DEVELOPING WIND POWER IN THE COMMONWEALTH: NO LONGER A QUIXOTIC QUEST TO BUILD WIND FARMS IN VIRGINIA

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INTRODUCTION

Economic, environmental, and national security developments have brought the issue of energy independence to the forefront of the national debate.[1] Many new technologies attempt to address these concerns in an effort to wean dependence from traditional sources and create alternative means for supplying the nation's energy.[2] So far, wind energy has taken the lead to become an economically viable method of producing energy with few environmental setbacks. Moreover, the Commonwealth of Virginia sits on an ample supply of wind resources in its mountainous regions and off the coast of the Delmarva Peninsula.[3] As this industry develops, many legal and regulatory measures of policy makers and the courts affect the viability of the industry. These issues include tax incentive programs, environmental concerns for migratory birds, and nuisance and zoning conflicts. On the federal level, Virginia congressmen should fight for a long-term enactment of the Energy Production Tax Credit. This will help give developers and creditors the reassurance they need to avoid the boom-bust cycle that the industry has experienced over the last decade due to a lack of a comprehensive long-term legislation.[4]

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[1] REGINA ANNE KELLY, ENERGY SUPPLY AND RENEWABLE RESOURCES 3 (2007).

[2] *Id.* at 58.

[3] Rick Webb, Professor of Environmental Sciences, University of Virginia, Presentation at the Energy Virginia Conference: Evaluating the Cost and Benefits of Wind Energy Development in the Mountains of Virginia (Oct. 17, 2006), *available at* http://www.windaction .org/?module=uploads&func=download&fileId=1006.

[4] *See* Union of Concerned Scientists, Renewable Energy Tax Credit Extended Again, but

One opportunity for Virginia to embrace wind energy is for the state legislature to pass a mandatory renewable energy portfolio standard ("RPS"). As of November 2008, more than half the states have passed mandatory renewable energy portfolio standards.[5] On April 11, 2007, Governor Tim Kaine signed a bill that established a voluntary renewable portfolio goal for the Commonwealth.[6] Although a voluntary standard is a step in the right direction, a mandatory standard would create the necessary regulatory environment to reassure wind farm developers of a consistent demand for wind energy in the Commonwealth. Of even greater value would be for the federal government to enact a federal RPS policy. This would alleviate concerns over possible dormant Commerce Clause challenges.

Additionally, the state legislature should ease zoning laws in specific areas of the Commonwealth to promote the development of wind turbines. In the mountainous areas of the Commonwealth, many citizens fear that placing wind turbines on mountain ridges will be aesthetically unpleasing and interfere with the private enjoyment of their property.[7] In the coastal regions, especially in the Chesapeake Bay, citizens worry about the placement of the turbines too close to highly valued property. Off the Eastern Shore, there is an added economic concern about building offshore wind farms as new transmission lines will have to be built.[8] Policy makers must balance these concerns and find a solution that opens the door for investment, without divesting the Commonwealth of its natural beauty.

The First section of this note will examine the argument for wind energy in general, including the economic, political, and environmental factors that have led to the need for alternative means of energy. The Second section will focus on the current development of the wind energy industry and assess the possibility of wind power in Virginia. The Third section will analyze current and potential regulatory incentives and hurdles for wind power development.

Risk of Boom-Bust Cycle in Wind Industry Continues, http://www.ucsusa.org/clean_energy/solutions/big_picture_solutions/production-tax-credit-for.html (last visited Oct. 10, 2008).

[5] The Pew Center on Global Climate Change, Renewable Portfolio Standards, http://www.pewclimate.org/what_s_being_done/in_the_states/rps.cfm (last visited Oct. 10, 2008).

[6] Pew Center on Global Climate Change, Virginia RPS, http://www.pewclimate.org/node/4683 (last visited Oct. 8, 2008).

[7] *See* Tom Pelton, *Bill Boosts Wind Power; Miller-Sponsored Measure Would Cut Permit Review; General Assembly*, BALTIMORE SUN, March 10, 2007, at 1B.

[8] *See* Scott Harper, *Wind Farm off V.A. Coast is Doable, Say Researchers*, VIRGINIA-PILOT, Aug. 30, 2008, at A1.

I. THE CASE FOR WIND ENERGY IN GENERAL

The case for wind power has been well documented in the environmental literature. Nonetheless, a general overview of the underlying reasons for wind energy will help the novice student of the subject better understand the benefits of this developing industry and provide the expert with a review of why wind, why now, and why Virginia. The demand for alternative forms of energy has grown exponentially in the past decade.[9] By definition, the continued use of non-renewable resources eventually necessitates a decrease in supply and thus, the need to explore alternative sources of energy. Historically, non-renewable resources have been abundant, inexpensive, and relatively easy to obtain. In the past decade, however, a series of political, economic, and environmental events have revitalized the need for alternative energy.

A. Economic, Political, and Environmental Need for Alternative Energy

In February of 2008, oil prices surpassed $100 a barrel for the first time in history.[10] By mid-summer, oil prices had risen to as high as $147 a barrel.[11] A confluence of political and economic events has lead to the high rise in oil and energy prices. One of the major contributing factors is the sharp growth in demand for energy from developing nations. In the past decade, emerging nations such as China, India, and the countries of Southeast Asia have seen enormous growth in their economies.[12] This growth has spurred development in many sectors of the economy, leading to numerous new factories, homes, and automobiles, all of which require various forms of energy.[13]

At the same time, the world has experienced political turmoil in many of the regions that supply oil.[14] Although a clash between the West and Fundamentalist Islam has developed over the decades, the results of

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[9] CHRISTOPHER A. SIMON, ALTERNATIVE ENERGY: POLITICAL, ECONOMIC, AND SOCIAL FEASIBILITY 17-18 (2007).

[10] Steven Mufson, *Oil Closes Over $100 for 1st Time*, WASH. POST, Feb. 20, 2008, at D01 *available at* http://www.washingtonpost.com/wp-dyn/content/article/2008/02/19/AR2008021900306.html.

[11] *Oil Prices Top 147 US Dollar Per Barrel*, THE AGE, July 12, 2008, http://news.theage.com.au/world/oil-prices-top-147-us-dollars-per-barrel-20080712-3dvb.html.

[12] *See* ASIAN DEVELOPMENT BANK, ASIAN DEVELOPMENT OUTLOOK 2007 *passim* (2007), *available at* http://www.adb.org/Documents/Books/ADO/2007/default.asp.

[13] SIMON, *supra* note 9, at 17-18.

[14] *Id.*

September 11, 2001 have brought this malady into the forefront of foreign policy.[15] The effect on the oil markets has been drastic as many of the world's largest oil reserves are within the boundaries of Middle Eastern countries, including Iran, Iraq, and Saudi Arabia, who are major players in the conflict.[16] Beyond the Middle East, other countries that won the geographical lottery, such as Russia and Venezuela, have begun to use their vast oil reserves as a tool of the state to bolster their own despotic regimes.[17] Thus, a large majority of the oil reserves are controlled by rogue nations such as Iran, Venezuela, and Russia, or nations in tumultuous areas such as the Middle East and Africa. This has led to uncertainty in oil markets, restrictions on supply, and increases in the cost per barrel.[18] Moreover, the United States and other Western nations are forced to interact with dangerous countries and essentially fund nations with anti-democratic and sometimes terroristic tendencies merely to ensure that the international lubricant of commerce flows freely and cheaply.[19]

Within the past few years mainstream media has begun to recognize that global warming is a likely reality, and that industrial development over the last century has had serious effects on our ecosystem.[20] Most notably, the burning of fossil fuels, such as oil, coal, and natural gas emit dangerous greenhouse gasses such as carbon dioxide, sulfur dioxide, and nitrogen oxide.[21] These gases collect in the upper level of the atmo-

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[15] *Id.*

[16] *See* Neela Banerjee, *Mideast and Venezuela Turmoil Sends Oil Prices Into Wild Swing*, N.Y. TIMES, April 9, 2002, http://query.nytimes.com/gst/fullpage.htm?res=9F0DE5D6133DF93AA35757COA9649C8B63; Neil King Jr. & Peter Fritsch, *Energy Watchdog Warns of Oil-Production Crunch*, WALL ST. J., May 22, 2008, at A1, *available at* http://royaldutchshellplc.com/2008/05/22/energy-watchdog-warns-of-oil-production-crunch/. *See generally* OPEC, OPEC ANNUAL STATISTICAL BULLETIN 2006 (2006), *available at* http://www.opec.org/library/Annual%20Statistical%20Bulletin/pdf/ASB2006.pdf; ENERGY INFORMATION AGENCY, INTERNATIONAL ENERGY OUTLOOK, Rep. DOE/EIA-0484 (2008), *available at* http://www.eia.doe.gov/oiaf/ieo/0484(2008).pdf.

