North Dakota Law Review

Volume 85
Number 4 *North Dakota Energy Law: The Production, Conservation, and Regulation of Our State's Diverse Energy Sources*

Article 4

1-1-2009

Harmonious Federalism in Support of National Energy Goals — Increased Wind Renewable Energy

Ronald H. Rosenberg

HARMONIOUS FEDERALISM IN SUPPORT OF NATIONAL ENERGY GOALS— INCREASED WIND RENEWABLE ENERGY

RONALD H. ROSENBERG*

ABSTRACT

American energy policy has slowly begun to change the mix in the sources of supply of electricity to residences, industry, and businesses. Renewable sources of electricity have been promoted as future contributors of large portions of the nation's electricity consumption. Wind power has been identified as a potentially substantial future electricity source contributing up to 20% of American demand by 2030. To achieve these optimistic goals, there must be: (1) cost-effective, reliable energy technology; (2) sufficient investment capital to finance new construction; and (3) the existence of supportive governmental policies at all levels of government. This article discusses the importance of inter-governmental policy support for the emerging wind power industry in America. It concludes that federal and state policies have been harmonious in their encouragement of wind power over the past three decades, but that the states have led the way. The crucial policy frontier that will ultimately determine the success of wind power in America, will be the development of laws and policies improving the availability of transmission capacity needed to move the wind-generated electricity to where it is most needed.

I. INTRODUCTION

The pressure for changing American energy patterns is growing. Evidence supporting this observation is reflected both in emerging public policy and in consumer behavior. Over the last several years, federal and state programs and policies have emphasized greater support for energy conservation and for the development of renewable forms of energy such as solar, wind, and hydropower. At the same time, consumers have participated in this movement by increasing their purchases of fuel-efficient and electric vehicles as well as other energy-efficient consumer products. Much of this governmental policy and private change is the result of heightened awareness of the adverse impacts of energy use resulting from the generation of greenhouse gas emissions and global warming effects. As the

global scientific consensus has coalesced around the idea that human activities actually do contribute to climate change through the combustion of carbon-based fuels,[1] policy makers in the United States and abroad have begun to consider ways to reduce our reliance on those energy sources.[2] While upgraded energy conservation efforts could help to limit the growth rate in overall electricity consumption,[3] most expert predictions of our future national energy use anticipate even higher levels of consumption,

---

*Associate Dean of Academic Affairs, Chancellor Professor of Law, William and Mary Law School.

1. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (2007), *available at* http://www.ipcc-wg3.de/publications/assessment-reports/ar4/working-group-iii-fourth-assessment-report (detailing an in depth analysis of the costs and benefits of mitigating and avoiding climate change). The IPCC report also has its skeptics who dispute the existence of human-caused global warming. *See* John M. Broder, *Climate-Change Debate is Heating Up in Deep Freeze*, N.Y. TIMES, Feb. 11, 2010, at A1; Elisabeth Rosenthal, *Skeptics Find Fault With U.N. Climate* Panel, N.Y. TIMES, Feb. 8, 2010, at A1. However, the overwhelming majority of scientific analysis has supported the IPCC view. As President Obama noted in his January 2010 State of the Union speech, despite those who take issue with the "overwhelming scientific evidence on climate change," most nations have determined that climate change is a real and serious threat to current living conditions. President Barack Obama, State of the Union Address (Jan. 27, 2010), *available at* http://stateoftheunionaddress.org /2010-barack-obama. Recently, the United States Global Change Research Program, a collection of thirteen federal departments and agencies, released its Global Climate Change: Impacts in the United States report, which reaffirmed that global warming is "unequivocal and primarily human-induced." GLOBAL CLIMATE CHANGE IMPACTS IN THE UNITED STATES (Thomas R. Karl et al. eds., Cambridge University Press, 2009), *available at* http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf.

2. Efforts to encourage renewable energy sources derive from businesses as well as media. Many companies are promoting their commitment to renewable energy and energy conservation increases daily. A new trend is for companies to register themselves as renewable energy companies. *See* Welcome to the Source Guides, http://www.sourceguides.com/energy/businesses/byN/byNameS.shtml (last visited Apr. 14, 2010) (listing renewable energy businesses in the world by Business Name). Media, most noticeably blogs, also have a large impact in affecting the consumer knowledge about availability of renewable energy. *See also* Renewableenergy.com, http://www renewableenergyworld.com/rea/home (last visited Apr. 14, 2010) (providing renewable energy news and information). Even in politically conservative states, the initiative to reduce carbon emissions has been advanced under the rubric of cleaning up carbon pollution and developing green jobs. Thomas L. Friedman, *How the GOP Goes Green*, N.Y. TIMES, Feb. 28, 2010, at WK10.

3. Modern energy efficient appliances use significantly less energy. Energy-efficient 2009 refrigerators use 40% less energy than 2001 models. If every household in the United States traded in 10 year or older appliances for new ones, over 17 billion kilowatt hours (kWh) of electricity would be saved annually and 27 billion pounds of CO_2 emissions reduced. Ecosavings Calculator, http://www.electrolux.com/ecosavings_us (last visited Apr. 24, 2010). A 2009 study from McKinsey and Company proved replacement of old appliances is one of the most efficient global measures in reducing greenhouse gas emissions. Current appliances implore power management systems and have an idle mode that uses low energy when not used. The Energy Star label is used in many countries for consumer identification of energy-efficient appliances. *See also White Roofs Could Reduce Urban Heating*, LIVE SCIENCE, Jan. 30, 2010, *available at* http://www.livescience.com/environment/warming-white-roofs html (explaining that the installation of white roofs in major urban areas could mitigate the urban heat island effect and help reduce the cooling costs and power needs for city buildings).

especially in the use of electricity.[4] Likely American population growth, and the increased reliance on electricity in transportation and other uses, are expected to result in higher overall electrical demand. To have any chance to meet national and international environmental and climate change goals,[5] the United States will need to increasingly diversify its domestic supply of electricity so that we may reduce, even in a marginal way, our existing, heavy reliance on carbon-based fuels. Moving to a greater use of renewable, non-carbon emitting electricity will undoubtedly be part of the solution. Hydro, wind, solar, biomass, and geothermal sources comprise existing renewable energy technologies, while the future may see the development of other methods with competitive efficiencies and costs. However, for this to occur, the shifting mix of energy technologies must satisfy the basic criteria of supplying reliable electrical power at a reasonable cost in a less environmentally harmful way. Satisfying this complicated equation is the essential challenge in our national energy future.

After many decades of reliance on traditional forms of electricity, domestic energy policy has also begun to change. The disadvantages of costly and environmentally-damaging fossil fuels[6] have focused our national attention on the development and operation of alternative sources of electricity that once were considered technically infeasible or economically noncompetitive. The complex and decentralized industry that produces and delivers electricity to American industrial, commercial, and

---

4. The United States Department of Energy (DOE) projects that American energy consumption will steadily increase throughout the next two decades with an estimated growth from 100 quadrillion British thermal units (Btus) to nearly 111 quadrillion Btus between 2008 and 2030. *See* U.S. DEP'T OF ENERGY, ENERGY INFO. ADMIN., REP. NO. DOE/EIA-0383, ANN. ENERGY OUTLOOK 2010 EARLY RELEASE OVERVIEW tbl. 1 (2009), *available at* http://www.eia.doe.gov/oiaf/aeo/index html?ref=bookshelf.

5. Prior to the Copenhagen Conference on Climate Change, America promised to reduce greenhouse emissions in the range of 17% below 2005 levels by 2020 and 83% by 2050. *See* John M. Broder, *Obama to go to Copenhagen With Emissions Target,* N.Y. TIMES, Nov. 26, 2009, at A1. By January 31, 2010, the United States Government submitted its emission reduction plan to the United Nations climate change office. John M. Broder, *Countries Submit Emissions Goals*, N.Y. TIMES, Feb. 1, 2010, at A1.

6. Coal-fired power plants produce more than 50% of American electricity. Coal-fired power plants, like the Tennessee Valley Authority's Cumberland Fossil Plant in Clarksville, contribute to thousands of premature deaths each year. *Deadly Power Plants Study Fuels Debate: Thousands of Early Deaths Tied to Emissions*, MSNBC, June 9, 2004, http://www msnbc msn.com /id/5174391/. On December 23, 2008, a retaining wall at the Tennessee Valley Authority's Kingston coal-fired power plant collapsed. At the time, it was believed that 2.6 million cubic yards of fly ash was spilled across hundreds of acres. Environment News Service, http://www.ens-newswire.com/ens/dec2008/2008-12-23-091.asp (last visited Apr. 15, 2010). However, based on an aerial survey, the actual amount was estimated to be 5.4 million cubic yards, which is enough fly ash to flood 3,000 acres at a depth of one foot. *Tenn. Ash Spill Larger Than Thought*, BOSTON GLOBE, Dec. 27, 2008, *available at* http://www.boston.com/news/nation/articles/2008/12/27/tenn_ash_spill_larger_than_thought/.

residential consumers has begun to adjust to the need for new, non-carbon based sources of electricity.[7] Perhaps motivated by a desire to avoid the higher carbon taxes[8] or other regulatory costs[9] that might be imposed on the future generation of conventional, carbon-based electricity, the utility industry and independent power producers have increasingly supported the development of American wind power as a significant part of a more environmentally benign electrical power system.[10] The rapid acceleration in building utility-scale wind energy projects and placing them into service over the last several years represents one of the first steps toward realizing the goal of developing a more balanced electricity supply system in the United States that is less reliant on fossil fuels and more dependent upon renewable and other non-fossil fueled sources.[11] However, at this point, the

7. As reported by the DOE, renewable sources of energy have been steadily increasing. In 2004, 6.260 quadrillion Btus of renewable energy were produced. In 2008, 7.301 quadrillion Btus were produced. *See* U.S. DEP'T OF ENERGY, ENERGY INFO. ADMIN., U.S. ENERGY CONSUMPTION BY ENERGY SOURCE tbl. 1 (2009), *available at* http://www.eia.doe.gov/cneaf/alternate/page/renew_energy_consump/table1 html. Renewable electricity capacity (summer) has shown similar increases. In 2004, 96,357 megawatts (MW) were generated. In 2008, 115,459 megawatts were generated. *See* U.S. DEP'T OF ENERGY, ENERGY INFO. ADMIN., U.S. ELECTRIC NET SUMMER CAPACITY tbl. 4 (2009), *available at* http://www.eia.doe.gov/cneaf/alternate/page/renew_energyconsump/table4 html. Research and development on carbon sequestration and storage may play an important future role if they can be developed and used at a reasonable cost. *See* U.S. DEP'T OF ENERGY, CARBON CAPTURE AND STORAGE R&D OVERVIEW, *available at* http://fossil.energy.gov/sequestration/overview html.

8. A tax on the CO_2 emissions from burning fossil fuels is called a carbon tax. The use of high carbon fuels is reduced by economic incentive. Carbon Tax Center, Tax vs. Cap-Trade, http://www.carbontax.org/introduction/ (last visited Apr. 15, 2010). A carbon cap and trade system is an alternative approach by creating a market for CO_2 usage. Carbon Tax Center, Introduction, http://www.carbontax.org/issues/carbon-taxes-vs-cap-and-trade/ (last visited Apr. 15, 2010). President Barack Obama has introduced a climate bill that is currently pending in Congress. Under the "cap and trade" program included in that draft legislation, the amount of pollution permits would be reduced over several decades. Companies that pollute under their limit would be allowed to sell their permit rights to companies over the limit. Richard Cowan, *Factbox: Climate Change Bill Pending in Congress*, REUTERS, June 29, 2009, http://www.reuters.com/article/idUSTRE55S6F420090629. *See also* Lesley K. McAllister, *The Over-allocation Problem in Cap-And-Trade: Moving Toward Stringency*, 34 COLUM. J. ENVTL. L. 395, 426-31 (2009) (discussing the problem of setting the proper maximum level of emissions).

9. The Environmental Protection Agency (EPA) has recently announced plans to control greenhouse gas emissions through new and modified Clean Air Act stationary source standards that would apply to power plants and refineries with emissions greater than 75,000 tons per year. This regulation would begin in 2011 and 2012, and it would reach 1,700 facilities in 2011 with potential expansion to 3,000 additional plants by 2013. *See* Steven D. Cook, *Jackson Says Climate Rules Initially To Apply To Sources With Emissions Over 75,000 Tons* 41 ENVT. REP. (BNA) 464 (Mar. 5, 2010).

10. The cost of wind power has declined 80% since the 1980s and continues to become cheaper. Wind energy is one of the cheapest and cleanest renewable energy sources available. With the popularity of renewable energy many conventional electricity providers are investing in wind energy. AM. WIND ENERGY ASS'N, WIND ENERGY FACT SHEET, *available at* http://www.awea.org/pubs/factsheets/Investing_WP02.pdf.

11. Renewable sources of electricity do not represent the sole approach to reducing carbon emissions. Nuclear power has been gaining increasing governmental support as a useful and

total amount of electricity generated from all forms of renewable energy represents only 9% of the annual total,[12] with wind power constituting merely 1.25% of that amount.[13] Even this relatively small overall percentage represents a substantial achievement because it contributes to an enormous national total of electrical generation. It also masks the huge potential wind energy might have in replacing some of the existing fossil fuel generated electricity and meeting a larger portion of the nation's future demand.[14] However, there is a long way to go to make wind-generated electricity a significant component of the nation's electricity mix.[15] In

politically acceptable approach. In his January 2010 State of the Union Address, President Obama emphasized a range of energy improvements including "a new generation of safe, clean nuclear power plants in this country." He also mentioned offshore oil and gas and clean coal technology as being worthy of "incentives" and support. President Barack Obama, State of the Union Address (Jan. 27, 2010), *available at* http://stateoftheunionaddress.org/2010-barack-obama. In the February 1, 2010 submission of the proposed 2011 federal budget, $54 billion was included for new nuclear plant loan guarantees—an amount that is triple of the 2005 authorization. Two Southern Company nuclear power reactors to be built in Burke, Georgia were announced in February 2010 as the first facilities to use the new loan guarantees. Ben Feller, *AP Source: Obama to Announce Nuke Plan Loan*, HUFFINGTON POST, Feb. 12, 2010, *available at* http://www.huffingtonpost.com/huff-wires/20100212/us-obama-nuclear-plant/. Also, the DOE announced the creation of a high-level commission to study nuclear waste disposal. Matthew L. Wald, *Obama Acts to Ease Way to Construct New Reactors*, N.Y. TIMES, Jan. 30, 2010, at A13.

12. Of the electricity produced from renewable sources in 2008, hydro electric production represented 66% of the total with biomass and wind energy contributing approximately 15% each. Solar powered, photovoltaic electricity did not even make the list. U.S. DEP'T OF ENERGY, ENERGY INFO. ADMIN. tbl. 8.2a, *available at* http://www.eia.doe.gov/emeu/aer/pdf/pages/sec8_8.pdf.

