring concerns.

¹⁷⁹ *Id.*

¹⁸⁰ See Glebe Mountain Group, *Fast Facts*, *supra* note 107; see also Susan Smallheer, *Wind Power Views Divided*, *supra* note 107. For differing perspectives on the potential impact of the wind farm on tourism, compare Stephen H. Burrington, *Our Energy Future is in the Wind*, BOSTON GLOBE, Jul. 13, 2002, at A15 (“Some wind farms actually attract tourists who hail them as beautiful.”); Catamount Energy Corp., *Facts for Communities*, *supra* note 113 (“Wind farms can be used as ‘eco parks’ providing communities with potential for increased tourism.”), with Glebe Mountain Group, *Fast Facts*, *supra* note 107 (“Vermont’s natural beauty is the primary resource which attracts visitors and makes [the] state such as special place.”); Hoffer, *supra* note 123, at 6 (stating that “there is anecdotal evidence that windfarms attract tourists” but that “[w]e cannot say whether tourists would come to Vermont specifically because of the turbines”).

¹⁸¹ Allen, *supra* note 6.

¹⁸² *Id.*

¹⁸³ *Id.*

1. *Concerns over Avian Mortality*¹⁸⁴

According to Jillian Liner, Audubon New York's Important Bird Areas (IBA) Program Coordinator, "as environmentalists fight to increase the percent of our energy supplied by alternative, 'greener' sources, there is one alternative source that is not getting the immediate green light, even from environmentalists: Wind power. And one of the concerns is the potential risk to birds."¹⁸⁵ Concern over avian mortality first arose in the early 1990s when more than thirty-three threatened gold eagles and seventy-five other raptors, such as red-tailed hawks, were injured or died during a three-year period from collisions with wind turbines in Altamont Pass, California (about sixty miles east of San Francisco).¹⁸⁶

¹⁸⁴ Bats also occasionally collide with wind turbines, but there has been less public outcry over deaths to bats than to birds. This may in part be due to the fact that "[b]at collisions at wind plants . . . involve common species that are quite numerous." *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 15; *see also* Jim Balow, *Kilowatts and Killed Bats*, CHARLESTON-GAZETTE, May 9, 2004 (citing Merlin Tuttle, director of Bat Conservation International in Austin, Texas, for the proposition that "[b]ats aren't as well loved as birds"), available at <http://www.glebemountaingroup.org/N010104/Charlestonbats050904.doc>; *Berkshire Wind Farm Contested*, CAPE COD TIMES, Mar. 2, 2004, at <http://www.capecodonline.com/special/windfarm/berkshirewind2.htm>; Noah Hoffenberg, *Imperiled Bats Tilt Windmill Project*, BERKSHIRE EAGLE, Apr. 5, 2004 (stating that concerns over the endangered Indiana bat have caused delays in construction projects, potentially including windfarms), at <http://www.glebemountaingroup.org/N010104/Bat%20040504.doc> (last visited Oct. 28, 2004); ANDERSON ET AL., *supra* note 92, at 24-26.

¹⁸⁵ Jillian Liner, *Criteria Needed for Wind Power Projects*, AUDUBON ADVCOATE (Audubon New York, Albany, N.Y.), Winter 2003, at 5, available at <http://www.audubon.org/chapter/ny/ny/advocate/2003winter/page5.pdf> (last visited Dec. 6, 2004); *see also* Serchuk, *supra* note 3, at 21 (discussing the danger that wind turbines may pose to birds).

¹⁸⁶ BROWER, *supra* note 9, at 85; *see also* Leaning, *supra* note 176; Polachek, *supra* note 110; *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 6; ANDERSON ET AL., *supra* note 92, at 6; CHAPMAN & WIESE, *supra* note 114, at 6; Richard Anderson et al., *Studying Wind Energy/Bird Interactions: A Guidance Document: Metrics and Methods for Determining or Monitoring Potential Impacts of Birds at Existing and Proposed Wind Energy Sites* (Dec. 1999), available at http://www.nationalwind.org/pubs/avian99/Avian_booklet.pdf; Catamount Energy Corp., *Frequently Asked Questions*, *supra* note 114; Danish Wind Indus. Ass'n, *Birds and Wind Turbines*, at <http://www.windpower.org/en/tour/env/birds.htm> (last visited Oct. 26, 2004); Ed DeMeo & Brian Parsons, *Some Common Misconceptions about Wind Power*, available at http://www.eere.energy.gov/windpoweringamerica/pdfs/wpa/34600_misconceptions.pdf (last visited Oct. 26, 2004); NAT'L RENEWABLE ENERGY LAB., *supra* note 98; NAT'L WIND COORDINATING COMM., AVIAN COLLISIONS WITH WIND TURBINES: A SUMMARY OF EXISTING STUDIES AND

These numbers, however, are not indicative of bird deaths at other wind farms. According to Reeves and Beck, the turbines in Altamont Pass were sited in the middle of prime raptor habitat. “Extensive studies performed subsequently at sites around the U.S. measured only one or two bird deaths per turbine per year,” they explain.¹⁸⁷ This is a small number when one considers that

COMPARISONS TO OTHER SOURCES OF AVIAN COLLISION MORTALITY IN THE UNITED STATES (Aug. 2001), *available at* http://www.nationalwind.org/publications/avian_collisions.pdf; Nat’l Wind Coordinating Comm., *Wind Energy Series: Wind Energy Environmental Issues* (Jan. 1997), *supra* note 114 (discussing how “federally protected golden eagles and red-tailed hawks . . . were being killed by wind turbines and high-voltage transmission lines . . . at California Altamont Pass”); OFFICE OF UTIL. TECH., *supra* note 20; ARI REEVES & FREDRIC BECK, WIND ENERGY FOR ELECTRIC POWER: A REPP ISSUE BRIEF 17 (July 2003), *available at* http://www.repp.org/articles/static/1/binaries/wind%20issue%20brief_FINAL.pdf; Serchuk, *supra* note 3, at 21; Union of Concerned Scientists, *Clean Energy: Backgrounder: Environmental Impacts of Renewable Energy Technologies*, at http://www.ucusa.org/clean_energy/renewable_energy/page.cfm?pageID=90 (last visited Apr. 8, 2004).

¹⁸⁷ REEVES & BECK, *supra* note 10, at 17 (emphasis added); *see also* Burkett, *supra* note 11, at 50 (citing Seth Kaplan, senior attorney, Conservation Law Foundation, for the proposition that turbines kill birds at a rate of one or two per year); Leaning, *supra* note 176 (“It’s important to understand that the experience at Altamont Pass has not been experienced elsewhere in the U.S.” (quoting Mark Rodgers, a Cape Wind Associates spokesperson)); Leaning, *Boaters Protest Wind Farm*, *supra* note 121 (“Experience in Europe indicates that the wind turbines and blades do not cause major bird mortality.”); Polachek, *supra* note 110, at 37 (explaining how, at Altamont, the wind turbines “were put into a pass where the wind is sort of trapped at a higher velocity, and that’s where birds like to go—with the wind [T]hose towers were the old lattice design towers, and they made tremendous perches. Raptors would sit there and look for their prey.” (quoting Craig Olmsted, vice president of Cape Wind Associates)); *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 15, (While “[a]vian deaths have become a concern at Altamont Pass . . . , which is an area of extensive wind development and also high year-round raptor use, [d]etailed studies, and monitoring following construction, at other wind development areas, indicate that this is a site-specific issue that will not be a problem at most potential wind sites.”); ANDERSON ET AL., *supra* note 92, at 24 (“[M]ost large wind farms have been operating for years with only minor impacts on birds and bats.”); Anderson, *Studying Wind Energy/Bird Interactions*, *supra* note 186, at 6 (“Studies conducted at sites other than Altamont Pass [Wind Resource Area] indicated few birds were being killed.”); Danish Wind Indus. Ass’n, *supra* note 186 (“Birds often collide with high voltage overhead lines, masts, poles, and windows of buildings. They are also killed by cars in the traffic. Birds are seldom bothered by wind turbines, however.”); Liner, *supra* note 185 (“Overall, the death of birds at wind turbines is relatively low compared to other sources of avian collision mortality.”); Carl Strojjan et al., Solar Energy Research Institute, *Environmental and Aesthetic Assessment of Small Wind Energy Systems* (Sept. 1981) (on file with author) (“The potential for bird collisions . . . should be extremely small, especially when considered in the

“[e]stimates of annual bird fatalities due to collisions with man-made structures in the United States range from *100 million to greater than 1 billion*.”¹⁸⁸

The AWEA has also attempted to assuage concerns over bird deaths:

[W]ind’s overall impact on birds is low compared with other human-related sources of avian mortality No matter how extensively wind is developed in the future, bird deaths from wind energy are unlikely to ever reach as high as 1% of those from other human-related sources such as hunters, house cats, buildings, and autos. Wind is, quite literally, a drop in the bucket.¹⁸⁹

These already low numbers should continue to drop given that “birds can see (and avoid) the newer, larger, more slowly rotating rotors more easily.”¹⁹⁰ In addition, research has found that

context of the natural hazards these organisms face during their life spans.”). As with birds, “[b]at collisions at wind plants tend to be low in number Human disturbance of hibernating bats in caves is a far greater threat to species of concern.” *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 15.

¹⁸⁸ ANDERSON ET AL., *supra* note 92, at 24; *see also* Leaning, *supra* note 176 (citing Paul Kerlinger, an expert on bird interactions with wind farms, for the proposition that between 100 million and 900 million birds die each year flying into windows, and that cats kill another 100 million); Liner, *supra* note 185 (estimating “that each year 60-80 million birds die due to vehicle collision, 98-980 million due to buildings and windows, 174 million due to power lines, 4-50 million due to communication towers”); Nat’l Wind Coordinating Comm., *Avian Collisions with Wind Turbines*, *supra* note 186 (estimating that “from 100 million to well over 1 billion birds are killed annually in the United States due to collisions with human-made structures” and that based on these estimates “windplant-related avian collision fatalities probably represent from 0.01% to 0.02% (i.e., 1 out of 5,000 to 10,000 avian fatalities) of the annual avian collision fatalities in the United States”); REEVES & BECK, *supra* note 10, at 17 (arguing that the number of birds killed by wind turbines per year is “a small number, when contrasted with the estimated four to ten million birds that die each year in the U.S. from nighttime collisions with lighted telecommunications towers and the several hundred million more that die each year because of other human activities”); Serchuk, *supra* note 3, at 21 (comparing the number of bird deaths at Altamont Pass to the 3000 birds who “died in two successive nights in 1982 from collisions with four chimneys at the Florida Power Corporation’s Crystal River Generating Facility” and 90,000-270,000 seabirds that died as a result of the Exxon Valdez oil spill).

¹⁸⁹ *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 15.

¹⁹⁰ REEVES & BECK, *supra* note 10, at 17; *see also* Catamount Energy Corp., *Facts for Communities*, *supra* note 113 (stating that “new designs drastically reduce negative impacts to bird life”).

painting turbine blades and installing sonar systems helps reduce the likelihood of avian mortality.¹⁹¹ Nevertheless, the stigma of wind turbines as “condor Cuisinarts”¹⁹² persists, posing an unfortunate problem for wind farm developers. Two commentators have noted that “[w]ind energy’s ability to emerge as a positive symbol of environmentally responsible energy production will be seriously jeopardized if wind turbines become popularly associated with the death of [birds].”¹⁹³

2. *Aesthetic Concerns*

To some extent, the apprehension about wind farms because of the risk of avian mortality can be mitigated by careful site

¹⁹¹ Nat’l Renewable Energy Lab., *supra* note 98; *see also* Nat’l Wind Coordinating Comm., *Wind Energy Issue Brief: Wind Energy Environmental Issues* (Jan. 1997) (noting that some of the practical measures to reduce bird deaths and injuries include “changing the color of wind turbine blades, using tubular towers with diagonal stringers, eliminating places for birds to perch on the towers (especially perches near uninsulated electricity transmission lines) and using radar to alert wind project operators to the passage of large flocks of birds”), at <http://www.nationalwind.org/publications/wes/ibrief02.htm>; Wind & Hydropower Tech. Program, Dep’t of Energy, *Advantages and Disadvantages of Wind Energy*, at http://www.eere.gov/windandhydro/wind_ad.html?print (last visited Dec. 8, 2004). According to Richard Anderson of the California Energy Commission, “bird deaths can be reduced by modifying towers to reduce perching, painting disruptive patterns on turbine blades, [and] modifying turbine spacing.” Anderson, *Studying Wind Energy/Bird Interactions*, *supra* note 186, at 72. But Anderson is cautious about the use of perch guards: “a perch guard might successfully prevent birds from perching on the tower, but might also have the effect of causing a frightened bird to fly into the blades, indirectly resulting in the very death it was designed to prevent.” *Id.*

¹⁹² Seelye, *Windmills*, *supra* note 105; *see also* Burkett, *supra* note 11, at 50 (mentioning that some opponents of wind turbines refer to them as “pole-mounted Cuisinarts”).

¹⁹³ BROWER, *supra* note 9, at 85 (citing ROBERT L. THAYER & HEATHER A. HANSEN, *WIND FARM SITING CONFLICTS IN CALIFORNIA: IMPLICATIONS FOR ENERGY POLICY* (1991)); *see also* CHAPMAN & WIESE, *supra* note 114, at 6 (explaining that concern over bird kills can making siting a new wind project “a slow process”); Nat’l Wind Coordinating Comm., *Avian Collisions with Wind Turbines*, *supra* note 186 (“Although wind energy is generally considered environmentally friendly (because it generates electricity without emitting air pollutants or greenhouse gases), the potential for avian fatalities has delayed and even significantly contributed to blocking the development of some windplants in the U.S.”); Natural Res. Def. Council, *Clean Air & Energy: Energy: In Brief: Fact Sheet: Wind Power: Alternative Energy Technologies Hold the Key to Curbing Air Pollution and Global Warming*, *supra* note 10 (“[W]ind energy developers and environmentalists alike are concerned that bird deaths from collisions with wind turbines could pose a major obstacle to widespread deployment of the technology.”).

evaluation to avoid placing turbines in areas of concentrated bird activity.¹⁹⁴ Much more difficult to understand and address, however, are objections to wind farms on aesthetic grounds.

Although most of this opposition has centered around the fear that wind farms will cause “visual pollution”¹⁹⁵ of the landscape, some have resisted wind farms out of concern for the noise created by wind farms.¹⁹⁶ The AWEA claims there is little cause for

¹⁹⁴ See, e.g., Anderson, *Studying Wind Energy/Bird Interactions*, *supra* note 186, at 73; Liner, *supra* note 185 (“High-risk areas would include significant nesting and foraging habitat of state federally listed bird species and also major migratory corridors.”). For an in-depth discussion of research and regulatory approaches that could be helpful in predicting, measuring, and reducing the numbers of birds killed by collisions with wind turbines, see PROCEEDINGS OF THE NATIONAL AVIAN-WIND POWER PLANNING MEETING, DENVER, CO, JULY 1994, at <http://www.nationalwind.org/publications/avian/avian94/default.htm> (last visited Jan. 10, 2005); PROCEEDINGS OF NATIONAL AVIAN-WIND POWER PLANNING MEETING III, PALM SPRINGS, CA, SEPT. 1995, THE AVIAN SUBCOMMITTEE OF THE NATIONAL WIND COORDINATING COMMITTEE, at <http://www.nationalwind.org/publications/avian/avian95/default.htm> (last visited Jan. 10, 2005); PROCEEDINGS OF NATIONAL AVIAN-WIND POWER PLANNING MEETING III, SAN DIEGO, CA, MAY 1998, THE AVIAN SUBCOMMITTEE OF THE NATIONAL WIND COORDINATING COMMITTEE, available at <http://www.nationalwind.org/publications/avian/avian98/avian98.pdf> (last visited Jan. 10, 2005); PROCEEDINGS OF THE NATIONAL AVIAN-WIND POWER PLANNING MEETING IV, CARMEL, CA, MAY 16-17, 2000, THE AVIAN SUBCOMMITTEE OF THE NATIONAL WIND COORDINATING COMMITTEE, available at http://www.nationalwind.org/publications/avian/avian00/avian_proceedings_2000.pdf (last visited Jan. 10, 2005).

¹⁹⁵ Strojan et al., *supra* note 187.

¹⁹⁶ See, e.g., Jehl, *supra* note 12, at 1; Lambert, *supra* note 111, at 47; ANDERSON ET AL., *supra* note 92, at 24; Cal. Energy Comm’n, *supra* note 92 (stating that noise is one of the potential issues associated with windfarm development); see also CHAPMAN & WIESE, *supra* note 114, at 6; Nat’l Renewable Energy Laboratory, *Profiles in Renewable Energy: Case Studies of Successful Utility-Sector Projects*, at <http://www.nrel.gov/documents/profiles.html> (last visited Nov. 4, 2004); Nat’l Wind Coordinating Comm., *Wind Energy Issue Brief: Siting Issues for Wind Power Plants* (“Wind turbines are highly visible structures that generate noise and often are located in conspicuous settings.”), at <http://www.nationalwind.org/publications/wes/ibrief03.htm> (last visited Jan. 10, 2005); Nat’l Wind Coordinating Comm., *Wind Energy Series: Wind Energy Environmental Issues*, *supra* note 191 (“[W]ind power can raise . . . community concerns. . . . [W]ind turbines generate noise”); Nat’l Wind Coordinating Comm., *Wind Energy Series: Siting Issues for Wind Power*, *supra* note 114 (describing how wind turbines “generate noise that can be disturbing to nearby residents”); OFFICE OF UTIL. TECH., *supra* note 20 (“Since turbines . . . emit some noise, it is prudent for windfarm developers to consider proximity to residential areas when selecting development sites.”); WIND, *supra* note 98, at 90 (“[H]igh-speed wind turbine blades can be very noisy.”); Wind & Hydropower Tech. Program, Dep’t of Energy, *supra* note 191; Nat’l Wind Coordinating

worry:

Noise was an issue with some early wind turbine designs, but it has been largely eliminated as a problem through improved engineering and through appropriate use of setbacks from nearby residences. Aerodynamic noise has been reduced by adjusting the thickness of the blades' trailing edges and by orienting blades upwind of the turbine tower. A small amount of noise is generated by the mechanical components of the turbine. To put this into perspective, a wind turbine 250 meters from a residence is no noisier than a kitchen refrigerator.¹⁹⁷

Reeves and Beck share the belief that noise should no longer be a significant impediment to gaining public support for wind farms, stating that "[t]he apparent noise level of a typical wind farm at 350 meters distance varies between 35 and 45 dB(A). This is similar to the noise level in the reading room of a library."¹⁹⁸ In

Comm., *Wind Energy Issue Series: Wind Energy Environmental Issues* (Jan. 1997) (stating that noise from wind turbines "is sufficient to be heard indoors and may be especially disturbing in the middle of the night when traffic and household sounds are diminished"), available at <http://www.nationalwind.org/publications/wes/wes02.htm>; Union of Concerned Scientists, *Clean Energy: Environmental Impacts of Renewable Energy Technologies* ("[W]ind projects often run into stiff opposition from people who regard them as . . . noisy."), at http://www.ucusa.org/clean_energy/renewable_energy/page.cfm?pageID=90 (last visited Nov. 29, 2004).

The Danish Wind Industry Association explains that sound emissions from wind turbines may have two different origins: (1) mechanical noise, caused by metal components moving or knocking against each other in the gearbox, drive train, or generator of the wind turbine; or (2) aerodynamic noise, caused by the movement of the rotor blades. See Danish Wind Indus. Ass'n, *Designing for Low Mechanical Noise from Wind Turbines*, at <http://www.windpower.org/en/tour/design/quietma.htm> (last visited Oct. 26, 2004); Danish Wind Indus. Ass'n, *Designing for Low Aerodynamic Noise from Wind Turbines*, at <http://www.windpower.org/en/tour/design/quietae.htm> (last visited Oct. 26, 2004); see also INT'L ENERGY AGENCY, BENIGN ENERGY? THE ENVIRONMENTAL IMPLICATIONS OF RENEWABLES (1998) ("There are two major types of noise emitted by wind turbines: aerodynamic (from the passage of air over the rotating blades) and mechanical (from all other moving parts, particularly the gearbox). Most complaints about wind turbines relate to the mechanically generated noise, specifically where the noise has a strong tonal component."), at <http://spider.iea.org/pubs/studies/files/benign/full/07-bene.htm>.