[17] *See* MARSHALL I. GOLDMAN, PETROSTATE: PUTIN, POWER, AND THE NEW RUSSIA *passim* (2008); *The Autocrat of Caracas*, THE ECONOMIST, Aug. 7, 2008, *available at* http://www.economist.com/world/americas/displaystory.cfm?story_id=11885670.

[18] *See Why Are Oil Prices So High?,* BBC NEWS.COM, Sept. 28, 2004, http://news.bbc.co.uk/1/hi/business/3708951.stm.

[19] *See* Banerjee*, supra* note 16.

[20] *See* AL GORE, AN INCONVENIENT TRUTH: THE PLANETARY EMERGENCY OF GLOBAL WARMING AND WHAT WE CAN DO ABOUT IT (Rodale 2006); *See generally* RICHARD L. OTTINGER ET AL., ENVIRONMENTAL COSTS OF ELECTRICITY (1990).

[21] *See* GORE, *supra* note 20; AM. BAR ASS'N, SECTION OF ENV'T, ENERGY, & RES, GLOBAL CLIMATE CHANGE AND U.S. LAW 5 (Michael B. Gerrard ed., 2007).

sphere letting in more harmful rays from the sun and then trapping the heat in a blanket of heightened levels of atmospheric gases.[22] This increased level of heat has began to erode the polar ice caps and warm the earth, setting the world on a collision course for a series of possible catastrophic events.[23] The melting of the polar ice caps can lead to a rising sea level that could completely submerge low-lying coastal areas, including those on the Eastern Shore of Virginia.[24] The increased heating of the Earth can also lead to frequent and violent storms, and thus to an increased possibility of more Katrina-like disasters.[25] Further, increased temperatures could result in substantial changes in ecosystems from the tundra to the tropics, which could upset the balance of life on the planet.[26]

B. How Wind Energy Addresses Those Issues

The environmental benefits of wind power are extraordinary. Wind power is a clean source of energy that transforms the mechanical power of the wind into electricity.[27] Unlike power plants that rely on the combustion of fossil fuels, such as coal or natural gas, wind turbines do not produce atmospheric emissions that cause acid rain or greenhouse gasses.[28] As of 2007, the U.S. wind turbine fleet produces 16,818 megawatts of electricity and displaces more than thirty million tons of carbon dioxide each year.[29] A single one megawatt turbine displaces 1800 tons of carbon dioxide, the primary global warming pollutant, each year.[30] And one megawatt of wind for twenty years would equal 29,000 tons of coal or 92,000 barrels of oil.[31] In other words, to generate as much electricity as today's full U.S. wind capacity, we have to burn 23 million tons of coal, a line of 10-ton trucks over 9000 miles long, or 75 million barrels of oil *each year*.[32]

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[22] See AM. BAR ASS'N, *supra* note 21.
[23] See GORE, *supra* note 20.
[24] *Id.*
[25] *Id.*
[26] *Id.*
[27] U.S. Dep't of Energy, Advantages and Disadvantages of Wind Energy, http://www1.eere.energy.gov/windandhydro/wind_ad.html (last visited Oct. 16, 2007).
[28] *Id.*
[29] AM. WIND ENERGY ASS'N, WIND ENERGY BASICS (2008), *available at* http://www.awea.org/newsroom/pdf/ Wind_Energy_Basics.pdf.
[30] *Id.*
[31] *Id.*
[32] *Id.*

The change in the political milieu has dictated the need to develop alternative means of energy. The development of energy industries that rely little to none on foreign sources is vital to United States security and foreign policy.[33] Fortunately, the United States has an abundant amount of wind capacity that can be harvested by wind farms both on and offshore.[34]

In order for wind to be harvested economically, an area must have a consistent and strong level of wind.[35] The Department of Energy has classified areas from class 1 to class 7, with class 1 being unsuitable for wind development and class 7 being most ideal for wind development.[36] Currently, class 3 and 4 are the minimal levels of wind that are economically viable for wind turbine development.[37] As of 2007, the United States has enough area for potential development to provide 150 percent of the electrical needs of the entire country.[38] However, as of 2005, less than one half a percent of our nation's electricity came from wind sources.[39]

One of the largest obstacles for any source of alternative energy is making the industry economically viable. Other sources of alternative energy have potential for the future but currently have major economic obstacles. Biofuels, such as ethanol, are still expensive to produce, heavily reliant on subsidies,[40] produce considerable levels of greenhouse gases,[41] have not yet reached low levels of efficiency,[42] and affect other vital industries such as corn prices and food stock.[43] Solar energy is readily abun-

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[33] *See* President George W. Bush, State of the Union Address (Jan. 8, 2008), *available at* http://whitehouse.gov.news/releases/2008/01/print/20080129-13.html.

[34] U.S. Dep't of Energy, Advantages and Disadvantages of Wind Energy, http://www.eere.energy.gov/windandhydro/wind_ad.html; Cheryl Pellerin, *Wind Power World's Fastest-Growing New Electricity Source*, WASH FILE, Apr. 22, 2005 *available at* http://usinfo.state.gov/usinfo/Archive/2005/Apr/22-89769.html.

[35] Pellerin, *supra* note 34.

[36] U.S. Dep't of Energy, Wind Energy Resource Potential, http://www.eere.energy.gov/windandhydro/wind_potential.html (last visited Oct. 10, 2008).

[37] Pellerin, *supra* note 34, U.S. DEP'T OF ENERGY, *supra* note 36.

[38] U.S. Dep't of Energy, *supra* note 36.

[39] Pellerin, *supra* note 34.

[40] *See* Press Release, U.S. Dep't of Energy, DOE Publishes Roadmap for Developing Cleaner Fuels (Jul. 7, 2008), *available at* http://www.doe.gov/news/3804.htm.

[41] *See* U.S. Dep't of Energy, Ethanol Emissions, http://www.afdc.energy.gov/afdc/vehicles/emissions_ethanol.html; *see also* U.S. Dep't of Energy, Biodiesel Emissions, http://www.afdc.energy.gov/afdc/vehicles/emissions_biodiesel.html.

[42] U.S. Dep't of Energy, *supra* note 40.

[43] H. Joseph Herbert, *Study: Ethanol Won't Solve Energy Problems*, USA TODAY, July 10, 2006, *available at* http://www.usatoday.com/tech/news/2006-07-10-ethanol-study_x.htm.

dant, however, current photovoltaic technology only transforms fifteen percent of the sun's rays into electricity and the photovoltaic cells themselves are too expensive to sustain large amounts of electricity without heavy government subsidies.[44] Fuel cells have the potential to overtake the combustible engine,[45] yet reducing hydrogen production cost is a barrier that prevents the fuel cell from reaching market efficient levels.[46]

The beauty of the wind industry is that it is economically viable today.[47] Consumers pay for electricity on a per kilowatt-hour basis. The average retail price of electricity in the United States in 2006 was 8.9 cents per kilowatt-hour.[48] The average cost of producing electricity depends on the type of energy, the location of the source of energy, and the regulatory schemes that affects those sources.[49] For example, the average cost to produce electricity from coal in 1996 was about 5 cents per kilowatt-hour, and has stayed relatively the same since.[50] The average cost of electricity from nuclear sources was 11.1-14.5 cents per kilowatt-hour in 1996, and with recent advances in technology, has since fallen to around 7 to 8 cents per kilowatt-hour.[51] The average cost of production from wind resources is 5-7 cents per kilowatt-hour.[52] The average cost for production of other forms of alternative energy range from 6 cents per kilowatt-hour for hydropower to 42 cents per kilowatt-hour for photovoltaic power, the most common source of solar power.[53]

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[44] Nat'l Renewable Energy Lab., Photovoltaics, http://www.nrel.gov/learning/re_photovoltaics.html (last visited Oct. 10, 2008).

[45] U.S. Dep't of Energy, Hydrogen, Fuel Cells, and Infrastructure Technologies Program—Fuel Cells, http://www.eere.energy.gov/hydrogenandfuelcells/fuelcells/ (last visited Oct. 10, 2008).

[46] *See* U.S. Dep't of Energy, Hydrogen Production, http://eere.energy.gov/hydrogenandfuelcells/production/(last visited Oct. 10, 2008).

[47] *See generally* U.S. Dep't of Energy, *supra* note 27.

[48] Energy Info. Admin., Average Retail Price of Electricity by State, http://www.eia.doe.gov/cneaf/electricity/epa/fig7p4.html (last visited Nov. 10, 2008).