13. Accelerated installation of new generating capacity in 2009 has raised wind power's contribution to U.S. electrical supply to 1.6% through the third quarter of 2009 with some estimates placing it as high as 2% for the entire year. Matt Smith, *Fact Check: Stimulus Money gave "Green" Industry Second Wind*, CNN.COM, Jan. 26, 2010, http://www.cnn.com/2010/POLITICS/01/26/fact.check.wind.power/index html?iref=allsearch.

14. In 2010, the U.S. Department of Energy's National Renewable Energy Laboratory estimated that onshore U.S. wind resources could generate nearly 37,000,000 gigawatt hours (GWh) annually, more than nine times current total U.S. electricity consumption. This evaluation represented a four-fold increase over the previous estimate made by the Pacific Northwest Laboratory in the 1990s. Expressed in other terms, the potential capacity of the domestic onshore wind resource is over 10,000 gigawatts (GW). Currently, the United States is only making use of a tiny sliver of this vast resource: current wind installed capacity is 35 GW in the U.S. and 158 GW world-wide. In this new DOE study, North Dakota and South Dakota rank 6th and 5th respectively in terms of national wind resources. U.S. DEP'T OF ENERGY, NEW WIND RESOURCE MAPS AND WIND POTENTIAL ESTIMATES FOR THE UNITED STATES, Feb. 19, 2010, *available at* http://www.windpoweringamerica.gov/filter_detail.asp?itemid=2542.

15. *Id*. Spurred on by federal financial incentives provided through the American Recovery and Reinvestment Act (ARRA), 2009 witnessed the largest increase in wind power generating capacity which grew by nearly 10,000 MW with over 4,000 MW being completed in the fourth quarter of 2009 alone. With this addition, the total U.S. wind energy generating capacity rose to over 35,000 MW marking a five year growth rate of 39%. This amount of electricity is enough to serve nearly 10 million homes with power that saved 62 million tons of CO_2 emissions that otherwise would have been emitted from fossil fuel burning plants. Am. Wind Energy Ass'n, *U.S. Wind Energy Industry Breaks All Records, Installs Nearly 10,000 MW in 2009*, Jan. 26, 2010,

order to make a significant dent in the amount of carbon-based electricity supplying our national future energy demand, we must discover and implement realistic methods to make hortatory political rhetoric pushing "green" energy and think tank study plans a real world reality.

But, how can the current small contribution of wind power to the nation's electricity supply be substantially increased? How can the expansive, yet technically achievable, goals of the 2008 United States Department of Energy (DOE) "20% Wind Energy by 2030" study be met?[16] What will be needed to make this form of renewable electricity a sizable component of our electrical supply at a level rivaling the existing production of nuclear power or natural gas?[17]

The American electric power industry is organized around a combination of over 320 investor-owned utilities, large government utilities, and rural generation and transmission cooperatives that supply electricity to more than 3,000 local distribution firms throughout the United States.[18] The largest utilities and independent power producers (IPPs) invest in generating facilities through the issuance of equity shares and debt, while providing revenue for electrical supply through the payment of charges or rates. Since energy generation is an extremely capital-intensive activity, a shift to a new technology can only follow a careful cost-benefit analysis of modifying technical approaches to electricity generation. Investment in new generating capacity represents a major, long-term financial commitment that cannot be easily replaced if it fails to provide the expected generating results. Accordingly, utilities and IPPs often make incremental improvements to their existing generating technologies and major changes in their basic generating equipment only when significant benefits have been identified. In addition, the supply of electricity requires reliability, so the new technology must have predictable characteristics in order to be integrated into the overall stream of supply.

---

available at http://www.awea.org/newsroom/releases/01-26-10_AWEA_Q4_and_Year-End_Report_Release html.

16. U.S. DEP'T OF ENERGY, 20% WIND ENERGY BY 2030: INCREASING WIND ENERGY'S CONTRIBUTION TO U.S. ELECTRICITY SUPPLY, Rep. No. DOE/GO-102008-2567 (2008) [hereinafter 20% Wind by 2030 Report]. In August 2008, presidential candidate Barack Obama announced a 25% renewable energy goal to be achieved by 2025 as part of his New Energy for America plan. BarackObama.com, New Energy for America, http://www.barackobama.com/issues/newenergy/index.php (last visited Apr. 15, 2010).

17. In 2008, electricity produced by natural gas and nuclear energy comprised 21.3% and 19.6% of the annual total U.S. generation respectively. U.S. DEPT. OF ENERGY, ENERGY INFO. ADMIN., ANN. ENERGY REV. 2008 tbl. 8.2a, *available at* http://www.eia.doe.gov /emeu /aer/pdf/pages/sec8_8.pdf.

18. 20% WIND BY 2030 REPORT, *supra* note 16, at 135.

Focusing on wind power, the sizable increase in generating capacity installed, and operating over the last several years, results from the coincidence of three critical factors: (1) the availability of a cost-effective, reliable energy technology that could be manufactured and installed on a utility scale by reliable suppliers; (2) the availability of sufficient investment funding from the capital markets and corporate investors to finance the new construction of wind power turbines and related equipment; and (3) the existence of supportive and multi-faceted governmental policies providing favorable financial and regulatory support for the new technology. Attaining optimistic renewable energy goals like those set forth in the 2008 DOE report will require that these three factors continue to exist and function even more effectively in order to scale up wind energy production.[19] Maintaining a consistent, long-term, supportive government policy environment will be especially important[20] for wind power to become a significant contributor to the nation's energy future.[21]

This article will concentrate on the third element necessary for the future growth of wind power—government policy support. Much attention has been focused on recent advances and potential future measures to promote federal energy law and policy suggesting the primacy of the federal government in the energy field. While federal initiatives and resources are certainly important, they do not represent the exclusive, nor necessarily the

19. ENERNEX CORP., NAT'L RENEWABLE ENERGY LAB., EASTERN WIND INTERGRATION AND TRANSMISSION STUDY: EXECUTIVE SUMMARY AND PROJECT OVERVIEW 10-11 (2010), http://www nrel.gov/wind/systemsintegration/pdfs/2010/ewits_executive_summary.pdf. Wind energy could supply 225,000 MW of power, or 20% of the electricity for the eastern half of the U.S. by 2024 according to a recent DOE study. *Id.* at 13. A public-private investment of approximately $90 billion would be needed for onshore and offshore turbine installation and for 22,000 miles of new electrical transmission capacity to make this renewable energy a reality. *Id.* at 24.

20. The DOE's 20% Wind by 2030 Report relies on several assumptions including financial predictions that the U.S. economy will be stable. 20% Wind by 2030 Report, *supra* note 16, at 3. The U.S. Energy Information Administration (EIA) predicts U.S. electricity demand increasing by 39% from 2005 to 2030. *Id.* at 1-2, 12, 133. The final calculations foresee new electricity needs rising by more than 50% from 2005 to 2030 due to older sources of energy running out. *Id.* at 133. Wind energy may be a viable energy source for meeting a substantial portion of this growing demand. *Id.* The DOE's 20% Wind by 2030 Report relies on several other assumptions: an inflation rate of 3%, a marginal tax rate of 40%, and a nominal interest rate during construction of 10%. *Id.* at 169. The 20% wind energy model could replace 50% of electric utility natural gas consumption by 2030. *Id.* at 12. This is an impressive 11% reduction in natural gas for all industries. *Id.* Coal consumption would be reduced by 18%. *Id.*

21. Investor T. Boone Pickens has announced a plan to develop wind power and natural gas. He has declared that the United States can become "the Saudi Arabia of Wind." *See* Pickens Plan, The Plan: America is Addicted to Foreign Oil, http://www.pickensplan.com/theplan/ (last visited Apr. 10, 2010). Doubters exist who believe fundamental limitations associated with wind power will limit its potential for replacing conventional sources of power generation. *See* William O'Keefe, *Solar and Wind Can't Replace Conventional Power Generation*, WASH. POST, Feb. 3, 2010, *available at* http://views.washingtonpost.com/climate-change/panelists/williamokeefe/2010/02/solar_and_wind_cant_replace_conventional_powergeneration html.

most important, energy policy initiatives taken to date. This emphasis on federal action also ignores the reality that the states have taken the lead over the past three decades in devising a wide range of programs and policies that have successfully promoted renewable energy and wind power development. Using the metaphor from Justice Louis D. Brandeis's famous dissent from *New State Ice Co. v. Liebmann*,[22] the states have truly been "laborator[ies]" for novel policy experiments when it has come to encouraging "green" power through a variety of regulatory and subsidy mechanisms.[23] In the absence of a sweeping federally preemptive law, the states, as the partners in federalism with the national government, retain their freedom to choose their own policies regarding energy supply and consumption within their jurisdictions.[24] Within our multi-tiered system of governance, coordination to reach national policy objectives can be difficult to achieve due to differing policy preferences, to the uneven distribution of authority, and to the uncertainty surrounding the boundaries between the policies of different governmental units. Harmonious integration of governmental policy at all levels will be a necessary condition for the long-term development of wind power in America.

The key inquiry will be to determine the optimal federal-state government policy and program mix that will support the private market initiatives currently being considered to increase the supply of wind-generated electricity. The first section of the article will briefly describe U.S. historic and projected electricity demand patterns, as well as the growth of renewable energy as a component of American electrical supply. After analyzing this information, the discussion will focus on the growth potential for wind-generated electricity to serve American consumers, industries, and other users. The second part of the article will analyze current federal policy as it affects renewable energy production, generally, and wind power,

---

22. 285 U.S. 262 (1932).

23. *New State Ice Co.*, 285 U.S. at 311 (Brandeis, J., dissenting). Justice Brandeis wrote in dissent against a majority opinion striking down, as a violation of 14th Amendment substantive due process, an Oklahoma statute prohibiting the manufacture, distribution, and sale of ice without a certificate of public convenience and necessity. *Id.* This "laboratories of democracy" quote has found its way into numerous Supreme Court opinions in later years. *See, e.g.*, United States v. Lopez, 514 U.S. 549, 581 (1995) (Kennedy, J. concurring); United States v. Morrison, 529 U.S. 598, 618 (2000).

24. In theory, this state policy autonomy might span a wide range of positions from being obstructionist, to indifferent, to wholly supportive of a particular form of energy supply such as wind power. It is worth noting that limits to this form of state action would exist if the state policies had the effect of unconstitutionally interfering with interstate commerce or violating other constitutional norms or statutory rights. *See generally* Steven Ferrey, *Goblets of Fire: Potential Constitutional Impediments to the Regulation of Global Warming*, 35 ECOLOGY L.Q. 835, 839-42 (2008) (describing potential Commerce Clause, preemption, Compact Clause, and extra-constitutional limits).

specifically. This section will evaluate the strengths and weaknesses of the changing mix of our national energy policies with an emphasis on wind power, and it will attempt to identify the essential federal interest in renewable power production. The third segment of the article will examine state law and policies supporting wind power, and identify a template of state "best practices" that could serve as a model for states wishing to encourage the development of their wind power generation potential. Finally, the article will conclude that, in general, state and federal wind power policy has been consistent over the last three decades in supporting wind power, but that the states have developed a broader and deeper array of techniques to encourage the fledgling industry. Ultimately, inter-governmental policies should be maintained with new attention given to improving the availability of transmission capacity needed to carry expanded renewable power generation. To achieve this expansion will require the integration of state and federal law and policy in a way that fosters more inter-governmental cooperation.

II. ELECTRICITY IN AMERICA—LOOKING BACKWARD AND MOVING FORWARD

In order to comprehend the scope of energy policy issues in the United States, it is necessary to comprehend the trends of American energy production and consumption. As a measure of overall energy consumption, in 1978, America used 79.986 quadrillion Btus from fossil fuels, nuclear electric power, and renewable energy.[25] This represented the highest national energy consumption of any nation in the world.[26] These statistics also relate to total energy consumption, including petroleum products, and not only to the national consumption of electricity. By 2008, this total had grown to 99.304 quadrillion Btus, an increase of 24.1% over 30 years for an average increase of 0.8% per year.[27] By comparison, the United States' resident population growth over this same period was 36.8%, for an average increase of 1.23% per year, suggesting that per capita energy use has been reduced through the introduction of energy conservation methods.[28] Unknown to most Americans, the United States' overall energy consumption patterns have actually shifted toward non-fossil fuels during this same

25. ENERGY INFO. ADMIN., ANN. ENERGY REV. tbl. 1.1 (2008).

26. U.S. ENERGY INFO. ADMIN., INTERNATIONAL ENERGY STATISTICS, *available at* http://tonto.eia.doe.gov/cfapps/ipdbproject/IEDIndex3.cfm.

27. ENERGY INFO. ADMIN., *supra* note 26.

28. U.S. Census Bureau, Population: 1960 to 2008, http://www.census.gov/compendia/statab/2010/tables/10s0002.pdf (last visited May 2, 2010).

three decade period.[29] Over this period of time, renewable sources of energy have stayed remarkably static at 6 - 7% of the energy mix with wind power representing a small fragment of that total.[30]

Looking forward, American energy consumption is projected by the United States Energy Information Administration to rise by approximately 1% per year from 2003 to 2030, to reach a total of 133.9 quadrillion Btus in 2030.[31] Under this prediction, domestic energy consumption would grow by 1.2% per year.[32] This estimate states that all renewable sources of energy would increase by an annual rate of approximately 1.8%, and by 2030 renewable energy would constitute approximately 10% of the domestic energy production.[33] While the definition of renewable energy does not have a fixed meaning, it usually includes hydroelectric, biomass, wind, geothermal, and solar energy. Notably, this projected rate of increase for renewable energy production would be double the overall rate of energy production. This bullish view of American renewable energy is further reinforced by the International Energy Agency's estimate of world-wide energy trends indicating that renewable energy would increase globally by 14%.[34] In China, the current government renewable energy target is even more aggressive with the goal of having 8% of the nation's electricity supplied by wind, solar, and biomass sources by 2020.[35] While such energy assessments represent attempts at modeling complex systems of supply and demand, they do present an educated guess concerning future energy trends.[36]

---

29. The distribution of energy consumed in the United States for fossil/nuclear/renewable energy has drifted from 89.8%/3.8%/6.3% in 1978 to 84.0%/8.5%/7.4% in 2008, revealing a small shift away from fossil fuels with a commensurate increase in nuclear and renewable energy sources. ENERGY INFO. ADMIN., *supra* note 25, at tbl. 1.1.

30. *Id.*

31. ENERGY INFO. ADMIN., INT'L ENERGY OUTLOOK (2006), *available at* http://www.eia.doe.gov/oiaf/ieo/pdf/ieoreftab_1.pdf.