¹⁹⁷ *The Most Frequently Asked Questions About Wind Energy*, *supra* note 62, at 16; see ANDERSON ET AL., *supra* note 92, at 23 ("Noise produced by wind turbines has diminished markedly as the technology has matured."); see also INT'L ENERGY AGENCY, *supra* note 196, at 8 (stating that noise is less of a problem with modern turbines).

¹⁹⁸ REEVES & BECK, *supra* note 10, at 17; see ANDERSON ET AL., *supra* note 92, at 23 ("Under most conditions, modern turbines are quiet, generating

addition, they note that “wind farm noise will be partly masked by ambient noise, such as that from the wind rustling leaves or grasses. The sound also tends to be spread out across many frequencies, like white noise, further contributing to its unobtrusiveness.”¹⁹⁹

The larger aesthetic issue surrounding wind farms, however, concerns the visual perception of wind turbines and their impact on the landscape. According to the International Energy Agency, “[t]he impact of wind farms on visual amenity is probably the most controversial and difficult to quantify of all the environmental issues affecting wind energy development.”²⁰⁰ As indicated above, the Cape Wind project has “pitted the interests of renewable energy against the aesthetics of the turbines.”²⁰¹ In Vermont, “[w]ind power appear[s] to be in the eye of the beholder, as wind turbines [have been] described as things of beauty or an abomination of Vermont’s natural landscape.”²⁰²

Opponents of the Cape Wind and Glebe Mountain projects, as well as opponents of other proposals, have described wind farms as “the rape of a pristine natural resource”²⁰³ and as an “ugly industrial invasiveness, a blight on unspoiled mountainsides and seascapes.”²⁰⁴ Vincent Collins, a lawyer from Morgantown who was planning to build a house near Thomas, West Virginia, scrapped his plans because of the presence of a wind farm containing forty-four turbines, 228 feet high: “I can’t believe how large and hideous they are. . . . They look like alien monsters coming out of the ground.”²⁰⁵ According to a detractor of another

primarily broad-band sound levels no higher than those of a moderately quiet room at distances of 750 to 1000 feet (about 230-300 m).”).

¹⁹⁹ REEVES & BECK, *supra* note 10, at 17; *see also* Danish Wind Indus. Ass’n, *Sound from Wind Turbines* (“No landscape is ever completely quiet. Birds and human activities emit sound, and at winds speeds around 4-7 m/s and up the noise from the wind in leaves, shrubs, trees, masts etc. will gradually mask (drown out) any potential sound from e.g. wind turbines.”), at <http://www.windpower.org/en/tour/env/sound.htm> (last visited Oct. 26, 2004).

²⁰⁰ INT’L ENERGY AGENCY, *supra* note 196, at 7.

²⁰¹ Ethan Zindler & John Leaning, *Study: Wind Farm Doesn’t Add Up*, CAPE COD TIMES, Mar. 16, 2004, at <http://www.capecodonline.com/special/windfarm/studywind16.htm> (last visited Oct. 28, 2004).

²⁰² Susan Smallheer, *Wind Power Views Divided*, *supra* note 180.

²⁰³ Polachek, *supra* note 110, at 30 (quoting a Cape Cod resident opposed to the Cape Wind project).

²⁰⁴ Grady, *supra* note 11.

²⁰⁵ Seelye, *Windmills*, *supra* note 105.

project, “[w]ind power is the foremost threat to . . . natural beauty in recent memory. The idea that the [mountains] would somehow be enhanced with rows of giant, industrial-strength pinwheels rotating along their ridgelines defies all standards of aesthetic appreciation. To think that some people who call themselves environmentalists support such desecration of [the] mountaintops is mind-boggling.”²⁰⁶

In contrast, many proponents of wind projects consider visual aesthetics a “flimsy” reason to oppose a clean energy source.²⁰⁷ They view wind turbines as “an improvement over oil spills, the smokestacks of coal-burning power plants, and the cooling towers of nuclear plants.”²⁰⁸ “We have to make a choice,” says one supporter, “whether we want to look at smokestacks or windmills.”²⁰⁹ Another proponent remarks that “if acid rain and smog keep up, we’re not going to have a view, anyway.”²¹⁰ Some advocates not only regard wind turbines as aesthetically more appealing than fossil fuel power plants, or as a more appealing alternative to the eventual aesthetic impact of fossil fuel pollution on the environment, but “find [turbines] pleasant to look at, truly feeling that their lazy, pinwheel motion adds charm to the landscape.”²¹¹ These individuals have described turbines as “tall and graceful,”²¹² “graceful and sleek,”²¹³ and “beautiful and fascinating to watch.”²¹⁴

Although wind turbines will always be highly visible elements in the landscape, several measures can be taken to mitigate their visual impact. While there are no objective guidelines,²¹⁵ the Danish Wind Industry Association suggests that

²⁰⁶ Editorial, *Assault on Beauty*, BURLINGTON FREE PRESS, Mar. 15, 2004, <http://www.glebemountaingroup.org/N010104/Bbeauty031504.doc>.

²⁰⁷ Berry, *supra* note 171.

²⁰⁸ Grady, *supra* note 11.

²⁰⁹ Lambert, *supra* note 111, at 47.

²¹⁰ *Id.*

²¹¹ Grady, *supra* note 11.

²¹² *Wind Power Firm Files Plans for Mars Hill Peak*, *supra* note 108.

²¹³ Polachek, *supra* note 110, at 32.

²¹⁴ Cape Wind Assoc., LLC, *Frequently asked questions: Questions about the Cape Wind Project*, at <http://www.capewind.org/modules.php?op=modload&name=FAQ&file=index> (last visited Mar. 18, 2005).

²¹⁵ See, e.g., Danish Wind Indus. Ass’n, *Wind Turbines and the Environment: Landscape*, at <http://www.windpower.org/en/tour/env/index.htm> (last visited Oct. 26, 2004).

choice of paint color may help improve the visual impact of wind farms.²¹⁶ Reeves and Beck suggest that turbines be painted to match their surroundings.²¹⁷ Neutral colors, rather than bright graphics, tend to work best. For some sites, especially offshore sites, gray may be a good selection.²¹⁸ For areas surrounded by lots of sky and less land, lighter colors may be preferable.²¹⁹

The arrangement of a wind farm's turbines can also provide a purposeful and efficient appearance.²²⁰ The Danish Wind Industry Association suggests:

In flat areas it is often a good idea to place turbines in a simple geometrical pattern which is easily perceived by the viewer. Turbines placed equidistantly in a straight line work well There are limits to the usefulness of being dogmatic about using simple geometrical patterns, however: In hilly landscapes it is rarely feasible to use a simple pattern, and it usually works better to [allow the] turbines [to] follow the . . . contours of the landscape²²¹

This recommendation is echoed by the National Wind Coordinating Committee: "Following the contours of a ridge, for example, helps turbines blend into the surroundings. Avoiding construction of conspicuous roads and clearings, burying transmission lines, and hiding buildings and structures behind ridges or vegetation are also prudent steps."²²² Of course, as seen from the objections above, especially the objections to the Glebe Mountain project, following the contours of a ridge may not always mitigate the visual impact. Nor may it always be feasible to place wind turbines in a particularly compelling pattern. For example, because "[t]he roughness of the surface across which the wind blows before arriving at a turbine determines the amount of

²¹⁶ *Id.*

²¹⁷ REEVES & BECK, *supra* note 10, at 17.

²¹⁸ See, e.g., Danish Wind Indus. Ass'n, *Wind Turbines and the Environment: Landscape*, at <http://www.windpower.org/en/tour/env/index.htm> (last updated Sept. 19, 2003); REEVES & BECK, *supra* note 10, at 17.

²¹⁹ JEAN E. VISSERING, SITING WIND TURBINES, available at <http://www.saveoursound.org/pdfs/wind%20farm%20siting.pdf> (last visited Dec. 8, 2004).

²²⁰ Nat'l Wind Coordinating Comm., *Wind Energy Issue Brief: Wind Energy Environmental Issues*, *supra* note 191.

²²¹ Danish Wind Indus. Ass'n, *supra* note 218.

²²² Nat'l Wind Coordinating Comm., *Wind Energy Issue Brief: Wind Energy Environmental Issues*, *supra* note 191.

turbulence that a turbine will experience,”²²³ and because “[a] location far removed from the power transmission grid might be uneconomic, as new transmission lines will be required to connect the wind farm to the grid,”²²⁴ the aesthetic placement of turbines will necessarily be a secondary concern to a developer.²²⁵

Finally, Anderson notes that “[f]ewer and wider-spaced turbines may present a more pleasing appearance than tightly-packed arrays.”²²⁶ The problem with this suggestion, however, is that “[t]he wind moves more slowly at lower heights, with the greatest reduction in wind speed found very close to the ground. This phenomenon . . . is the key factor when deciding on tower height, as higher rotors are exposed to faster winds.”²²⁷ Thus, in order to reduce the number of turbines in a project, a developer would have to use taller turbines. Although the “newer, larger rotors rotate more slowly than their predecessors, and thus are less eye-catching,”²²⁸ some opponents have objected to the turbines because of their height. As a result, a developer who could make a decision based purely on aesthetics would need to weigh potential complaints about the number, spacing, and speed of the rotors against concerns about height.

To further complicate matters, because the rotors on taller wind turbines move more slowly than smaller turbines, the taller the turbine, the less likely it is to cause bird deaths.²²⁹ This low rotational speed is also less likely to cause aerodynamic noise.²³⁰ Thus, those who oppose wind energy projects because of the risk of avian mortality *and* because of the height of the proposed turbines should recognize the inherent conflict in their arguments against the projects. Similarly, those who are concerned about both the noise and visual impact of the turbines should realize that the chosen size of the turbines will necessarily remove one of these

²²³ REEVES & BECK, *supra* note 10, at 6.

²²⁴ *Id.* at 7.

²²⁵ One reason that Cape Wind Associates, LLC has proposed building offshore, rather than onshore is that “[a]verage wind speeds over water are typically 20% higher than nearby locations on land.” *Id.*

²²⁶ ANDERSON ET AL., *supra* note 92, at 28.

²²⁷ REEVES & BECK, *supra* note 10, at 7.

²²⁸ *Id.* at 16-17.

²²⁹ *See supra* note 190.

²³⁰ *See* Danish Wind Indus. Ass’n, *Designing for Low Aerodynamic Noise from Wind Turbines*, *supra* note 196.

perceived problems.

Despite the diversity of perspectives on the aesthetics of wind turbines, “[d]eployment experience has shown reduced perception of visual amenity impacts where the local community can see the benefits of a scheme, either from directly using the wind energy or from seeing existing fossil fuel stations displaced.”²³¹ While *environmental* education about the impacts of fossil fuels (see *supra* Part II) and the benefits of wind energy (see *supra* Part III.B) can increase the chances of support for a wind energy project, Part IV of this Article contends that *aesthetic* education can also help foster an appreciation for wind farms.

Part IV begins by providing a definition of aesthetics and setting forth the argument that the aesthetic appreciation of “environment,” “landscape,” and “nature” can be cultivated through an examination of art. In Part IV.A, this Article looks at how windmills, the precursors to modern turbines, were depicted in select seventeenth-century Dutch landscape paintings, drawings, and prints. In so doing, it discusses both the aesthetic and symbolic significance of windmills in these works of art and urges that we follow the lead of our Dutch precursors and embrace wind turbines as they did their windmills. In Part IV.B, this Article looks at some of the works of Christo, comparing not only the visual effect of his works with that of wind turbines, but how both Christo’s projects and wind farm projects have encountered similar opposition on aesthetic and environmental grounds. This Section also addresses some of the potential criticisms of looking to the art of Dutch painters and Christo as an aesthetic model for how to regard wind turbines and proposes a standard of beauty that contemplates more than simply what is visually pleasing.

IV. MODELS FOR AESTHETIC APPRECIATION OF WIND ENERGY SYSTEMS

Nature is no great mother who has borne us. She is our creation. . . . At present, people see fogs, not because there are fogs, but because poets and painters have taught them the

²³¹ INT’L ENERGY AGENCY, *supra* note 196, at 7; see also Nat’l Wind Coordinating Comm., *Wind Energy Issue Brief: Wind Energy Environmental Issues*, *supra* note 191 (stating that “educating nearby communities prior to construction about wind energy and its benefits can reduce opposition to visual effects”).

*mysterious loveliness of such effects.*²³²

Entire books and entire undergraduate- and graduate-level philosophy courses are devoted to the study of “aesthetics.” Some philosophers have dedicated their whole careers to discussing and writing about “aesthetics.”²³³ Thus, it is well beyond the scope of this Article to provide even a basic introduction to the elements of the branch of philosophy called “aesthetics.”²³⁴ Nevertheless, it is worthwhile to present *a* definition of “aesthetics” to ground our discussion of the aesthetic precedent for wind energy systems. According to Allen Carlson:

Aesthetics is the area of philosophy that concerns our appreciation of things as they affect our senses, and especially as they affect them in a pleasing way. As such it frequently focuses primarily on the fine arts, the products of which are traditionally designed to please our senses. However, much of our aesthetic appreciation is not confined to art, but directed towards the world at large. We appreciate not only art, but also nature—broad horizons, fiery sunsets, and towering mountains. Moreover, our appreciation reaches beyond pristine nature to our more mundane surroundings: the solitude of a neighborhood park on a rainy evening, the chaos of a bustling morning marketplace, the view from the road.²³⁵

²³² Oscar Wilde, *The Decay of Lying* (1889), in OSCAR WILDE: A CRITICAL EDITION OF THE MAJOR WORKS 215, 232-33 (Isobel Murray ed., 1989); *see also* R.W. HEPBURN, ‘WONDER’ AND OTHER ESSAYS: EIGHT STUDIES IN AESTHETICS AND NEIGHBORING FIELDS 36 (1984) (“We see as the painters, sculptors, architects, photographers, advertising designers teach us to see.” (quoting GYORGY KEPES, *LANGUAGES OF VISION* 67 (1961))).

²³³ *See generally* Arnold Berleant, *Introduction: Art, Environment and the Shaping of Experience*, in ENVIRONMENT AND THE ARTS: PERSPECTIVES ON ENVIRONMENTAL AESTHETICS 1 (Arnold Berleant ed., 2002) [hereinafter ENVIRONMENT AND THE ARTS] (stating that “the question of what makes something aesthetic has intrigued philosophers and art critics since the arts began to be discussed philosophically”).

²³⁴ For a summary of the historical development of “aesthetics,” as well as a discussion of some of the problems of “aesthetics,” *see* Van Meter Ames, *Recent Schools of Aesthetics*, in A HISTORY OF PHILOSOPHICAL SYSTEMS 552-62 (Vergilius Ferm ed., 1950); THE CAMBRIDGE DICTIONARY OF PHILOSOPHY 11-13 (Robert Audi ed., 1999); GEORGE DICKIE, AESTHETICS: AN INTRODUCTION 1-46, 109-46 (1971); JOHN HOSPERS, AN INTRODUCTION TO PHILOSOPHICAL ANALYSIS 497-523 (1953).

²³⁵ ALLEN CARLSON, AESTHETICS AND THE ENVIRONMENT: THE APPRECIATION OF NATURE, ART AND ARCHITECTURE xvii (2000); *see also* Arnold Berleant, *Introduction: Art, Environment and the Shaping of Experience*, in ENVIRONMENT AND THE ARTS, *supra* note 233, at 5 (“Aesthetics is the area of philosophical

In Part III, this Article identified two types of negative visual aesthetic responses to wind farms, echoing Carlson's definition of aesthetics. Whereas some individuals dislike the structural form of wind turbines and regard them as unappealing objects of fine art ("I can't believe how large and hideous they are They look like alien monsters coming out of the ground."),²³⁶ others object to turbines because of turbines' impact on their aesthetic appreciation of the landscape ("a blight on unspoiled mountainsides and seascapes").²³⁷ While at least one commentator has noted that "[t]he pinwheel-like motion of . . . wind plants is a source of playful visual interest to many,"²³⁸ and while one could make a fairly convincing argument that the meditative experience of this pinwheel-like motion resembles the contemplative encounter with one of George Rickey's kinetic sculptures (such as *Summer III* (1963); *Sedge IV* (1964); *Two Lines—Temporal I* (1964); *Five Lines in Parallel Planes* (1965); *Six Lines in a T* (1965-66); *Peristyle II* (1966); *Two Vertical, Three Horizontal Lines* (1966)),²³⁹ or with one of the mobiles of Alexander Calder (such as *Non-Objective* (1947); *Object in Y* (1955); *Red, 1959* (1959); *Antennae with Red and Blue Dots* (1960)),²⁴⁰ Lynn Chadwick (*Dragonfly* (1951)),²⁴¹ or Kenneth Martin (*Small Screw Mobile* (1953); *Screw Mobile with Black Centre*, (ca. 1958-65)),²⁴² this

inquiry customarily concerned with understanding the arts and with beauty in nature."); BERLEANT, *supra* note 21, at 9 ("[T]he area of philosophy known as aesthetics . . . concerns itself with the special values found in making and appreciating art and in the enjoyment of natural beauty.").

²³⁶ See Seelye, *Windmills*, *supra* note 105.

²³⁷ Conservation Law Foundation, *Reaping the Wind in a Brand New Age*, CONSERVATION MATTERS, Spring 2003, at <http://clf.org/general/index.asp?id=405> (last visited Dec. 6, 2004).

²³⁸ THAYER, JR., *supra* note 9, at 274-75 (1994).

²³⁹ See Peter Selz, *Introduction*, in CORCORAN GALLERY OF ART, GEORGE RICKEY: SIXTEEN YEARS OF KINETIC SCULPTURE (1966); Sue M. Thurman, *Foreword*, in INSTITUTE OF CONTEMPORARY ART, BOSTON, GEORGE RICKEY: KINETIC SCULPTURES (1964).

²⁴⁰ For a discussion of Calder's work, see JONATHAN FINEBERG, ART SINCE 1940: STRATEGIES OF BEING 42-51 (1995); see also MICHAEL COMPTON, OPTICAL AND KINETIC ART 8 (1974) (describing how the movement of *Antennae with Red and Blue Dots* is generated by wind). See generally GEORGE RICKEY, CONSTRUCTIVISM: ORIGINS AND EVOLUTION 65, 195 (1967).

²⁴¹ See COMPTON, *supra* note 240.

²⁴² See COMPTON, *supra* note 240. This is not to suggest that wind turbines resemble part-for-part the works of Rickey, Calder, Chadwick, and Martin. On the contrary, wind turbines are much larger than these artists' works and the

Article is more interested in demonstrating how an exposure to certain artworks might affect the sentiment that wind turbines disrupt the “purity” of the landscape or “spoil” the view.

Recognizing that to some degree aesthetic values may vary,²⁴³ this Article accepts the assertion that aesthetics can be taught and learned²⁴⁴ and argues that looking at art can inform our appreciation of “environment,” “landscape,” and “nature.”²⁴⁵ In

rotation of the blades of turbines is directionally distinct from the gyrations in these artists’ works. Rather, the comparison is between the *experience* of movement in a wind turbine and the movement in a Rickey or Calder or Chadwick or Martin sculpture. One could also make the argument that wind turbines possess a similarity to the minimalist works of Carl Andre, Dan Flavin, Donald Judd, Sol LeWitt, Robert Morris, Frank Stella, and Tony Smith, to name a few. Thayer writes that “[w]ith wind energy plants, ‘what you see is what you get.’ When the wind blows, turbines spin, and electricity is generated. When the wind doesn’t blow, the turbines are idle.” THAYER, JR., *supra* note 9, at 274. The phrase, “what you see is what you get,” or versions thereof, echoes the Minimalist credo. Indeed, Frank Stella, who rejected Abstract Expressionism’s invitation to introspection, stated: “‘My painting is based on the fact that only what can be seen there *is* there It really is an object . . . you can see the whole idea without any confusion . . . what you see is what you see.’” FINEBERG, *supra* note 240, at 299 (citing Frank Stella, *quoted in* Bruce Glaser (interviewer) & Lucy R. Lippard (editor), *Questions to Stella and Judd*, ARTNEWS, Sept. 1966, at 58-59, *reprinted in* MINIMAL ART 158 (Gregory Battock ed., 1968)); FRANCES COLPITT, MINIMAL ART: THE CRITICAL PERSPECTIVE 56, 118 n.117 (1990); *see also* Michael Kimmelman, *To Be Enlightened, You Pull the Switch*, N.Y. TIMES, Oct. 1, 2004, at E2, E27, ProQuest Doc. 703519271 (“It is what it is and it ain’t nothing else” (quoting Dan Flavin)).