[49] Energy Info. Admin., Energy in Brief, http://www.tonto.eia.doe.gov/energy_in_brief/electricity.cfm (last visited on Nov. 10, 2008).

[50] Note that the averages per kilowatt-hour exclude regulatory incentives and restrictions. CAL. ENERGY COMM'N, ENERGY TECHNOLOGY STATUS REPORT, REPORT SUMMARY 75 (1996) *available at* http://www.energyarchive.ca.gov/etsr/reportsu.html; *see also* James R. Katzer, US and Global Energy Perspectives, http://cosmos-club.org/web/journals/2002/katzer.html (last visited Nov. 24, 2008).

[51] CAL. ENERGY COMM'N, *supra* note 50, at 73; Katzer, *supra* note 50.

[52] Katzer, *supra* note 50.

[53] CAL. ENERGY COMM'N, LEVELIZED COSTS OF ELECTRICITY PRODUCTION BY TECHNOLOGY (1996), *available at* http://deanzaemtp.googlepages.com/CECsLevelizedCostofElectricityProduction.pdf.

In Virginia, the average retail price of electricity in 2006 was 6.86 cents per kilowatt-hour.[54] One of the main reasons retail power is less expensive in Virginia than the national average is that the Commonwealth has a decent amount of coal reserves, and is located near West Virginia and Kentucky, which are two of the largest producers of coal in the United States.[55] Close proximity to the resource decreases transportation costs, in turn decreasing production costs, which results in lower retail costs. Indeed, Virginia currently receives 48 percent of its energy generated for electricity from coal.[56] Also, Virginia has two twin reactor nuclear plants in Surry and Lake Anna.[57] These reactors account for 32 percent of total electrical generation in the Commonwealth.[58]

For wind power to be a reasonable source of energy in Virginia, it must compete with traditional sources of energy. The average cost to produce electricity from coal between 1986 and 1999 in Virginia was 2.7 cents per kilowatt-hour.[59] The average cost to produce electricity from nuclear power in Virginia between 1986 and 1999 was 2.13 cents per kilowatt-hour.[60] Assuming these rates have increased at least with the level of inflation, the cost per kilowatt-hour would be 3.3 cents for coal and 2.7 cents for nuclear.[61]

Although coal is an inexpensive source of energy, it comes with tremendous environmental costs. For example, coal-fired plants produced 95 percent of the 10.3 million tons of sulfur dioxide released from U.S. power plants in 2004 and 90 percent of the 3.9 million tons of nitrogen oxides

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[54] Energy Info. Admin., note 49.
[55] Virginia Energy and Patterns, Virginia Coal, http://www.energy.vt.edu/vept/coal/index.asp (last visited Nov. 10, 2008).
[56] Virginia receives 32 percent of its energy generated for electricity from nuclear sources, 8 percent from petroleum, 6 percent from natural gas, 2 percent from hydroelectric, and 4 percent from other renewables. *See* Virginia Energy Overview Diagram, http://www .energy.vt.edu/vept/energyover/overdiagram.asp (last visited Nov. 10, 2008).
[57] Dominion Power, Nuclear Power Stations, http://www.dom.com/about/stations/nuclear/ (last visited Oct. 13, 2008).
[58] Virginia Energy Overview Diagram, *supra* note 56.
[59] TIMOTHY J. CONSIDINE & ANDREW N. KLEIT, COMPARING ELECTRICITY DEREGULATION IN CALIFORNIA AND PENNSYLVANIA: IMPLICATIONS FOR THE APPALACHIAN REGION 35 (2002).
[60] *Id.* at 41.
[61] Assuming a 2.8 percent inflation rate over the past 7 years. *See* Inflation by Decade, http://inflationdata.com/Inflation/Inflation/DecadeInflation.asp (last visited Oct. 10, 2008).

released from U.S. power plants that year.[62] These chemicals contribute significantly to harmful ground-level ozone, smog, and acid rain.[63]

Virginia currently benefits from some of the cheapest nuclear power rates in the United States.[64] This can likely be attributed to the efficiency of the Surry and Lake Anna facilities. However, expansion of the energy supply into new nuclear facilities has major drawbacks. First, building new nuclear plants requires significant capital costs, which is "the single most important factor [in] determining the economic competitiveness" of nuclear power plants.[65] A study conducted by the University of Chicago indicates that development of new nuclear plants would result in a levelized cost of electricity (LOC) of $47 to $71 per megawatt-hour (MWh)."[66] Beyond fluctuating construction costs, new nuclear plants still have the added risk elements of fuel price for uranium, security costs, nuclear waste transportation and storage, as well as decommissioning and insurance costs from the environmental effects of nuclear or radiological incidents.[67]

Wind power is nearly economically competitive with the traditional sources without additional governmental incentives or regulation. As discussed above, wind power costs 5 to 7 cents per kilowatt-hour, coal (in Virginia) roughly 3.3 cents per kilowatt-hour, and nuclear power (in Virginia) 2.7 cents per kilowatt-hour.[68] However, expanding nuclear capacity in Virginia would require new nuclear plants, which costs roughly 4.7 to 7.1 cents per kilowatt-hour.[69] New coal capacity would be relatively inexpensive, however, coal has numerous negative externalities that are not accounted for in the cost of production. These costs are important to keep in mind in the Third section of this note, which addresses the various government incentives and regulations that affect the economic competitiveness of wind power.

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[62] NAT'L RES. DEF. COUNCIL, COAL IN A CHANGING CLIMATE 13 (2007) *available at* http://nrdc.org/globalwarming/coal/coalclimate.pdf (last visited Nov. 10, 2008).
[63] *Id.*
[64] *See* CONSIDINE & KLEIT, *supra* note 59, at 41.
[65] UNIVERSITY OF CHICAGO, THE ECONOMIC FUTURE OF NUCLEAR POWER xi (2004), *available at* http://www.nei.org/filefolder/univchicago_economic_study_8-04.pdf.
[66] *Id.*
[67] Benjamin K. Sovacool & Christopher Cooper, *Nuclear Nonsense: Why Nuclear Power is No Answer to Climate Change and the World's Post-Kyoto Energy Challenges* 33 WM & MARY ENVTL L. & POL'Y REV. 1, 2-3 (2008).
[68] *See supra* notes 52, 61 and accompanying text.
[69] *See* UNIVERSITY OF CHICAGO, *supra* note 65, at xi.

II. CURRENT DEVELOPMENT OF WIND ENERGY

A. International

The wind power industry has developed internationally, especially in Europe, much faster than in the United States.[70] This is due to a number of reasons but most notably the signing of the Kyoto Protocol, an international agreement among 141 countries to reduce emissions of carbon dioxide and five other greenhouse gases.[71] This treaty has induced European countries to enact legislation that has spurred the growth of wind energy in the region.[72] Denmark, for example, receives as much as 20 percent of its electricity from wind power.[73] Germany, a large economy like the United States, receives roughly 6 percent of its electrical energy from wind.[74]

B. Domestic

Installation of wind farms in the United States has grown dramatically in the past decade. Many of the best areas for wind farms are located in rural areas.[75] As an added benefit, farmers and ranchers can continue to work the land for agricultural means because wind turbines use only a fraction of the land.[76] Wind turbine owners then make rent payments to the farmer or rancher for the use of the land.[77]

In 2006, "[m]ore than 2,400 megawatts of wind generation, enough to serve more than 650,000 average American homes was installed."[78] In 2007, the United States produced enough electricity from wind to power nearly 3 million American homes.[79] Since 2006, Texas has taken the lead

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[70] SIMON, *supra* note 9, at 47.
[71] Pellerin, *supra* note 34.
[72] Eur. Wind and Energy Ass'n, Legal Framework for Wind Energy, http://www.ewea.org/index.php?id=197 (last visited Oct. 13, 2008).
[73] Pellerin, *supra* note 34.
[74] *Id.*
[75] *See* U.S. DEP'T OF ENERGY, WIND POWER TODAY 7 (2003), *available at* http://www.nrel.gov/ docs/fy03osti/33149.pdf.
[76] *Id.* at 23.
[77] *Id.*
[78] Kern Wind Web, Wind Energy Basics, Feb. 5, 2007, http://www.kernwind.com/article-basics.asp (last visited Oct. 10, 2008).
[79] *Id.* One megawatt of wind energy generates enough electricity for roughly 250 to 300 average American homes.

in cumulative installed capacity and currently hosts the world's largest operating wind farm, the 735-MW Horse Hollow Wind Energy Center.[80]

C. Virginia

The Virginia Center for Coal and Energy Research has determined that the capacity for wind energy in Virginia is roughly 1960 megawatts onshore and 33,792 megawatts offshore.[81] Nearly all of the onshore capacity for wind energy in Virginia is located in the Blue Ridge Mountains.[82] The offshore capacity for wind energy in Virginia ranges from the Chesapeake Bay to Virginia's Eastern Shore.[83]

Virginia planned its first wind power development project in Highland County.[84] The Highland County Wind Project, developed by Highland New Wind Development LLC, has proposed a 39-megawatt capacity wind farm development in the ridgelines of Highland County.[85] Currently, an application for a certificate to construct, own, and operate a generating facility is under review by the Virginia State Corporation Commission.[86] Successful passage and completion of the Highland Project will help pave the way for further development of wind turbines in the Commonwealth.