32. *Id.*

33. *Id.*

34. The global scenario predicts that in 2030, 17-29% of the heat and electricity demand can be provided by renewable energy technologies. *See* STEFAN PETER & HARRY LEHMANN, RENEWABLE ENERGY OUTLOOK: ENERGY WATCH GROUP GLOBAL RENEWABLE ENERGY SCENERIOS 3, *available at* http://www.isusi.de/downloads/REO_2030_EE_ExcecSummary_en.pdf.

35. Keith Bradsher, *China Leading Race to Make Clean Energy*, N.Y. TIMES, Jan. 31, 2010, *available at* http://www nytimes.com/2010/01/31/business/energy-environment/31renew html. China has already become the world leader in the manufacturing of wind turbines and solar panels moving ahead of Germany, Denmark, Spain and the United States. In an effort to develop the clean energy industry, China has attracted foreign wind turbine manufacturers such as Vestas, Inc. of Denmark, and has its own domestic industry employing 1.12 million workers in 2008 and adding 100,000 workers per year. *Id*.

36. Wind power has even begun to be developed in Africa where Kenya's Chalbi Desert will soon be the site of Africa's largest wind farm built by a consortium of Dutch and Kenyan

With regards to the generation of electricity, the United States leads the world with 4.11 trillion kWh followed by China with 3.45 trillion kWh in 2008,[37] representing 21.82% and 16.14% respectively.[38] These two nations generate and consume nearly 40% of the world's electricity. Since 1978, American electricity consumption has nearly doubled,[39] with the largest increases in use coming from the residential and commercial sectors of the U.S. economy.[40] Electricity has been used in these sectors for heating and cooling, lighting, and the operation of appliances such as computers, televisions, and refrigerators. In this period, industrial use of electricity has actually declined slightly indicating a contraction in large electricity consuming industries such as iron, steel, and aluminum manufacturing.[41] Focusing on the accelerating growth in electrical generation and demand, it is significant that most of this electricity has been produced by burning fossil fuels. Even today, at least 70% of electricity is generated through the combustion of coal, natural gas, and oil.[42] New power plant construction in the United States during the last few years has emphasized natural gas generating facilities; however, new coal plants are also on the drawing boards.[43] With this picture of strong future electricity demand, American

investors consisting of 350 wind turbines at a cost of $760 million. When installed in 2012, the project will increase Kenya electricity supply by nearly 30%. Ethiopia, Tanzania, and South Africa also have wind power projects on the drawing board. *See* Christopher Vourlias, *The Wind May Carry a Solution for Kenya*, WASH. POST, Nov. 21, 2009, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2009/ 11/20/AR2009112004313 html.

37. CENT. INTELLIGENCE AGENCY, THE WORLDFACTBOOK 2010 (2009), *available at* https://www.cia.gov/library/publications/theworldfactbook/rankorder/2038rank html?country Name=UnitedStates&countryCode=us&regionCode=na&rank=1#us. National electricity statistics have decreased a small amount since 2007 with electricity generation peaking in 2007 and falling slightly in 2008. ENERGY INFO. ADMIN., ANN. ENERGY REV. tbl. 8.1 (2008), *available at* http://www.eia.doe.gov/emeu/aer/pdf/pages/sec8. The U.S. Energy Information Administration's Monthly Energy Review listed American electrical generation for 2007 at 4.157 trillion kWh, at 4.1 trillion kWh in 2008, and falling 4.7% to 3.91 trillion kWh in 2009. *Id.* It has been estimated that China will pass the United States in electrical generation by 2012. *See* Bradsher, *supra* note 35, at A1.

38. CENT. INTELLIGENCE AGENCY, *supra* note 37. If Taiwan, Macau, and Hong Kong are added to the electricity generated by China, the total rises to 17.55% of the world total. *Id.*

39. U.S. ENERGY INFO. ADMIN., *supra* note 26, at tbl. 8.1.

40. *Id*. at tbl. 2.1a.

41. *Id*.

42. U.S. ENERGY INFO. ADMIN., ELECTRIC POWER MONTHLY, 5 tbl. ES1.B (Jan. 2010), *available at* http:///tonto.eia.doe.gov/ftproof/electricity/epm/02261001.pdf. For the period of January through October 2009, American electrical power was generated by coal (44.4%), petroleum (1.03%), nuclear (20.2%), and natural gas (23.7%). Renewable sources of electricity, including hydroelectric, comprised approximately 10.5%. *Id.*

43. In spite of a 4.6% reduction in electricity produced in the January through October 2009 period versus the same period in 2008, the amount of electricity generated from the combustion of natural gas rose 3.9% in the same period. *Id.* New extraction techniques that have made it economically feasible to recover extensive supplies of natural gas trapped in dense shale formations deep underground have increased likely future domestic supplies of that fuel. Located

citizens and policymakers must consider the implications of selecting appropriate technologies for meeting the increased electrical demand over the next two and a half decades.

III. FEDERAL WIND POWER POLICY

Since electricity production is largely a privately financed and operated activity, there is no direct national governmental control over the development of this industry. Utilities generating electricity determine the most desirable mix of energy technologies to employ. However, these private market decisions are undoubtedly influenced by governmental policies that make investing in a particular energy production technology operationally and financially advantageous. There is also an increasing federal interest in limiting the emissions of greenhouse gases. At the national level, there have been a number of executive pronouncements encouraging renewable wind energy supply,[44] but no comprehensive, long-term federal strategy has been set forth.[45] This stands in high contrast to the national policies of a number of other countries such as Brazil, Denmark, Germany, Japan, Spain, and France, which have adopted a range of financial initiatives and performance mandates to encourage the development and adoption of advanced, non-carbon energy technologies.[46]

As a result of our fragmented approach, federal policy on wind power must be pieced together from a series of separate, and largely disconnected, federal actions and initiatives. Overall, the federal government has

---

in the eastern U.S., a major deposit called Marcellus Shale has been identified. *Unconventional Natural Gas Reservoir Could Boost U.S. Supply*, PENN. STATE LIVE, Jan. 17, 2008, http://live.psu.edu/story/28116. Recent geological research announced in 2008 has estimated that with new drilling and recovery technology it would be possible to recover 50 trillion cubic feet of natural gas valued at $1 trillion. *Id.*

44. President Barack Obama's "New Energy for America" plan—announced during the recent presidential campaign—predicted that 10% of our electricity will come from renewable sources by 2012, and 25% by 2025. Barack Obama: New Energy for America, *supra* note 16. In addition, the plan would put 1 million Plug-In hybrid cars on the road by 2015 and implement an economy-wide cap and trade program to reduce greenhouse gas emissions 80% by 2050. *Id.*

45. However, Obama's plan has been widely criticized for not having a clear idea how to actually reduce pollution. Critics voice the plan is not a plan, but a conclusion. *See* Lisa Margonelli, *Obama's Energy Policy is Hardly Electric*, THE ATLANTIC, Oct. 28, 2009, *available at* http://correspondents.theatlantic.com/lisa_margonelli/2009/10/obamas_missing_energy_vision_thing.php. *See also,* Bob Herbert, *Watching China Run*, N.Y. TIMES, Feb. 13, 2010, at A23 (describing China's leading role in renewable energy while the U.S. lacks a coherent energy policy).

46. GEN. ACCOUNTABILITY OFFICE, DEP'T OF ENERGY KEY CHALLENGES REMAIN FOR DEVELOPING AND DEPLOYING ADVANCED ENERGY TECHNOLOGIES TO MEET FUTURE NEEDS 47-53 (2006), *available at* http://gao.gov/new.items/do7106.pdf. In addition, the regulation of wind energy in European nations follows a more centralized structure of regulation and support under domestic laws of the nations and the European Union. *See* LEGAL SYSTEMS AND WIND ENERGY: A COMPARATIVE PERSPECTIVE 239-292 (Helle T. Anker et al. eds., 2009).

encouraged private investments in wind power production using a variety of methods including providing subsidies, supporting research and development of improved technology, making federal lands available for the siting of wind turbines and transmission lines, and having an accommodative regulatory policy. Until recently, the federal interest in wind energy was primarily reflected in a small United States DOE research commitment and intermittently available production tax credits made available to wind power companies.[47] It is fair to say that wind energy had not been a high policy preference of the federal government until the last few years.

Although the federal policy on wind energy has focused on subsidy and support, disagreement currently exists about which of several policy approaches would be most effective. Other ideas that have not yet been adopted would act to directly reduce the carbon emissions of conventional fossil fuel sources of electricity by taxing the emission of greenhouse gases (GHG), capping the total allowable units that may lawfully be discharged, or mandating that utilities supply their customers' electricity with a minimum amount of renewable power.[48] These approaches would either focus on carbon emitters or create a basic demand for renewable energy including wind power. With the enactment of climate legislation in doubt, a federal carbon tax, a cap and trade system for greenhouse gases, or a renewable electricity standard appear to be unlikely policy steps at the moment.[49] Regardless of the exact composition of the policies that will eventually be adopted to assist in the shift to a cleaner electricity mix, it is certain that a specific federal role is likely to exist in the future.[50]

A. FINANCIAL OR ECONOMIC SUBSIDIES

Energy subsidies have been in existence for many years but they have overwhelmingly favored the conventional energy industry.[51] Renewable

47. JEFFREY LOGAN & STAN MARK KAPLAN, CONG. RESEARCH SERV. REPORT FOR CONGRESS, WIND POWER IN THE UNITED STATES: TECHNOLOGY, ECONOMIC AND POLICY ISSUES 2 (updated June 20, 2008), *available at* http://www fas.org/sgp/crs/misc/RL34546.pdf; U.S. DEP'T OF ENERGY, FEDERAL INCENTIVES FOR WIND POWER DEPLOYMENT (Oct. 2009), *available at* http://www1.eere.energy.gov/windandhydro/pdfs/federal_incentives_wind_deployment.pdf.

48. *See* Posting of Richard L. Revesz to http://views.washingtonpost.com/climate-change/panelists/richard_revesz/ (Feb. 3, 2010, 7:15 EST).

49. Stephen Lacey, *Prospects Fading for U.S. Climate Legislation in 2010*, RENEWABLE ENERGY WORLD, Jan. 14, 2010, http://featured matternetwork.com/2010/1/prospects-fading-us-climate-legislation.cfm.

50. Sindya N. Bhanoo, *Arizona, in Switch, Pulls Out of Regional Emissions Plan*, N.Y. TIMES, Feb. 12, 2010, at A20 (describing one state's withdrawal from a regional state GHG control program).

51. U.S. ENERGY INFO. ADMIN., FEDERAL FINANCIAL INTERVENTIONS AND SUBSIDIES IN ENERGY MARKETS IN 2007 XV tbl. ES4 (2008), *available at* http://www.eia.doe.gov/oiaf/

energy has been the beneficiary of small federal subsidies, and Congress has enacted a range of laws creating direct forms of federal financial support affecting the financial bottom line of wind power production.[52] From 1992 until 2009, the most important federal policy has been the federal production tax credit (PTC), originally established by the Energy Policy Act of 1992.[53] Under the American Recovery and Reinvestment Act of 2009 (ARRA), which is commonly known as the stimulus legislation, the PTC currently provides a 2.1 cent per kWh tax credit to companies for electricity produced from specified renewable energy facilities including wind plants for a period of 10 years from initial plant operation.[54] This subsidy will be available for facilities placed into service until December 31, 2012.[55] As with the 2009 ARRA legislation, the federal tax credit has been adopted by Congress for limited time periods and it has expired six times since its initial enactment in 1992.[56] As a result of this on-again, off-again approach, each temporary termination of the PTC has had a negative effect on long-term project planning and manufacturing costs. Attempts to extend the PTC for longer periods of time—which would provide investors with greater certainty in their investment horizon—have failed due to a lack of congressional support.[57] This inconsistent federal policy has led to uncertainty in the minds of wind power developers, financiers, and states about the continued federal encouragement for wind generated electricity.

In addition to the PTC, the 2009 stimulus bill substantially expanded federal support for renewable energy and wind power through a variety of other means. It extended existing tax preferences to wind power projects,

servicerpt/subsidy2/pdf/subsidy08.pdf (coal and refined coal received approximately 55% of electricity production subsidies and support in fiscal year 2007).

52. For instance, financial loan guarantees have been included in the 2011 federal budget request that was sent to Congress in January 2010. The administration has proposed $500 million in credit subsidies to support $3 billion to $5 billion in loan guarantees for energy efficiency and renewable energy projects. Steven Mufson, *Obama 2011 Budget Request: Energy Department*, WASH. POST, Feb. 1, 2010, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2010/02/01/AR2010020101794 html.

53. Pub. L. No 102-486, 106 Stat. 2776, 3020 (codified at 26 U.S.C. § 45) (1992).

54. Pub. L. No. 111-5, 123 Stat. 115 (codified at 26 U.S.C. § 45) (2009).

55. *Id*.

56. Database of State Incentives for Renewables & Efficiency, Renewable Electricity Production Tax Credit (PTC), http://www.dsireusa.org/Incentives/Incentive.cfm?Incentive_Code=US13F (last visited May 2, 2010).

57. The construction of new wind power installations appears to be directly correlated to the availability of the production tax credit. *See* GAO 2004 Farm Impact Study, fig. 8 at 32. This has led to a boom and bust cycle in wind power development with construction collapsing each year after the expiration of the PTC. By comparison to nuclear power, the Energy Policy Act of 2005 provides for a similar production tax credit for nuclear projects up to six GW of capacity built before 2021. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (codified at 26 U.S.C. § 453) (2005).

including the optional conversion of the PTC into either a 30% investment tax credit (ITC) on the wind power investment[58] or a direct grant from the Treasury Department in lieu of claiming the ITC.[59] The latter provision helps wind power developers to monetize the investment tax credit into a one-time cash grant from the federal government.[60] Federal law provides for other financial incentives, including a five-year accelerated depreciation schedule that is allowed for renewable energy system investments,[61] bonus depreciation for capital expenditures incurred in 2009, establishment of a new 30% investment tax credit for advanced energy manufacturing plants for renewable energy equipment,[62] and expansion of the full 30% investment tax credit for small wind energy facilities.[63] Tax deductions are also available for interest expenses and operational costs.[64] The 2009 ARRA legislation contains other aspects of financial support for wind energy, including $6 billion in loan guarantees for generation, transmission, and manufacturing facilities;[65] bonding authority for electrical transmission

58. American Recovery and Reinvestment Act of 2009 § 1102, Pub. L. No. 111-5, 50 Stat. 664 (2009). This optional tax treatment is available in lieu of the PTC for wind power facilities placed into service from 2009-2012 and allows these facilities to be leased, or to be made subject to sale and leaseback arrangements, without loss of the production credit, equalizing their tax status with that of solar projects.

59. *See id.* § 1603.

60. *See* U.S. TREASURY DEP'T, OFFICE OF THE FISCAL ASSISTANT SECRETARY, *Payments for Specified Energy Property in Lieu of Tax Credits under the American Recovery and Reinvestment Act of 2009* (July 2009), *available at* http://www.ustreas.gov/recovery/docs/guidance.pdf.