²⁴³ See, e.g., Cape Wind Assoc., LLC, *supra* note 214; INT’L ENERGY AGENCY, *supra* note 196, at 7. For a discussion of the “subjectivist” theory of evaluation, see DICKIE, *supra* note 234, at 160-65.

²⁴⁴ For a discussion of whether there can be “improvement or progress in matters of esthetic sensibility,” see Hospers, *supra* note 234, at 506. Cf. THAYER, JR., *supra* note 9, at 11 (“[M]an [has] an innate aesthetic preference for landscapes characterized by natural elements as opposed to the architectonic environments that have developed since the advent of modern civilization.”) (quoting D. Pitt, *Are Landscape Preferences Genotypical or Phenotypical? An Investigation of Evolutionary-Based Hypotheses of Aesthetic Preference for Landscapes* (1982)) (unpublished manuscript, available at the University of Minnesota)).

²⁴⁵ Carlson identifies ten different approaches to or models for the appreciation of nature. The “landscape model” of nature appreciation treats nature as similar to landscape painting. It “mandates appreciation of nature as we might appreciate a landscape painting. This requires seeing it to some extent as a two-dimensional scene” CARLSON, *supra* note 235, at 6. The “natural environmental model” of nature appreciation “recommends that we appreciate nature in light of our knowledge of what it is, that is, in light of knowledge provided by the natural sciences, especially the environmental sciences such as

discussing whether we “can appreciate the aesthetically valuable qualities of the environment by looking at photographs of it,”²⁴⁶ Jonathan Friday writes in his article, *Looking at Nature through Photographs*,

It might be the case, that is, that looking at certain photographs provides a kind of aesthetic experience of the environment that could not (or is unlikely to) be had by someone standing face-to-face with the scene depicted.

. . . .

. . . [T]here are some aesthetically valuable qualities of the environment that could be appreciated only by looking at certain sorts of photographs of the environment.²⁴⁷

R.W. Hepburn extends Friday’s comments regarding photographs to painting, contending that “[a]rt is without a doubt a powerful agent in determining how nature appears to us. . . . In some cases we can say that a painting has made us aware of an aspect of nature we would have been unlikely to notice without its help.”²⁴⁸ Similarly, Berleant writes:

geology, biology, and ecology.” *Id.* The postmodern model of nature appreciation . . . compare[s] nature to a text, contending that in reading a text we appropriately appreciate not just the meaning its author intended, but any of various meanings that it may have acquired or that we may find in it. . . . [O]n such a postmodern model, whatever cultural significance nature may have acquired and that we may find in it, the rich and varied deposits from our art, literature, folklore, religion, and myth, would all be accepted as proper dimensions of our aesthetic appreciation of nature. And of such dimensions none would be given priority; no particular appreciation would be privileged as more serious or more appropriate than any other.

Id. at 9. This Article recommends a hybrid approach to nature appreciation based on these three models. Like the “natural environmental model,” this Article suggests that we appreciate nature in light of our knowledge of what it is. Rather than appreciating nature just in light of knowledge provided by the natural sciences, however, this Article proposes appreciating nature in light of knowledge provided by art, such as Dutch landscape paintings, as in the “postmodern model of nature appreciation.” But in advocating that we appreciate nature in light of our knowledge provided by Dutch landscape paintings, this Article rejects the “landscape model,” which regards nature as a landscape painting, which frames nature and flattens it into scenery.

²⁴⁶ Jonathan Friday, *Looking at Nature through Photographs*, 33 J. OF AESTHETIC EDUC. 25, 25 (1999).

²⁴⁷ *Id.* at 26, 34.

²⁴⁸ HEPBURN, *supra* note 232, at 36-37; see also ARTHUR D. EFLAND, A

There is a continuity between the pictorial landscape and the actual one, not a relation between original and copy but a shared aspect, as when distance depicted by means of perspective begins at the eye of the viewer, with both picture and perceiver inhabiting the same perceptual space. In the still life, too, a way of looking is opened to us that we can carry over to the common objects that surround us, and in the portrait we learn to see more truly the people we have always looked at. Even when these arts develop in the direction of greater abstraction, they continue to act as models for experiencing the world that lies outside the frame and the museum.²⁴⁹

Friday, Hepburn, and Berleant's assertions are by no means novel. Indeed, as Robert Thayer states in *Gray World, Green Heart: Technology, Nature, and the Sustainable Landscape*, "[l]andscape painters and, later, photographers of postcards and travel posters, played a significant role in shaping our aesthetic experience of the land's surface."²⁵⁰ But just because art can influence how we appreciate "environment," "landscape," and "nature" does not mean that it can act as a surrogate for the actual experience of "environment," "landscape," and "nature." We should not interpret Friday, Hepburn, and Berleant, or Thayer, for that matter, to suggest that we can fully comprehend or experience "environment," "landscape," and "nature" simply by looking at paintings and photographs or that "nature can be aesthetically contemplated *only* in the light of art."²⁵¹ As Berleant cautions, "[i]t is impossible to know a landscape fully by reading accounts of a region or perusing a map. Nor can we obtain such knowledge by looking at photographs, film clips, or paintings."²⁵² But we can certainly learn a lot about "environment," "landscape,"

HISTORY OF ART EDUCATION: INTELLECTUAL AND SOCIAL CURRENTS IN TEACHING THE VISUAL ARTS 132 (1990) ("[T]he great majority of the public have little appreciation for beauty in nature because they have not studied it through the interpretations of art. Art should be taught 'in order that men be able to appreciate . . . the beautiful.'" (quoting William Torrey Harris, *Why Art and Literature Ought to be Taught in Our Schools*, NAT. EDUC. ASSOC. J. OF PROC. AND ADDRESSES OF THE THIRTY-SIXTH ANN. MEETING 261, 270 (1897))). As discussed below, some will contend that "beauty in nature" means a nature *without* wind turbines, not a nature with them. In Part V, this Article contemplates a definition of "nature" that includes, rather than excludes, humans.

²⁴⁹ ARNOLD BERLEANT, *THE AESTHETICS OF ENVIRONMENT* 58-59 (1992).

²⁵⁰ THAYER, JR., *supra* note 9, at 8.

²⁵¹ HEPBURN, *supra* note 232, at 48.

²⁵² BERLEANT, *supra* note 21, at 18.

and “nature” from looking at art.

This is not to imply that all art presents a new way of experiencing “environment,” “landscape,” and “nature.” As Hepburn explains: “M.C. Escher offers arresting and disturbing graphic works where perspectival laws and limits which we ordinarily think inviolable are very thoroughly violated, and the impossible seems to be shown as possible. But they do not present a new way of seeing nature”²⁵³ Nor should we *always* look to art to show us how to regard and interact with the environment.²⁵⁴ For example, in *Reinventing Eden: Western Culture as a Recovery Narrative*, Professor Carolyn Merchant discusses four paintings which, as she describes, “portray movement from dark, barren, virgin, undeveloped nature, or *Natura naturans*, to final Platonic, civilized, ideal form, *Natura naturata*”:²⁵⁵ John Gast’s 1872 painting, *American Progress*;²⁵⁶ Emmanuel Leutze’s mural in the U.S. Capitol, *Westward the Course of Empire Takes Its Way* (1861);²⁵⁷ Domenico Tojetti’s 1875 painting, *Progress in*

²⁵³ HEPBURN, *supra* note 232, at 44.

²⁵⁴ *Id.* at 48 (stating that not “every sort of influence art-experience can have on nature-experience is necessarily beneficial to the latter”).

²⁵⁵ Carolyn Merchant, *Reinventing Eden: Western Culture as a Recovery Narrative*, in UNCOMMON GROUND, *supra* note 17, at 132, 149.

²⁵⁶ Merchant provides the following description of this painting:

On the left, toward the west is *Natura naturans*, nature active, alive, wild, dark, and savage Buffaloes, wolves, and elk flee in dark disorder accompanied by Indians with horses and travois. On the right, coming from the east, advancing to the west, is *Natura naturata*—nature ordered, civilized, and tamed. No longer to be feared or sexually assaulted, she floats angelically through the air in flowing white robes, emblazoned with the start of empire. She carries telegraph wires in her left hand, symbols of the highest level of communication—language borne through the air, the word or logos from above. The domination of logic or pure form is repeated in the book grasped in her right hand touching the coiled telegraph wires. She represents the city, the civil, the civic order of government—the highest order of nature. She is pure Platonic form impressed on female matter, transforming and ordering all beneath her.

Id. at 147–48.

²⁵⁷ Merchant writes that

[a]t the center of the mural on a rock outcrop pointing west toward barren “virgin” land is a madonna-like grouping of a pioneer with his wife and child. Below pass men with guns mounted on horses followed by covered wagons bearing women representing civilization. Their way is prepared by men cutting the forest with axes and uprooting trees that lie in the party’s way. Below, in the mural’s frame, is a view of San Francisco’s golden gate flanked by portraits of explorers

America,²⁵⁸ and *Civilization*, painted by George Maynard in 1893.²⁵⁹ If this Article were to recommend looking to these paintings as a paradigm for how to interact with “environment,” “landscape,” and “nature,” then this Article would essentially condone rampant development and sprawl, unbridled logging of national forests, and continued violent subjugation of native peoples. Certainly this is not the intent of this Article. Similarly, consider, for example, how haze has inspired the work of at least one artist—Kim Abeles—who, in her project “The Smog Collector” series, “place[s] stencil images on transparent or opaque material, then leave[s] these on the roof of [her] studio and let[s] the particulate matter in the heavy air fall upon them.”²⁶⁰ While

William Clark and Daniel Boone. Like Gast’s *American Progress*, the scene is a dynamic moment in the transformation of “virgin” nature into female civilized form through the agency of men.

Id. at 148-149.

²⁵⁸ According to Merchant, in this painting,

[a] female liberty figure personifying progress drives a chariot with a mounted American eagle pulled by two white horses. On the left, American Indians and buffalo flee into darkness and disorder in the advance of civilization, while on the right behind the liberty icon, female figures representing agriculture, medicine, mechanics, and the arts accompany her advance. Women bearing a tablet symbolizing literacy follow in front of a train bringing commerce and light to a barren “virgin” landscape.

Id. at 149.

²⁵⁹ Here, Merchant explains that

[a] white female figure dressed in white robes is seated on a throne decorated with cornucopias. She holds the book of knowledge on her lap and points to its written words as the epitome of enlightenment and education. The book represents the logos, the light or word from above. The figure’s Anglo-Saxon whiteness excludes the blackness of matter, darkness, and dark-skinned peoples.

Id.

²⁶⁰ El Camino College Art Gallery, *Kim Abeles—Smog Series*, at http://www.elcamino.cc.ca.us/ArtGallery/ARCHIVES/kim_abeles/graphics/smogplate.html (last visited Oct. 26, 2004); see also California Science Center, *Science Center Debuts “Art & Science Studio” Featuring Exhibit on Where is Color?* (describing Abeles’s piece “Sixty Days of Los Angeles Sky Patch” as “a sculptural contraption used to monitor the coloration of polluted skies”), at <http://www.casciencectr.org/GenInfo/MediaRoom/PressReleases/ArtAndScienceStudio/ArtAndScienceStudio.php> (last visited Nov. 8, 2004); Women Artists of the American West, *It’s All About the Apple, Or is it?: Artist Statement: Kim Abeles* (discussing *The Smog Collector* series, in which Abeles “invented a method to create images from smog by collecting particulate matter onto stenciled images”), at <http://www.sla.purdue.edu/WAAW/Ressler/artists/Abelesstat.html> (last visited Oct. 28, 2004).

haze may have provided Abeles with the subject matter for her art, we should not interpret her art to mean that we should perpetuate an attitude and pattern of behavior that produces (more) haze.²⁶¹ Or, to take an extreme example, no one would suggest that we look to Andy Warhol's silkscreen series, *Saturday Disaster* (1964), based on gruesome tabloid photographs of mutilated accident victims,²⁶² as an example for how to drive! Artists, as we well know, are often more inspired by what troubles them than what is pleasing. This Part simply contends that, based on Carlson's definition of "aesthetics," the notion that "aesthetics" can be taught and learned, and Friday, Hepburn, and Berleant's assertion that an aesthetic appreciation of our surroundings can be fostered by looking at art, both seventeenth-century Dutch landscape painting, drawing, and prints and Christo's site-specific environmental artworks can provide a guide for how to look at wind turbines.

Before beginning our examination of Dutch landscape art and Christo's works, however, it is first necessary to preempt one potential argument against the claim that these works can influence how wind turbines appear to us. Some will contend that Friday's statement that "there are some aesthetically valuable qualities of the environment that could be appreciated only by looking at certain sorts of photographs of the environment" refers to an "environment" *without* wind turbines. Similarly, these people will contend that Hepburn's statement that "[a]rt is without a doubt a powerful agent in determining how nature appears to us" refers to

²⁶¹ Like Abeles, Doug Blandy, Kristin G. Congdon, and Don H. Krug explain: Some contemporary artists, influenced by current discussions of what constitutes aesthetic experiences, are . . . electing not to portray the beauty of the landscape, but its destruction. For example, in 1990, Patrick Nagatani photographed contaminated radioactive sediment in Mortnadad Canyon, Los Alamos, California. Photographer Robert Glenn Ketchum documented the imperiled Tongass rain forest in Alaska. Antonin Kratochvil documented the ravaged landscape and the pollution caused by an underground tar factory in Romania. Richard Mistrach's 1985 photo, *Submerged Lamppost*, portrayed a town in California that was flooded by a misguided irrigation system Sue Coe draws and paints to make visible harsh realities. For example, in her 1988 work *Last Bit of Daylight*, she illustrates that human cruelty is not limited to the land or other people; animals also suffer from lack of sensitivity.

Doug Blandy et al., *Art, Ecological Restoration, and Art Education*, 39(3) STUD. IN ART EDUC. 230, 235-36 (1998).

²⁶² For a discussion of Warhol's "disaster series," see JONATHAN FINEBERG, *ART SINCE 1940: STRATEGIES OF BEING* 255 (1995).

a “nature” *without* turbines. It is by no means clear that these authors intend to restrict their statements to “nature untouched,”²⁶³ rather than “nature as modified by humans,”²⁶⁴ or to “natural” environments to the exclusion of “built environments,” i.e., ones that include architecture, cityscapes, or industrial design.²⁶⁵ In fact, as this Article discusses in Part V, Hepburn “cannot agree that nature is ‘categorically other than us, a nature of which were never part’”²⁶⁶ And Berleant’s assertion that still life paintings open up a way of looking “that we can carry over to the common objects that surround us” would certainly appear to contemplate windmills and wind turbines. Thus, the argument that we cannot look to art to instruct us in how to appreciate “environment,” “landscape,” and “nature” because these concepts do not contemplate a human presence is myopic.

A. *Seventeenth-Century Dutch Landscape Paintings, Drawings, and Prints*

It would be a substantial task to list, let alone discuss, all of the Dutch artists who painted, drew, or printed windmills as either the primary or secondary subjects in their works of art. Even attempting to compile an exhaustive inventory or to provide a thorough description of just seventeenth-century Dutch landscape paintings, drawings, and prints containing windmills would be a dissertation-worthy undertaking.²⁶⁷ Thus, this Section endeavors

²⁶³ BERLEANT, *supra* note 21, at 60.

²⁶⁴ Donald Crawford, *Nature and Art: Dialectical Relationships*, 42(1) J. OF AESTHETICS & ART CRITICISM 49, 49 (Autumn 1983).

²⁶⁵ See, e.g., CONTEXT, CONTENT, AND COMMUNITY IN ART EDUCATION: BEYOND POSTMODERNISM 223 (Ronald W. Neperud ed., 1995).

²⁶⁶ Ronald W. Hepburn, *Data and Theory in Aesthetics: Philosophical Understanding and Misunderstanding*, in ENVIRONMENT AND THE ARTS, *supra* note 233, at 36.

²⁶⁷ Art historian Alan Chong is careful to distinguish between the use of the windmill as a primary versus secondary motif, as well as between its depiction in paintings and its depiction in the graphic arts (drawing and printing):

[W]indmills rarely contribute the principal motif in Dutch paintings after the first decades of the [seventeenth] century. It had been common in Flanders in the late sixteenth and early seventeenth centuries, especially in the work of Jan Brueghel the Elder Mills occur occasionally in the work of early Dutch landscapists such as Adriaen van de Venne, Esaias van de Velde, and Jan van Goyen . . . , as well as [Aelbert] Cuyp and [Aert] van der Neer. But even these are isolated examples. . . . [Jan Isaackz. van] Ruysdael is one of the few leading Dutch landscapists at midcentury to have treated the windmill

only to offer an overview of the windmill motif in seventeenth-century Dutch landscape art. This Section will discuss selected works of four artists—Jacob Isaackz. van Ruisdael (b. 1628 or 1629), Rembrandt van Rijn (b.1606), Aelbert Cuyp (b.1620), and Aert van der Neer (b. 1603 or 1604)²⁶⁸—in which windmills form either the primary subject or secondary subject. In the process, this Section will attempt to explain how the windmill in seventeenth-century Holland functioned not only as a source of aesthetic contemplation, but as an economic, political, religious, and social symbol—a paradigm for how we might regard wind turbines today.

Ruisdael's painting, *The Mill at Wijk bij Duurstede* (painted probably between 1665 and 1670 and also known simply as *The Mill at Wijk*)²⁶⁹ is one of the better-known examples of seventeenth-century Dutch landscape painting containing a windmill as its primary subject. The painting depicts a tall platform windmill, located in the right-center of the painting, towering over a group of buildings and a number of people scattered on a riverbank below.²⁷⁰ Art historian Madlyn Millner Kahr provides the following description:

The great mill seen against the sky dominates the scene. The lines of the wings of the windmill are echoed by a lozenge pattern in the sky, a geometrical organization of the clouds. Everything in this painting is highly organized. The tall masts [of the ships in the river to the lower left of the mill], for example, are related to the clouds above and to the posts

as a major theme in his paintings. . . . The situation is different in the graphic arts, where many artists, including Rembrandt, made drawings and prints of windmills.

Alan Chong, *The Mill at Wijk, c. 1670*, in *MASTERS OF 17TH-CENTURY DUTCH LANDSCAPE PAINTING* 459-60 (Peter C. Sutton ed., 1987). Indeed, windmills are ubiquitous in Rembrandt's drawings and etchings. According to Chong, "Rembrandt drew windmills around Amsterdam on many occasions, from the early 1640s to the mid-1650s." *Id.* at 462 n.12.

²⁶⁸ MADLYN MILLNER KAHR, *DUTCH PAINTING IN THE SEVENTEENTH CENTURY* 89, 220, 209, 211 (1978).

²⁶⁹ See Chong, *supra* note 267, at 458-62; see also JULIUS S. HELD & DONALD POSNER, *17TH AND 18TH CENTURY ART: BAROQUE PAINTING, SCULPTURE, ARCHITECTURE* 233-34 (1972); KAHR, *supra* note 268, at 214. Wijk bij Duurstede is a village southeast of Utrecht on the river Lek, a branch of the Rhine that connects Holland and Germany. Chong, *supra* note 267, at 459, 461.

²⁷⁰ See Chong, *supra* note 267, at 458 (stating that "it is the sharply angled, dramatically lit windmill that dominates the landscape and forms the primary focus of the painting").