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[80] *Id.*

[81] Webb *supra* note 3.

[82] *See* U.S. Dep't of Energy, Virginia Wind Resource Map, http://www.eere.energy.gov/windandhydro/windpoweringamerica/maps_template.asp?stateab=va (last visited Aug. 13, 2008).

[83] *Id.*

[84] *Virginia OKs First Wind-Powered Turbines*, WTOPNEWS.COM, Dec. 21, 2007, http://www.wtop.com/?nid=25&sid=1314419.

[85] KEVIN M. HATHAWAY, MSC AND COLIN J. HIGH, PHD, RES. SYS. GROUP, INC., AVOIDED AIR EMISSIONS FROM ELECTRIC POWER GENERATION AT THREE POTENTIAL WIND ENERGY PROJECTS IN VIRGINIA 6 (2006), *available at* http://www.ert.net/pubs/VA-WindReportFINAL.pdf.

[86] Application to Construct a 39-Megawatt Wind Farm in Highland County, Virginia from John W. Flora, Attorney at Law, Keeler Obenshain, P.C., to Virginia State Corporation Commission (Case Number PUE-2005-00101) (Nov. 7, 2005), *available at* http://docket.scc.state.va.us/CyberDocs/Libraries/Default_Library/Common/frameviewdsp.asp?doc=58158&lib=CASEWEBP%5FLIB&mimetype=application%2Fpdf&rendition=native (last visited Sept. 19, 2008). *See generally* Highland New Wind Development, PUE-2005-00101 (Va. State Corp. Comm'n Dec. 20, 2007) (final order), *available at* http://docket.scc.state.va.us/CyberDocs/Libraries/Default_Library/Common/frameviewdsp.asp?doc=76353&lib=CASEWEBP%5FLIB&mimetype=application%2Fpdf&rendition=native (granting authority to construct and to operate a wind energy generating facility in Highland County).

Coastal areas of Virginia offer the most potential for development of wind farms in the Commonwealth.[87] As stated before, offshore sites comprise of the largest capacity in Virginia.[88] Moreover, the physical attributes of the Atlantic seaboard are ideal for developing wind turbines offshore.[89] The shelf of the Atlantic ocean extends roughly 80 miles from the coastline on average.[90] The average depth of the water in the area is 100 to 200 meters.[91] Placing wind turbines on the shelf, but far enough offshore, would allow for relatively low cost with little impact on coastline vistas or other competing needs. Also, Virginia's location is north enough that it rarely receives powerful coastal storms or hurricanes that could cause havoc to an offshore wind farm system. Moreover, the Virginia legislature has already passed legislation to promote the development of offshore natural gas and wind resources.[92]

Other areas on the Atlantic coast also plan to develop their high wind capacity coastal areas. The Cape Wind Project, for example, is a wind power project planned for the Cape Cod area.[93] If it successfully passes the planning stages with the local and state government, the Cape Wind Project has the potential to be the largest and most efficient wind farm, either onshore or offshore, in the world.[94] Like most wind energy projects, however, various hurdles must be overcome in order to make the project a viable reality. The Cape Wind Project's largest hurdle comes from influential property owners on the Cape, including Democratic Senator Ted Kennedy, who arduously protests its development, claiming the presence of the wind farm would produce a nuisance in the area.[95]

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[87] *See* U.S. Dep't of Energy, *supra* note 82.
[88] *See id.*
[89] *See* Rusty Russell, *Neither Out Far Nor In Deep: The Prospects for Utility-Scale Wind Power In The Coastal Zone*, 31 BCEALR 221, 222 (2004).
[90] National Atlas Map Maker, http://www.nationalatlas.gov/natlas/natlasstart.asp (last visited Oct. 10, 2008) (map drawn to evaluate ocean depth).
[91] *Id.*
[92] VA. CODE ANN. § 67-300 (2006).
[93] Guy R. Martin & Odin A. Smith, *The World's Largest Wind Energy Facility in Nantucket Sound? Deficiencies in the Current Regulatory Process for Offshore Wind Energy Development*, 31 BCEALR 285-86 (2004).
[94] *Id.*
[95] WENDY WILLIAMS & ROBERT WHITCOMB, CAPE WIND: MONEY, CELEBRITY, CLASS, POLITICS AND THE BATTLE FOR OUR ENERGY FUTURE ON NANTUCKET SOUND 29-30, 38-40 (2007).

III. REGULATORY INCENTIVES AND HURDLES FOR WIND PROJECTS

A. Incentives

Many regulatory and legal decisions affect the development of the wind energy industry in the United States. For this infant industry to grow to maturity, it needs the appropriate combination of governmental incentives and sensible regulation. Traditional energy sources produce negative externalities, most notably pollution, that are not accounted for in the price of the consumption of the good. Since their inception traditional energy products such as oil, coal, and natural gas have polluted the environment.[96] Although these industries pollute by only marginal amounts at a time, cumulatively they have contributed substantially to global warming.[97] As with other externalities, the government can regulate pollution with a carrot—incentives for alternative, non-polluting sources—or a stick—taxing current industries. Below is a discussion of the various forms of governmental regulation that affect the wind industry.

B. Governmental Incentives and Regulations

One of the traditional ways the government can promote a socially beneficial industry or technology is to provide a tax credit to those who produce the beneficial product. Typically, a tax credit provides recognition of partial payment already made towards taxes due.[98] Because a business receiving the tax credit spends less revenue on taxes, the business can lower the cost of the good, making it more competitive.

1. Production Tax Credit ("PTC")

In December of 2006, Congress passed the Tax Credit and Health Care Act of 2006, which included an extension of tax credits provided to producers of various forms of alternative energy.[99] The bill amended I.R.C. § 45 extending the tax credit for energy produced from certain alternative

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[96] *See* NAT'L RES. DEF. COUNCIL, *supra* note 62, at 13.
[97] *See generally* GORE, *supra* note 20.
[98] *See* AIC.com, Investor Learning Center, http://www.aic.com/en/learning/learning_glossary.asp#TAX (last visited Oct. 13, 2008).
[99] These resources include wind, closed and open-looped biomass, geothermal, solar, small irrigation, municipal solid waste, qualified hydropower. *See* Tax Relief and Health Care Act of 2006, P.L. No. 109-432 (2006).

energy sources, including wind, until January 1, 2009.[100] The base amount of the credit is 1.5 cents per kilowatt-hour of electricity produced, indexed annually for inflation.[101] In 2006, the amount of the credit was 1.9 cents per kilowatt-hour.[102]

The PTC has been extremely valuable to the wind power industry. The near 2 cents per kilowatt-hour credit reduces production costs for electricity from wind power from 5 to 7 cents per kilowatt-hour to 3 to 5 cents per kilowatt-hour. This allows wind energy to compete economically with both coal and nuclear energy in Virginia.[103]

Although this credit has been highly beneficial to the wind power industry, Congress has chosen to renew this credit on a year-by-year basis. Currently, the production tax credit will expire at the end of 2008 if not renewed by Congress.[104] This method of tax credit makes a boom-bust cycle for the industry.[105] When the credit is in place wind developers build more wind farms. When the credit becomes close to relapsing, or Congress allows it to relapse, as it did often in the 1990's, then the industry faces potential for losses.[106] In order to ensure continued growth for the wind power industry, Congress should enact a long-term extension of the federal production tax credit.[107] In 2008 alone, over 9 billion of investments were made to the wind industry.[108] A long-term, stable production tax credit would allow companies to plan and build manufacturing capacity in the U.S. to supply the increased demand for energy. Senate Bill 1531, The Clean Renewable Energy and Economic Development Incentives Act of 2007 proposes to extend the federal production tax credit from a one-year period to a ten-year period.[109] Congress should pass this initiative as it would allow developers of wind farms to predict costs and revenue on a longer timeline, which would allow for cheaper and more abundant financing. If in the future wind power becomes competitive without the tax credit, either through increased prices for alternative methods or an

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[100] *Id.*; *see also* I.R.C. § 45.
[101] I.R.C. § 45, *supra* note 100.
[102] Union of Concerned Scientists, *supra* note 4.
[103] For the cost of coal and nuclear generated electricity in Virginia, *see supra* notes 59-60 and accompanying text.
[104] *See* Union of Concerned Scientists, *supra* note 4.
[105] *Id.*
[106] *Id.*
[107] AM. WIND ENERGY ASS'N, *supra* note 29.
[108] AM. WIND ENERGY ASS'N, ANOTHER RECORD YEAR FOR NEW WIND INSTALLATIONS, *available at* http://www.awea.org/pubs/factsheets/Market_Update.pdf.
[109] Clean Renewable Energy and Economic Development Incentives Act of 2007 S. 1531.

increase in efficiency of wind turbine technology, Congress could certainly repeal the tax credit.