61. This front-loaded depreciation deduction further offsets the high initial capital costs of wind power projects. Economic Recovery Tax Act of 1981, Pub. L. No. 97034, 95 Stat. 230 (codified as amended at 26 U.S.C. § 168(e)(3)(B)(vi)) (1981).

62. American Recovery Reinvestment Act § 1302, Pub. L. No. 111-5, 50 Stat. 664 (2009). Under the advanced energy project program, which is commonly referred to as the manufacturing tax credit program, qualifying projects can receive an amount equal to 30% of the qualified investment. New manufacturing facilities, as well as re-equipped or expanded manufacturing facilities, are eligible if they qualify as an advanced energy project and have a reasonable expectation of commercial viability. The new law authorizes $2.3 billion for this program. On August 14, 2009, the U.S. Department of Energy and the Internal Revenue Service began accepting applications for the 30% Manufacturing Investment Tax Credit provided for in ARRA. *See* Notice 2009-72, http://www.energy.gov/recovery/48C html (last visited May 2, 2010).

63. *See id.* § 1103. *See* DEP'T OF TREASURY GUIDANCE, *available at* http://www.treas.gov/recovery/1603.shtml.

64. *See generally* INTERNAL REVENUE SERVICE, PUBLICATION 535 (2009), *available at* http://www.irs.gov/publications/p535/index html (discussing the various tax deductions available for a range of business expenses).

65. American Recovery and Reinstatement Act of 2009 § 406, Pub. L. No. 111-5, 50 Stat. 664 (2009). Referred to as the Title XVII loan guarantee program, the DOE has issued two solicitations for proposals for innovative technology projects and commercial renewable energy generation projects in 2009 and is expected to issue a third request for renewable energy manufacturers. *See generally* Department of Energy—Loan Guarantee Program Home Page, http://www.lgprogram.energy.gov/ (providing information about the DOE Loan Guarantee program, including recent news and publications). The loan program is designed for renewable

lines;[66] and Clean Renewable Energy Bonds to help finance municipal, state, and tribal governments, public power providers, and electric cooperatives.[67] Some of these wind power subsidies have been controversial.[68]

More specialized legislation enacted in the prior decade made other forms of federal funding available for wind power, including programs of the United States Department of Agriculture under the 2002 Farm Bill, known as the Farm Security and Rural Investment Act of 2002. Title IX of the 2002 law provided grants and loan guarantees to farmers and rural business owners for assistance in purchasing renewable energy systems, including wind power.[69] The 2008 Farm Bill amended the Title IX provisions by expanding its coverage and renaming the program the Rural Energy for America Program (REAP).[70] Under this expansion, hydroelectric source technologies are eligible, energy audits are included as eligible costs, and loan limits are increased.[71] This array of federal financial incentives includes even more subsidy methods that have a

energy systems and other technologies using funding from ARRA. Recently, the DOE made a $1.37 billion loan guarantee for the Ivanpah Solar Complex in California for a utility scale thermal solar power generation plant. *See California Solar Project Gets $1.37 Billion in Conditional Loan Guarantees, DOE Says*, 41 ENVT. RPT. 417 (Feb. 26, 2010).

66. American Recovery Reinstatement Act of 2009 §§ 401-402 (Bonneville Power Administration & Western Area Power Administration) Pub. L. No. 111-5, 50 Stat. 664 (2009).

67. The Energy Tax Incentives Act of 2005, Pub. L. No. 109-58, added section 54 to the Internal Revenue Code. Section 54 authorized up to $800 million in tax credit bonds for renewable energy projects undertaken by municipalities and cooperatives. In November 2006, the IRS announced that it allocated the full $800 million in bond authorizations to 610 renewable energy projects throughout the United States, of which 100 were for wind power projects. *See* Internal Revenue Service, Information Release IR-2006-181, Nov. 20, 2006. ARRA authorizes an additional $1.6 billion in new Clean Renewable Energy Bonds to finance a range of renewable power projects. *See* American Recovery and Reinstatement Act § 1111, Pub. L. No. 111-5, 50 Stat. 664 (2009).

68. Dan Eggen, *Four Democratic Senators Aim to Halt Stimulus Wind Project*, Mar. 4, 2010, WASH. POST, at A6 (senators object to Texas wind project alleging equipment would be manufactured abroad).

69. Section 906 of the 2002 Farm Bill established the Renewal Energy and Energy Efficiency loan and grant program. The Renewable Energy and Energy Efficiency loan and grant program was established under section 9006 of the 2002 Farm Bill to encourage agricultural producers and small rural businesses to create renewable and energy-efficient systems. A total of 435 grants totaling $66.7 million have been awarded in thirty-six states since the program began, and in 2005, for the first time, renewable energy loan guarantees were made under the program. Grants have been awarded to fund a wide range of wind, solar, biomass, geothermal, and conservation technologies. For the 2003 to 2005 fiscal years, the Farm Bill has made wind awards totaling $25.1 million. Section 6401 of the Farm Bill designates wind power as a "value added agricultural product" and makes grants available for rural projects. Farm Security and Rural Investment Act of 2002, Pub. L. No. 107-171, 116 Stat. 134 (2002).

70. Food, Conservation, and Energy Act of 2008, Pub. L. No. 234, 122 Stat. 923 (2008). The 2002 Farm bill program, formerly called the Renewable Energy Systems and Energy Efficiency Improvements Program, is now known as the REAP program. The financial aspects of the new law provide $55 million for FY 2009, $60 million for FY 2010, and $70 million for FYs 2011 and 2012. It also authorizes additional funds of $25 million per year, from FY 2009 through 2012.

71. *Id.*

narrower focus or a smaller economic impact.[72] Federal financial support for wind power has followed a rocky and inconsistent path over the last three decades with Congress and the federal government only recently taking a stronger interest in supporting this form of renewable energy. As discussed below, the states and local governments have taken far greater initiative and have committed far more appropriations and tax benefits in support of the fledgling wind energy industry.

B. RESEARCH AND DEVELOPMENT FUNDING

The generation of electricity has always been a technological pursuit. From 1831, when English physicist and chemist Michael Faraday discovered electromagnetic induction,[73] to George Westinghouse's development of alternating current power distribution in the 1880s,[74] the generation and transmission of electricity has relied on the creative application of the basic laws of thermodynamics, which postulate that energy can be exchanged between physical systems as heat or work.[75] Finding new ways to employ the principles of physics, chemistry, and engineering to generate and distribute the electric power that we use requires constant experimentation and technological development. Often this critical, basic research is of a magnitude, cost, and sophistication that only the federal government can be expected to provide the level of resources needed to fund the necessary work.

Governmental support for early-stage development of energy technology is especially necessary with advanced technologies like renewable, green energy because they are not initially economically competitive with conventional forms of electricity production. Of course, this comparison with conventional power sources only measures per kWh costs and does not incorporate the indirect environmental harm or global impact of these forms of electricity. In addition, seed money for innovative, advanced energy research can be difficult to obtain. As a result, governmental

---

72. *See, e.g.,* Energy-Efficient Commercial Buildings Tax Deduction**,** 26 U.S.C. § 179D; Energy-Efficient New Homes Tax Credit for Home Builders, *id*. § 45L; Modified Accelerated Cost-Recovery System (MACRS) + Bonus Depreciation**,** *id*. § 168; Residential Energy Conservation Subsidy Exclusion, *id*. § 136.

73. MICHAEL FARADAY, ENCYCLOPEDIA OF CHEMISTRY, *available at* http://www.chemie.de/lexikon /e/Michael_Faraday/.

74. WestinghouseNuclear.com, Our Company, History: George Westinghouse, http://www.westinghousenuclear.com/Our_Company/history/george_westinghouse.shtm (last visited Apr. 1, 2010) (describing accomplishments of George Westinghouse).

75. *See generally* H.C. VAN NESS, UNDERSTANDING THERMODYNAMICS 50-66 (1969) (stating thermodynamics represents the study of energy conversion between heat and mechanical work).

subsidy for new energy research and development (R&D) is necessary to overcome the high level of risk and the high capital costs associated with advanced electrical generation and transmission. Maintaining a high level of basic research support is a prerequisite if new, renewable technologies will ever constitute a significant portion of the U.S. energy system.

Over the past quarter century, federal R&D support for all forms of energy development has not demonstrated a consistent recognition of the importance of energy policy or a commitment to energy as a long-term national investment. Surprisingly, since 1980, both public and private R&D investment in energy has declined from approximately 10% of the domestic research spending to about 2% of the national total.[76] In the early 1980s, following the oil price shock of the 1970s, annual energy R&D investment in the U.S. actually exceeded that of pharmaceutical firms.[77] Today, the situation has been completely reversed with the total U.S. biopharmaceutical industry spending $65.2 billion in 2008 compared with approximately $8.45 billion for the energy industry in 2005.[78] This shift reflects a de-emphasis in innovative energy research over this period and a sense of complacency with existing energy technology regardless of its long-term consequences.[79]

When considering only federal energy R&D expenditures, the drop-off over the last three decades has been dramatic, with a reduction from $6 billion in 1978 to $1.4 billion in 2008—using constant 2008 dollars, nearly a 75% drop.[80] Taking a longer look and reviewing the sixty-year period from 1948 through 2007, another pattern emerges: the emphasis of federal research dollars on non-renewable power technology. Federal energy R&D support over this lengthy period has been concentrated on fossil fuel and nuclear energy technology in substantial ways, exceeding $125.61 billion in constant 2008 dollars and consuming nearly 78.4% of all federal energy

76. Daniel M. Kammen, *The Rise of Renewable Energy*, SCI. AM., Sept. 2006, at 91-92.

77. *Id.* at 91.

78. *Compare* PhRMA, Pharmaceutical Industry, Profile 2009 32 fig. 9 (2009), *available at* http://www.phrma.org/files/attachments/PhRMA%202009%20Profile%20FINAL.pdf (observing that investment in biopharmaceutical research and development has increased at a steady pace, from $2 billion in 1985 to $65.2 billion in 2010), *with* Kammen, *supra* note 76, at 91(observing that funding for research and development in the energy sector fell from 10% of all United States research and development spending in 1980 to 2% in 2005).

79. Jill Jusko, *R&D Spending: By the Numbers, Industry Week*, Jan. 1, 2009, *available at* http://www.industryweek.com/articles/rd_spending_by_the_numbers_17988.aspx (noting that while the software industry spends 13.6% on R&D as a percentage of sales, the energy sector spends only 1% of its sales on research).

80. MARK. E. GAFFIGAN, ADVANCED ENERGY TECHNOLOGIES, BUDGET TRENDS AND CHALLENGES FOR DOE'S ENERGY R&D PROGRAM 5 (2008).

research funding.[81] Analyzing the more recent decade of 1998-2007, fossil and nuclear energy still received the lion's share of federal funding, accounting for 52% of the DOE's R&D funding with renewable energy representing merely 16% of the total.[82] It seems clear that the federal research into energy technology has not been a high priority and the emphasis in R&D support has not given wind power much assistance.

With total domestic R&D spending in 2010 estimated to be $401.9 billion and the federal component of this amount predicted to be $114.1 billion,[83] allocating $8.75 billion for all United States Government energy R&D programs hardly seems to represent a major "moon shot" level of national investment in the development of new energy technology.[84] In fact, federal appropriations for advanced energy research have fallen far short of the increased funding levels seen as necessary by independent observers and analysts.[85] Significant improvements in wind energy production efficiency and operational costs are predicted to be the result of future increases in R&D expenditures.[86] For example, a 2008 DOE commissioned study identified many possible future technological improvements for wind power that could significantly affect capital costs, annual energy production, reliability, and the operation and maintenance of wind generating stations.[87] The areas of potential wind technology improvement include technical advances that could cause dramatic productivity gains from advanced tower, rotors, and turbine drive trains as well as reduced energy losses that could increase energy production on the order of 45% and reduce

---

81. FRED SISSINE, CONGRESSIONAL RESEARCH SERVICE REP. FOR CONGRESS, RENEWABLE ENERGY R&D FUNDING HISTORY: A COMPARISON WITH FUNDING FOR NUCLEAR ENERGY, FOSSIL ENERGY, AND ENERGY EFFICIENCY R&D 2 (2008).

82. *Id.*

83. Martin Grueber & Tim Studt, *Reemerging U.S. R&D*, R&D MAG., Dec. 22, 2009, *available at* http://rdmag.com/Featured-Articles/2009/12/Policy-and-Industry-Re-Emerging-U-S-R-D/.

84. Katie Howell, *DOE: Chu Takes R&D Budget Request to House Science Panel*, E&E DAILY, Feb. 8, 2010, *available at* http://www.eenews net/public/EEDaily/print/2010/02/08/1. This component of the FY 2011 budget request allocated to the DOE Office of Energy Efficiency and Renewable Energy was a total of $2.4 billion.

85. GENERAL ACCOUNTABILITY OFFICE, DEP'T OF ENERGY: KEY CHALLENGES REMAIN FOR DEVELOPING AND DEPLOYING ADVANCED ENERGY TECHNOLOGIES TO MEET FUTURE NEEDS (2006); GAFFIGAN, *supra* note 80, at 13.

86. The level of federal wind R&D expenditure remains low in absolute terms. In 2009, President Obama signed an $80 million appropriation for the DOE wind program. The funding, which was part of the energy and water appropriations bill, represents a $25 million increase from 2008 and $5 million above the President's budget request. It also includes an additional $22.8 million in funding for wind-specific projects across the country. According to International Energy Agency statistics, the $80 million allocation is the highest funding level, adjusted for inflation, since 1981.

87. J. COHEN ET AL., TECHNOLOGY IMPROVEMENT OPPORTUNITIES FOR LOW WIND SPEED TURBINES AND IMPLICATIONS FOR COST OF ENERGY REDUCTION 7-22 (2008).

turbine capital costs by 10%.[88] These technological improvements could make wind energy even more economically competitive with conventional fossil fuel generated electricity. While the fiscal year 2010 Energy and Water Appropriations bill did increase wind energy R&D funding over 2009 levels, the total allocated to wind was only $80 million, a small fraction of that provided for other energy producing or energy saving technologies.[89] It is unclear why Congress has chosen to fund wind power at this less-than-optimal level, especially when considering the potential benefits in terms of efficiency.

During the past decade, state energy policies have increasingly supported and, in some cases, required clean forms of energy to be supplied to consumers, while federal research funding has lagged and has continued to stress conventional energy technologies. Unfortunately, the states have neither the R&D funding capacity nor the expertise to oversee sophisticated technical research projects. It is in the R&D area where the federal government could show important leadership by working with the wind power industry to develop the higher technology needed to improve wind turbine performance and cost. Without such support, technological development will be left to the industry and foreign governments and, to a lesser extent, states and universities.