[reinforcing the riverbank] below. A zigzag pattern of strong diagonals directs our attention into and through the picture, which leads our eyes to the point of land in the middle ground and from there to an ascending diagonal provided by the cloud formations and wings of the windmill. . . . The overall composition of this picture is so powerful that all details are subordinated to it without a struggle.²⁷¹

Peter C. Sutton echoes Kahr's assessment of the prominence of the mill in the painting: "The stately cylinder of the mill stands powerfully against the airy sky"²⁷² And Alan Chong explains that Ruisdael emphasized the windmill by "eliminat[ing] a gate that should have stood in front of the mill."²⁷³

Chong's statement that Ruisdael edited *out* something in order to make the windmill more pronounced may come as a surprise to some, who may have believed that seventeenth-century Dutch landscape painters attempted to mirror precisely their surroundings in their works of art. But as Sutton further explains:

As no other people before them, the Dutch in the seventeenth century compiled a remarkably comprehensive record in paint of their land, people, and possessions. . . . We no longer rest easy with uncomplicated notions of a naïve Dutch realism chronicling the countryside with the literalness of a camera lens. Nor can we accept the view of Dutch landscape as a portrait of the land, unless one acknowledges the portraitist's license to editorialize, recast, and flatter.²⁷⁴

Cynthia P. Schneider endorses Sutton's statements about Dutch artists' willingness to edit what they saw in composing their landscapes. In describing Rembrandt's 1640 etching, *View of Amsterdam* (also known as *View of Amsterdam from the Northwest*)²⁷⁵—a panoramic view of the city with marshy wetlands in the foreground—Schneider writes: "Rembrandt's print, like most Dutch landscapes of the seventeenth century, combines natural observation with artistic selection. In this case the artist

²⁷¹ KAHR, *supra* note 268, at 214-15.

²⁷² Peter C. Sutton, *Introduction*, in MASTERS OF 17TH-CENTURY DUTCH LANDSCAPE PAINTING, *supra* note 267, at 51.

²⁷³ Chong, *supra* note 267, at 461. "In eliminating the gate and wall, Ruisdael greatly emphasizes the height of the mill beyond its appearance in reality and calls special attention to it." *Id.* at 459.

²⁷⁴ Sutton, *supra* note 272, at 1.

²⁷⁵ KAHR, *supra* note 268, at 118.

portrayed accurately the sequence of buildings [including about half-a-dozen windmills], but adjusted their heights and positions.”²⁷⁶ The fact that Dutch artists frequently took artistic license in their depictions of the landscape, in some instances removed objects blocking windmills, and even enlarged the windmills in proportion to the rest of the scene,²⁷⁷ emphasizes the degree to which the Dutch viewed windmills not as “blights on unspoiled mountainscapes and seascapes,” but as objects of aesthetic contemplation.

It would be misleading, however, to state that Dutch landscape painters depicted windmills *solely* for their perceived beauty. In fact, art historians have suggested multiple interpretations for the windmill as a symbol.²⁷⁸ For example, Rembrandt’s etching, *The Windmill* (1641), “places an eight-sided industrial grain mill and adjacent cottages . . . in a setting devoid of landmarks. But in contrast to their anonymous environment, the mill and cottage are described in minute detail.”²⁷⁹ Schneider notes that, “[i]n *The Windmill*, rather than representing a particular mill, Rembrandt created an evocative and timeless image of Holland’s trademark, set against a flat expanse of polder.”²⁸⁰ Kahr confirms Schneider’s assessment of windmills as a metonymy for Holland, but adds: “The windmill, so noticeable a feature of the Dutch landscape and so important in its practical uses, is a suitable monument to Dutch tenacity and ingenuity.”²⁸¹ In characterizing Ruisdael’s windmill in *The Mill at Wijk*, Sutton writes: “[M]ore

²⁷⁶ CYNTHIA P. SCHNEIDER, REMBRANDT’S LANDSCAPES: DRAWINGS AND PRINTS 238-39 (1990).

²⁷⁷ Chong, *supra* note 267, at 462.

²⁷⁸ For example, some art historians have focused on the moral and religious symbolism of windmills. According to Chong, this type of exploration relates to studies of earlier Netherlandish art concerning the use of windmills as Christian emblems:

Windmills in sixteenth-century landscapes (particularly those of Bosch and Bruegel) have been variously interpreted as representing the mind, man’s fortune, the evil world (or Augustine’s City of Man), folly, virtue, and temperance. Most convincing are the analyses . . . of the grain mill as a symbol of the Eucharist and Redemption, whether in the form of a hand, water, or windmill. That the blades of a windmill could also form a cross increased its symbolic power.

Id. at 460 (footnotes omitted).

²⁷⁹ SCHNEIDER, *supra* note 276, at 79.

²⁸⁰ *Id.*

²⁸¹ KAHR, *supra* note 268, at 215.

than a heroic motif, it serves as an icon of preindustrial Holland, an image rich with social, political and spiritual meanings.”²⁸² And Chong notes that Ruisdael “celebrates the common windmill, symbol of Holland, and an acknowledged factor in the economic strength of the country.”²⁸³ This last statement regarding the windmill as a sign of Holland’s economic strength in the seventeenth century further underscores the precedential value of Dutch landscape painting. Just as the seventeenth-century Dutch viewed windmills as totems of economic strength, so should we regard wind turbines as pillars of economic potential. As discussed in Part III.B, wind projects today create jobs in manufacturing, construction, operation, and maintenance and provide economic benefits to farmers, local communities, and utilities.

Another iconographic approach to Ruisdael’s *The Mill at Wijk* is the idea of *vanitas*—“of the impermanence of everything earthly.”²⁸⁴ At least one art historian has suggested that the restless sky and threatening weather, as well as the worn millstones in the foreground of the painting, reinforce a *vanitas* interpretation.²⁸⁵ If we accept the symbolism of the sky and weather as powerful elements in contrast to the ephemeral (and terrestrial) windmill, then Ruisdael’s painting can serve in yet another way as a guide for how to regard modern wind turbines—only that rather than viewing the wind turbine as an emblem of human transience (as we would in Ruisdael’s painting), its role is reversed. Whereas the wind and other natural forces, in contrast to the human-made windmill, symbolized for the Dutch the power of

²⁸² Sutton, *supra* note 272, at 51.

²⁸³ Chong, *supra* note 267, at 462. Chong also notes that “[s]eventeenth-century observers would have been interested in the windmill as an industrial structure, with its functions and special features.” *Id.* at 461.

²⁸⁴ KAHR, *supra* note 268, at 214.

²⁸⁵ See Chong, *supra* note 267, at 460 (citing R.H. FUCHS, DUTCH PAINTING 131-34 (1978)). Such a *vanitas* interpretation could be extended to other paintings containing images of windmills and foreboding weather in seventeenth-century Dutch works of art. One could make an argument that there is a element of *vanitas* in Aelbert Cuyp’s *Dordrecht from the South, in a Storm*—most likely a pendant to his more famous *Dordrecht Harbor by Moonlight* (c.1643-45) (both discussed below)—which depicts dark powerful clouds that cover more than two-thirds of the painting and dwarf the human elements expressed by the three windmills and various other scattered buildings. But note that “painters of Dutch landscapes rarely represented extreme weather conditions . . . until the late 1630s and early 1640s.” AELBERT CUYP 114-16 (Arthur K. Wheelock, Jr. ed., 2001).

God over man, we should regard the wind turbine in today's landscape as a means of ensuring an enduring future in contrast to the *vanitas* of trusting fossil fuels to serve us forever.

Up until this point, this Section has argued that because Dutch artists viewed the windmill as a source of aesthetic contemplation, as a symbol of economic prosperity, and as a reminder of human evanescence, we should accept modern wind turbines as aesthetically worthy objects, as symbols of economic potential, and as a means of ensuring human longevity. But the countless number of Dutch artworks that include windmills as secondary subjects (despite Dutch willingness to edit out undesirable elements from their depictions of landscapes) provides us with another insight into the Dutch attitude towards windmills and thus another reason to consider landscapes with wind turbines the way the seventeenth-century Dutch regarded their landscapes with windmills. As the next few paragraphs attempt to demonstrate, some Dutch artists depicted windmills as unobtrusive parts of the landscape, rather than as objects of note.

For example, in discussing Cuyp's *Dordrecht Harbor by Moonlight* (ca.1643-45) and *Dordrecht from the South, in a Storm*—both of which contain windmills²⁸⁶—Arthur K. Wheelock, Jr., writes: “In the mid-1640s, Dutch painters were fascinated with depicting unusual light and weather conditions. The origins of this interest are not entirely clear, although the depiction of ephemeral light and weather conditions had long been recognized as one of the most difficult challenges a landscape artist could face.”²⁸⁷

²⁸⁶ Note that the windmill in *Dordrecht Harbor by Moonlight* is actually quite large—almost the size of the large ship docked at the harbor. But it is certainly not the focus of the painting the way the mill is in Ruisdael's *The Mill at Wijk*. In *Dordrecht Harbor by Moonlight*, it is the feeling of silence and tranquility, created through the cool light of the moon that dominates the painting. The windmill plays a supporting role by reflecting some of the light of the moon but is clearly not the center of our attention.

²⁸⁷ AELBERT CUYP, *supra* note 285, at 114-16. According to Arnold Houbraken, the eighteenth-century artist-critic who was a native of Dordrecht, Cuyp

paid much attention to the time of day in which he portrayed his subjects, so that one can distinguish in his paintings the misty early morning from the bright afternoon and that again from the saffron-colored evening time. . . . I have also seen various moonlight scenes by him which were very realistic and arranged in such a way that the moon was beautifully reflected in the water.

Id. at 114 (citing ARNOLD HOUBRAKEN, DE GROOTE SCHOUBURG DER

Similarly, in describing Cuyp's drawing, *A Windmill and Farm Buildings beyond Meadows*, Wheelock offers:

In this drawing, Cuyp filled the horizon with farmhouses, a church, a haystack, and a post-mill, while to the right a farmhouse, a tree, and a small, indistinct building are nearer to the viewer. In a remarkable tour de force he gave excitement to the virtually formless land in the foreground and middle ground. The only accent of any significance in this area is a bridge, which also articulates a water channel running parallel to the picture plane. A vast undefined sky unites the landscape.

... [H]e must have been excited by the complex problems and possibilities presented by drawing this landscape.²⁸⁸

In these works, the windmills depicted neither reflect a source of aesthetic inspiration for the artist, nor do they serve a symbolic function (although, as mentioned above, one could make an argument for a *vanitas* interpretation in *Dordrecht from the South, in a Storm*²⁸⁹). In fact, for Cuyp, the windmill is incidental—it serves solely as an opportunity for him to address technical issues of composition and light. This is not to suggest that the windmills in Cuyp's work are unnecessary. On the contrary, in describing Cuyp's painting, *A River Scene with Distant Windmills* (early 1640s), Wheelock writes that “a number of majestic windmills” contribute to “the general atmosphere of harmony and peacefulness” of the painting.²⁹⁰

The same could be said for Aert van der Neer's *Canal Scene by Moonlight*—another painting containing a windmill as a secondary subject. Kahr writes:

[T]he reflection of the moon on the water and the clouds exemplifies [van der Neer's] romantic contribution to Dutch landscape painting. He painted a number of pictures of conflagrations in towns that also gave him the opportunity to deal with strange and fascinating light effects. There was scientific interest in the seventeenth century, and the artists were, in some cases at least, aware of this. . . . Aert van der Neer, however, gives not a scientific but an emotional effect

NEDERLANDSCHE KONTSTSCILDERS EN SCHILDERESSEN 248-49 (reprint 1976) (2nd prtg. 1753)).

²⁸⁸ *Id.* at 233.

²⁸⁹ See sources cited *supra* note 285.

²⁹⁰ AELBERT CUYP, *supra* note 285, at 102.

with his nocturnal studies.²⁹¹

Like Cuyp, van der Neer appears indifferent to the presence of the windmill. It neither serves as an object of aesthetic contemplation (although it does function to help convey other aesthetic interests), nor operates as an economic, political, religious, or social emblem. For these artists, the windmill seems merely to be a quotidian component of the Dutch countryside;²⁹² it does not excite them to the point of their making the windmill the main event in their paintings, but they obviously do not view the windmill as a “threat to the natural beauty of the landscape” or as “defying all standards of aesthetic appreciation.”²⁹³ In fact, given that the terms “harmony,” “peacefulness,” and “romantic” are used to describe their landscapes—landscapes that include windmills—further indicates how unobtrusive the Dutch found windmills to be.²⁹⁴

As indicated above, this Section has offered only a small glimpse at the windmill motif in seventeenth-century Dutch landscape art. Based on the works discussed, however, it is safe to say that many artists celebrated the windmill for its aesthetic qualities and multilayered symbolism. At the very least, it was a familiar and commonplace object. But there is no indication that

²⁹¹ KAHR, *supra* note 268, at 210.

²⁹² The windmill in Rembrandt’s drawing, *View on the Amsteldijk near the Trompenburg Estate* (c.1649-50), functions in a similar way. As Schneider describes:

This highly finished sheet gives a vivid picture of riverside activities in Rembrandt’s day: a horse pulls a barge up the river toward Amsterdam; a wagon loaded with hay rounds the bend; a pedestrian rests beneath the trees; a sailboat glides downriver, past the houses across the shore The little windmill . . . dominates the opposite shore.

SCHNEIDER, *supra* note 276, at 228.

²⁹³ See sources cited *supra* note 118.

²⁹⁴ As another example, consider Kahr’s description of Esaias van de Velde’s (b.1590) painting, *View of Zierikzee* (1618):

The profile of the town is seen on the far bank of the canal, jutting into the sky, while the foreground is a bit of the near bank, on which three figures, silhouetted against the light-reflecting surface of the water, intently go about their labors. The foreground figures, along with the many naturalistic details recorded throughout the picture [including a windmill on the far bank of the canal, pinned to the left-hand side of the painting], are subordinated to the composition as a whole. The masterly integration of all elements produces an *impression of stability and a mood of enduring peace*.

KAHR, *supra* note 268, at 55 (emphasis added).

windmills ever incited the type of rancor that wind turbines encounter today.

There are, however, several problems with the suggestion that the Dutch attitude towards windmills should have an impact on how we view wind turbines as aesthetic and symbolic objects. First, the Dutch windmills depicted in the landscape art of the seventeenth century are a good deal smaller than modern turbines, many of which are several hundred feet high.²⁹⁵ Second, while Dutch windmills occasionally appeared in clusters, such as in Cuyp's *A River Scene with Distant Windmills*, which contains about half a dozen windmills, the Dutch never grouped dozens, let alone hundreds, of windmills in a format resembling today's wind farms. And third, Dutch artists never depicted offshore windmills (because the Dutch never built them).

Opponents of wind turbines on aesthetic grounds have made some of these points in attempting to distinguish modern wind turbines from windmills. For example, according to one opponent of the proposed project on Glebe Mountain: "'Windmills' bring to mind those small, quaint Dutch windmills. 'Farms' bring to mind scenic pastoral Vermont. These windfarms are nothing like this. Instead, they are industrial-sized monsters."²⁹⁶ The Kingdom Commons Group, an organization that has resisted the construction of industrial wind turbine projects along the ridgelines in Vermont's Northeast Kingdom, proclaims: "The proposed industrial wind towers are not quaint little structures. They are not the antique 40-foot windmills seen on farms or in photos of Holland."²⁹⁷ Similarly, Vincent Collins, the Morgantown lawyer who abandoned his plans to build a home near Thomas, West

²⁹⁵ See *supra* Part III.A. Note, however, that "platform[s] [seen most clearly in Ruisdael's *The Mill at Wijk*] served to set the mill high enough to catch the wind without interference from surrounding structures." Chong, *supra* note 267, at 461.

²⁹⁶ Shirley Nelson, 'Obscene' Wind Turbines Will Ruin State's Beauty, BURLINGTON FREE PRESS, Feb. 1, 2004, available at <http://www.glebemountaingroup.org/N010104/Bobsce020104.doc> (last visited Dec. 8, 2004); see also Editorial, *Don't Rush to Wind*, BURLINGTON FREE PRESS, Jan. 30, 2004 (stating that the wind turbines that would appear on the ridge of Glebe Mountain "are not cute little windmills"), available at <http://www.glebemountaingroup.org/N010104/Bed013004.doc> (last visited Oct. 26, 2004).

²⁹⁷ The Kingdom Commons Group, *Size Matters*, available at <http://www.kingdomcommonsgroup.org/sizematters.htm> (last visited Nov. 4, 2004).

Virginia, because of the presence of a wind farm containing forty-four turbines, 228 feet high, states: “When you think of ‘windmill,’ you think Holland and Don Quixote. That’s wrong.”²⁹⁸

In Cape Cod, where 200 years ago “windmills sprouted like dandelions”²⁹⁹ and “the windmill remains an enduring and revered image,”³⁰⁰ there is some recognition that “[t]he Cape Wind proposal would feature turbines that bear a distant resemblance to the windmills of old.”³⁰¹ But there are still many detractors, such as Isaac Rosen, executive director of the Alliance to Protect Nantucket Sound, which opposes the project. According to Rosen, “there is a modern-day comparison and it’s not to a 24-square-mile power plant but to the small distributed generation turbines being proposed by the towns.”³⁰² As mentioned above, Rosen has a point. Structurally speaking, eighteenth-century Cape Cod windmills, like Dutch windmills, are more similar to small wind turbines intended for residential or small business use than to utility-scale wind turbines.

But just because seventeenth-century Dutch windmills and eighteenth-century Cape Cod windmills bear a closer resemblance to the smaller distributed wind systems than to wind turbines does not mean that there is no aesthetic precedent. A precedent is, after all, “an earlier occurrence of a similar character,”³⁰³ not “an earlier occurrence of an *identical* character.” Today’s wind turbines *are* larger and are often clustered in larger groups because our energy needs have changed and grown and our technology to meet those needs has improved. Thus, our notion of “precedent” must reflect this evolution.

²⁹⁸ Seelye, *supra* note 105.

²⁹⁹ *An Old Wind Blows*, *supra* note 110. For a history of windmills on Cape Cod, see *id.*; JACK SHEEDY & JIM COOGAN, CAPE COD COMPANION: THE HISTORY AND MYSTERY OF OLD CAPE COD (1999), *publication information at* www.barnstablepatriot.com/cccompanion/order.html.

³⁰⁰ *An Old Wind Blows*, *supra* note 110.

³⁰¹ *Id.* According to one resident, early Cape Codders were “smart enough to take advantage of a natural resource that the Cape has plenty of and turn it to their advantage. Now we have the opportunity, thanks to the Cape Wind proposal, to do it all over again and reap the benefits of the wind. To watch the wind blow the leaves off the trees and not see it do something useful, it seems stupid to me.” *Id.*

³⁰² *An Old Wind Blows*, *supra* note 110.

³⁰³ WEBSTER’S THIRD NEW INTERNATIONAL DICTIONARY OF THE ENGLISH LANGUAGE UNABRIDGED 1783 (3d ed. 1976).

More important and more germane to this discussion, however, is that seventeenth-century Dutch landscape art provides insight into how the Dutch regarded the relationship of humans to their surroundings. Kahr writes that, “[t]o Rembrandt, ‘nature’ surely meant not only the trees and fields and waterways that he could see around him, but—preeminently—human-kind and all that pertains to it.”³⁰⁴ Similarly, Arnold Berleant explains in *The Aesthetics of Environment* that “[t]he intimate scenes that . . . van Ruisdael[] . . . caught reflect a European nature that had been humanized and cultivated over long centuries into a symbolic balance with its inhabitants.”³⁰⁵ And in fact, “[t]he English word ‘landscape’ was first used in the sixteenth century to describe the backgrounds of Dutch paintings which depicted rural life”³⁰⁶ To Rembrandt and other Dutch artists, “nature,” then, included windmills. To speakers of the English language at that time, “landscape” included windmills. This Article proposes that, like our Dutch precursors, we embrace a similar conception of “nature” and “landscape”—one that does not treat “nature” as something “other than” or “apart from” humans—one that does not regard “landscape” as that which contains no human element³⁰⁷—when considering the aesthetic impact of wind turbines on the landscape. This is not to imply that all landscapes must bear the visible evidence of human existence³⁰⁸—that we should develop open

³⁰⁴ KAHR, *supra* note 268, at 118.

³⁰⁵ BERLEANT, *supra* note 249, at 176.

³⁰⁶ THAYER, JR., *supra* note 9, at 17.

³⁰⁷ Compare Jack Tally, Letter to the Editor, *Finding Sanctuary for Renewal*, RUTLAND HERALD, June 4, 2004 (describing the desire for places that “have little or no human infrastructure”), available at <http://www.glebemountaingroup.org/N010104/Rsanctuary060404.doc> (last visited July 20, 2004), with ARNOLD BERLEANT, LIVING IN THE LANDSCAPE: TOWARD AN AESTHETICS OF ENVIRONMENT 17 (1997) (“It is important to remember that . . . culturally transformed landscapes are of no less value than wilderness areas . . .”).