2. Carbon Tax

A carbon tax is a tax on the carbon content of fuels.[110] Effectively, it is a tax on the carbon dioxide emissions from burning fossil fuels.[111] Most traditional sources of energy—coal, oil, and natural gas—release significant levels of carbon into the atmosphere when burned.[112] Indeed, the precise amount of how much carbon released from burning a specific type of fossil fuel is known.[113] Thus, a fair calculation can be made of how much the various forms of fossil fuels should be taxed in relation to each other.

As discussed before, the burning of fossil fuels and the release of carbon emissions into the atmosphere have significant negative affects on the environment.[114] As a classic tragedy of the commons, the government serves as the best entity to properly regulate those effects and assign costs, usually through the implementation of a tax.[115] However, the prices of gasoline and carbon-based electricity generation does not include the costs associated with their negative externalities.[116]

Although there may be many reasons why the U.S. government has yet to adopt a carbon tax, the primary reason is the effect a carbon tax would have on the economy. The philosophy behind a carbon tax is that a significant tax on the price of fossil fuels would raise the cost of fossil fuels to such levels that would either make alternative means of energy more economically viable or increase the cost to the consumer to such a level that the demand for energy would decrease. Although over the long-term this solution may make sense, the short-term economic effects would be drastic. The energy markets are slow to change from one form of energy to the next. For example, implementing an alternative fuel for automobiles would take years. Automobile makers would have to design and build new models on a large scale that use the alternative fuel. Once those new models hit the market, it is unlikely that many Americans would be able

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[110] Carbon Tax Center, http://www.carbontax.org (last visited Nov. 10, 2008).
[111] *Id.*
[112] *Id.*
[113] *Id.*
[114] *See generally* GORE, *supra* note 20.
[115] Garrett Hardin, *The Tragedy of the Commons*, SCIENCE, 162, 1243-48 (1968), *available at* http://dieoff.org/page95.htm.
[116] Carbon Tax Center, *supra* note 110.

to afford substituting their car—the second most expensive purchase the average American makes after a house—so quickly. Thus, the consumer would be significantly affected by the changes in price for energy, either by consuming less or by paying more for energy and thus spending less on other items.

Changes in demand for alternative forms of energy to produce electricity would also take a significant amount of time. Developing and building new nuclear plants—which are obviously, exempt from the carbon tax—takes years. Wind turbines have a shorter cycle of development, however, the rate at which the market for energy can increase is capped by the rate at which manufactures can produce new turbines. Thus, consumers once again would be forced with the dilemma of consuming less electricity or paying more for electricity and spending less on other goods.

With oil prices at all time highs, a significant carbon tax would raise oil prices to a level that would affect all sectors of the economy. An increase in oil prices, among other things, results in the increase of transportation costs for goods, which in turn increases the price paid by consumers. The effect would either be a decrease in spending as consumers purchase fewer goods at higher prices, which can lead to recession, or a mandatory increase in the monetary supply to meet these new prices, which would lead to higher rates of inflation.

Additionally, implementation of a carbon tax would be politically infeasible. In 1993, Congress considered a marginal tax on energy, including a 4.3 cents per gallon tax on gasoline.[117] This tax was pronounced dead on arrival in the Senate.[118] In 1993 the average price of gasoline in the United States was a little less than $1.50 per gallon.[119] With the price per gallon today being significantly more than the amount in 1993, it seems even less likely that Congress would adopt such a proposal.

3. Renewable Energy Portfolio Standards ("RPS")

An RPS is a legislative mandate requiring electricity suppliers in a given geographical area to employ renewable resources to produce a certain percentage of power by a fixed date.[120] As of 2007, RPS policies were in

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[117] Steven Greenhouse, *Moynihan Predicts a Deal on Bigger Energy Tax*, N.Y. TIMES, July 12, 1993, at A18.
[118] *Id.*
[119] zFacts, http://zfacts.com/p/35.html (last visited Oct. 10, 2008).
[120] Benjamin K. Sovacool & Christopher Cooper, *State Efforts to Promote Renewable Energy: Tripping the Horse with the Cart?*, SUSTAINABLE DEV. L. & POL'Y, Fall 2007, at 6.

place in twenty-four states and the District of Columbia.[121] More than half of the total electricity sales in the country occur in these jurisdictions.[122] In addition, Illinois, Missouri, Virginia, and Vermont have nonbinding goals for adoption of renewable energy.[123]

RPS policies have an advantage in comparison to other state mandated polices because they do not give preference towards one particular renewable over another.[124] Instead of subsidizing one method of renewable energy, which may have varying levels of efficiency given each region or state, it allows utility companies to embrace the most economically efficient form of renewable for their coverage areas.[125] Because of wind energy's competitive position in the market, recent RPS policy has fueled growth in the industry. Of the approximate 9000 MW of wind energy in the United States, roughly 50 percent, or 4500 MW, have been promoted directly by RPS policies.[126]

Many of Virginia's neighboring states have enacted a RPS policy. For example, North Carolina requires that 10 percent of electricity being produced by utilities in the state be from renewable sources by 2018.[127] In Maryland, the Maryland Renewable Energy Portfolio Standard and Credit Trading Act, signed into law on May 26, 2004, requires that energy sales be derived from renewable sources on an increasing scale.[128] In 2006, retailers must provide 1 percent of their sales in the state from Tier 1 renewables and 2.5 percent from Tier 2. Tier 1 then increases by 1 percent biannually to 7 percent in 2018 and Tier 2 stays stable through 2018.[129]

Colorado's RPS policy serves as an example of a highly successful policy that has spurred development of wind energy in the state.[130] At first,

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[121] *See* U.S. Dep't of Energy, Information Resources: States with Renewable Portfolio Standards, *available at* http://www.eere.energy.gov/states/maps/renewable_portfolio_states.cfm (last visited Feb. 1, 2008).
[122] *Id.*
[123] *Id.*
[124] Sovacool & Cooper, *supra* note 120, at 6.
[125] *Id.*
[126] *Id.*
[127] Jeff Hampton & Scott Harper, *New North Carolina Law Triggers Flurry of Wind Turbine Plans*, National Wind Watch, Oct. 14, 2007, http://www.wind-watch.org/news/2007/10/14/new-north-carolina-law-triggers-flurry-of-wind-turbine-plans/.
[128] Union of Concerned Scientists, *Maryland Renewable Energy Portfolio Standard Summary*, May 2008, http://www.ucsusa.org/assets/documents/clean_energy/Maryland.pdf.
[129] *Id.*
[130] Peter Slevin, *Renewable Power's Growth in Colorado Presages National Debate*, WASH. POST, Aug. 18, 2008, at A1, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2008/08/17/AR2008081702193_pf.html.

when Colorado voters decided to require that 10 percent of the state's electricity must come from alternative sources, the state's largest utility fought the proposal, arguing that any shift from coal and natural gas would be costly and unwise.[131] However, Xcel Energy met the requirement eight years ahead of the deadline.[132] As a result, the government quickly decided to double the target to 20 percent.[133]

a. Virginia's Voluntary RPS Policy

Virginia recently implemented a voluntary RPS policy.[134] On April 11, 2007, Senate Bill 1416 was signed by Governor Tim Kaine. This established a voluntary renewable portfolio goal with a standard of a twelve percent target of base year sales by 2022 for renewable energy. Senate Bill 1416 identifies standard targets as percentages of the sale of electricity from 2007, the base year used, less the average annual percentage of supplied power by nuclear generators between 2004 and 2006.[135] Utilities may take part in this voluntary program if they exhibit that they may reasonably expect to achieve the twelve percent stated target by 2022.[136] Inclusive of the numerous sources of energy that count toward the stated target are as follows: wave, geothermal, biomass energy, wind, solar, hydropower, and tidal.[137] It should also be noted that under the bill, solar and wind receive double credit toward reaching RPS goals.[138]