C. WIND POWER ON FEDERAL LANDS

The federal government also contributes to the development of renewable energy as a major land owner. It has made high wind quality federal lands available for the development of wind energy projects under right-of-way authorizations.[90] Up to now, the Department of the Interior's (DOI) Bureau of Land Management (BLM) has been the only federal agency granting permission for these kinds of private activities, and it has permitted approximately 500 MW of installed capacity, or 5% of the

88. 20% WIND BY 2030 REPORT, *supra* note 16, at 41 tbl. 2-1. The DOE 20% Wind by 2030 Report concluded that the capacity of annual energy production could increase by as much as 61% and that turbine capital costs could decline by as much as 36% with new technological developments. *Id.* *See also* COHEN ET AL., *supra* note 87, at 24 fig. 4 (describing Potential Contributions to Cost of Energy from all TIOs).

89. The FY 2010 Energy and Water Appropriations bill, whose conference report was approved in mid-October 2009, provided $80 million in Department of Energy wind R&D funding along with nearly $23 million in additional Congressional, wind-related "earmarks." This total compared poorly with amounts provided to other energy technology: fuel cell ($174 million), biomass/biorefineries ($220 million), solar ($225 million), vehicle technologies ($311 million), and weatherization assistance ($210 million).

90. ADAM VANN, CONG. RESEARCH SERV. REP. FOR CONGRESS, ORDER CODE R40806, ENERGY PROJECTS ON FEDERAL LANDS: LEASING AND AUTHORIZATION 14 (2009).

national total.[91] Due to their prime locations in windy areas, BLM lands will continue to be an important focus of wind energy development.[92] In March 2009, Secretary of the Interior Ken Salazar issued an order that made renewable energy production a top priority for the DOI.[93] This order established an energy and climate change task force to advance this agenda and directed it to identify specific renewable energy zones on U.S. public lands that would be well suited to large-scale production of renewable energy including wind power.[94] The agency has also established comprehensive policies and best management practices (BMPs) for analyzing wind energy developments through a Programmatic Environmental Impact Statement (PEIS).[95] This proposed Wind Energy Development Program would affect all BLM-administered lands in eleven western states and would set general mitigation standards.[96] The comprehensive approach taken in the BLM policy suggests that federal lands will increasingly be available to private firms wishing to develop wind energy resources.[97] In these western states, the two largest public land managers—the BLM and the Forest Service—are currently evaluating more than 400 applications for

91. This wind energy capacity is located in the San Gorgonio Pass and the Tehachapi Pass areas of southern California and in the Foote Creek Rim and Simpson Ridge areas of Wyoming. U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-05-906, WINDPOWER: IMPACTS ON WILDLIFE AND GOVERNMENT RESPONSIBILITIES FOR REGULATING DEVELOPMENT AND PROTECTING WILDLIFE 32 (2005).

92. As of September 2005, the BLM had approved eighty-eight applications for new projects and had sixty-eight pending applications to review. *Id*.

93. Press Release, U.S. Dep't of the Interior, Secretary Salazar Issues Order to Spur Renewable Energy Development on U.S. Public Lands (Mar. 11, 2009), *available at* http:// www.doi.gov /news/pressreleases /2009_03_11_ releaseB.cfm.

94. *Id.*

95. Memorandum from the Dir. of the U.S. Dep't of Interior Bureau of Land Mgmt. (Dec. 19, 2008), *available at* http://windeis.anl.gov/documents/docs/IM_2009-043_BLMWindEnergy DevelopmentPolicy.pdf.

96. *Id.* The 2005 PEIS included an assessment of the environmental, social, and economic impacts; a discussion of the relevant mitigation measures to address these impacts; and an identification of appropriate program policies and BMPs to be included in the BLM's Wind Energy Development Program. The geographic scope of the Program includes BLM lands in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. *Id.* at 1-3. The PEIS simultaneously proposed amendments to the BLM's specific land use plans for fifty-two areas under its administration. *Id.* at ES-3.

97. BLM has identified about 21 million acres of public land in Alaska and other western states that have high wind energy potential. Scott Streater, *Obama Admin. Faces 21st Century Grid vs. Public Lands Conundrum*, THE LAND LETTER, Mar. 12, 2009, *available at* http:// www.eenews net /public/Landletter/ 2009/03/12/1. As of January 2009, the BLM reported 223 applications pending for solar projects on federal land and 217 for wind projects. Wind farms have become primary users of federal land, with 192 approved to date. National Wind Watch, *Renewable Energy Companies Vying to Use State Land*, Feb. 9, 2009 *available at* http:// www.wind-watch.org/news /2009 /02/09/renewable-energy-companies-vying-to-use-state-land/.

wind and solar projects on federal lands.[98] The U.S. Forest Service has recently begun to develop national guidance to evaluate wind energy proposals on national forest system lands, and the DOI has proposed a general authorization of energy development project on Native American tribal lands.[99] However, the use of federal lands for renewable energy production in some parts of the west has not been completely supported by all constituencies. In fact, there have been some publicized efforts to exclude certain federal lands from renewable wind and solar power development.[100]

In 2009, a federal Memorandum of Understanding (MOU) was issued by nine federal agencies to improve coordination, reduce regulatory costs, and minimize delays in the permit approval process for transmission projects on federal lands.[101] This new agreement is especially important for the development of renewable energy sources like wind power because it will consolidate and expedite the federal permitting process for the location of new transmission lines that are crucial for the movement of wind energy to consumers.[102] While new transmission lines may also have to traverse lands under state jurisdiction in some parts of the nation, the new coordinated and accelerated federal inter-agency agreement will have an expanded impact in the western states. In that region, the federal ownership extends to 53.4% of the entire land base, with Nevada having 84.5% of its territory in federal lands.[103] Federal energy policy has been supportive of

---

98. It has been estimated that if these projects were approved, they would use 2.3 million acres in seven states and generate an estimated 70,000 MW of electricity, which is sufficient to provide electricity for more than 50 million homes. Streater, *supra* note 97.

99. U.S. DEP'T OF THE INTERIOR, BUREAU OF LAND MGMT., RECORD OF DECISION: IMPLEMENTATION OF A WIND ENERGY DEVELOPMENT PROGRAM AND ASSOCIATED LAND USE PLAN AMENDMENTS 6 (2005).

100. *Senate Bill Could Block Solar & Wind Projects in California*, RENEWABLE ENERGY WORLD.COM, Dec. 28, 2009, *available at* http://www renewableenergyworld.com/rea/news/article/2009/12/sen-feinstein-introduces-bill-that-could-block-solar-wind-projects-in-california; Robert Lahey, *To Put Solar Power on Federal Land, or Not*, RENEWABLE ENERGY WORLD.COM, Jan. 19, 2010, *available at* http://www renewableenergyworld.com/rea/news/article/2010/01/to-put-solar-power-on-federal-land-or-not?cmpid=WNL-Wednesday-January20-2010.

101. The 2009 MOU was signed by the U.S. Department of Agriculture, Department of Commerce, Department of Defense, Department of Energy, Environmental Protection Agency, Council on Environmental Quality, Federal Energy Regulatory Commission, Advisory Council on Historic Preservation, and Department of the Interior. *See* Nine Federal Agencies Enter into a Memorandum of Understanding Regarding Transmission Siting on Federal Lands, *available at* http://www ferc.gov/legal/maj-ord-reg/mou/mou-transmission-siting.pdf.

102. The MOU will accomplish four important organizational goals: (1) designating a single federal lead agency for all federal agency authorizations; (2) encouraging coordination and a unified environmental review among federal agencies, states, tribal governments, and applicants; (3) establishing clear timelines for the agency review process; and (4) creating a single consolidated environmental review and administrative record. *Id.*

103. The federal government owns 653 million acres, or about 29% of the overall land area of the United States, with the DOI managing 67.83% and the Department of Agriculture in charge of 27.79% of the total. In the western states, federal ownership is higher: Montana (29.9%),

wind power and other renewable technologies by encouraging projects to be sited on federal lands and by working to enhance the transmission of the electricity that has been generated there to the nation's load centers. The challenge of the future will be to integrate federal land decisions with state land use priorities for adjoining parcels of state and privately owned land to allow for the efficient and cost-effective movement of renewable power off of the government lands where they were generated.

D. FEDERAL ENVIRONMENTAL AND OTHER REGULATION

The federal government's role in regulating wind power projects is limited. Generally, federal project control is restricted to those projects taking place on federal lands or having some other form of federal involvement.[104] While the Federal Energy Regulatory Commission (FERC) regulates interstate energy transmission, it has no authority to regulate the actual construction of electric generation and transmission facilities.[105] That task is reserved for state and local governments operating under their sovereign authority to regulate commerce and industry within their borders.[106] In fact, federal authority over the electric power industry began in 1935 when the Federal Power Act[107] was amended to regulate interstate wholesale power

---

Wyoming (42.3%), Colorado (36.6%), New Mexico (41.8%), Idaho (50.2%), Utah (57.4%), Arizona (48.1%),Washington (30.3%), Oregon (53.1%), Nevada (84.5%), California (45.3%) and Alaska (69.1%). The eastern states have very little land in federal ownership and therefore, very little chance of using federal land for wind turbines or transmission lines. *See* U.S. GENERAL SERVICES ADMINISTRATION, FEDERAL REAL PROPERTY PROFILE (2004), *available at* http:// www.gsa.gov/ realpropertyprofile.

104. The Federal Aviation Administration (FAA) has the authority to issue "notices of presumed hazard" to the developers of structures that might present risks to civilian aircraft operations in the United States. This evaluation of obstructions to aircraft operations or navigation is conducted pursuant to FAA regulations found in U.S. Code Title 14, Part 77. Recently, the FAA's reviews of wind power projects has been a controversial issue but one that has been handled by the FAA on a case-by-case basis. According to a press release in June 2006 from U.S. Senator Byron Dorgan, the Department of Defense and Federal Aviation Administration withdrew their objections to a North Dakota wind generation project. *See* Press Release, U.S. Senator Byron Dorgan, Dep't of Fed. Aviation Admin. Withdrew Their Objections to a Wind Generation Project (June 15, 2006), *available at* http://www.zmetro.com/community/ us/wi/madison/renew/archives/2006/06/defense_dept_re html.

105. H. J. Reinier, H. Lock, Marlene L. Stein, Energy Law and Transactions § 81.04 (2009) (discussing jurisdiction over transmission transactions).

106. In July 2003, FERC issued Order 2003, Standardization of Generator Interconnection Agreements and Procedures, to establish a set of standard procedures and agreements to govern the process of interconnecting generators to a transmission system. Order No. 661, Interconnection for Wind Energy, F.E.R.C. Stats & Regs. ¶ 31, 186, 70 Fed. Reg. 34993 (2005) order on reh'g, Order No. 661-A. Order 2003 applies to any new wind energy development less than twenty MW that wants to interconnect to a transmission system with a FERC approved transmission tariff. *Id.* In 2005, FERC finalized regulations that would remove barriers to wind generated electricity while ensuring system reliability. *Id.*

107. 16 U.S.C. § 824 (2009).

sales and the interstate transmission of electricity. Over the twentieth century, federal authority expanded as the electric power industry developed into a less vertically integrated enterprise.

There are other general federal regulations that could affect wind power developments including environmental rules,[108] aircraft obstruction regulations, and civilian and military radar interference controls.[109] The nature of the environmental review required for a wind power site depends upon the particular attributes of the location and the degree of federal involvement in the project.[110] Some of these restrictions have the potential for slowing or even derailing wind power developments. Generally, the federal government's regulatory stance has been to take a case-by-case approach in its evaluation of each project.

E. FEDERAL RENEWABLE PORTFOLIO STANDARDS

Renewable Portfolio Standards (RPS), also referred to as Renewable Electricity Standards (RES), require retail electricity providers to supply a minimum percentage of their electricity from renewable sources, such as solar, wind, and geothermal. Twenty-eight states plus the District of Columbia have mandatory RPS, with another six states having voluntary renewable goals.[111] However, a review of these RPS systems reveals a

---

108. A general environmental statute such as the National Environmental Policy Act (NEPA) would apply to any wind power development if it constituted "a major federal action significantly affecting the quality of the human environment." *Id.* § 102(2)(C). Other federal environmental wildlife laws like the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and the Endangered Species Act generally forbid harm to various species of wildlife.

109. In January 2006, the National Defense Authorization Act for FY2006 was signed into law. This statute contains a provision requiring the Department of Defense to study and report to Congress on the effects of wind projects on military readiness, specifically investigating whether windmill facilities interfere with military radar. While the report is being completed, the Federal Aviation Administration has issued "Notice of Presumed Hazard" letters to more than a dozen wind farms and facilities in Illinois, Wisconsin, North Dakota, and South Dakota, thereby preventing these projects from moving forward. This issue has caused major concern in the wind power industry that projects near completion will not be allowed to operate.

110. For instance, the regulatory framework for the protection of birds includes the Endangered Species Act, The Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and the Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds." If a federally-funded or permitted wind project affected cultural resources including archaeological sites and historic structures and features, the National Historic Preservation Act would require consultation with the state, mitigation of adverse effects, and dispute resolution by the Advisory Council on Historic Preservation. Other federal cultural properties laws, including the American Indian Religious Freedom Act and the American Graves Protection and Repatriation Act, specifically apply to federal actions affecting Native American sites. Siting in wetland areas would require approval under § 404 of the Clean Water Act, and any discharge into navigable waters would require an NPDES permit under the same law. Disposal of any hazardous waste would be subject to solid and hazardous waste laws.

111. *See* SOLAR ENERGY INDUSTRIES ASSOCIATION, RENEWABLE ELECTRICITY STANDARD (RES)—EXPANDING MARKETS FOR RENEWABLE ENERGY (2009), *available at* http://www.

significant lack of consistency from state to state with different percentages of renewable supply required, either a voluntary or mandatory character, differing definitions of renewable energy, recognition or non-recognition of energy efficiency measures to meet the standard, and variable penalties for failure to meet standards.[112] Although the state RPS systems have not been uniform in their requirements, they have been accepted by over half of the nation's state legislatures and some have even been toughened with increased standards after their initial adoption.[113]

The main arguments supporting a national RPS focus on the goal of spurring renewable power development in order to: (1) reduce environmental damage and greenhouse gas emissions; (2) foster employment and job growth; (3) create a long-term, predictable demand for green power needed to attract capital investment; (4) lessen future electricity and energy costs; and (5) establish a national baseline that states would be free to exceed based on their own policies. In the past, manufacturing interests and utility trade associations have opposed such a national RPS claiming it would lead to higher electricity prices and would be unachievable in part of the nation.[114] Recent studies that have analyzed current congressional RPS proposals have consistently concluded a national RPS would be affordable, achievable, and would stimulate employment in the emerging renewable energy industry.[115] More specifically, with regard to job growth, these

---

seia.org/ galleries/ pdf/SEIA_RES_Factsheet.pdf. In 2007, North Dakota statutorily adopted a voluntary state renewable and recycled energy objective for 10% of all providers of electricity by 2015. N.D. CENT. CODE § 49-02-28 (2009). However, the state law requires the utility to undertake an economic evaluation of renewable power alternatives, and "the retail provider or its generation supplier may use the electricity alternative that best meets its resource or customer needs." *Id.* § 49-02-32. By comparison, in 2009, Virginia adopted a 15% by 2025 voluntary renewable energy portfolio goal. *See* VA. CODE ANN. § 56-585.2 (2009).