³⁰⁸ The word “visible” is critical in this sentence, because according to a number of commentators, there are no regions on the planet that have not been impacted by human activities. See, e.g., BERLEANT, *supra* note 249, at 3 (“[N]ature, in the sense of a landscape unaffected by human agency, has long since disappeared in nearly every region of the industrialized world.”); MCKIBBEN, *supra* note 3, at 18 (“We have substantially altered the earth’s atmosphere.”); Darrel Jenerette, Landscape Complexity and Ecosystem Processes of the Phoenix, AZ Metropolitan Region (2004) (dissertation defense, Arizona State University) (on file with author). See generally THAYER, JR., *supra* note 9, at 190 (“What is most critical to the discussion of landscape . . . is that the developing edges of both nature and technology have now moved beyond

space, drill in Arctic National Wildlife Refuge (ANWR), or log the Tongass National Forest. Such efforts to develop, drill, and log should be opposed not only because, in the case of development and drilling, these activities encourage greater reliance on fossil fuels, and, in all three cases, adversely effect wildlife, but because of their adverse aesthetic impact. Rather, this Article suggests that we should not treat the construction of wind farm projects as an identical evil to development, drilling, and logging. Wind farms not only provide an alternative energy source that prevents environmental and aesthetic ruin caused by rampant fossil fuel use, but are aesthetically appealing.

This Article will continue this discussion of how wind turbines preserve beauty and the different conceptions of “environment,” “landscape,” and “nature” in Part V, but first it is necessary to examine some of Christo’s works. This next Section endeavors to reveal the inconsistencies in lauding his projects but rejecting wind farms. It hopes that a consideration of Christo’s works will result in a better understanding of and aesthetic appreciation for wind farms.

B. *Christo*

While all of Christo’s works “temporarily disrupt one part of the environment [to allow viewers to] see and perceive the whole environment with new eyes and a new consciousness,”³⁰⁹ this Article suggests that four works in particular bear a resemblance to the way wind turbines “disrupt the environment”—and that if we accept and admire Christo’s works because of or despite this interference, we should receive wind turbines in the same way. This Article also proposes that just as Christo’s works “disrupt one part of the environment” to allow viewers to perceive the environment as a whole differently, we should recognize that the disruption of one part of the environment by wind turbines allows not only for the appreciation and improvement of other parts of that particular environment, but the appreciation and improvement

the visible realm. With few exceptions, the unfolding dimensions of nature are now well outside the boundaries of everyday human perception.” (emphasis in original)); Richard White, “Are you an Environmentalist or Do You Work for a Living?”: *Work and Nature*, in UNCOMMON GROUND, *supra* note 17, at 171, 172 (“[N]o place is without evidence of its alteration by human labor.”).

³⁰⁹ Jok Church, *F.A.Q.: Frequently Asked Questions*, at <http://christojeanneclaude.net/faq.html> (last visited Nov. 5, 2004).

of the environment as a whole, both now and in the future. This Section will describe *Valley Curtain*, *Rifle, Colorado*, 1970-72; *Running Fence*, *Sonoma and Marin Counties, California*, 1972-76; *Surrounded Islands*, *Biscayne Bay, Greater Miami, Florida*, 1980-83; and *The Umbrellas*, *Japan/USA*, 1984-91, comparing not only the aesthetic similarities between these works and wind turbines, but also the similarities in the grounds for opposition to Christo's works and wind farms, namely aesthetic reasons and fear of environmental degradation. As with Part IV.A, this Section will conclude by addressing some of the concerns for treating Christo's works as a model for considering and appreciating wind turbines.

1. *Valley Curtain*

For *Valley Curtain*, Christo (with the assistance of thirty-five construction workers and sixty-four temporary workers) hung a woven nylon orange curtain between two peaks in the Grand Hogback Mountain Range, located seven miles north of Rifle, Colorado (which is between Grand Junction and Glenwood Springs).³¹⁰ The curtain—12,780 square meters (142,000 square feet)³¹¹ and comparable in size to the Brooklyn Bridge's main span³¹²—was suspended at a width of 381 meters (1250 feet) and at a height curving from 111 meters (365 feet) at each end to 55.5 meters (182 feet) at the center, leaving it clear of the slopes and the valley bottom.³¹³

The project took twenty-eight months to complete.³¹⁴ Much of this time was spent fostering community support and securing the proper leases and permits.³¹⁵ Like wind farm developers, Christo encountered both aesthetic and environmental opposition to his project. The community of Rifle had “no history of

³¹⁰ Christo & Jeanne-Claude, *Valley Curtain: Rifle, Colorado, 1970-72* [hereinafter *Valley Curtain*], at <http://christojeanneclaude.net/vc.html> (last visited Nov. 1, 2004).

³¹¹ *Valley Curtain*, *supra* note 310.

³¹² CHERNOW, *supra* note 15, at 206.

³¹³ *Valley Curtain*, *supra* note 310. “A 3 meter (10 foot) skirt attached to the lower part of the Curtain visually completed the area between the thimbles and the ground.” *Id.* Note that the height of the curtain is about the same as the height of many of the proposed wind energy projects mentioned in *supra* Part III.A.

³¹⁴ *Valley Curtain*, *supra* note 310.

³¹⁵ CHERNOW, *supra* note 15, at 206-18.

embracing avant-garde art,”³¹⁶ and environmentalists feared that the “curtain could harm plant or animal life, particularly unsuspecting birds that might be snared in flight.”³¹⁷ Ultimately, however, Christo prevailed. While he had a difficult time convincing individuals of the project’s aesthetic merits, “financial, if not aesthetic, logic convinced most business leaders.”³¹⁸ As Bert Chernow, Christo’s biographer explains: “*Valley Curtain* promised to pump up a sagging economy with jobs and an influx of tourists.”³¹⁹ To address the fear of avian mortality, Christo enlisted the support of various scholars. For example, Professor William Weber, then head of the biology department at the University of Colorado, stated in a meeting with the Rocky Mountain Center on Environment and the Colorado Open Space Council, groups who had expressed ecological concerns, that “[a]ny bird that could not manage to fly over the curtain would have been in pretty bad shape to begin with.”³²⁰ Another scholar noted:

[T]he shadow of the curtain . . . would slow down the dehydration of the soil, actually benefiting plant and animal life. . . .

. . . .

Between the planned 60-90 kiloton nuclear underground detonation at Rio Blanco—35 miles away—and the foul smoke-belching uranium processing plant of Union Carbide—10 miles from Christo’s Valley Curtain, this proposed art project [would be] an innocent to pollution and ecological tampering. Not a single tree [would] have to be cut Birds, sensitive to moving objects and surfaces, [would not] crash into the curtains as they crash into the steel and glass sides of office highrises in New York or Chicago.³²¹

While these scholars could not assuage everyone’s concerns,

³¹⁶ *Id.* at 206.

³¹⁷ *Id.* at 207.

³¹⁸ *Id.*

³¹⁹ *Id.* at 206-07. Christo does not use “volunteers” for his projects. “[E]veryone who works is paid: normal union wages for specialized professional workers, and just above minimum wage for non-skilled workers.” *Common Errors*, *supra* note 16.

³²⁰ CHERNOW, *supra* note 15, at 207 (quotations omitted).

³²¹ *Id.* at 207-08 (quotations omitted).

many environmentalists worried about the project recognized that “with the dangers of air pollution, underground atomic explosions and the 1976 Winter Olympics, the proposed Valley Curtain was a minor matter of concern and should be allowed to happen as planned.”³²² And when the curtain finally was raised, many individuals who opposed the project on aesthetic grounds remarked how beautiful it looked³²³—a phenomenon that is not uncommon with wind turbines.

2. *Running Fence*

Like *Valley Curtain*, *Running Fence* did not possess a part-for-part resemblance to wind turbines, although both protruded from the earth to the sky. The project involved running miles of fence through two California counties. It was 5.5 meters (eighteen feet) high and forty kilometers (24.5 miles) long, extending east-west near route 101, north of San Francisco;³²⁴ it traversed the properties of fifty-nine ranchers, intersected fourteen roads, passed through the middle of a town, and descended into the Pacific Ocean at Bodega Bay.³²⁵ The fence itself was “made of 200,000 square meters (2,222,222 square feet) of heavy woven white nylon fabric, hung from a steel cable strung between 2050 steel poles (each 6.4 meters (21 feet) long, 9 centimeters (3½ inches) in diameter) embedded one meter (three feet) into the ground.”³²⁶

³²² *Id.* at 209 (quotations omitted).

³²³ *See, e.g., id.* at 216, 219.

³²⁴ Christo & Jeanne-Claude, *Running Fence: Sonoma and Marin Counties, California, 1972-76* [hereinafter *Running Fence*], at <http://christojeanneclaude.net/rf.html> (last visited Nov. 6, 2004); *see also* CHERNOW, *supra* note 15, at 224-25; FINEBERG, *supra* note 240, at 355; JONATHAN FINEBERG, CHRISTO AND JEANNE-CLAUDE: ON THE WAY TO *THE GATES*, CENTRAL PARK, NEW YORK CITY 34, 37 (2004); Milner S. Ball, *Good Old American Permits: Madisonian Federalism on the Territorial Sea and Continental Shelf*, 12 ENVTL. L. 623, 655 (1982); Ralph E. Lerner & Judith Bresler, *Art Law: The Guide for Collectors, Investors, Dealers, and Artists*, PLIREF-ART CH9 667, 723 (2001). “The height of the *Fence* was eighteen feet, because this is the average height of the barns, the garages, and the farmhouses . . .” Interview by Jonathan Fineberg with Christo at the University of Illinois at Urbana-Champaign, 1977, in FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra*, at 127 [hereinafter Fineberg, University of Illinois Interview].

³²⁵ *Running Fence*, *supra* note 324; *see also* FINEBERG, *supra* note 240, at 355 (1995).

³²⁶ *Running Fence*, *supra* note 324. The fence used “no concrete and braced laterally with guy wires (145 kilometers (90 miles) of steel cable) and 14,000 earth anchors.” *Id.*

As with *Valley Curtain* and Christo's other projects, discussed below, *Running Fence* encountered fierce and sustained opposition.³²⁷ Detractors called the project an "elegant hustle" and "another exploitation of our dwindling natural resources"³²⁸—phrases that bear close resemblance to the epithets directed towards wind farm proposals. As art historian Jonathan Fineberg explains:

Running Fence took four years of negotiations with the fifty-nine private ranchers who owned the land, required a 450-page environmental impact statement, prompted eighteen public hearings (including three sessions of the Superior Court of California) to obtain the permits, and cost a total of \$3.2 million.³²⁹

The two-volume environmental impact report, prepared by Dr. Richard Cole of Environmental Science Associates, merits special attention because it addressed many of the concerns often voiced by opponents of wind farm projects. As Chernow explains:

The final draft [was] replete with foldout maps, diagrams, time charts, an archaeology report, legal history, a fabric sample, lists of amphibians, reptiles, mammals, and birds found in Sonoma County, as well as of rare and endangered native plants, and reports on marine biology, soils, geology, seismology, waste-disposal issues, air quality, noises, traffic contingencies, parking, ocean engineering, rainfall means and extremes, and dust emissions from unpaved roads³³⁰

³²⁷ CHERNOW, *supra* note 15, at 249; FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 35.

³²⁸ CHERNOW, *supra* note 15, at 240.

³²⁹ FINEBERG, *supra* note 240, at 355; *see also* *Running Fence Corp. v. Superior Court of California, County of Sonoma*, 124 Cal.Rptr. 339 (Cal. Ct. App. 1975); FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 34; Ball, *supra* note 324, at 655 ("The enterprise required, among other things, numerous permits, an environmental impact report, hearings before fifteen governmental agencies, the permission of private landowners, and the services of nine lawyers. (One of the required permits was a Coastal Development Permit for the last leg of the fence as it crossed the coast and ended, submerged, in the Pacific. The permit was first issued and then revoked; that Christo proceeded without it was an independent source of controversy.)").

³³⁰ CHERNOW, *supra* note 15, at 244-45. With respect to the issue of avian mortality, *see id.* at 237 (discussing how during one of the hearings, Stan Picher of the Audubon Society stated before the Marin County Planning Commission that "'No bird unless it's ill will fly into an opaque fence.' Even an ailing bird, he added, would bounce off."). For a discussion of the concern over noise, *see*

Whereas the report went a long way towards alleviating some of the concerns of the initial objectors (although the creation of jobs³³¹ and the consent of the ranchers, who were promised the poles and fabric at the end of the project,³³² played a large role as well), it is perhaps most significant for its statement under the heading “Impact Overview”:

“The large-scale irreversible environmental change may very well be in the ideas and attitudes of people. *Running Fence* is an idea, as well as a physical object. Because of this idea, different people may become more aware of the dairy farm environment of southern Sonoma County and northern Marin County, and more sensitive to its beauty and preservation. As an idea or an event, *Running Fence* will remain in the memories of all those involved with the idea, whether they are sympathetic to the project or not.”³³³

Whereas Christo hoped that, once installed, *Running Fence* would disrupt one part of the environment to allow viewers to see and perceive the whole environment with new eyes and a new consciousness, the report contended that this process had *already transpired*—that individuals were already seeing “environment,” “landscape,” and “nature” in a different light because of Christo’s *proposal*—and that as a result, individuals were resisting the project. In other words, the report suggested that the project, whose goal was to foster in individuals a greater awareness of and appreciation for their surroundings, had already begun to achieve this goal, thereby creating a force of opposition. Ultimately, however, those who opposed *Running Fence* on aesthetic grounds prior to its construction later admitted to admiring the work and finding it beautiful upon its completion³³⁴—a phenomenon which,

id. at 238.

³³¹ See *id.* at 239.

³³² See *id.* at 268.

³³³ *Id.* at 245 (quoting ENVIRONMENTAL SCIENCE ASSOC., ENVIRONMENTAL IMPACT REPORT, *RUNNING FENCE* (1975)).

³³⁴ *Id.* at 266. Christo explains that in 1977 “for an exhibition of *Running Fence* . . . at the Boymans [Museum in Rotterdam], [t]hose very same people who were so hard to convince four years before, . . . chartered a plane from San Francisco to fly to the Rotterdam exhibition.” Fineberg, University of Illinois Interview, *supra* note 324, at 131-32.

The Saturday after *Running Fence* was completed, Christo remarked that “thousands of people drove by in cars. The Fence was visible to sightseers on the beach two miles away. I loved the way the fabric shimmered in the wind, in the morning mists. It caught and reflected the changing light; it responded to the

as mentioned above, occurred with *Valley Curtain* and with wind farm projects.

Although this author has not uncovered any evidence specifically suggesting that the process of siting a wind farm generates a greater sense of and appreciation for “environment,” “landscape,” and “nature,” and therefore greater opposition to the project—as was the case with *Running Fence*—it would not be an untenable suggestion. While this Article lauds the benefits of this type of heightened awareness in the abstract, it stresses the need to channel this awareness into ecologically responsible behavior in one’s daily life, rather than hostility towards environmentally benign energy sources, such as wind, that alter “environment,” “landscape,” and “nature” on a much smaller scale than fossil fuel power plants and that allow future generations to appreciate “environment,” “landscape,” and “nature.”

3. *Surrounded Islands*

Of the projects discussed in this Section, *Surrounded Islands* perhaps bears the least resemblance to wind turbines and thus the argument that it functions as an aesthetic precedent for wind farms is slightly more attenuated. Nevertheless, it is worth mentioning because, like offshore wind farms, it altered the view of water from land.³³⁵

colors and contours of the landscape.” CHERNOW, *supra* note 15, at 266 (quoting Christo in JANE KATZ, *ARTISTS IN EXILE* 151 (1983)). Chernow notes that:

Some art-world observers called the *Running Fence* once of the most surprising, spectacular works of the century. A few added the word *spiritual*. During the fence’s final days, imminent removal only underscored the poignant urgency of experiencing its quicksilver beauty, wavering between reality and abstraction. Ranchers, visitors, and workers counted down the remaining hours. Christo spoke of the “suicidal nature” and “the involuntary beauty of the ephemeral.” Then it was gone.

Id. at 268. And Fineberg adds that “*Running Fence* . . . blended so well into—even commingled with—the real surroundings that for a moment they too seemed an exorbitant part of nature rather than a work of art.” FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 9.

³³⁵ In addition to *Running Fence*, which ended in the water, two other works also altered the view of water from land: *Wrapped Coast, One Million Square Feet, Little Bay, Sydney, Australia, 1968-69*, where Christo wrapped approximately 2.4 kilometers (1.5 miles) of the cliff-lined shore, and *Oceanfront, Newport, Rhode Island, 1974*, where Christo extended six thousand pounds of white polypropylene fabric several hundred feet from the shore of a cove at King’s Beach seaward. For a description of *Wrapped Coast*, see CHERNOW, *supra* note 15, at 190-95; FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note

Unlike *Valley Curtain* and *Running Fence* (or *The Umbrellas*, discussed below), *Surrounded Islands* did not protrude from the land skyward, the way wind turbines do. Rather, *Surrounded Islands* entailed “outfitting” several islands in Biscayne Bay between Miami City and Miami Beach with floating skirts of pink woven polypropylene fabric,³³⁶ or “tutus,” as one observer described the project.³³⁷ Here, Christo surrounded eleven islands³³⁸ with 603,850 square meters (6.5 million square feet) of fabric covering the surface of the water, floating and extending

324, at 28-31; Christo & Jeanne-Claude, *Wrapped Coast, Little Bay, Australia, 1968-69*, at <http://christojeanneclaude.net/wc.html> (last visited Nov. 5, 2004); for *Ocean Front*, CHERNOW, *supra* note 15, at 234-35. It is worth noting that “the scale and expanse [of *Wrapped Coast*] allowed the wind to come up under the material and move around the rocks below it.” FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 30. Christo recalls that “[i]t was an enormous beauty . . . unbelievable beauty. The wind was going underneath and the fabric was moving, but, of course, the areas where the fabric was tied around a rock the fabric was not moving. It was a beautiful contrast. We never expected that. Those images, I still see them today . . .” Interview by Jonathan Fineberg with Christo & Jeanne-Claude in New York City (July 25, 2003), in FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 191; *see also* FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 30 (quoting Christo as saying that “[t]he whole fabric was moving the whole time”).

³³⁶ FINEBERG, *supra* note 240, at 357. There is often a misconception about where the islands are located. For example, some journalists have stated that the islands are located “off the coast” of Miami. *Common Errors*, *supra* note 16. *Christo and Jeanne-Claude Respond*, available at <http://christojeanneclaude.net/errors.html> (last visited May 19, 2004). The islands are in Biscayne Bay, in the area of Bakers Haulover Cut, Broad Causeway, and 79th Street Causeway, which is in the heart of the city of Miami. Christo & Jeanne-Claude, *Surrounded Islands, Miami, Florida, 1980-83* [hereinafter *Surrounded Islands*], at <http://christojeanneclaude.net/si.html> (last visited Nov. 5, 2004). “Off the coast would be in the Atlantic Ocean, east of Miami Beach.” *Common Errors*, *supra* note 16. Fineberg explains:

In 1936, the Army Corps of Engineers had dredged the bay to create a navigational channel for oceangoing ships and had dumped the excavated material in fourteen piles that formed a chain of islands. These islands sat, unnoticed for decades, between the cities of Miami and Miami Beach, in the midst of the heavy cross-bay traffic of boats and automobile causeways.

FINEBERG, *supra* note 240, at 357; *see also* FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 40; Wolfgang Volz, *Epilogue*, in CHERNOW, *supra* note 15, at 307.

³³⁷ *See* Grace Glueck, *Christo’s Feat: 25 Years’ Work for 16 Days*, N.Y. TIMES, Apr. 9, 2004, at B31.