While the Virginia RPS policy does provide the first step towards the Commonwealth embracing alternative sources for energy, it ultimately falls short because it leaves compliance voluntary. Dominion Power, Virginia's largest utility,[139] has responded positively to the legislation by issuing a request for proposals for alternative energy projects.[140] However, part of Dominion's impetus for doing so could be an attempt to fulfill their

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[131] *Id.*
[132] *Id.*
[133] *Id.*
[134] Pew Center on Global Climate Change, *supra* note 6.
[135] *Id.*
[136] *Id.*
[137] *Id.*
[138] *Id.*
[139] *Maryland Power Plant Project Sold to Virginia's Largest Utility*, THE BALTIMORE DAILY RECORD, Mar. 5, 2008, *available at* http://www.findarticles.com/p/article/mi_qn4183/is_20080305/ai_n24371469/print?tag=artbody;coll.
[140] Dominion Power, Dominion Seeks Proposals for Renewable Energy Projects, http://www.dom.com/news/elec2007/pr1129.jsp (last visited Oct. 10, 2008).

mandatory requirements for the RPS policy enacted by North Carolina.[141] Moreover, because Dominion is integrated into the PJM Interconnection, it can sell renewable energy credits to states within the PJM Interconnect to assist with those states' RPS policies.[142] Adopting a mandatory RPS policy would provide more security for developers of wind farms in Virginia because developers would know that their investments will be supported by the policy's demands.

b. Argument for a National RPS Policy

A policy that would be even more beneficial to wind power development is the adoption of a national RPS policy. A national RPS policy has many advantages over the current state-by-state regime. First, a national policy would allow for easier trading of renewable credits between states.[143] A renewable energy credit ("REC") that is national, will work to create a trading market that will allow the generators to retail their RECs anywhere in the nation at a constant price. This type of REC market would create more capital for investment for renewable technologies. It will do this by creating a stable and predictable return rate.[144] This would provide incentives for states with abundant renewable resources, like Virginia, to develop those resources. Second, a national mandate would guarantee a greatly increased demand for renewable sources, which, through economies of scale, would ultimately lower construction costs for wind turbines by more than 20 percent.[145] Third, a national RPS policy would speed up investment in critical infrastructure, such as transmission lines, that local governing bodies often vigorously fight

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[141] Dominion Power's coverage area extends throughout Virginia and North Carolina, *see* PJM.com http://www.pjm.com/documents/maps/pjm-zones.pdf (last visited Oct. 13, 2008).
[142] The PJM Interconnection is a regional transmission organization ("RTO"). The interconnections work to coordinate the wholesale movement of electricity in parts of whole of the following states: Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. *See* PJM.com, http://www.pjm.com/about/overview.html (last visited Oct. 13, 2008).
[143] Christopher Cooper & Benjamin Sovacool, *Renewing America: The Case for Federal Leadership on a National Renewable Portfolio Standard*, NETWORK FOR NEW ENERGY CHOICES, REPORT NO. 01-07, June 2007, at 8, *available at* http://www.newenergychoices.org/dev/uploads/RPS%20Report_Cooper_Sovacool_FINAL_HILL.pdf.
[144] *Id.* at 11.
[145] *Id.* at 8-9. This increased demand for wind turbines would also have the advantage of creating significantly more manufacturing jobs. *Id.*

because of protest from their constituents.[146] Indeed, the state legislatures could justify such additions to their infrastructure as compliance with the federal standard. Fourth, a national RPS policy would avoid the "free rider" problem that currently exists.[147] This "free rider" problem can most accurately be described as many states having deflated electricity prices because they rely on cheap and dirty sources of energy. The people residing in RPS states "pick up the tab" for aiding in cleaning the water and air for the whole country.[148]

The most compelling legal argument for the adoption of a national standard is that the current state-by-state RPS is vulnerable to a Constitutional challenge.[149] Article 1, section 8 of the United States Constitution gives Congress the power to "regulate commerce amongst the several states."[150] Implied within the Commerce Clause is a dormant Commerce Clause. Because of the power granted to Congress to regulate commerce amongst the states, conversely inferred is that no state can pass legislation that improperly burdens or discriminates against interstate commerce.[151] The main factor in determining if a state law violates the dormant Commerce Clause is whether the state law discriminates against those living out of state or whether those living in-state or out of state are treated similarly.[152] As a general rule, discriminatory state laws are not upheld and laws that are not discriminatory are validated.[153] Many factors surrounding the energy industry contribute to the potential conflict between the state-by-state RPS standard and the dormant commerce clause. Whether or not the source of electric current is renewable or non-renewable, it all crosses state lines[154] Further, utilities service areas often incorporate multiple states. Thus, how a state defines its RPS policy could have a significant effect on individuals in another state.

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[146] *Id.* at 9.
[147] *Id.* at 10.
[148] *Id.* at 10.
[149] Cooper & Sovacool, *supra* note 143, 11.
[150] US Const. art. 1, § 8. This part of Article 1, § 8 is commonly referred to as the Commerce Clause.
[151] ERWIN CHEMERINSKY, CONSTITUTIONAL LAW: PRINCIPLES AND POLICES 419 (3rd ed. 2006).
[152] *Id.* at 431.
[153] *Id.*
[154] Patrick R. Jacobi, *Renewable Portfolio Standard Generator Applicability Requirements: How States Can Stop Worrying and Learn to Love the Dormant Commerce Clause*, 30 VT. L. REV. 1079, 1094 (2006).

For example, it is likely that the Supreme Court would invalidate New Mexico's RPS policy on a dormant Commerce Clause challenge.[155] The relevant New Mexico statute begins neutrally. It describes different factors that utilities should observe when trying to decide what renewable producers they should purchase from; it lists cost, reliability and flexibility.[156] In the next sentence, however, the statute violates the dormant Commerce Clause: "Other factors being equal, preference shall be given to renewable energy generated in New Mexico."[157] It is clear that this is a statement giving preferred treatment to those within the state.[158] Indeed, several states have various RPS policies that could run afoul of the dormant Commerce Clause.[159]

Utilities have gone to court over the vague language in state RPS laws in Connecticut, Iowa, Massachusetts, and New Mexico. As of yet, no one has brought a successful dormant Commerce Clause challenge against any of the State RPS policies.[160] However, if this happens, there is a significant risk that utility companies across the nation will follow with similar litigation that could collapse the entire state-based RPS structure.[161] The addition of a national RPS policy would eliminate possible dormant Commerce Clause challenges. Further, it would provide even stronger support for the development of the wind industry in Virginia and the rest of the nation.

C. Legal Hurdles for Wind Power Development

State and national RPS policies, as well as the production tax credit, provide significant incentive for wind power development. Nonetheless, significant federal and local legal barriers still exist. Some of the largest hurdles for wind development typically include concern for avian life. Nuisance claims and state zoning regulations provide additional challenges

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[155] *Id.* at 1120.
[156] *Id.* at 1120. *See also* N.M. Code R. § 17.9.572 (Weil 2004).
[157] N.M. Code R. § 17.9.572.10 (A)(1) (Weil 2004).
[158] Jacobi, *supra* note 154, at 1121.
[159] *Id.* at 1121-23. Jacobi discusses Texas, New York, and Arizona as being states with various dormant commerce clause challenges. *Id.* Cooper and Sovacool include California, Washington, Maryland, Nevada, New Jersey, Pennsylvania, and the District of Columbia as states that are also vulnerable to Constitutional challenges. Sovacool & Cooper, *supra* note 143, at 11.
[160] *See generally id.* at 1095-1107.
[161] *Id.*

to developers. Still, these challenges are not insurmountable, and could be significantly eased with assistance from Congress and state legislatures.

1. Environmental Impact on Avian Species

One of the few environmental concerns facing the development of wind energy is the effect building turbines have on avian species in the area.[162] This first became an issue in the 1980's, when California built one of the largest known wind farms in existence at that time along the Altamont Pass.[163] Altamont Pass is home to a substantially high population of raptors. As a result, the development of wind turbines in the area resulted in a significant number of avian deaths.[164]

Recent developments in wind energy technology have reduced the effect on avian life. Today's turbines have larger blades, spin more slowly, and are mounted on tubular towers instead of the more traditional ladder structure.[165] Further, recent studies specifically examining the effect of modern turbines on avian species—and other flora and fauna—have yielded promising results. The Bonneville Power Administration ("BPA") published a report on avian and bat mortality that indicated that the Altamont Pass was indeed an exception to the rule and not the rule itself.[166] In comparing avian and bat mortality rates using data from more than 30 study areas at 15 wind projects, the study found that more than 74,000 communications towers—radio, TV, cellular and microwave—in the U.S. kill an estimated 4-5 million birds per year.[167] "By contrast, according

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[162] U.S. Dep't of Energy, Environmental Impact? http://www.eere.energy.gov/windand hydro/windpoweringamerica/ne_issues_environment.asp (last visited Oct. 10, 2008); John Arnold McKinsey, *Regulating Avian Impacts under the Migratory Bird Treaty Act and other Laws: The Wind Industry Collides with One of its Own, The Environmental Protection Movement*, 28 ENERGY L.J. 71, 72-73 (2007).