112. *See, e.g.*, Database of State Incentives for Renewables and Efficiency, *available at* http://www.dsireusa.org.

113. Tom Kenworthy, *A Renewable Energy Standard: The Proof Is in the States*, THE CENTER FOR AMERICAN PROGRESS, May 19, 2009, *available at* http://www.americanprogress.org /issues /2009/05 /kenworthy_res html (describing the experience in Colorado, New Mexico, and Texas, where RPS targets were raised from original levels).

114. Press Release, National Association of Manufacturers & Edison Electric Institute, U.S. Manufacturers and Electric Companies Remain Firmly United Against Federal Renewable Portfolio Standard (Aug. 2, 2007), *available at* http://www.eei.org/ newsroom/pressreleases/ Press%20Releases/070802.pdf. Recent announcements have not mentioned the national RPS issue. *See* THOMAS R. KUHN & DAVID K. OWENS, ELECTRICITY 2010: OPPORTUNITY DRESSED AS HARD WORK, Feb. 10, 2010, *available at* http://www.eei.org/ourissues/finance/Documents/ Wall_Street_Briefing_2010.pdf (supporting national climate policy but no mention of RPS).

115. *See* UNION OF CONCERNED SCIENTISTS, CLEAN POWER, GREEN JOBS (2009), *available at* http://www.ucsusa.org/assets/documents/clean_energy/Clean-Power-Green-Jobs-25-RES.pdf; NAVIGANT CONSULTING, INC., JOBS IMPACT OF A NATIONAL RENEWABLE ELECTRICITY STANDARD (2010), *available at* http://www res-alliance.org/public/RESAllianceNavigantJobs Study.pdf; DEP'T OF ENERGY, NATIONAL RENEWABLE ENERGY LABORATORY; PATRICK SULLIVAN ET AL., NREL/TTP-6A2-45877, COMPARATIVE ANALYSIS OF THREE PROPOSED

reports found that a national renewable electricity standard mandating 25% renewable power to be achieved by 2025 would lead to the creation of at least 274,000 additional jobs[116] widely distributed across the nation's manufacturing, construction, engineering, and technical services. Conversely, the reports predicted job losses in the renewable energy industry without the impetus of strong demand.[117] These assessments also conclude that a RPS would attract $263.4 billion in long-term manufacturing capital investment for new renewable energy projects[118] and would have a negligible or cost saving effect on electricity prices for consumers.[119]

For over ten years, a federal RPS has been proposed that would require electric utilities to increase their electricity derived from wind, solar, and other renewable energy sources from a baseline to certain set percentages.[120] Previous attempts to enact a federal RPS law imposing uniform national electrical power requirements have failed despite the fact the federal government has operated under its own RPS and energy conservation

---

FEDERAL RENEWABLE ELECTRICITY STANDARDS (2009), *available at* http://www.nrel.gov/docs/fy09osti/45877.pdf; DEP'T OF ENERGY, ENERGY INFORMATION ADMINISTRATION, SR/OIAF/2007-3, IMPACT OF A 15-PERCENT RENEWABLE PORTFOLIO STANDARD (2007).

116. *See* JOBS IMPACT OF A NATIONAL RENEWABLE ELECTRICITY STANDARD, *supra* note 115. The "Clean Power, Green Jobs" report estimated a high number of new jobs attributable to a national renewable electricity standard at 297,000 by 2025. CLEAN POWER, GREEN JOBS, *supra* note 115. Specifically, the Navigant Consulting, Inc. study found that the 25% RPS would add 60,000 biomass related jobs, 34,000 hydro power jobs, 15,000 waste-to-energy related jobs, 50,000 solar power related jobs, and 116,000 wind power industry jobs by 2025. JOB IMPACT OF A NATIONAL RENEWABLE ELECTRICITY STANDARD, *supra* note 115.

117. The following states are projected to actually lose existing clean energy jobs in the 2009-2025 period: North Dakota, Nebraska, Oklahoma, Texas, Iowa, Indiana, Ohio, South Carolina, Maryland, and Delaware. JOB IMPACT OF A NATIONAL RENEWABLE ELECTRICITY STANDARD, *supra* note 115.

118. CLEAN POWER, GREEN JOBS, *supra* note 115.

119. The Energy Information Administration's "Impacts of a 15-Percent Renewable Portfolio Standard" study concluded that the standard's impact on cumulative electric and natural gas bills would range from a marginal increase of 0.2% to a slight decrease of 0.1%. The Union of Concerned Scientist's "Clean Power, Green Jobs" report found that ratepayers would actually save $64.3 billion on their electricity and natural gas bills by 2025, and this savings would grow to $95.5 billion by 2030. In addition, between 2010 and 2030, the study found that consumer electricity rates would be as much as 7.6% lower than they would have otherwise been without the national standard. *Id*.

120. The 106th Congress (1999-2000) saw at least five separate bills proposed in the House and the Senate that would have introduced a federal RPS that would phase-in minimum renewable generation requirements between 2000 and 2020 for new and existing renewable energy sources. Similar efforts failed in the 107th Congress (2001-2002), but, in 2005, the Senate passed legislation that mandated a 10% renewable component by 2020. It did not become law in part due to the strong opposition of the Bush Administration. In 2007, another attempt to adopt a 20% renewable RPS by 2020 was unsuccessful. *See* Donald S. McCauley et al., *Renewable Portfolio Standards*, CAPTURING THE POWER OF ELECTRIC RESTRUCTURING 175, 181-82 (Joey L. Miranda ed., 2009).

policy for years.[121] Currently, the climate change bills pending before Congress have the potential for serving as the vehicle for adopting the RPS principle into federal law, and, if enacted, this new law would establish a renewable energy floor for most American utility companies and, presumably, would drive the production of renewable power to a higher level.[122]

Energy suppliers would be able to meet these national requirements either by producing renewable energy or by purchasing credits from other entities that have them to sell. This policy would encourage utilities to invest in renewable energy both as a regulatory requirement and as an investment for resale. Should one of these bills or a similar proposal be enacted into law, it would set a uniform national standard for utilities while allowing the states to maintain a RPS with higher standards. These legislative proposals have been pending at a time when the European Union (EU) has already endorsed binding greenhouse gas targets requiring EU nations to provide 20% of their electrical power from renewable sources including wind, solar, and hydro power by 2020.[123] The absence of a federal RPS has left the existing state policies in place as the main demand stimulus for wind generated electricity, and they will continue in that role until they are preempted by federal law or repealed by their own state legislatures.

IV. STATE POLICIES ON WIND POWER

State and local governments have been the leaders in the development of renewable energy in the United States. At times when the federal government expressed little interest in the concept of diversifying the nation's electricity supply, states used their wide-ranging legislative and

121. The attempt to include a national RPS failed in 2005 when Congress enacted the Energy Policy Act of 2005. However, § 203(a)(1)-(3) of that statute requires that the following percentages of renewable electricity be used by the federal government: at least 3% in FY 2007 to FY 2009, 5% in FY 2010 to FY 2012, and 7.5% in FY 2013 and beyond. 42 U.S.C. § 15852(a) (2006). In addition, Executive Order 13423 requires that at least half of the statutorily required renewable energy consumed by the government in a fiscal year come from new renewable sources, and, to the extent feasible, the government must implement renewable energy generation projects on government property for government use. Executive Order No. 13423, 72 Fed. Reg. 3919, 3919 (Jan. 24, 2007). The Energy Independence and Security Act, enacted in 2007, also imposes energy consumption standards for federal buildings, reaching a 30% reduction in 2015 over 2003 levels. Energy Independence Security Act § 431(a) (2007).

122. Monisha Shah, *Federal RPS Bill Comparison* (NATIONAL RENEWABLE ENERGY LABORATORY, 2009) http://www ncsl.org/documents/energy/SFMShah09.pdf.

123. Reuters, *Europeans Set Binding Energy Targets*, N.Y. TIMES, Mar. 9, 2007, *available at* http://www nytimes.com/reuters/world/international-energy-eu html. The Australian state of New South Wales has also established mandatory renewable energy targets of 10% by 2015 and 15% by 2020. *See* Selina Mitchell, *Wind Farm to Ruin Birds' Backyard*, THE AUSTRALIAN, Nov. 10, 2006, at 9 (explaining controversy over plan to build 1200 large wind turbines).

administrative authority to initiate a broad range of programs supporting renewable energy development and wind power. The states have been the leaders in renewable energy policy development, with the federal government just recently starting to adopt some of the federal ideas and policy principles. State policies generally fall into three main categories: (1) regulatory techniques; (2) economic subsidy devices; and (3) land use policies. The initiative taken in most states reflects a deep belief in the potential for renewable power as an important, non-polluting contributor to the electrical supply and as a force for local economic development. In fact, with its rapid expansion in wind power development, the State of Texas has been declared "the Saudi Arabia of Wind" by energy entrepreneur T. Boone Pickens.[124]

A. REGULATORY TECHNIQUES

States have taken the lead with wind power development by providing for the legal regulatory mechanisms facilitating wind power facility siting and for electrical utility policies supporting the growth of renewable energy projects. State policies in these areas possess similarities, but there is no template that all states follow.

1. *Wind Power Siting Procedures*

Since most wind power development takes place on non-federal land, the states and local governments largely have the primary responsibility for siting regulation. This permitting control is undertaken in a variety of ways including procedures directed by the local government, the state government, or a hybrid of both. The states have not settled on one dominant method of dealing with the wind power siting issues, and no model statute governs this field. As a result, a wide number of differing approaches have been adopted. Some states maintain the exclusive control over energy facility siting at the state level of government with a state board or agency having responsibility over energy plants, including wind power facilities. These are usually state utility commissions, facility siting boards, or environmental or natural resource agencies. For example, in Massachusetts, Connecticut, Ohio, and Oregon, state statutes grant approval authority to specialized siting boards.[125] Other states, such as Minnesota and Vermont,

124. *See* Pickens, *supra* note 21.

125. In Massachusetts, the Massachusetts Energy Facilities Siting Board considers applications for generating facilities of 100 MW or greater. *See* Dep't of Public Utilities: Energy and Environmental Affairs, http://www mass.gov/dte/siting/shandbook.pdf (last visited May 3, 2010). The Connecticut Siting Council regulates the siting of renewable energy projects of more than one MW. CONN. GEN. STAT. §§ 16-50g–16-50aa, 16-50j-1–16-50z-4 (2009). Ohio has established

allot permitting authority to general utility commissions rather than facility siting panels.[126] It is also not uncommon for state regulatory authority over wind energy projects to be spread over a number of state environmental, natural resource, parks, historic preservation, and transportation agencies. In these jurisdictions, state law-required environmental impact statements and individual water quality, endangered species, wetlands, and storm water runoff regulatory requirements must also be satisfied.[127]

In some states, the regulatory focus is local, and state guidance provides local governments with a frame of reference enabling them to carefully evaluate wind proposals in terms of their likely land use impacts.[128] State agencies in Kansas, Montana, and Wisconsin have developed voluntary guidelines or model local government ordinances to deal with wind power siting regulation.[129] Finally, in another group of jurisdictions, the primary wind power permitting authority is allocated to the local zoning and planning commissions or a panel of elected officials who are responsible for exercising general state law powers for implementing zoning and land use regulation.[130] Often this requires the issuance of a conditional or special use permit and permits for building and road use.[131] Such an

---

the Ohio Power Siting Board authorized to issue certificates of environmental compatibility and public need for the construction, operation, and maintenance of major utility facilities as defined in OHIO REV. CODE ANN. § 4906.01 (2009). Oregon law requires that energy facilities with generating capacities of 105 MW or more be approved by the Oregon Energy Facility Siting Council. OR. REV. STAT. §§ 469.300-469.560 (2009); OR. ADMIN. R. 345 (2010).

126. *See* MINN. STAT. §§ 116C.691-116.C.697 (2010) (Minnesota Public Utilities Commission); VT. STAT. ANN. tit. 30, § 248 (2009) (Vermont Public Service Board).

127. *See, e.g.*, NATIONAL WIND COORDINATING COMMITTEE, STATE SITING AND PERMITTING OF WIND ENERGY FACILITIES ii (2006), *available at* http://www nationalwind.org/asset.aspx?AssetId=189 (identifying regulatory procedures required to site wind-energy facilities).

128. For instance, Kansas does not have a siting board or public utility or service commission that oversees siting of energy projects. Instead, siting authority is vested in local government entities.

129. The Kansas Energy Council issued a Wind Energy Siting Handbook that provide cities and counties non-binding advice based on the experience of four Kansas counties. *See* KANSAS ENERGY COUNCIL, WIND ENERGY SITING HANDBOOK: GUIDELINE OPTIONS FOR KANSAS CITIES AND COUNTIES 1 (2005), *available at* http://www kansasenergy.org/Kansas_Siting_Guidelines.PDF. In Wisconsin, the Public Service Commission and the Department of Administration have developed a model wind ordinance to guide towns and counties. NATIONAL WIND COORDINATING COMMITTEE, *supra* note 127, at 14. Similar model wind ordinances have also been developed in Minnesota, Iowa, and New York. *See* TETRA TECH EC, INC. & NIXON PEABODY LLP, WIND SITING HANDBOOK 9-5 to 9-7 (2008), *available at* http://www.awea.org/sitinghandbook/download_center html.

130. California, New York and West Virginia are in this category, although in California and New York approvals are subject to the state's environmental quality act, which requires assessment of environmental impacts of proposed actions.

131. In 2006, the DOE's Renewable Energy Laboratory, in collaboration with the National Association of Counties, created a Wind Energy Guide for County Commissioners that can also be a useful resource for wind power developers. U.S. DEP'T OF ENERGY, WIND ENERGY GUIDE FOR COUNTY COMMISSIONERS, *available at* http://www nrel.gov/docs/fy07osti/40403.pdf.

approach localizes the decision to approve or deny wind power development permission either in a case-by-case fashion or through general land use designations.[132] Although general zoning control might be adequate for the regulation of "small wind" house, farm, or ranch turbines, it would seem to be inadequate to deal with the complexity of large, multi-turbine wind farm proposals. Vesting such authority at the local level of government might also lead to inconsistent outcomes where an encouraging state policy could be thwarted by local zoning decisions.