³³⁸ “There were eleven islands surrounded, but because in two occasions 2 islands were surrounded together, there was a total of nine configurations on a span of seven miles.” *Common Errors*, *supra* note 16; *see also* *Surrounded Islands*, *supra* note 336.

sixty-one meters (200 feet) from each island in the Bay.³³⁹ In order to secure the fabric,

[t]he outer edge of the floating fabric was attached to a 30.5 centimeter (12 inch) diameter octagonal boom, in sections, of the same color as the fabric. The boom was connected to the radial anchor lines which extended from the anchors at the island to the 610 specially made anchors, spaced at 15.3 meter (50 foot) intervals, 76 meters (250 feet) beyond the perimeter of each island, driven into the limestone at the bottom of the Bay. Earth anchors were driven into the land, near the foot of the trees, to secure the inland edge of the fabric, covering the surface of the beach and disappearing under the vegetation.³⁴⁰

As with his previous projects, Christo encountered strong opposition to the installation of *Surrounded Islands*.³⁴¹ Environmentalists were concerned about its consequences for the ecology of the islands and attempted to prevent its construction with legal action.³⁴² Specifically, the National Wildlife Rescue Team (NWRT) filed suit in federal court to stop the project, fearing for the safety of manatees and worrying that the project would disturb the nests of ospreys living on the islands.³⁴³ In a compromise, the court granted NWRT the right to monitor the project, with Christo financing the rental of the boat NWRT would use to monitor.³⁴⁴

Despite the initial concerns, the project actually turned out to

³³⁹ *Surrounded Islands*, *supra* note 336.

³⁴⁰ *Id.*

³⁴¹ See, e.g., FINEBERG, *supra* note 240, at 357. Christo had to obtain permits from the Governor of Florida and the Cabinet; the Dade County Commission; the Department of Environmental Regulation; the City of Miami Commission; the City of North Miami; the Village of Miami Shores; the U.S. Army Corps of Engineers; and the Dade County Department of Environmental Resources Management. *Surrounded Islands*, *supra* note 336.

³⁴² CARLSON, *supra* note 235, at 151.

³⁴³ Volz, *supra* note 336, at 307. Volz notes that prior to the lawsuit, biologist Dr. Daniel K. Odell conducted an experiment involving five manatees in Orlando's Seaquarium.

Half of a pool filled with seawater was covered with the type of fabric that would be used for *Surrounded Islands*; the other half was left uncovered. Dr. Odell reported that the manatees not only preferred to linger under the fabric but also used its shade "to engage in mating procedures."

Id. at 307.

³⁴⁴ *Id.*

be a *boon* to the environment. Christo's "marine and land crews picked up debris from the eleven islands, putting refuse in bags and carting it away after they had removed some *forty tons* of varied garbage: refrigerator doors, tires, kitchen sinks, mattresses and an abandoned boat."³⁴⁵ In addition, "[e]ven the ospreys had benefited from the project; the work of art had prevented visitors from coming to their islands and afforded them some peace."³⁴⁶ And, as with *Valley Curtain* and *Running Fence*, the project was an aesthetic success, too, surprising many who had voiced concerns over its merits as a work of art. According to Fineberg:

[A] striking aspect of the *Surrounded Islands* project is that it blended so remarkably into the visual surroundings. . . . Not only did the project pick up on the pastels of the local architecture in this beautiful Latin city but it even echoed the pinks and blues of the indigenous flora. *Surrounded Islands* seemed *more like a magnification of nature than an imposition upon it*.³⁴⁷

4. *The Umbrellas*

Of Christo's projects, *The Umbrellas, Japan-U.S.A., 1984-91*,³⁴⁸ most closely resembles the aesthetic impact that wind turbines have on the landscape:

[O]pened simultaneously in Ibaraki prefecture (about 60 miles north of Tokyo) and in California (roughly the same distance

³⁴⁵ *Surrounded Islands*, *supra* note 336 (emphasis added). In response to claims that his works cause environmental degradation, Christo notes that he always restores the land to its original condition. One exception was *Surrounded Islands*: "Before we installed our fabric, we had our workers remove 42 tons of garbage off the beaches of those islands. We never brought the garbage back." Interview by James Paglisotti with Christo and Jeanne-Claude, *supra* note 15.

³⁴⁶ Volz, *supra* note 336, at 311.

³⁴⁷ FINEBERG, *supra* note 240, at 357 (emphasis added); *see also* Volz, *supra* note 336, at 309-10 ("Seen from the air, the islands resembled inverted water lilies, with the pink outside and the green inside. 'These are my Monet water lilies,' announced Christo. . . . *Surrounded Islands* was, to date, their most aesthetically striking project . . .").

³⁴⁸ Jeanne-Claude explains that "*The Umbrellas, Japan-USA* were one work of art in two parts, like a painter might paint a diptych, one work in two paintings." Interview by James Paglisotti with Christo and Jeanne-Claude, *supra* note 15. When asked why they chose umbrellas, the artists responded that "[l]ike all their projects, this work of art was not only aesthetic about creating Joy and beauty—it was also about comparison showing the similarities and differences in the ways of life and the use of the land of two peoples—the two richest in the world—living across the Pacific Ocean." *Common Errors*, *supra* note 16.

north of Los Angeles) . . . , [t]he project involved the seemingly random scattering of 3,100 specially designed umbrellas (1,340 blue ones in Japan and 1,760 gold ones in California) over 12- and 18-mile lengths, respectively, of the two inland valleys.³⁴⁹

Each umbrella weighed approximately 500 pounds and measured nineteen feet eight inches high by twenty-eight feet six inches wide.³⁵⁰ Despite the fact that the umbrellas protruded from the ground and peppered the landscape the way wind turbines do, the project actually incited far fewer negative aesthetic responses than did Christo's earlier projects in their proposal/pre-completed phases. In fact, in September 1987, the California legislature, perhaps recalling the impact of *Running Fence*, "issued a

³⁴⁹ FINEBERG, *supra* note 240, at 359-60; *see also* FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 44; Christo & Jeanne Claude, *The Umbrellas: Japan-U.S.A., 1984-91* [hereinafter *The Umbrellas*], at <http://christojeanneclaude.net/um.html> (last visited Nov. 5, 2004). More specifically, the valley in Japan "is located north of Hitachiota and south of Satomi, 120 kilometers (75 miles) north of Tokyo, around Route 349 and the Sato River, in the Prefecture of Ibaraki, on the properties of 459 private landowners and governmental agencies." *The Umbrellas, supra*; *see also* Volz, *supra* note 336, at 316-17. The valley in California is "located 96.5 kilometers (60 miles) north of Los Angeles, along Interstate 5 and the Tejon Pass, between south of Gorman and Grapevine, on the properties of Tejon Ranch, 25 private landowners as well as governmental agencies." *The Umbrellas, supra*; *see also* Volz, *supra* note 336, at 317. The choice of location was based on a desire to make the project

quite accessible, not far from a metropolitan area, so that the work could be easier, for the workers and supplies, and also for the visitors. Ibaraki is just north of Tokyo, close to Narita International airport.

The California site is just north of Los Angeles, close to LAX International airport. The Pacific Rim unites the two sites, it would not be so if the Christos had chosen the East Coast of the USA or the northern part of the West Coast, the landscape would be too similar to the verdant Ibaraki, and it would not have the relationship brought by the Pacific.

Common Errors, supra note 16.

³⁵⁰ FINEBERG, *supra* note 240, at 360; FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 45; *The Umbrellas, supra* note 349.

The number of Umbrellas came out of the inspiration of the artists, while looking at the topographic maps and later in 1988, walking around and climbing up and down many times, surveying the land and creating their own design or drawing on the two landscapes. There was an ever present factor to limit the number to 3,100—that factor is called Jeanne-Claude, who kept saying that the maximum cost should be for 3,000 Umbrellas, however there were 3,100, financially she lost, esthetically she won.

Common Errors, supra note 16.

resolution *thanking* Christo and Jeanne-Claude for having chosen California as their site for the project.”³⁵¹ And in Japan, the farmers did not have a “problem grasping the concept that umbrellas in their rice fields could be a form of art. To the Japanese, art is not limited to exhibitions in museums; flower arrangements (*ikebana*) and rock gardens are also works of art.”³⁵²

This is not to suggest that the process of securing approval for *The Umbrellas* transpired without hurdles. In order to position 1340 umbrellas in Japan, Christo and Jeanne-Claude had to sign 459 separate leases.³⁵³ In California, they had comparatively less legal work, needing to sign leases with only twenty-six different landowners.³⁵⁴ In addition to the leases, the artists still had to address a number of environmental concerns. For example, in Japan they had to consider “the project’s possible interference with the upcoming rice harvest, its effect on fishing in the Sato River and on traffic management, as well as the potential for contact between the umbrellas and telephone and electrical wires. There were also questions regarding airspace and water rights.”³⁵⁵ But the project encountered few obstacles based on aesthetic grounds.

In describing the completed project, Fineberg writes:

[W]hat was really breathtaking and new about *Umbrellas* was its aesthetic. Here, for the first time, Christo placed a collection of discrete objects into the landscape rather than using the fabric in a more receptive response to the forms of nature, as in *Running Fence* or *Surrounded Islands*. . . . One might almost say that *Umbrellas* was unabashedly romantic in highlighting nature, using gold or blue accents to bring out the crest of a hill much as Constable dramatized his paintings of the English

³⁵¹ Volz, *supra* note 336, at 319 (emphasis added).

³⁵² *Id.*

³⁵³ *Id.* at 323; JONATHAN FINEBERG, *supra* note 240, at 360. Volz explains that “[l]and ownership became an issue for almost every umbrella positioned [in Japan]. . . . A difference of merely six feet between proposed positions means asking permission from a different property owner.” Volz, *supra* note 336, at 322.

³⁵⁴ FINEBERG, *supra* note 240, at 360; *Common Errors*, *supra* note 16; see also FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 44 (“*The Umbrellas* took place on the property of 459 different landowners in Japan, and only 26 in the much larger area of the California site, underscoring real differences in the social character of the two countries.”).

³⁵⁵ Volz, *supra* note 336, at 324. “The [Japan] project’s permit application . . . weighed almost twenty-two pounds” *Id.* at 327.

countryside with brilliant flecks of white.³⁵⁶

The choice of color—blue for the umbrellas in Japan, gold for the ones in California—was certainly not incidental. Christo and Jeanne-Claude explain the careful consideration that they gave to the choice of color, indicating that Fineberg's experience was the result of artistic intention, rather than a "happy accident":

In Japan where it rains throughout the summer the landscape is green. There is a river, the Sato River, in which 90 Umbrellas were standing in the water.

Many different shades of green vegetation—It is a humid and wet landscape therefore: Blue Umbrellas.

In Southern California, the dry Season lasts during the whole summer—The grass is burnt by the Sun, and becomes blond grass on brown hills—It is a dry Landscape, therefore: Yellow Umbrellas. This was part of the aesthetic of the temporary work of art.³⁵⁷

And Chernow recounts: "The blue represented the omnipresence of water in Japan; yellow signified the dryness of the California hills. . . . Watching the yellow dots spreading across the open landscape was an amazing spectacle. . . . In California, the yellow umbrellas looked like precious stones capriciously strewn around the valley."³⁵⁸

The positive aesthetic reactions to *The Umbrellas* indicate that objects that protrude from the earth and which are scattered over the landscape are not necessarily "stark intrusions" or a "blight on unspoiled mountainsides." In fact, if the color is well-chosen, these objects can create a beautiful aesthetic effect, highlighting the slight nuances in a hill or valley, rather than detracting from that hill or valley's shape and form. As suggested in Part III, many turbines are painted with consideration for their surroundings.³⁵⁹ Thus, when one considers a proposal for wind turbines, one needs to keep the dynamic of color in mind.

It is also important to note that Christo spaced the umbrellas differently in the two locations, further exhibiting his awareness of

³⁵⁶ FINEBERG, *supra* note 240, at 360; *see also* FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 45.

³⁵⁷ *Common Errors*, *supra* note 16.

³⁵⁸ Volz, *supra* note 336, at 317, 330-31.

³⁵⁹ *See supra* Part III.E.2.

and sensitivity to the different nuances of the land:

Because there is less space available in Japan (92% of the land can not be used, because of the steep volcanic mountains), 124 million Japanese people live on only 8% of the surface of Japan, [Christo] positioned the Umbrellas quite close together, sometimes following the geometry of the rice fields. In California, the configuration of the design on the land showed the vastness of the uncultivated grazing land. The configuration was whimsical and the Umbrellas were spreading in every direction, like the branches of a tree.³⁶⁰

As with their decision with respect to color, their choice of placement helped accentuate, rather than impede, the public's perception of the landscape. As Part III suggested, wind farm developers may have some latitude in where they position their turbines. Obviously, the turbines have to be placed in a way that best harnesses the wind. Thus, wind farm developers do not have the freedom to make decisions based purely on aesthetics. But they often have the occasion to locate the turbines in a pattern that recognizes and interacts with the landscape. As with color, turbine placement should also be considered when evaluating a wind proposal. In other words, the lesson of *The Umbrellas* is that there is a better chance that wind farms will be aesthetically beautiful—and widely perceived as such—if consideration is given to color and placement, and if attention is drawn to such consideration. As Berleant suggests, “[l]andscapes . . . are unique, and they need the individual consideration that we give to objects of art.”³⁶¹ That being said, the public, on the other hand, should be cognizant of how carefully selected color and placement can make the difference between objects that are perceived as “invasive” and those that complement and highlight nature.

5. *Objections to the Work-of-Art Analogy*

Just as there are problems with the suggestion that the Dutch attitude towards windmills should affect how we view wind turbines as aesthetic and symbolic objects, the proposition that we look to Christo as a guide for considering wind turbines also presents difficulties. First, one could argue that Christo's works do not or should not function as a model for how to regard wind

³⁶⁰ *Common Errors*, *supra* note 16.

³⁶¹ BERLEANT, *supra* note 21, at 24.

turbines because the physical materials in Christo's works—a curtain, fence, skirt/tutu, umbrella—bear little physical resemblance to wind turbines. A huge curtain, for example, as in *Valley Curtain*, or a long, nylon-fabric fence, as in *Running Fence*, is not likely to be confused with a cluster of wind turbines, even if the turbines are placed in a line that resembles a curtain descending into a valley or a fence running over hills. *The Umbrellas*, although more similar to turbines than either a curtain or fence, are still umbrellas and a good deal shorter than wind turbines (although far more numerous than even the largest of wind farms).

In response, this Article would maintain that the visual effect of a string of wind turbines in a valley or along a ridgeline is not that different from a large curtain or fence. As mentioned at the beginning of this Part, the comparison between Christo's works and modern wind turbines (just like the comparison between Dutch windmills and modern wind turbines) is not a part-for-part comparison; rather, it is an evaluation based on the disruption of the landscape. Although Christo's works frequently accentuate a feature of the landscape and wind turbines have the potential to do so as well, they share common ground in that they both disturb one's view of one's surroundings and alter how one perceives them.

In addition, the fact that people opposed *Valley Curtain* and *Running Fence* for aesthetic and avian mortality reasons (as well as for other environmental reasons), just as they oppose wind turbines on these grounds, is a similarity that cannot be overemphasized. For Christo, "[t]he process is part of the product."³⁶² When "aesthetic terrorists" sabotaged several of the trucks that were being used to help install *Running Fence*, Christo explained that the project was not just an aesthetic project, but "a process involving social, political and economic forces."³⁶³ Grace

³⁶² CHERNOW, *supra* note 15, at 238; *see also* FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 11; Ball, *supra* note 324, at 656. *See generally* CHRISTO'S VALLEY CURTAIN (Mayles Films, Inc. 1973) (Christo explains that "the excitement begins when I leave the studio when I start working on the large project with all the engineers and construction workers. . . . [The] engineering problems, dealing with construction workers, the blueprints, the permission from governments, the highway department—all these things give me what I can never imagine.").

³⁶³ CHERNOW, *supra* note 15, at 253.

Glueck, art critic for the *New York Times*, writes:

With Christo and Jeanne-Claude, the conceptual process—the technical problems, the political arm-twisting, the fund-raising, the public relations-maneuvering and the documentation relating to their projects and, of course, the power play involved in achieving them—is as much a part of their art as the visible, sometimes beautiful but always temporary, end product.³⁶⁴

Because the path to realization of Christo's projects mirrors the journey wind farm developers must take to install turbines, we must place less weight on the part-for-part differences. In other words, if, for example, Christo views *Running Fence* not just as a fence in California—if the “art” in *Running Fence* is more than just the nylon, and cables, and poles³⁶⁵—but as a project that includes preparatory drawings, meetings, negotiations, hearings, lawsuits, permit applications, environmental impact statements, construction, and removal, then all of these components need to be considered when determining whether his works should guide our appreciation of wind turbines. Christo has been careful to clarify that *Running Fence* “is the first artwork with an environmental-impact report,”³⁶⁶ not that “*Running Fence* represented the first time that an artist needed to secure governmental permission in order to execute an idea.” The difference between these two statements is that Christo views the report as an element of the piece, rather than as a means (or hurdle) to its realization. In fact, museum exhibitions and catalogs of Christo's works frequently include photographs from hearings, legal documents, maps, and

³⁶⁴ Glueck, *supra* note 337; see also Crawford, *supra* note 264, at 56 (stating that “[t]here is no doubt that the public hearings, legal contracts, etc. are part of Christo's intentions” and remarking that Christo “insists that the work of art is not merely the physical object finally attained, but the whole process—the surveys, the engineering, the leasing, the fabricating, the assembling, the hearings and the rest of it” (citing Alfred Frankenstein, *Christo's "Fence", Beauty or Betrayal?*, 64 ART IN AMERICA, Sept.–Oct. 1976, at 58, 58, for the second proposition)).

³⁶⁵ See Fineberg, University of Illinois Interview, *supra* note 324, at 134 (“The ranchers in California [*Running Fence*] or the cowboys in Colorado [*Valley Curtain*] understood that the work of art was not only the fabric and the steel cable, but there was the hills, rocks, the wind . . .” (emphasis added)); see also Ball, *supra* note 324, at 656 (explaining that, at one hearing for *Running Fence*, Christo stated: “It's hard to explain that the work is not only the fabric, steel poles, or Fence.”).

³⁶⁶ CHERNOW, *supra* note 15, at 244 (emphasis added).

technical diagrams.³⁶⁷ Thus, because Christo's "works" function as more than just aesthetic objects, we cannot simply compare their visual impact to the visual impact of wind turbines. While this Article would still maintain that the structural components of the works—the curtains, fences, skirts/tutus, and umbrellas—function as an aesthetic precedent for wind farms because of their similar effects on the landscape, this Article would stress that it is the works as a whole (including the preparatory drawings, notes from meetings, legal documents, maps, environmental impact statements, etc.) that function as an *artistic* precedent for wind energy systems.³⁶⁸

The second argument that one could present against the suggestion that Christo's works function as an aesthetic precedent for wind energy systems is that Christo's works are temporary. Although Christo intended *Valley Curtain* to exist for a finite period of time, twenty-eight hours after completion, a gale made it necessary to begin its removal.³⁶⁹ The removal of both *Running Fence*³⁷⁰ and *Surrounded Islands*³⁷¹ began fourteen days after the projects were completed. The public was able to see, approach, and enjoy *The Umbrellas* for a period of eighteen days.³⁷²

In comparing the element of time, however, it is important to

³⁶⁷ See Fineberg, University of Illinois Interview, *supra* note 324, at 138-39 ("If you are familiar with the *Valley Curtain* book or the *Wrapped Coast* book, there we reprinted in original form not all the documents, because all the documents would be thousands of pages, but at least a good number of documents where the references will be historically accurate. In the *Running Fence* book, there will be no written interpretation by me, there will be the original letters from the lawyers, engineers, professionals, and all those different people so that you will go through those papers and see how this project was growing through the months and years."); see also CHRISTO ET AL., *THE GATES: PROJECT FOR CENTRAL PARK, NEW YORK CITY: A WORK IN PROGRESS* (2003) [hereinafter *THE GATES*].

³⁶⁸ I use the term "artistic precedent" rather than "aesthetic precedent" to make clear that Christo's works are more than just the physical objects. "Aesthetic precedent" would focus just on the visual; "artistic precedent" is a more capacious term, drawing in all of the two-dimensional media mentioned above.

³⁶⁹ *Valley Curtain*, *supra* note 310; see also CHERNOW, *supra* note 15, at 220 ("[T]wenty-eight hours after the curtain's installation, a gale estimated in excess of sixty miles per hour destroyed it.").

³⁷⁰ CHERNOW, *supra* note 15, at 268; FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 35; *Running Fence*, *supra* note 324.

³⁷¹ *Surrounded Islands*, *supra* note 336; see also Volz, *supra* note 336, at 309-10.