[163] U.S. Dep't of Energy, *supra* note 162; McKinsey, *supra* note 162, at 85-86.

[164] U.S. Dep't of Energy, *supra* note 162; McKinsey, *supra* note 162, at 85-86.

[165] U.S. Dep't of Energy, *supra* note 162; McKinsey, *supra* note 162, at 84-85. The traditional ladder structure, similar to those used for cellular and transmission towers, provide a natural perch for birds. Like a moth to a flame, a bird would come to perch but instead meet their untimely demise.

[166] BONNEVILLE POWER ADMINISTRATION (BPA), FINAL SYNTHESIS AND COMPARISON OF BASELINE AVIAN AND BAT USE, RAPTOR NESTING AND MORTALITY INFORMATION FROM PROPOSED AND EXISTING WIND DEVELOPMENTS 46 (2002), *available at* http://www.bpa .gov/Power/pgc/wind/Avian_and_Bat_Study_12-2002.pdf.

[167] AMERICAN WIND ENERGY ASSOCIATION, AWEA COMMENTS ON INTERIM WIND/AVIAN GUIDELINES 4 (2007), *available at* http://www.awea.org/policy/documents/CommentsUSFWLS 12-8-03.pdf.

to a 2001 study of U.S. turbine impacts, based on more than 15,000 turbines (including 11,500 in California), estimated mortality is in the range of 10,000 to 40,000 per year."[168] In other words, the average number of avian fatalities per year is about 2.19 for all birds and 0.033 for raptors for all operating wind projects.[169] The ratio would be lower if not for the high rate of raptor mortality observed in California's Altamont Pass, which is not typical of wind power sites developed in the past 10 years.[170] In comparison, each communication tower kills approximately 60.81 birds per year.[171]

Offshore wind farm results have been similar to that of modern inland wind farms. Denmark recently conducted a monitoring program costing 11 million Euros on the effects of wind turbines on fauna and flora, foraging and migrating birds, reaction of waterfowl, and marine mammal behavior and impact of electromagnetic fields on fish.[172] The monitoring demonstrated that birds diverted their flight paths by 3km during the day and 1km during the night to avoid offshore wind turbines.[173] Radar and video monitoring also suggests that the risk of collision between a bird and a turbine is less than one thousandth of a percent.[174]

An even more pressing concern is the effect that wind turbines will have on endangered species of birds. Several laws govern the protection of endangered species of birds and other wildlife.[175] To respond to this concern, the U.S. Fish and Wildlife Service ("USFWS") issued interim guidelines on developing wind energy projects in compliance with the Endangered Species Act ("ESA") and the Migratory Bird Treaty Act ("MBTA").[176] Proper avian studies of a site need to be taken to conform compliance to federal laws protecting wildlife. Nonetheless, strong evidence shows that the high avian mortality rates like those in the Altamont Pass are a rare exception, rather than the rule.

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[168] *Id.*
[169] *Id.*
[170] *Id.*
[171] *Id.* (detailing that 74,000 communication towers kill between 4 and 5 million birds per year).
[172] Benjamin K. Sovacool, Hans H. Lindboe, & Ole Odgaard, *Is the Danish Wind Energy Model Replicable for other Countries?*, 21 ELECTR. J. 27, 33 (2008).
[173] *Id.* at 33-34.
[174] *Id.* at 34.
[175] *See* Migratory Bird Act, 16 U.S.C. § 703(a) (2006); Bald Eagle Protection Act, 16 U.S.C. § 668 (2006); Endangered Species Act, 16 U.S.C. §§ 1531-1544 (2006).
[176] U.S. Dep't of Energy, *supra* note 162.

2. Nuisance Law and Zoning Concerns

a. Nuisance Law Involving Wind Turbines

Nuisance complaints and zoning concerns are often the most difficult legal hurdles to wind farm development projects. Although wind power provides an economically efficient and environmentally friendly method of generating electricity, landowners surrounding potential projects often do not want wind turbines to be built near their property. One common complaint is that wind turbines produce noise and safety hazards that interfere with one's right to the quiet enjoyment of their property. Another common complaint is that wind farms constitute an eyesore that decreases property value. Often these landowners file nuisance complaints in hopes of obtaining an injunction for projects near their property.

Litigation against the Mount Storm wind farm project in West Virginia is an excellent example of such claims. On April 2, 2003, the Public Service Commission ("PSC") granted NedPower Mount Storm, LLC a certificate of convenience and necessity to construct and operate a wind farm along the Allegheny Front in Grant County.[177] In response, seven homeowners, each living up to two miles from the project, filed a complaint in the Circuit Court of Grant County seeking to permanently enjoin NedPower Mount Storm, LLC and the project's contracted buyer, Shell WindEnergy Inc., from constructing and operating the wind power facility.[178] The landowners alleged that the wind power facility would create a private nuisance. Specifically, the appellants asserted that they will "be negatively impacted by noise from the wind turbines; the turbines will create a 'flicker' or 'strobe' effect when the sun is near the horizon; the turbines will pose a significant danger from broken blades, ice throws, and collapsing towers; and the wind power facility will cause a reduction in the appellants' property values."[179]

The circuit court granted a motion for judgment on the pleadings in favor of NedPower Mount Storm, stating that most of the assertions made by the landowners concerned activities that constitute a public, rather than a private nuisance; that a prospective injunction was not a proper remedy in this case because the wind facility is not a nuisance *per se* and did not constitute an impending or imminent danger of certain effect; and that the PSC's approval of the facility collaterally estops the

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[177] Burch v. Nedpower Mount Storm, 220 W.Va. 443, 449, 647 S.E.2d 879, 884 (W. Va. 2007).
[178] *Id.* at 885.
[179] *Id.*

appellants from challenging it in circuit court.[180] The Supreme Court of West Virginia subsequently overturned that ruling in *Burch v. Nedpower Mount Storm, LLC*, and remanded the case back to the lower court.[181] The retrial is currently pending.

Such litigation can be disastrous to wind development projects. In this case, NedPower Mount Storm, received a certificate of convenience and necessity from the PSC in order to begin development in April, 2003. Nearly five years later the project is still tied up in litigation, causing costly delays and uncertain results for investors. One of the main problems is that the legal milieu in regards to wind power has remained largely unregulated and unlitigated over the years.[182] As a result, there exists little legal precedent as to whether wind turbines constitute a nuisance.

Discussions of potential legal battles over Highland County and other proposed ridgeline projects in Western Virginia are beginning to emerge.[183] The grassroots effort to stop the Liberty Gap project, a project that borders Virginia and West Virginia, was spearheaded by Friends of Beautiful Pendleton County. According to one of its members, it cost $87,000 to challenge the company's application.[184] On can expect opposition to the project to be as expensive as $250,000 in the future, as Liberty Gap has likely learned from its mistakes.[185]

Some members of the Commonwealth's legislature are trying to make the legal milieu easier for developers of wind farms. In January 2008, Virginia State Senator Frank Wagner submitted Senate Bill 324 to the Commerce and Labor Committee of the General Assembly.[186] The bill "would exempt all electric facilities that generate and distribute renewable energy with a capacity of no more than fifty megawatts," from state environmental regulations and requirements.[187]

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[180] *Id.*
[181] *Id.* at 895.
[182] *See* Asher Price, *For Better or Worse, Wind Power Loosely Regulated*, AMERICAN-STATESMAN, Jan. 14, 2008, *available at* http://www.statesman.com/news/content/news/stories/local/01/14/0114wind.html.
[183] James Jacenich, *Is another wind battle in Pendleton County's future?*, THE RECORDER, Jan. 24, 2008, *available at* http://www.therecorderonline.com/news/2008/0124/News/003.html.
[184] *Id.*
[185] *Id.*
[186] Laura Burns, *Bill Would Strike a Blow for Highland Wind Farm*, THE HOOK, Jan. 21, 2008, *available at* http://www.readthehook.com/blog/index.php/2008/01/21/bill-would-strike-a-blow-for-highland-wind-farm/.
[187] *Id.*

Rick Webb, a senior scientist at the University of Virginia believed the passage of the bill would be crucial to the Highland County wind farm's success.[188] Without it, he claims, Highland New Wind would face potentially devastating repercussions for violations of the Endangered Species Act.[189]

Webb's claim is partially incorrect. Even if the General Assembly passed Bill 324, and developers of wind farms under 50-megawatts did not have to abide by state environmental regulations and requirements, developers and operators would still have to abide by federal regulations.[190] The only effect the bill would have is on any state environmental policies that are not already in place prior to federal regulation.