As a qualitative matter, the regulatory regimes adopted by states to regulate wind power possess varying levels of sophistication, and they have been described as "evolving" by one federal study.[133] Needless to say, there is considerable variation from state-to-state and little regulatory uniformity. Some state regulators have developed an expertise in evaluating wind power project impacts, while others have little experience in assessing and mitigating the environmental and other effects. Such a variety of state level regulatory structure and competence presents a challenging regulatory environment to new project sponsors. This is not to say that having an exclusively federal wind power permitting scheme would necessarily be superior to a primarily state administered system,[134] but it does suggest that similar wind energy proposals could be subject to a highly variable regulatory approval process both in terms of substance and procedure in different states. Perhaps with time, wind power projects will be assessed in a fashion that carefully considers specific site characteristics so as to minimize adverse impacts following generally accepted "best practices" norms.[135] However, valuable time could be lost while those norms are being established and broadly adopted.

---

132. *See* Zimmerman v. Bd. of County Comm'rs of Wabaunsee County, 218 P.3d 400, 422 (Kan. 2009) (upholding county ordinance allowing small wind power systems but banning commercial wind farms).

133. GOV'T ACCOUNTABILITY OFFICE, REP. TO CONGRESSIONAL REQUESTERS: WIND POWER—IMPACTS ON WILDLIFE AND PROTECTING WILDLIFE 22 (2005), *available at* http://www.gao.gov/new.items/d05906.pdf.

134. The experience in England has suggested that a national, rather than a local or regional, regulatory system is not necessarily the most efficient method of evaluating wind power proposals. Despite having a national 10% renewable energy requirement by 2010, lengthy delays in planning and grid connection have deferred projects that would supply 8% of the British electricity supply. *See* Juliette Jowit, *Red Tape Thwarts Wind Revolution: Planning Battles Mean That Renewable Energy Projects Are Sitting in Limbo for Up to Six Years*, THE OBSERVER, Feb. 25, 2007, at 19.

135. The Sierra Club issued a Wind Siting Advisory Document in 2002 that identifies the relevant issues to consider in a wind power siting application. In addition, it creates a useful four-level hierarchy of development preferences for particular lands, ranking them most appropriate, more appropriate, less appropriate, and not appropriate. *See* Sierra Club, Sierra Club Conservation Policies—Wind Siting Advisory, *available at* http://www.sierraclub.org/policy/conservation/wind_siting.aspx.

Beyond expertise or standards, important and highly controversial questions remain concerning selecting the most appropriate process for making wind power siting decisions, especially when they involve utility-sized wind farms. These issues concern serious questions of political control and legitimacy in matters of potentially controversial siting impact, and they could result in the adoption of restrictive or unduly burdensome state procedures for approval. Should state regulatory siting processes actually work to unreasonably interfere with the achievement of federal renewable energy goals, important political and constitutional questions related to the federal-state relationship will be present. Congress could also choose to resolve this imbalance by exercising federal supremacy and effectively preempt state and local governments as it has in other controversial siting contexts, such as cell phone tower construction.[136]

2. *Renewable Portfolio or Renewable Electricity Standards*

One of the most significant state policies spurring development of renewable, or green, electricity is the Renewable Portfolio Standard (RPS). This policy method has been credited with increasing the production of renewable power over the last decade through utility regulation.[137] First adopted in Iowa in 1983,[138] twenty-nine jurisdictions have now imposed mandatory electricity supply requirements upon utility companies in the form of a RPS.[139] Another five states have Renewable Energy Goals that impose non-mandatory targets on utility supply of non-renewable power.[140]

---

136. *See, e.g.,* Federal Communications Act Amendments of 1996, 47 U.S.C. § 332(c)(7) (2010).

137. BARRY G. RABE, RACE TO THE TOP: THE EXPANDING ROLE OF U.S. RENEWABLE PORTFOLIO STANDARDS v (2006) (focusing on Texas, Massachusetts, Nevada, Pennsylvania, and Colorado).

138. TONY DUTZIK ET AL., ENVIRONMENT AMERICA RESEARCH & POLICY CENTER, AMERICA ON THE MOVE—STATE LEADERSHIP IN THE FIGHT AGAINST GLOBAL WARMING AND WHAT IT MEANS FOR THE WORLD 17 (2009), *available at* http://www.environmentamerica.org/home/reports/report-archives/global-warming-solutions/global-warming-solutions/america-on-the-move-state-leadership-in-the-fight-against-global-warming-and-what-it-means-for-the-world (indicating most states are without standards in the southeast and central parts of the U.S.). *See also* North Carolina Solar Center, Database of State Incentives for Renewables & Efficiency, *available at* www.dsireusa.org (providing statistical information on the implementation of renewable portfolio standards across all fifty states).

139. U.S. DEPT. OF ENERGY, ENERGY EFFICIENCY AND RENEWABLE ENERGY, STATES WITH RENEWABLE PORTFOLIO STANDARDS—SUMMARY OF STATE RENEWABLE PORTFOLIO STANDARDS (May 2009), *available at* http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm. RPS programs have been implemented in other nations as part of policies to curb greenhouse gas emissions. *See* RACE TO THE TOP, *supra* note 137, at 3 (detailing programs in Italy, Poland, Belgium, U.K., Japan, and parts of Australia and Canada).

140. North Carolina Solar Center, Database of State Incentives for Renewables & Efficiency, Renewable Portfolio Standards, *available at* http://dsireusa.org/documents/summarymaps/RPS_map.pptx.

During the last decade, these standards have spread across the United States as states increasingly adopted these policies under their general authority to regulate electrical utilities operating within their borders. In some states, these policies have evolved into second generation standards with more ambitious renewable energy percentages and target achievement dates. As mentioned above, the portfolio concept has been proposed, but not adopted, at the federal level due to resistance from some states.

An RPS is a state utility regulation requiring firms to supply a minimum percentage of their electrical load with eligible sources of renewable energy.[141] Often the overall goal of the RPS is to set a state-level policy to reduce greenhouse gas emissions.[142] The central premise behind the RPS technique is to use a state-mandated utility regulation to provide a predictable and competitive demand for renewable energy, ensuring renewable energy producers a steady market for their power. A secondary objective of these renewable energy demand programs has been the development of "green jobs," or employment in renewable power manufacturing and construction industries.[143] Most state RPS programs allow utility firms to meet the required percentages of green power by generating it themselves, by purchasing renewable energy credits, or obtaining certificates from other producers.[144] This use of a "common currency" for renewable power permits electrical suppliers to find least-cost solutions to meeting their mandated portfolio percentages.

These state renewable energy policies have become increasingly common, having been adopted in approximately 60% of the states.[145]

---

141. American Wind Energy Association, Wind Energy Policy Transmission & Regulation, *available at* http://www.awea.org/policy/rpsbrief html (last visited May 3, 2010).

142. In February 2007, the governors of Arizona, California, New Mexico, Oregon, and Washington announced the creation of the Western Climate Action Initiative aimed at reducing these gases by setting a regional target and setting market-based strategies for achieving their goals. Renewable portfolio standards have been made part of this effort. Press Release, Western Climate Initiative, Five Western Governors Announce Regional Greenhouse Gas Reduction Agreement (Feb. 26, 2007), *available at* http://www.governor.wa.gov/news/2007-02-26_WesternClimateAgreementRelease.pdf.

143. JOBS IMPACT OF A NATIONAL RENEWABLE ELECTRICITY STANDARD, *supra* note 115. The study was conducted by Navigant Consulting, Inc., and found that a 25% by 2025 national RES would result in 274,000 more renewable energy jobs over a no national RES policy. The number of websites devoted to the development of green energy or renewable power employment is constantly expanding. *See, e.g.*, Green Energy Jobs—Careers in Renewable Energy, http://www.greenenergyjobs.com/ (last visited May 3, 2010); Find Renewable Energy Jobs, http://www renewableenergyjobs.com/find_jobs/ (last visited May 3, 2010); Global Renewable Energy Recruitment Channel Survey & Recruitment Excellence Awards, http://www renewable energyjobs.com/greenleader/green_jobs/109/ (last visited May 3, 2010).

144. *See* ED HOLT & LORI BIRD, EMERGING MARKETS FOR RENEWABLE ENERGY CERTIFICATES: OPPORTUNITIES AND CHALLENGES 1 (2005), *available at* http://apps3.eere.energy.gov/greenpower/resources/pdfs/37388.pdf.

145. The popularity of RPS programs has been explained in the following terms:

Interestingly, this has been accomplished independently without federal direction or support. As of 2009, twenty-eight states and the District of Columbia have adopted RPS requirements in some form.[146] Although the different state policies vary in a number of ways, some general structural similarities do exist.[147] First, the time for achieving the mandated percentage of renewable electricity supply is one aspect of the program. Some states require achievement of target percentages in the near term—20% by 2010 in California and 29% by 2015 in New York—while others set their standards farther out—25% by 2025 in Ohio and 15% by 2025 in Arizona.[148] Usually, the more distant attainment dates often have the highest required percentages of renewable energy.[149] But that is not always the case. California, Illinois, Michigan, Montana, Nevada, New York, and Wisconsin have all adopted RPS targets from 10% to 24% to be achieved by 2015.[150] Second, another variable in the array of state RPS policies is the degree to which utilities must rely on renewable sources of supply. This is referred to as the renewable energy percentage. In 2007, the Connecticut legislature passed the most advanced state policy on renewable power in the nation, setting its mandated renewable power requirement at 27% by 2020.[151] The states of Illinois, Minnesota, and Oregon follow close behind Connecticut with 25% renewable energy requirements by 2025, and, in

---

> For most states, establishing an RPS merely involves an incremental expansion of existing regulatory powers over electricity generation and distribution within their boundaries. Alongside their historic and pivotal roles in overseeing the regulation of electric utilities, market restructuring, approval and siting of new generating facilities, and electricity rate-setting and taxation, states have for decades sought ways to promote renewable energy sources as well as energy conservation . . . . Consequently, many state officials view portfolio standards as simply one additional mechanism to respond to public demand for an electricity supply that is as reliable, inexpensive, and environmentally friendly as possible.

RABE, *supra* note 137, at 3.

146. *See* North Carolina Solar Center, *supra* note 140.

147. These policies often contain features establishing renewable energy targets, eligible renewable energy sources, treatment of existing plants, application requirements, enforcement mechanisms, flexibility devices, and even tradable permits. Database for Renewables & Efficiency (DSIRE), Rules, Regulations and Policies for Renewable Energy, http://www.epa.gov/grnpower/gpmarket/tracking htm (last visited May 3, 2010). Systems exist for tracking the tradable permits or RECs so as to prohibit fraud or double counting. *Id*.

148. North Carolina Solar Center, *supra* note 140; North Carolina Solar Center, California, Renewable Portfolio Standard, http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=CA25R&re=1&ee=0 (last visited Apr. 16, 2010).

149. *See* State-Level Renewable Energy Portfolio Standards (RPS), http://www.awea.org/legislative/pdf/RPS_Fact_Sheet.pdf (last visited May 3, 2010); American Wind Energy Association (2005), http://www.awea.org/ (last visited May 3, 2010).

150. *See* DSIRE, Database for Renewables & Efficiency, *supra* note 147.

151. North Carolina Solar Center, Connecticut, Renewable Portfolio Standard, http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=CT04R&re=1&ee=0 (last visited Apr. 16, 2010).

Minnesota, the state's largest utility is set to reach 30% renewable by 2020.[152] The third difference in state RPS programs lies in the definition of what energy technologies are eligible for inclusion in the renewable power calculus. While the elements of a particular state's renewable mandate system may differ, wind energy, solar photovoltaic, biomass, hydro, and landfill gas are always included within the definition of renewable energy.[153]

The composition of state RPS presents nuanced policy choices that will favor or discourage a range of energy saving approaches and will, in some cases, create different tiers or categories of acceptable energy choices. These state-specific preferences create a non-uniform pattern of renewable energy encouragement, creating potential conflicts between states. States may choose to encourage one renewable energy technology over another based on locally-significant factors such as employment, lobbying power, and the availability of particular energy sources. The broad adoption of the state RPS concept illustrates a widespread acceptance of the idea that utility-based electricity should, as a matter of state law, originate from diversified sources including a mandated percentage of renewable ones. These policies have been especially important in creating the stable, long-term demand for green energy that is needed to support the sizable capital investments in wind power.

3. *Other Forms of Utility Regulation*

States have also adopted policies that attempt to enlist the power of consumer demand to drive the development of "green" power alternatives. Using their broad regulatory authority over utilities operating within their borders, states have enacted a range of regulatory policies aimed at providing information to energy consumers and allowing them to purchase renewable power from their utility providers.

a. Generation Disclosure Rules

Twenty-four states and the District of Columbia require electrical utilities to disclose to their customers information about the electrical

152. In February 2007, Minnesota Governor Tim Pawlenty signed legislation setting a "25 x 25" standard for renewable energy in his state. This law also specified that Xcel Energy, the state's largest utility with over 50% market share, would be obligated to meet a 30% renewable standard by 2020, with 25% of that standard to be met by wind power. Press Release, Pawlenty Signs Next Generation Act (May 25, 2007), *available at* http://www.governor.state mn.us/media center/pressreleases/2007/PROD008146.html.

153. U.S. Environmental Protection Agency, Renewable Portfolio Standards Fact Sheet fig. 3, *available at* http://www.epa.gov/CHP/state-policy/renewable_fs html.

energy they purchase.[154] In particular, utilities must provide consumers with their fuel mix data plus emissions information in order to educate them about the sources of their electricity.[155] Some states go one step further by requiring the electrical utilities to certify the actual sources of their power and assure their customers the firms actually use these sources.[156]

b. Green Power Purchasing and Aggregation Policies

Ten states and twenty localities allow individuals and government units to purchase "green" power generated by renewable sources.[157] Municipalities, state governments, businesses, and other non-residential customers like universities can play a critical role in supporting renewable energy technologies by purchasing electricity from renewable sources. At the local level, green power purchasing can result in buying this kind of electrical power for municipal facilities, streetlights, water pumping stations, and other uses. Several states require a certain percentage of green power be purchased for use in state government buildings.[158] A few states allow local governments to aggregate the electricity loads of the entire community to purchase green power, while others allow localities to join with other communities to form a large purchasing block, often called "Community Choice."[159]

c. Interconnection

To encourage both small and large additions to the utility-supplied electricity grid, forty-two states and the District of Columbia have developed or are developing interconnection rules that establish technical standards for independent or distributed electrical generation sources to use when they wish to sell their power to the utility distribution system.[160]

---

154. DSIRE, Rules, Regulations, & Policies for Renewable Energy, http://web.archive.org/web/20070704193838/www.dsireusa.org/summarytables/reg1.cfm?&CurrentPageID=7&EE=1&RE=1 (last visited Apr. 16, 2010).

155. *Id.*

156. *Id.*

157. *Id.*

158. *See, e.g.*, North Carolina Solar Center, Massachusetts, Incentives/Policies for Renewable Energy, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=MA12R&re=1&ee=0 (last visited Apr. 16, 2010).