³⁷² *The Umbrellas*, *supra* note 349.

emphasize that because Christo's works include more than just the physical structures, they extend long before and long after their actual existence in real space and time. To illustrate, consider that despite its short lifespan, Christo still dates *Valley Curtain* from 1970-72. *Running Fence* carries the date of 1972-76; *Surrounded Islands*, 1980-83; *The Umbrellas*, 1984-91.³⁷³ Even though *The Gates, Project for Central Park, New York City*, stood for a mere sixteen days, beginning February 12, 2005, Christo has been working on the project since 1979 when he made the first concept drawing and would hardly consider the piece to be a two-week project.³⁷⁴ Fineberg explains that, "even after the physical project is removed, the project continues to exist in the minds of everyone who experienced it in the site, and it forever changes the relationship those individuals have to the site."³⁷⁵ Christo echoes Fineberg's sentiment: "The effect lasts longer than the actual work of art. Years after every physical trace has been removed and the materials recycled, original visitors can still see and feel them in their minds when they return to the sites of the artworks."³⁷⁶ "When asked whether the site of *Valley Curtain* remains unaffected by having hosted the work, Christo replied: 'Perhaps not. Was Mont-Saint-Victoire ever the same after Cezanne?'"³⁷⁷ Thus, while there is a difference between Christo's technically ephemeral works and the more permanent wind turbines, there is a temporal similarity that is not readily apparent. Because the landscapes are still altered in the minds of those who experienced the site years later, the effect of Christo's works on the landscape is not as fundamentally different from the effect of wind turbines

³⁷³ Christo states that "the work of art is the two and a half years of *Valley Curtain*, three and a half years [for] *Running Fence*." Fineberg, University of Illinois Interview, *supra* note 324, at 130.

³⁷⁴ FINEBERG, CHRISTO AND JEANNE-CLAUDE, *supra* note 324, at 3.

³⁷⁵ *Id.* at 10.

³⁷⁶ Church, *supra* note 309.

³⁷⁷ CARLSON, *supra* note 235, at 156 (citing Donald Crawford, *Nature and Art: Some Dialectical Relationships*, 42 J. AESTHETICS & ART CRITICISM 56 (1983)). Harold Osborne makes a similar observation about the effect of Van Gogh's works on our perception of the objects which he depicted: "[I]t is difficult ever again to see the objects uninfluenced by Van Gogh's vision of them." HEPBURN, *supra* note 232, at 36 (quoting HAROLD OSBORNE, *THE ART OF APPRECIATION* 155 (1970)). See generally HEPBURN, *supra* note 232, at 44 ("The particular genius of an artist can often be defined by answering . . . 'What things will never be quite the same again now that I have seen this work?'" (quoting ERIC NEWTON, *THE MEANING OF BEAUTY* 131 (1959))).

as one might initially surmise.³⁷⁸

Although the effect of the works lasts longer than the actual work of art, “[t]he sites are restored to their original condition and most materials are recycled.”³⁷⁹ Despite some claims to the contrary, Christo’s works do not cause environmental degradation. For *Running Fence*, “[a]ll parts of [the project’s] structure were designed for complete removal and no visible evidence of *Running Fence* remains on the hills of Sonoma and Marin Counties.”³⁸⁰ Similarly,

The Umbrellas were removed from the land. They were taken apart and most of the materials were recycled. The paint was scraped off the aluminum parts, (poles, ribs and struts) which was melted down and used again as aluminum. [sic] like soda cans or whatever aluminum is used for. The steel bases became scrap metal or were used as bases for satellite dishes.³⁸¹

Occasionally, Christo’s projects are an environmental *boon*. As mentioned above, for *Surrounded Islands*, the “site was luckily *not* restored to its original condition”³⁸² because, before the project, Christo’s workers removed forty tons of garbage from the eleven islands.³⁸³ Prior to Christo’s most recent project, *The Gates, Project for Central Park, New York City*, Christo promised, as he has with previous works, that “[n]either vegetation nor rock formations will be disturbed.”³⁸⁴ A soil expert explained that the “holes made in the ground of Central Park to support the sleeves of the steel gates on each outer side of the walkways will be *beneficial* to the park since the artists will have the holes filled with better soil after the removal of the work of art.”³⁸⁵

³⁷⁸ Ralph E. Lerner and Judith Bresler add that, “[a]lthough the physical presence of the works was of brief duration, permanence was achieved through the filmed record of each installation process.” Lerner & Bresler, *supra* note 324, at 723-24.

³⁷⁹ *Common Errors*, *supra* note 16; see also Allen Carlson, *Nature Appreciation and the Question of Aesthetic Relevance*, in ENVIRONMENT AND THE ARTS, *supra* note 233, at 70 (“Christo religiously restores the environments he uses in his artistic creations to their original conditions.”).

³⁸⁰ *Running Fence*, *supra* note 324.

³⁸¹ *Common Errors*, *supra* note 16.

³⁸² *Id.*

³⁸³ *Id.*

³⁸⁴ THE GATES, *supra* note 367, at 8; see also *id.* at 43 (“Great precaution will be taken so as not to interfere with any of the wildlife patterns.”).

³⁸⁵ THE GATES, *supra* note 367, at 42 (emphasis added).

Ultimately, however, the vertical poles of the gates were secured by narrow steel base footings positioned on the paved surfaces of the walkways of the park. No holes were made in the ground.³⁸⁶

The contention that Christo's works cause environmental degradation and thus are a reason why we should not treat them as a model for how to regard wind turbines becomes even more attenuated when one considers that recently Euan Nisbet, a Zimbabwean greenhouse gas specialist at The Royal Holloway College, University of London, proposed draping huge tarpaulins over the glaciers atop Tanzania's Mount Kilimanjaro to slow their melting, "much as the artist Christo adorns the countryside with miles of white fabric."³⁸⁷ "The glaciers on Kilimanjaro have been in retreat for at least a century, shrinking by 80 percent between 1912 and 2000."³⁸⁸ In fact, "[t]he summit of Kilimanjaro is losing its ice so quickly that it could be barren dirt before the next decade is out."³⁸⁹ Nisbet's theory is that the white polypropylene fabric of the tarpaulins would reflect sunlight hitting the mountain, allowing the ice below to stay cool.³⁹⁰ Keeping in line with Christo's works, the tarpaulins would not drape the mountain permanently. Rather, they would slow the melting long enough to develop reforestation plans for the forests at the base of the mountain, "which once exhaled moisture that replenished and protected the ice fields [and which] have largely disappeared, leaving the glaciers to the mercy of hot, dry winds that erode and melt the high cliffs that form their edges."³⁹¹

³⁸⁶ Christo & Jeanne-Claude, *The Gates: Central Park, New York, 1979-2005*, at <http://christojeanneclaude.net/tg.html> (last visited Mar. 30, 2005).

³⁸⁷ Editorial, *The Shrinking Snows of Kilimanjaro*, N.Y. TIMES, Nov. 26, 2003, at A28 [hereinafter *Shrinking Snows*].

³⁸⁸ *Id.*; Daniel Glick, *The Big Thaw*, NAT'L GEOGRAPHIC, Sept. 2004, at 14.

³⁸⁹ Oliver Morton, *The Tarps of Kilimanjaro*, N.Y. TIMES, Nov. 17, 2003, at A23.

³⁹⁰ *Id.*; *Shrinking Snows*, *supra* note 387.

³⁹¹ *Shrinking Snows*, *supra* note 387. Oliver Morton recognizes that the proposal would not be a permanent solution. But he advances Euan Nisbet's argument that "it would buy some decades, even a century, during which ways could be found to develop reforestation plans good for the mountain and the people who live beneath it." Morton, *supra* note 389. According to Morton, Nisbet's proposal

would be well within the grasp of the world's grandmaster wrapper, Christo. "Running Fence," the Christo masterpiece that snaked through 25 miles of Sonoma and Marin Counties in California for a couple of weeks in 1976, would easily be long enough to girdle the two main fields.

Nisbet's proposal, however, has been met with some concern. "[A]t least one scientist has wondered if the plan might backfire, allowing a little heat to penetrate the tarpaulins and get trapped inside, thus speeding up the melting."³⁹² Another scientist, Paul R. Epstein, the associate director for the Center for Health and the Global Environment at the Harvard Medical School, remarks that "[d]esperate Band-Aids in the face of such climate instability are, at best, temporary; at worst, pure folly."³⁹³

But whether Nisbet's suggestion is the best use of scientific resources is beside the point.³⁹⁴ Rather, what one should glean from the recommendation is that "[c]loaking the ice cliffs of Kilimanjaro would not just borrow the techniques of an art installation—it would be a work of art in itself. Done properly, it

Given that the cliffs are 60 to 150 feet high, their covering would have to be taller than 'Running Fence'; but the total amount of fabric required would probably be no greater than that used for the bright pink skirts Christo spread out around the islands in Miami's Biscayne Bay in 1983.

Indeed, Christo and his wife and partner, Jeanne-Claude, would make good consultants for the project; the team that convinced German parliamentarians to let them wrap the Reichstag [*Wrapped Reichstag, Berlin, 1971-95*] might well persuade the Tanzanian government to allow the same thing to be done to the country's best-known feature.

Id.

³⁹² *Shrinking Snows*, *supra* note 387.

³⁹³ Paul R. Epstein, Letter to the Editor, N.Y. TIMES, Nov. 23, 2003, at WK10.

³⁹⁴ Even if there was widespread consensus that draping tarpaulins over the mountain was the best way to preserve the glaciers, it is unlikely that the wrapping would be done by Christo and Jeanne-Claude (although it is conceivable that they might take on a role as a consultant). Christo and Jeanne-Claude are no longer interested in wrapping—"the last time an idea for a wrapping came out of their heads and hearts was in 1975, when they had the idea of wrapping the Pont Neuf in Paris, and then it took them ten years to get the permits." Church, *supra* note 309. (Note that whereas *Wrapped Reichstag, Berlin, 1971-95* was completed in 1995, the idea originated four years before *The Pont Neuf Wrapped, Paris, 1975-85*. Thus, it is safe to say that the artists have not envisioned a project that involves wrapping since 1971.) Even if Christo and Jeanne-Claude were interested in wrapping, it is important to note that they have never accepted a proposal for a work of art. They feel strongly that to do so would make the project *someone else's art*.

People with a really good idea have difficulty accepting this decision. But Christo and Jeanne-Claude say the one way to make sure a specific project does *not happen* is to propose it to them.

The choice of what to do is central to any artist's work. If Christo and Jeanne-Claude accepted proposals or commissions, they would soon become contractors and not creative artists.

Church, *supra* note 309.

would be a preservation of beauty that is itself, beautiful.”³⁹⁵ This last statement resonates with Professor David W. Orr’s plea that “what we must do to ensure human tenure on the earth is to cultivate a new standard that defines beauty as that which causes no ugliness somewhere else or at some later time.”³⁹⁶ Taken together, this Article asserts that we need to regard wind turbines as objects of aesthetic (or at least, *artistic*) contemplation that preserve beauty (by reducing reliance on fossil fuels that cause and will continue to cause ugliness).

This Part has argued that because seventeenth-century Dutch painters made windmills a subject of their landscape paintings (and in some instances, *the* subject of their landscape paintings) then perhaps we should regard modern wind turbines as they did their windmills. This Part has contended that if we accept and admire the way Christo’s works alter “environment,” “landscape,” and “nature,” then perhaps we should regard wind turbines as potentially aesthetically beautiful. But this Part would also suggest that even if one is unwilling to subscribe to the argument that wind turbines can be appreciated by looking at seventeenth-century Dutch landscape painting and Christo’s works—even if one continues to believe that wind turbines are hideous and spoil the landscape, despite efforts of wind farm developers to paint turbines and arrange them in a way that interacts well with the environment—one should still accept wind turbines because they help preserve beauty.

Part V continues with the argument that wind turbines are beautiful because they help preserve beauty by reducing the ugliness caused by fossil fuels. In making this argument, Part V considers whether the debate over the visual impact of wind turbines reflects just a difference in aesthetics, or whether it reveals a more fundamental difference in how individuals conceive

³⁹⁵ Morton, *supra* note 389.

³⁹⁶ DAVID W. ORR, *THE NATURE OF DESIGN: ECOLOGY, CULTURE, AND HUMAN INTENTION* 134 (2002). For other conceptions of “beauty,” see, e.g., THE CAMBRIDGE DICTIONARY OF PHILOSOPHY, *supra* note 234, at 75-76; Holmes Rolson, III, *From Beauty to Duty: Aesthetics of Nature and Environmental Ethics*, in *ENVIRONMENT AND THE ARTS*, *supra* note 233, at 131 (“[B]eauty in nature is always relational, arising in the interaction between humans and their world.”); Hospers, *supra* note 234, at 498 (“When you are enjoying something esthetically, you are enjoying it ‘for what it is in itself,’ not as a means to some further end. You are not thinking of the use to which it can be put, what you can get out of it, or how you can influence others by means of it.”).

“environment,” “landscape,” and “nature.”

V. THE CONCEPTS OF “ENVIRONMENT,” “LANDSCAPE,”
AND “NATURE”

*[W]e will have accomplished a lot if we can get people to not take their own concept of nature and the natural for granted. To get them to show tolerance and consider the fact that such concepts are culturally defined.*³⁹⁷

As discussed in Part III.E.2, when individuals reject a wind farm on aesthetic grounds, their claim is that wind farms are threats to natural beauty³⁹⁸ and that they wish to prevent the rape of a pristine natural resource.³⁹⁹ In the name of “environment,” “landscape,” and “nature,” these individuals write letters, speak at town meetings, organize, and vote to thwart the efforts to bring this form of renewable energy to their particular place. But if we accept the fact that a wind farm that is not built means either that a fossil fuel power plant will be built elsewhere or that we will need to rely more heavily on our existing fossil fuel power, then we must assume that the place that is being “protected” from the wind farm will, at some point in time, degrade because of this continued fossil fuel consumption. If we can rightly assume that an “environment,” “landscape,” or “nature” that is ruined by fossil fuel use (in the ways described in Part II) is *not* aesthetically appealing, then essentially those who have rejected wind farms on aesthetic grounds really have chosen a definition of “beauty” at odds with Orr’s. They have privileged what this Article would call “present aesthetics” over “future aesthetics.” In other words, they have decided that their present aesthetic appreciation of the “environment,” “landscape,” or “nature” is more important than their or their children’s aesthetic appreciation of “environment,” “landscape,” or “nature” in the future.

To illustrate, imagine that a developer wishes to erect a small wind farm in an area just outside of a city that local residents cherish because of the gorgeous sunsets. Upon learning of the proposed project, some of the locals voice their opposition on the grounds that the farm would impede their view of the sunsets.

³⁹⁷ William Cronon, *Toward a Conclusion*, in UNCOMMON GROUND, *supra* note 17, at 455, 455.

³⁹⁸ See Grady, *supra* note 11.

³⁹⁹ See *id.*

What these residents may not realize is that this seemingly beautiful landscape threatens their health.⁴⁰⁰ As Berleant explains, “[t]he colors of the setting sun may be more varied and striking through the miasma that hovers over a city, but they are a distressing sign of the pollution that produces them.”⁴⁰¹ By objecting to the wind farm project so that they might take pleasure in this smog-enhanced sunset, these residents have placed their current gratification above the enjoyment that they or their children might derive from exercising in clean fresh air years down the road.⁴⁰²

This choice is short-sighted. Emily Brady, in her article, *Aesthetics, Ethics and the Natural Environment*, condemns the fact that “the same people who care about the natural environment often harm it.”⁴⁰³ Thayer cautions that “[l]andscapes that create an illusion of a better world while depriving us of the actual means of achieving it are not sustainable.”⁴⁰⁴ Hepburn writes that “our cherishing of aesthetic experience must not be allowed to displace or override practical efforts to ameliorate environmental threats and dangers.”⁴⁰⁵ Although McKibben is no less unforgiving, reminding us that “[f]uture generations depend on us, but not vice versa,”⁴⁰⁶ he paints an almost comical picture of the potential end result of privileging “present aesthetics” over “future aesthetics.” McKibben explains that researchers have begun to ponder different ways to protect Long Beach Island and Cape Cod from rising sea levels due to climate change.⁴⁰⁷ The cheapest solution would be to build a levee.⁴⁰⁸ The problem, however, is that the levee would eliminate the waterfront view.⁴⁰⁹ Thus, those opposing offshore

⁴⁰⁰ THAYER, JR., *supra* note 9, at 222.

⁴⁰¹ BERLEANT, *supra* note 21, at 59; *see also* MCKIBBEN, *supra* note 3, at 63 (discussing how “smog breeds spectacular sunsets”).

⁴⁰² McKibben claims that already “[a] child born now will never know a natural summer, a natural autumn, winter, or spring.” MCKIBBEN, *supra* note 3, at 59.

⁴⁰³ Emily Brady, *Aesthetics, Ethics and the Natural Environment*, in ENVIRONMENT AND THE ARTS, *supra* note 233, at 124.

⁴⁰⁴ THAYER, JR., *supra* note 9, at 310 (emphasis in original).

⁴⁰⁵ Ronald W. Hepburn, *Data and Theory in Aesthetics: Philosophical Understanding and Misunderstanding*, in ENVIRONMENT AND THE ARTS, *supra* note 233, at 34.

⁴⁰⁶ MCKIBBEN, *supra* note 3, at 200.

⁴⁰⁷ *Id.* at 113-15.

⁴⁰⁸ *Id.*

⁴⁰⁹ *Id.*

wind projects on the grounds that they would be a blight on unspoiled seascapes may eventually have a view desecrated by a levee designed to keep the rising seawater out of their basements. In other words, the view that these residents hold so sacred is ephemeral; it is simply a question of when and how they would like it to be altered.⁴¹⁰

In Part III.E, this Article quoted one resident of Hyannis who opposes the proposed offshore wind farm: “[Wind turbines] are probably great for the environment, but we shouldn’t have to sacrifice the environment to build renewable energy.”⁴¹¹ What is intriguing about this statement is that it raises the question of whether or when one should sacrifice the environment to save the environment (or sacrifice one part of the environment to save another part of the environment). But what is perhaps more interesting about this statement, and others of this kind, is that it implies a privileging of one conception of “environment,” “landscape,” and “nature” over another. As mentioned above, when a wind farm gets rejected on aesthetic grounds (or for any other reason, for that matter), spaces elsewhere will continue to degrade because of fossil fuel consumption. While those spaces may be similar waterfront or pastoral settings, they may also be urban areas—areas that are already highly developed—areas where minority groups suffer from high incidences of health-related problems due to air pollution.⁴¹² By rejecting a wind farm project in the name of preserving “environment,” “landscape,” or “nature,” these individuals essentially exalt their notion of these concepts over other people’s understanding of these concepts. These individuals promote an idea of “environment,” “landscape,” and “nature” that excludes humans (or bears as little trace of

⁴¹⁰ Thayer provides another example:

Los Angeles County Supervisors voted against a proposed wind power plant which, although largely out of sight of the freeway, would have reduced local carbon emissions and provided direct benefits for local residents. Instead, their actions opened the door to more low-density, rural “ranchette” housing development which will only add to carbon emissions and local smog by increasing energy demand and encouraging automobile commuting.

THAYER, JR., *supra* note 9, at 321.

⁴¹¹ See *supra* note 174 and accompanying text.

⁴¹² See generally BERLEANT, *supra* note 21, at 173 (stating that, “[b]ecause environment is socially created and almost always common to many inhabitants, any damage to it has social as well as physical effects”).

humans as possible), rather than one that regards nature as “everything that there is . . . all-inclusive, a total, integrated, continuous process.”⁴¹³

The debate over what constitutes “environment,” “landscape,” and “nature” is by no means new. Whereas Locke conceived of nature as something apart from humans, Spinoza considered nature to “embrace the conscious human organism fully, along with everything else.”⁴¹⁴ Thus, it would be well outside the scope of this Article to trace the evolution of these terms and the implications of their development. What this Article does wish to convey in this Part, however, is threefold.

First, as much as “environment,” “landscape,” and “nature” are terms to describe a physical locus,⁴¹⁵ they are also *concepts* that are in flux. As Merchant explains, “[n]ature, wilderness, and civilization are socially constructed concepts that change over time.”⁴¹⁶ Similarly, Ronald Hepburn asserts that “nature exists only in time and in constant change.”⁴¹⁷

⁴¹³ BERLEANT, *supra* note 249, at 9.