Given that there are no major wind turbines in operation in Virginia to date, there is no case law in Virginia that has ruled on whether a wind turbine is a nuisance *per se*. Indeed, there is little case law in any state that has ruled on the nuisance status of wind turbines. One case that speaks on the subject in the Great Plains is *Rassier v. Houim*.[191] In *Rassier*, a resident erected a tower and installed a wind generator on his residential lot.[192] Subsequently, a neighbor sued, claiming that the wind generator was a private nuisance.[193] Ultimately the court ruled that the wind generator was not a private nuisance.[194]

Although this ruling is positive, there are some distinguishing factors that need to be taken into consideration when attempting to analogize for possible future litigation in Virginia over wind turbine nuisance. First, the case occurred in North Dakota. Yet, the standard for nuisance is very similar in both North Dakota and Virginia. In North Dakota, a nuisance consists of "unlawfully doing an act or omitting to perform a duty, which act or omission: 1. Annoys, injures, or endangers the comfort, repose, health, or safety of others; . . . 4. In any way renders other persons insecure in life or in the use of property."[195] Specifically, North Dakota describes a private

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[188] *Id.*
[189] *Id.*
[190] *See* Missouri v. Holland, 252 U.S. 416 (1920). The court rejected the claim that state sovereignty and the Tenth Amendment limit the scope of the treaty power. "In *Missouri v. Holland*, the Supreme Court upheld the constitutionality of a treaty between the United States and Great Britain protecting migratory birds." ERWIN CHEMERINSKY, CONSTITUTIONAL LAW: PRINCIPLES AND POLICES 282 (3rd ed. 2006).
[191] Rassier v. Houim, 488 N.W.2d 635 (N.D. 1992).
[192] *Id.* at 636.
[193] *Id.*
[194] *Id.* at 638-39.
[195] N.D. CENT. CODE §42-01-01 (2008).

nuisance as one that affects a single individual or a determinate number of persons in the enjoyment of some private right not common to the public.[196]

Virginia case law has defined nuisance very similarly. In Virginia, the term nuisance includes "everything that endangers life or health, or obstructs the reasonable and comfortable use of property."[197] However, the Virginia court further defined the scope of that meaning, stating that every trifling or imaginary annoyance that may offend the sensibilities of a fastidious person is not actionable.[198] The main element Virginia courts look for to determine if a nuisance exists is whether the action caused substantial damage to the plaintiffs, regardless of the location of the plant and the nature and importance of its operation.[199]

The second distinguishing factor in *Rassier* is that the wind generators in question in that case were of residential scale.[200] Most wind projects that receive negative attention today are large-scale projects involving turbines much bigger than the generator in *Rassier*. The difference in scale could result in increased factors that may render its operation more likely a nuisance. Nonetheless, those filing nuisance complaints in Virginia may find it hard to prove that wind turbines produce a non-trivial threat to the life, health, or reasonable and comfortable use of property.

b. Zoning Issues Involving Wind Turbine Development in Virginia

Obtaining the proper zoning permit to develop a wind farm in a particular area can be one of the most difficult steps in the process of wind farm development. State governments have the power to enforce regulations promoting the health, welfare, and safety of its citizens.[201] "States delegate zoning power to individual municipalities through general legislation often called zoning enabling acts. This legislation delegates power to municipalities to promulgate zoning laws regulating the type and level of use in different districts within the municipality."[202]

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[196] N.D. CENT. CODE §42-01-02 (2008).
[197] Barnes v. Quarries, Inc., 204 Va. 414, 417, 132 S.E.2d 395, 397 (1963).
[198] *National Energy Corp. v. O'Quinn*, 223 Va. 83, 85, 286 S.E.2d 181, 182 (1982) (citing Bragg v. Ives, 149 Va. 482, 496, 140 S.E. 656, 660 (1927).
[199] Smith v. The Pittston Company, 203 Va. 711, 715, 127 S.E.2d 79, 82 (1962).
[200] Rassier,488 N.W.2d. at 635.
[201] *See Village of Euclid v. Ambler Realty Co.*, 272 U.S. 365, 389-390 (1926).
[202] JOSEPH WILLIAM SINGER, PROPERTY LAW: RULES, POLICIES AND PRACTICES 911 (4th ed. 2006).

In Virginia, each locality is given the authority to create a local planning commission that decides zoning regulations for that locality.[203] It is these planning commissions that need be convinced that development of wind farms fits within the overall comprehensive plan of development for the area. For the Highland County project, Virginia's only major turbine development to date, the local planning commission of Highland County adopted a resolution in July 2005 granting Highland New Wind a conditional use permit necessary to build the wind plant.[204]

The property that New Wind sought to have zoned for wind turbine use is located in an agricultural zoning district, zone A-2.[205] In addition, New Wind had to apply for an amendment to the zoning ordinance because the turbine height, standing at about 400 feet, exceeds the maximum height permitted by the zoning ordinance.[206] The zoning ordinance designates zone A-2 as a district in which "construction of an electric generation substation is permitted only after the governing body finds, as a fact, that the proposed use is compatible with surrounding uses, is consistent with the intent of this ordinance and of the Land Element of the Comprehensive Plan, is in the public interest and will comply with all other provisions of law and ordinances of Highland County or the Town of Monterey."[207]

As a result of the county permitting development of the wind farm, "several owners of property adjoining the proposed wind turbine site filed a bill of complaint for declaratory judgment in the circuit court alleging that the Board acted in an arbitrary and capricious manner, and without authority, in approving the height amendment."[208] Other landowners filed a separate bill of complaint for declaratory judgment against Highland County and New Wind, alleging that the conditional use permit was invalid because the planning commission had not made a determination on whether the permit was in substantial accord with the comprehensive plan (as required by VA. CODE ANN. § 15.2-2232).[209] The circuit court granted partial summary judgment in favor of Highland County and New Wind, holding that the height amendment was valid and that the conditional use

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[203] *See* VA. CODE ANN. § 15.2-2210. Local planning commissions means either a municipal planning commission or a county planning commission. VA. CODE ANN. § 15.2-2201.
[204] Miller v. Highland County, 650 S.E.2d 532, 534 (Va. 2007).
[205] *Id.* at 533.
[206] *Id.*
[207] *Id.* at 533-34 (quotations omitted).
[208] *Id.* at 534 (parenthetical omitted).
[209] *Id.*

permit was properly issued even though the planning commission did not make its substantial accord determination under the Code § 15.2-2232.[210]

The circuit court ordered a bench trial on whether the Board made factual finds that complied with the requirements of the ordinance, where the County ultimately prevailed.[211] The landowners continued to appeal to the Virginia Supreme Court on a question of error in not allowing the court to hear the substantial accord challenge.[212] Ultimately, the court ruled in favor of Highland County and New Wind, helping to continue to pave the way for wind development in Virginia.[213]

CONCLUSIONS

Wind power in Virginia is a viable solution that could provide citizens of the Commonwealth with a clean and efficient source of electricity generation. The coastal and mountain regions provide an abundant source of wind that is ripe for development. Federal programs such as the production tax credit are vital to the industries success and should be enacted for a longer period of time to avoid the problem of the boom-bust cycle in the industry. Further, establishing a mandatory renewable portfolio standard for the Commonwealth would help ensure demand for wind development. Even better, the enactment of a federal RPS policy would ensure the development of clean, renewable energy while surpassing any potential legal conflicts over violation of the dormant Commerce Clause.

Legal hurdles facing the wind power industry also need addressing. The much written about impact on avian species can be far lessened with proper pre-development site tests. Potential lawsuits claiming that wind turbines present a nuisance may be inevitable; however, such suits may find it difficult to prove that the turbines present a threat to health, life, or quiet enjoyment of property. Finally, much power is held in the zoning boards to decide whether sites can be developed for wind farms, and hopefully, other boards in Virginia will take the standard set forth by Highland County in easing restrictions for permits.

Wind energy presents a significant piece of the solution to energy independence and environmental responsibility. The Commonwealth is trending towards embracing the industry and should continue down its path of supporting wind energy development.

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[210] Miller, 650 S.E.2d at 534.
[211] *Id.*
[212] *Id.* at 540.
[213] *Id.*