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Tangled in the Wires: An Assessment of the Existing U.S. Renewable Energy Legal Framework

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ABSTRACT

Fossil fuel dependence threatens environmental preservation as well as the stability of our economic and social institutions. The time is ripe for a transition away from fossil fuel over-consumption and toward renewable energy deployment. This article is an analysis of current public efforts to provide renewable energy incentives and promote wide-scale deployment. Effective initiatives require coordination between public actors and policies and a cohesive renewable energy policy strategy. Currently, governmental efforts are tangled in a complexity of actors, policies, and barriers. This analysis determines that public actors at all levels of government must work together to shape a viable and comprehensive renewable energy legal framework.

I. INTRODUCTION

The United States has established a dependency on oil, natural gas, and coal to provide for its transportation, industrial, electricity, and residential energy needs. The repercussions of this dependency are severe: we risk depleting natural resources, destroying our environment through climate change, and producing deleterious effects on human health and welfare. Global energy trade also contributes to inter-country animosity and compromised world market relationships. As the Organization of the Petroleum Exporting Countries continues to restrict oil supplies and prices gradually climb to unprecedented levels, the United States' need to create viable solutions to a pervasive energy dilemma is becoming increasingly more critical.

From a sustainable development perspective, the only feasible solution to the United States' current energy situation is the development of a comprehensive legal framework that will support renewable energy

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technology and require energy efficiency initiatives. This article analyzes the current policy framework for renewable energies (RE), the levels of government that are involved with energy policy and regulation, and the legal issues that underlie RE adoption. After a thorough analysis of the current U.S. legal regime, this article argues that it is imperative to establish a more comprehensive system of policies and legal protections to cover the range of considerations involving energy policy, RE development, and energy security. There is currently a complexity of public actors involved in RE development, all of whom operate according to their own agendas and with a different set of sporadic and often voluntary policies. A viable comprehensive framework requires an understanding of the current RE policies and agencies as well as the options for and potential obstacles to widespread adoption of RE technologies. Until these elements are understood and the necessity of RE deployment for societal and environmental development is recognized, a movement away from fossil fuel extraction and environmental destruction will remain impeded.

Analysis of an RE legal framework requires a clear distinction between some related issues. The first distinction is between RE policies and energy efficiency policies. RE policies promote and regulate an alternative supply of fuel based on renewable, non-depletable resources. Energy efficiency policies promote methods of altering energy demands and help to reduce peak loads through conservation and demand-side management techniques as well as substitution of more efficient equipment, technology, and building supplies.[1] Both RE and energy efficiency policies are needed to reduce fossil fuel dependence; however, the focus of this analysis is on RE and only touches on applicable energy efficiency measures.

The second distinction is between centralized and non-centralized energy systems. Centralized systems hook up to a central grid and provide energy for a large number of people or organizations; power plants are hooked into centralized systems. Decentralized systems are smaller, more localized systems that provide power for a single property or a small conglomeration of properties. Each system has its own unique legal issues and requires a different set of regulations and controls. Decentralized system regulation has only recently become a governmental priority. While this article will only briefly examine the physical regulation of decentralized and centralized electricity systems, the distinction between size and connectivity of the energy source will be

1. Union of Concerned Scientists, Energy Efficiency Index, http://www.ucsusa.org/clean_energy/energy_efficiency (last visited May 21, 2006).

important when explaining the difference between legal barriers to small-scale photovoltaic panels, for instance, and decentralized wind turbine power plants.

The third distinction is between the various sectors of the economy that are affected by energy issues. These include the industrial, commercial, residential, building, appliance, and transport sectors. Each of these sectors has its own set of legal issues and, while a comprehensive analysis of all possible overlapping issues is preferable, this analysis only briefly discusses industry regulation and provides no discussion of the transportation sector, but does cover the remaining sectors.[2]

A final distinction must be drawn between different types of RE technologies. While there are a great deal of new technologies emerging in the international and national energy markets—such as tidal wave energy, hydrogen fuel cells made from biomass, agricultural methane recovery, ethanol and other crop energies—solar, wind, geothermal, biomass, and small hydropower energies are most in need of legal safeguarding and fiscal incentives.[3] This discussion mainly addresses solar and wind energy applications, with limited focus on the variety of other options that exist. The limited scope of this analysis is intended to allow for the most complete review of the two renewables that are regulated by all levels of government, are fully functioning as both centralized and decentralized systems, and are present in all aforementioned sectors of the economy.