159. *See generally* North Carolina Solar Center, Green Power Purchasing for Renewable Energy, http://www.dsireusa.org/incentives/index.cfm?SearchType=Purchase&Back=regtab&&EE=0&RE=1(last visited Apr. 16, 2010) (listing the green power purchasing rules, policies, and regulations for all fifty states).

160. *See generally* North Carolina Solar Center, Interconnection Standards for Renewable Energy, http://www.dsireusa.org/incentives/index.cfm?SearchType=Interconnection&&EE=0&RE=1 (last visited Apr. 16, 2010) (listing the interconnection rules, policies, and regulations for all fifty states).

These interconnection standards have become a near-universal feature of state utility regulation throughout the United States.[161] These potentially contributing sources of electricity, known as distributed power sources, must meet either FERC specified engineering standards or state specified rules so that their power can safely and efficiently flow into the utilities' lines.[162] In addition to technical engineering standards, these state rules also deal with business, indemnity, insurance, and liability matters.[163]

B. ECONOMIC SUBSIDIES AND FINANCIAL INCENTIVES

The investment of business capital in new wind power energy projects, while environmentally beneficial, is fundamentally a financial investment. States and localities have been remarkably creative in using economic subsidies and other financial incentives to spur this form of energy development by affecting the project owner's profitability. A significant number of states have adopted a wide range of supportive policies with the intent of both expanding the renewable energy supply and increasing the demand for renewable power. State governments, operating under their taxing and spending powers, have been extremely flexible in using their broad authorities to design and adopt helpful policies including tax rules, financial support, and encouraging regulatory policies. In these ways, the states have demonstrated both great policy creativity and political will to assist companies wishing to produce renewable energy.

1. *State Tax Incentives*

Establishing state tax policy is one of the basic powers of state government. As long as federal constitutional norms are not violated, state legislatures may employ the instruments of taxation to achieve politically supported state policy goals including the development of renewable power facilities like small wind energy and wind farms. By using this approach, state governments appropriate tax subsidies in favor of these types of investments. Although there is significant variation in the details of each jurisdiction's law, states are currently offering at least three areas of tax incentives to assist and attract renewable energy production: (1) taxes on

---

161. *Id.*

162. *See*, *e.g.*, CONN. GEN. STAT. § 16-243a (West 2007) (Connecticut's interconnection guidelines); Connecticut Dep't of Public Utilities Decision, Docket No. 03-01-15RE01; N.M. CODE R. §§ 17.9.568–17.9.569 (2010) (New Mexico's interconnection rules).

163. The Database State Incentives for Renewable Energy (DSIRE) provides the most up-to-date, state-by-state listing of policies and practices adopted in the United States for the support and encouragement of renewable energy production. *See* DSIRE, Home Page, http://www.dsireusa.org/ (last visited May 3, 2010).

real and personal property; (2) income taxes on individuals and corporations; and (3) sales taxation. With regard to wind power facilities, these financial incentives can subsidize the cost of energy produced and make wind-generated electricity cost-competitive with other forms of production.

a. Taxes on Real and Personal Property

Thirty-one states offer property tax exemptions, exclusions, and credits for renewable power including wind energy.[164] These policies take many forms, like full or partial property tax exemptions on a range of renewable energy equipment including wind power.[165] The net result of these policies is to reduce state or local government property taxes on renewable energy equipment, thereby reducing the effective cost of owning and operating these forms of energy production.

b. Income Taxes on Individuals and Corporations

Twenty-two states make personal income tax incentives available, and twenty-four states give corporate income tax payers benefits for the expense of purchasing and installing renewable energy equipment.[166] Affecting the after-tax income of firms or individuals making these wind power investments improves the company's profit and reduces the costs to the individual owner. Some states, like Iowa, go one step further and provide production tax credits, similar to the federal ones, which are creditable against state income tax liability.[167] In other instances, tax credits are provided for 10 to

164. DSIRE, Financial Incentives for Renewable Energy, http://www.dsireusa.org/summary tables/finre.cfm (last visited Apr. 8, 2010).

165. *See, e.g.,* ARIZ. REV. STAT. ANN. § 42-155 (2006) (renewable energy equipment owned by utilities and other entities operating in Arizona is assessed at 20% of its depreciated cost for the purpose of determining property tax); IDAHO CODE ANN. § 63-3502B (2007) (in lieu of property taxes; however, wind and geothermal energy producers must instead pay a tax of 3% of their gross energy earnings); N.H. REV. STAT. ANN. § 72:62 (LexisNexis 2009) (allows cities and towns to offer an exemption from residential property taxes in the amount of the assessed value of a renewable-energy system used on the property); N.D. CENT. CODE § 57-06-14.1 (2005) (seventy or eighty-five percent reduction in property taxes on centrally-assessed wind turbines, depending on project circumstances); TENN. CODE ANN. § 67-5-601 (wind energy systems operated by public utilities, businesses, or industrial facilities shall not be taxed at more than one-third of their total installed cost). In 2009, the City of Honolulu, Hawaii adopted a 100% real property tax exemption for alternative energy improvements for twenty-five years. *See* Honolulu City Council Bill 58.

166. *See* DSIRE, Financial Incentives for Renewable Energy, *supra* note 164.

167. IOWA CODE ANN. § 476C.2 (West 2009) (a production tax credit of 1.5¢ per kilowatt-hour is available for energy generated and sold by eligible wind energy generators and other renewable energy facilities, including biomass and solar).

35% of the costs of constructing wind power facilities.[168] Taking the reverse approach, at least one state, Wyoming, has determined the wind power industry does not need additional tax subsidies.[169] In fact, a recent proposal by Wyoming's governor adds new excise taxes on wind energy production in the state.[170]

c. Sales Taxation

For those states that impose a sales tax on goods or services purchased within their borders, adopting a policy to waive or reduce the tax that would have otherwise been imposed on sales of renewable energy equipment could provide additional incentive to develop new renewable energy projects. Twenty-four states allow for sales tax exemptions on the purchase of renewable energy equipment including wind turbines and related machinery.[171] This policy effectively grants a financial subsidy for the acquisition of wind power equipment in the amount of the state's sales tax rates. Considering the high cost of wind power turbines and other related items, this tax exemption could provide a significant subsidy to the construction of new wind facilities.

2. *State Financial Support*

A relatively large number of states provide direct financial support for renewable energy production through a wide array of techniques including grants (25 states), loans (37 states), rebates (24 states), bonds (2 states), and production incentives (10 states) that seek to promote renewable energy production.[172] In addition to state and local government support, utilities and non-profit organizations offer these kinds of financial incentives to renewable power suppliers.[173] State legislatures possess the independence and authority to appropriate funds for the policy goals that they identify as having the necessary political support. Renewable energy has been chosen as one of these goals. This range of state and local government financial subsidy has contributed to the expansion of renewable power in striking

168. *See, e.g.*, MONT. CODE ANN. § 15-42-402 (2009) (35% corporate tax credit); N.C. GEN. STAT. § 105-129.16A (2009) (35% corporate tax credit); N.D. CENT. CODE § 57-38-01.8 (2005) (15% corporate tax credit); UTAH CODE ANN. § 59-7-614 (2008) (10% corporate tax credit).

169. Matt Joyce, *Wyoming Considers Becoming First State to Tax Wind Energy*, WASH. POST, Feb. 14, 2010, at A8 (the proposal would impose a $3-per-megawatt-hour excise tax on commercial wind energy generation with the estimated annual $11.5 in revenues to be split 60-40 between the state and counties where turbines are located).

170. *Id.*

171. *See* DSIRE, Financial Incentives for Renewable Energy, *supra* note 164.

172. *Id.*

173. *Id.*

ways, revealing that a myriad of techniques can be developed to promote renewable energy and that subsidies are an effective way of doing so even if they are granted by state and local governments.

3. *Net Metering Laws*

For small producers of wind power, the opportunity to sell electricity back to utilities serves as a strong incentive for home, ranch, farm, and community-scale electricity generation. This concept of net metering has swept the nation and is now widely accepted. Forty-four states and the District of Columbia have adopted net metering laws.[174] In at least three other states—Idaho, South Carolina, and Texas—the policy has been adopted by the utilities themselves.[175] For those consumers who have installed their own electricity generating units, net metering allows for the flow of electricity both to and from the customer through a single, bi-directional meter. With net metering, during times when the customer's generation exceeds use, electricity from the customer moves to the utility and is credited to the customer's account.[176] By adding electrical current to the transmission system, the consumer replaces utility-supplied electricity with self-generated power, thereby creating the possibility of having the utility pay the small generator. Net metering laws are often beneficial for small wind turbine owners such as farmers, ranchers, and community facilities.

---

174. *See, e.g.,* IOWA CODE ANN. §§ 476.41–.48 (West 2009); MO. CODE ANN. § 7-306 (LexisNexis 2008). In addition, North Dakota's net-metering policy, adopted in 1991 by the state Public Service Commission (PSC), applies to renewable-energy systems and combined heat and power (CHP) systems up to 100 kilowatts (kW) in capacity. Net metering is available to all customers of investor-owned electric utilities; it is not available to customers of municipal utilities or electric cooperatives. N.D. ADMIN. CODE § 69-09-07-09 (1991).

175. For example, Idaho does not have a state-wide net metering policy. Nevertheless, each of the state's three private utilities has developed a net metering tariff that has been approved by the Idaho Public Utilities Commission (PUC).

> The framework of the utilities' net-metering programs is similar in that each utility: (1) offers net metering to customers that generate electricity using solar, wind, hydropower, biomass, or fuel cells; (2) limits residential systems to 25 kilowatts; (3) limits aggregate net-metered capacity to 0.1% of the utility's peak demand in a baseline year; and (4) restricts any single customer from generating more than 20% of the aggregate capacity of all net-metered systems. Idaho Power's net-metering tariffs Schedule 84.

DSIRE, Idaho Power—Net Metering, http://www.dsireusa.org/incentives/incentive.cfm ?Incentive_Code=ID01R&re=1&ee=1 (last visited Apr. 9, 2010).

176. Minnesota is the only state that requires utilities to pay for "customer net excess generation" if the amount exceeds $25 per month. MINN. STAT. § 216B.164 (2005); MINN. R. 7835.9910 (2009).

V. CONCLUSION: HARMONIZING AND IMPROVING STATE AND FEDERAL LAW TO ACHIEVE ADVANCED WIND POWER DEVELOPMENT GOALS

The American system of electricity is complex in its generation and distributional features. These characteristics are largely determined by investor-owned utilities, independent power producers, and regional transmission organizations operating under the oversight of both state and federal governments. Reaching the advanced energy goals that significantly increase the share of renewable wind energy in the nation's portfolio of electrical supply will require a broad support from a number of directions. The generation and distribution of electricity will also necessitate changes to the entire system, both in terms of supply and demand of energy. These changes cannot be imposed by government decree or directive alone, but must result from the mutually-reinforcing support of utilities, governments, and consumers. Each participant has its specific role to play if renewable energy will be able to contribute to a larger share of the American electricity supply.

Encouragement of renewable energy by the federal government has been gaining momentum over the last few years as Congress and the Executive Branch have come to believe they must assist the private market in making the transition to a more diverse supply of electricity with more non-carbon emitting sources. In order to have any realistic chance to slow the growth or even reduce the emission of green house gases, there must undoubtedly be a significant increase in the production of carbon-free electricity. It is now time for the federal government to match the thirty-year state performance by increasing its own renewable power incentives and by establishing disincentives for carbon-emitting power generation. The adoption of a significant federal carbon tax or system of capping carbon emissions would do much to spur investment and development into non-carbon emitting forms of electricity. Taking these steps at the federal level would energize renewable power development and would enable state energy objectives—like the RPS—to actually be realized, perhaps ahead of schedule. Government policies would then not only be consistent, but would also be mutually reinforcing.

There is one area where the states can have a substantial positive impact on the expansion of wind power and other forms of renewable energy. States can embark upon a new policy initiative to improve the availability of and access to electrical transmission lines within their jurisdictions to serve both local consumers and energy users in more distant load centers. Improving transmission infrastructure will allow for locally-

generated renewable electricity to be moved into the wholesale bulk power supply market and, ultimately, to consumers. Currently, in many remote areas with excellent wind resources there are either inadequate or non-existent transmission facilities.[177] Wind power generated in these potentially productive areas has no way to reach consumers in more distant locations, losing the opportunity to offset conventional, carbon-emitting electrical demand. Not surprisingly, few energy investments in utility-scale wind power projects are forthcoming without adequate transmission infrastructure.

State transmission siting laws are often part of the problem since they have a narrowly defined scope, only allowing utility regulators to consider the transmission "need" of local consumers and not out-of-state interests in deciding siting requests.[178] If transmission siting regulation remains a state regulatory function,[179] serious thought should be given to reforming state utility siting law to allow for a broader consideration of factors that could support approval of transmission line requests. In particular, the general benefits of new or expanded renewable power generation to the state or regional economy and energy supply should be factors included in this calculus. Without a careful reform of state transmission siting practices, the inability to efficiently move bulk power to the geographical areas with high demand will actually frustrate the positive effect of the supportive state renewable power programs. In the end, the clear wind and renewable energy preferences of the government could be blocked by the inability to move the electricity to where it is needed. Without effective state action on this issue the full potential of wind energy will not be realized. As a result, preemptive federal law might be enacted to break the logjam in transmission capacity should the states not take meaningful reform.

---

177. *See* 20% WIND BY 2030 REPORT, *supra* note 16. It has been argued wind power would need more transmission capacity than conventional power plants because:

> To ensure reliability, the grid needs to have sufficient reserves in transmission to accommodate possible surges, as well as quickly deployable backup sources of power should intermittent renewable sources become unavailable. Wind, for example, will demand more power lines and substations than coal-fired plants, which provide a steady stream of electricity . . . . It is for this reason that it is widely perceived that a large increase in renewable energy resources will not only require transmission lines in new locations of the United States, but also will require more transmission infrastructure than historically may have been necessary for fossil fuel sources of electricity.

Jim Rossi, *The Trojan Horse of Electric Transmission Line Siting Authority*, 39 ENVTL. L. 1015, 1042 (2009).

178. *See, e.g.,* N.Y. PUB. SERV. LAW § 126 (Consol. 2004).

179. *See* Rossi, *supra* note 177, at 1026-27 (mentioning the "possibility of federal preemption").

With the shift in federal policy emphasis toward renewable energy, both the state and federal levels of government are now pursuing similar energy goals for the future including the encouragement for wind power. The variety of governmental policy support for this form of renewable energy generation has been impressive considering the longstanding preference in the United States for conventional forms of electricity. At the most general level of state and federal law, intergovernmental harmony exists with regard to the goals and techniques needed for the achievement of clean energy. These policies, however, may not be sufficient to ensure the ambitious objectives will be achieved until the American electrical system is viewed more as an integrated, interstate power market that flows regionally across state borders. Devising ways of understanding the system, in this connected fashion while recognizing valid state and local interests will be the true energy challenge of the future.