⁴¹⁴ *Id.* at 7; *see also* BERLEANT, *supra* note 21, at 31.

⁴¹⁵ *See, e.g.,* BERLEANT, *supra* note 21, at 30 (“Geographers tend to define [“landscape”] in visual ways as the space of the earth’s surface that extends from the viewer’s eye to the horizon.”).

⁴¹⁶ Merchant, *supra* note 255, at 153; *see also* WRITING WORLDS: DISCOURSE, TEXT & METAPHOR IN THE REPRESENTATION OF LANDSCAPE 6 (Trevor J. Barnes & James S. Duncan eds., 1992) [hereinafter WRITING WORLDS] (“[L]andscape . . . is a social and cultural production.”); THAYER, JR., *supra* note 9, at 164 (“In spite of their tangible manifestations, technology and nature are social constructs . . .”); William Cronon, *Introduction: In Search of Nature*, in UNCOMMON GROUND, *supra* note 17, at 23, 25 (“[‘N]ature’ is not nearly so natural as it seems. Instead, it is a profoundly human construction.”); James D. Proctor, *Whose Nature? The Contested Moral Terrain of Ancient Forests*, in UNCOMMON GROUND, *supra* note 17, at 269, 287 (“[T]he environment is a social construction: a product of cultural responses to specific historical circumstances which give rise to shared sets of imagined landscapes.” (quoting Barbara Deutsch Lynch, *The Garden and the Sea: U.S. Latino Environmental Discourses and Mainstream Environmentalism*, 40 SOCIAL PROBLEMS 108, 109 (1993))). *See generally* THAYER, JR., *supra* note 9, at 173 (stating that “the world as it is known is a construct” (quoting O.B. HARDISON, JR., *DISAPPEARING THROUGH THE SKYLIGHT: CULTURE AND TECHNOLOGY IN THE TWENTIETH CENTURY* 49 (1989))); William Cronon, *The Trouble with Wilderness; or, Getting Back to the Wrong Nature*, in UNCOMMON GROUND, *supra* note 17, at 69, 69 (“[‘Wilderness’] is quite profoundly a human creation—indeed, the creation of very particular human cultures at very particular moments in human history.”).

⁴¹⁷ Ronald W. Hepburn, *Data and Theory in Aesthetics: Philosophical Understanding and Misunderstanding*, in ENVIRONMENT AND THE ARTS, *supra* note 233, at 30; *see also* NEPERUD, *supra* note 265, at 244 (“The meaning of

Second, as the epigraph to this Part indicates, not only must we consider “environment,” “landscape,” and “nature” to be works-in-progress, but we must also recognize that they are concepts that take on very different meanings for different groups of people. Berleant explains:

[T]he natural world is no independent sphere but is itself a cultural artifact. Not only is nature affected pervasively by human action; our very conception of nature has emerged historically, differing widely from one cultural tradition to another. What we mean by nature, our beliefs about wilderness, the recognition of landscape, our very sense of environment have all made an historical appearance and have been understood differently at different times and places.⁴¹⁸

Likewise, Richard White writes: “Nature is . . . purely cultural. Different cultures produce different versions of culture.”⁴¹⁹ And Giovanna Di Chiro proclaims: “What counts as nature is . . . different among various people of color groups that have very different cultural histories.”⁴²⁰

Third, and perhaps most importantly, while these concepts are

environment has changed dramatically in recent decades.”); GARY SNYDER, *NO NATURE* (1992) (“The greatest respect we can pay to nature is not to trap it, but to acknowledge that it eludes us and that our own nature is also fluid, open, and conditional.”); THAYER, JR., *supra* note 9, at 176 (“Science, starting with the most rational excursions into the ‘real’ phenomena of nature, has led us into a realm of ‘reality’ that is highly unrecognizable, unfathomable, and ‘unrealistic.’ Nature has, indeed, changed.”); Anne Whiston Spirn, *Constructing Nature: The Legacy of Frederick Law Olmstead*, in *UNCOMMON GROUND*, *supra* note 17, at 91, 98 (“Even the most awesome landscapes are products of both nature and culture, and they change in predictable and unpredictable ways in response to both.”). Thayer further suggests that not only has nature changed and will nature continue to change but that science has caused what we consider “nature” to expand:

The quantum theories of subatomic physics and the relativistic theories of astrophysics are not the only influences on the expansion of the core of nature. In addition to the frontiers of the very small and very large, other dimensions of scientific exploration are enlarging the domain to be included within the boundaries of nature.

THAYER, JR., *supra* note 9, at 179.

⁴¹⁸ Arnold Berleant, *The Aesthetics of Art and Nature*, in *LANDSCAPE, NATURAL BEAUTY AND THE ARTS* 228, 234 (Salim Kemal & Ivan Gaskell eds., 1993).

⁴¹⁹ White, *supra* note 308, at 183.

⁴²⁰ Giovanna Di Chiro, *Nature as Community: The Convergence of Environment and Social Justice*, in *UNCOMMON GROUND*, *supra* note 17, at 298, 311; see also Cronon, *supra* note 397, at 455 (quoting Kenneth R. Olwig as saying that “not even all Americans share the same idea of nature”).

ever-evolving and while we must cultivate an understanding that these ideas vary in meaning for different people, there is a growing recognition that “[n]ature is not out there, a place apart from us.”⁴²¹ While Cronon contends that “[n]ature will *always* be contested terrain. We will never stop arguing about its meanings,”⁴²² he also recognizes that there is a continuity of humans with the natural world. McKibben greets the change in “nature” with sorrow, lamenting that “[a]n idea, a relationship, can go extinct, just like an animal or a plant. The idea in this case is ‘nature,’ the separate and wild province, the world apart from man to which he adapted, under whose rules he was born and died.”⁴²³ While few would paint such a morbid picture,⁴²⁴ many would agree that we cannot or should not conceive of “nature” as that which lies outside the human sphere. For example, Hepburn writes that “we are *in* nature and a part *of* nature; we do not stand over against it as over against a painting on a wall.”⁴²⁵ Berleant agrees: “The most usual meaning of nature is the naïve sense of the term as everything outside the human sphere.”⁴²⁶

⁴²¹ BERLEANT, *supra* note 21, at 121; *see also* ORR, *supra* note 6, at 118 (“Nature . . . is not something ‘out there,’ but rather something that has been inscribed in us, and after several million years of evolution it would be surprising were it otherwise.”).

⁴²² Cronon, *supra* note 416, at 52.

⁴²³ MCKIBBEN, *supra* note 3, at 48. McKibben reasons that because we have altered the atmosphere so badly, especially by increasing the amount of carbon dioxide in the air, “nature as we know it is over.” *Id.* at 166.

⁴²⁴ Berleant comes close by stating:

Nature, in the sense of the earth apart from human intervention, has mostly disappeared. We live in a world profoundly affected by human action, not just in the nearly complete destruction of the planet’s primeval wilderness or in the distribution of flora and fauna from their original habitats, but in the alteration of the shape and character of the earth’s surface, its climate, its very atmosphere.

Berleant, *supra* note 418, at 234.

⁴²⁵ HEPBURN, *supra* note 232, at 13.

⁴²⁶ BERLEANT, *supra* note 249, at 7. “Nature includes humans as a container includes its contents, and the object is to attain an equilibrium that harmonizes the interests of both. No longer an alien realm, nature imposes the conditions under which people must carry on their activities and attain their goals.” *Id.* at 8; *see also* BERLEANT, *supra* note 21, at 31 (“The difficulty, perhaps the impossibility, of locating regions on the earth that have not been affected in some significant way by human activity and the recognition that human actions have transformed the planet have led to the realization that the distinction between the natural and the artificial no longer holds.”); THAYER, JR., *supra* note 9, at xvii (“I use the term ‘nature’ to imply the total realm of life forms and primordial elements composing a living earth.”).

Berleant also dismisses as naïve the usual meaning of “environment,” which also seems to treat the concept as “everything outside the human sphere”:

Environment is more than simply our external surroundings. We are realizing with growing force that human life is intimately bound to environmental conditions and that no sharp line divides us from the environment we inhabit. . . .

Whatever the situation, environment is always inclusive, and it encompasses a multiplicity of social, physical, and perceptual features.⁴²⁷

In fact, Berleant so wishes to emphasize that “environment” includes a human dimension that he states:

I do not ordinarily speak of “the” environment. While this is the usual locution, it embodies a hidden meaning that is the source of much of our difficulty. For “the” environment objectifies environment; it turns it into an entity that we can think of and deal with as if it were outside and independent of ourselves.⁴²⁸

Similarly, with respect to “landscape,” J.B. Jackson proclaims:

[L]andscape is not scenery, it is not a political unit; it is really

⁴²⁷ BERLEANT, *supra* note 21, at 11, 38.

⁴²⁸ BERLEANT, *supra* note 249, at 3-4; *see also* ENVIRONMENT AND THE ARTS, *supra* note 233, at 10 (“[C]onsidering human beings apart from their environment is both philosophically unfounded and scientifically false.”); Arnold Berleant, *Introduction: Art, Environment and the Shaping of Experience*, in ENVIRONMENT AND THE ARTS, *supra* note 233, at 6, 14 (“Everyone is involved with environment, but what is it? The usual answer that environment is our natural surroundings obviously will not do, for this overlooks the fact that most people’s lives are far removed from any kind of natural setting. . . . ‘Environment’ is [an] inclusive term, for it encompasses places and objects other than those in the so-called ‘natural world’, such as design architecture and the city.”); Kaia Lehari, *Embodied Metaphors*, in ENVIRONMENT AND THE ARTS, *supra* note 233, at 75 (“Environment is neither external surrounding nor subjective imagination but the immediate, mutual and reciprocal relation of a person as an embodied spirit in the world.”); Anne Taylor et al., *Architecture Can Teach . . . and the lessons are rather fundamental*, in CONTEXT, Winter 1998, at 31 (“People are . . . an integral part of, not apart from, the environment.”), <http://www.context.org/ICLIB.IC18/Taylor.htm>. *See generally* Stan Godlovitch, *Some Theoretical Aspects of Environmental Ethics*, 32(4) J. OF AESTHETIC EDUC., Winter 1998, at 17, 19 (“One’s environment is that experiential field that includes both internal and external objects of awareness—the real and the imaginary, the private and the public. As such, ‘environment’ is, paradoxically perhaps, a subjectivist notion.”).

no more than a collection, a system of man-made spaces on the surface of the earth. Whatever its shape or size, it is *never* simply a natural space, a feature of the natural environment; it is *always* artificial, always synthetic, always subject to sudden or unpredictable change. We create them and need them because every landscape is the place where we establish our own human organization of space and time.⁴²⁹

Thayer echoes Jackson's sentiment that "landscape" cannot be limited to the non-human, explaining:

I use the term landscape expansively In my view, landscape is the broad physical and experiential arena in which human activity occurs—the land surface as physically modified (whether subtly or substantially) by humans in the course of their personal and collective existence. I do *not* constrain landscape to be just ornamental vegetation, only so-called "natural" materials, or merely the outdoor places intentionally designed for aesthetic purpose. . . . [L]andscape is the fundamental, physical context for human life as it is perceived and experienced.⁴³⁰

In promoting a more capacious understanding of "environment," "landscape," and "nature," none of the above-quoted authors (nor would the author of this Article) suggest that we return to an era of unbridled subjugation of our surroundings. The incorporation of a human element into the concepts "environment," "landscape," and "nature" should not be interpreted as a license to act in ways that place humans above all other concerns. As this Article mentioned in Part IV, just because "environment," "landscape," and "nature" often exhibit a human trace—because "[w]e cannot hope to leave without a trace"⁴³¹—

⁴²⁹ J.B. JACKSON, *DISCOVERING THE VERNACULAR LANDSCAPE* 156 (1984).

⁴³⁰ THAYER, JR., *supra* note 9, at xvi (1994); *see also* BERLEANT, *supra* note 249, at 155. ("There is . . . no point at which we can distance ourselves from the landscape."); Denis Cosgrove & Stephen Daniels, *Introduction: Iconography and Landscape*, in *THE ICONOGRAPHY OF LANDSCAPE: ESSAYS ON THE SYMBOLIC REPRESENTATION, DESIGN AND USE OF PAST ENVIRONMENTS* 1 (1988) (Landscapes "may be represented in a variety of materials and on many surfaces—in paint on canvas, in writing on paper, in earth, stone, water, and vegetation on the ground. A landscape park is more palpable but no more real, nor less imaginary, than a landscape or poem."). *See generally* Spirn, *supra* note 417, at 111 ("Calling some landscapes 'natural' and others 'artificial' or 'cultural' ignores the fact that landscapes are never wholly one or the other.").

⁴³¹ E. Louis Lankford, *Ecological Stewardship in Art Education*, *ART EDUC.*, Nov. 1997, at 47, 49.

does not mean that we should *strive* to leave our mark. We should not, as mentioned in Part IV, drill in ANWR. As McKibben writes:

[We still] feel the need for pristine places, places substantially *unaltered* by man. Even if we do not visit them, they matter to us. We need to know that though we are surrounded by buildings there are vast places where the world goes on as it always has. The Arctic National Wildlife Refuge [ANWR], on Alaska's northern shore, is reached by just a few hundred people a year, but it has a vivid life in the minds of many more, who are upset that oil companies want to drill there. And upset not only because it may or may not harm the caribou but because here is a vast space free of roads and buildings and antennas, a blank spot if not on the map then on the surface.⁴³²

Thus, this Article would take issue with Holmes Rolston, III's assertion that "[a] landscape is like a suit of clothes, empty and meaningless apart from its wearer. Without a human presence, it possesses only possibilities."⁴³³ To the contrary, this Article would concur with the authors above that "[m]istakenly, commonsense environmental definitions have assumed humans to be in a separate and domineering role over their surroundings rather than interacting on a more reciprocal basis."⁴³⁴ Whereas this Article would agree that drilling for fossil fuels, which will further degrade our environment, constitutes an attempt to dominate our surroundings, altering our landscape with a *renewable* energy source that will actually help to ensure "pristine" nature (or what is left of it) should be regarded as a *reciprocal* relationship with our surroundings.

As discussed in Parts II and III, one of the benefits of wind energy is that it will help reduce the adverse effects to human health caused by fossil fuels. As discussed in Parts IV and V, this Article suggests that one reason why wind turbines might be regarded as "beautiful" is that they symbolize a respect for human health. Such a position would be consistent with that of environmental justice advocates, who, as Di Chiro explains in *Nature as Community: The Convergence of Environment and*

⁴³² MCKIBBEN, *supra* note 3, at 55.

⁴³³ Holmes Rolston, III, *From Beauty to Duty: Aesthetics of Nature and Environmental Ethics*, in ENVIRONMENT AND THE ARTS, *supra* note 233, at 131.

⁴³⁴ NEPERUD, *supra* note 265, at 244.

Social Justice, define environment as “the place you work, the place you live, the place you play.”⁴³⁵ Unfortunately, Di Chiro continues, “[m]any mainstream environmentalists would find this formulation incomprehensible, even ethically indefensible, because of its apparent anthropocentrism. Putting humans at the center of environmental discourse is a grave error, they argue, because humans are the perpetrators of environmental problems in the first place.”⁴³⁶ Asserting that wind farms are beautiful because they protect human health runs the risk of a response similar to that offered by the “mainstream environmentalists” Di Chiro describes. But this Article would contend that taking steps to protect human health is not anthropocentric, even if it might disrupt a particular view. Putting aside the concomitant boon to wildlife that cleaner air would offer, this Article would argue that it is the people who oppose wind farms on aesthetic grounds and in the name of “environment,” “landscape,” and “nature” who are taking an anthropocentric position. These individuals are thinking only of their own (aesthetic) interests. Wind energy is *biocentric*.⁴³⁷

A 2004 editorial in the *New York Times* declared that “the real task for environmentalists is to help policy makers manage the inevitable in ways that protect both people and the environment.”⁴³⁸ While this Article has suggested that

⁴³⁵ Di Chiro, *supra* note 420, at 301.

⁴³⁶ *Id.* According to Di Chiro, environmental justice advocates typically respond to this contention by

maintain[ing] that some humans, especially the poor, are also the victims of environmental destruction and pollution and that, furthermore, some human cultures live in ways that are relatively sound ecologically. They therefore contend that the mainstream environmentalists’ invention of a universal division between humans and nature is deceptive, theoretically incoherent, and strategically ineffective in its political aim to promote widespread environmental awareness.

Id.

⁴³⁷ A “biocentric” view of ecosystems is one that recognizes “the need to bring humans into harmony with the natural environment,” in contrast to an “anthropocentric” view of ecosystems, which places “humans at the center of the human-environment relationship.” NEPERUD, *supra* note 265, at 229; *see also* MCKIBBEN, *supra* note 3, at 174 (“But what if we began to believe in the rain forest *for its own sake*? This attitude has very slowly begun to spread in recent years, both in America and abroad, as the effects of man’s domination have become clearer. Some few people have begun to talk of two views of the world—the traditional, man-centered-anthropocentric view and the biocentric vision of people as a part of the world, just like bears.”).

⁴³⁸ Editorial, *Rumble at the Sierra Club*, N.Y. TIMES, Mar. 17, 2004, at A24.

“environment” includes people and hence that the statement “protect both people and the environment” is redundant, it is the spirit of this statement that is important. Wind energy protects the environment, *including* people. While the aesthetic issues surrounding wind farm projects may seem like minor problems when compared to some of the larger environmental battles being waged, they reflect differences that permeate *all* environmental debates. Environmentalists, especially those working in the areas of law and policy, need to be more mindful of this discourse surrounding “environment,” “landscape,” and “nature” as they plan for these battles, whatever they may be.

VI. CONCLUSION

*The choice of doing nothing—of continuing to burn even more oil and coal—is not a choice It will lead us, if not straight to hell, then straight to a place with a similar temperature.*⁴³⁹

Another recent editorial in the *New York Times* offered the following recommendation: “No comprehensive energy policy should overlook long-term means of encouraging conservation and minimizing our dependence on oil from the Persian Gulf region.”⁴⁴⁰ Given the Bush administration’s position on conservation,⁴⁴¹ it is unlikely that any forthcoming comprehensive energy policy will include conservation as a significant component. But as Thayer writes, while “[c]onservation . . . is still the most important national energy policy we must establish; . . . wind plant[s], however, represent[] an energy technology . . . which serves rather than dominates humankind.”⁴⁴² It goes without saying that wind energy is an energy technology that serves rather than dominates most species, not just humans. But in order for wind energy to achieve more of its potential in the United States, this country needs a permanent extension of the PTC, as

⁴³⁹ MCKIBBEN, *supra* note 3, at 146.

⁴⁴⁰ Editorial, *Gasoline Hysteria*, N.Y. TIMES, May 19, 2004, at A24.

⁴⁴¹ Geneva Overholser, *Is Energy Conservation for Sissies?*, SEATTLE POST-INTELLIGENCER, May 8, 2001 (quoting Vice-President Dick Cheney for the proposition that “[c]onservation may be a sign of personal virtue, but it is not a sufficient basis—all by itself—for a sound comprehensive energy policy,” although he did call conservation “an important part of the total effort”), http://seattlepi.nwsourc.com/opinion/21956_overholser.shtml (last visited July 19, 2004).

⁴⁴² THAYER, JR., *supra* note 9, at 276.

well as the creation of a federal investment tax credit. In addition, this country must move away from its practice of simultaneously subsidizing the fossil fuel industries and the renewable energy industries, and must work to eliminate its system of promoting rules and regulations that make it easier for fossil fuel power plants to pollute.

In *Living in the Landscape: Toward an Aesthetics of Environment*, Berleant writes:

Until recently, wetlands were devalued landscapes, considered suitable only for draining or for dump sites. Such negative attitudes, however, are culturally prescribed; they do not arise from inherent features of the landscape itself. In the United States over the last few decades, critical discussion has helped prevent the degradation of such a natural landscape by changing our judgment of the wetland from a despised landscape into an appreciated one.⁴⁴³

This Article would suggest that if “critical discussion” helped change the negative attitudes towards wetlands, “aesthetic discussion” can help change the negative perception of wind farms as a visual impairment. While changing people’s aesthetic responses to wind turbines will not, in and of itself, allow wind energy to achieve its potential in the United States, the hope is that it will help remove one of the barriers to wider acceptance and use of wind energy.

⁴⁴³ BERLEANT, *supra* note 21, at 19-20.