II. THE HISTORY OF RENEWABLE ENERGY POLICY

Much of the existing RE legislation was passed in the late 1970s and early 1980s in response to the global oil crisis.[4] When the United States realized that restricted supplies could not meet increasing demands spurred by advanced industrial development, suburbanization and the increase in automobile ownership and miles traveled, and rising demands for electricity, policy makers understood that Americans

2. A discussion of industrial energy regulation involves an in-depth analysis of power plant regulations, international treaties, emissions trading, and many environmental regulatory acts. These issues, while pertinent, are beyond the scope of this article. Similarly, the transportation sector has its own cadre of interwoven agencies, regulatory guidelines, emissions standards, and governmental processes, which should be addressed in a separate and extensive analysis.

3. Adrian J Bradbrook, *A Legislative Framework for Renewable Energy and Energy Conservation*, 15 J. ENERGY & NAT. RESOURCES L. 313, 316-17 (1997).

4. *See* WALTER A. ROSENBAUM, ENVIRONMENTAL POLITICS AND POLICY 272 (5th ed. 2002).

needed to change their consumption habits. Political efforts were made to respond to these social crises through the research and development of RE technologies, while individuals endeavored to limit household electricity demand. Regulatory codes were also adopted to diversify electricity mixes and to open the electricity market to non-utilities.[5]

Within a short period of time the United States was able to secure oil supplies and stabilize prices, thereby reducing the perceived severity of energy problems.[6] The government no longer had the incentive to pour fiscal support into programs and tax structures that altered energy demands, and individuals no longer felt the pressing need to modify consumption habits. Energy demand began to rise again in the early 1980s and continues to do so.[7] Electricity consumption, especially at peak times, has reached unprecedented levels and demand for oil and natural gas is on the rise. A long line of presidents has neglected to consider the implications of these trends, as evidenced by the lack of progressive energy policies in the last two decades.[8] It is only in the face of a recent natural gas crisis and a drastic rise in fossil fuel costs that President Bush has increased RE funding and publicly encouraged efficiency.

A number of events in recent years have once again focused attention on issues surrounding fossil fuel consumption and the concurrent need for RE development. As M.K. Hubbert hypothesized in 1956, the United States along with the rest of the world will reach a peak of oil extraction and then decline from there.[9] Oil and natural gas prices rose dramatically in the fall of 2005 and have remained relatively high since. While the United States cannot be certain as to the amount of extractable oil that exists in the world—mainly in the Middle East and South America—some experts contend that the world has passed its peak extraction.[10] In response to tight oil supplies and rising prices, the United States is searching for ways to increase oil and other fossil fuel supplies, as evidenced by the recent congressional vote regarding

5. *See id.* at 61.

6. *Id.*

7. INT'L ENERGY AGENCY, ENERGY POLICIES OF IEA COUNTRIES: THE UNITED STATES 2002 REVIEW 24 (2002), http://www.iea.org/textbase/nppdf/free/2000/usa2002.pdf.

8. ROSENBAUM, *supra* note 4, at 272-74.

9. *See* M. King Hubbert, Nuclear Energy and the Fossil Fuels, Presentation to the Spring Meeting of the Southern Dist., American Petroleum Inst., San Antonio, Tex., Mar. 7-9, 1956 (Pub. No. 95, Shell Dev. Co., Exploration & Production Res. Div.), *available at* http://www.hubbertpeak.com/hubbert/1956/1956.pdf.

10. Kenneth S. Deffeyes, *What Happens Once the Oil Runs Out?*, N.Y. TIMES, Mar. 25, 2005, at A17.

inclusion of drilling in the Arctic National Wildlife Refuge in the 2006 fiscal budget.[11]

Historically, RE has been promoted through the advancement of science and engineering technologies. Within the past 15 years, as policy makers have come to recognize the severity of the situation, RE standards and development have been incorporated into policies at the federal, state, and local level. At the same time, the U.S. government has renewed the push toward diversifying energy supplies with RE substitutes and altering energy demand.

Scientific studies that model atmospheric deterioration caused by pollution from fossil fuel emissions have also proven valid and have catalyzed a series of RE policy responses.[12] Despite near unanimous decrees by leading scientists that global warming is an actual and potentially devastating phenomenon, not all politicians are convinced that political action to reduce global warming contributors, such as fossil fuel plants, is necessary. Consequently, global warming has become a contentious partisan issue among politicians that has been wrought by procedural delays. As George Pring succinctly explained, "The US negotiating position on global warming has been schizophrenic. It has been characterized by extreme divisions within the government exacerbated by intensive special interest lobbying."[13] Disagreements over the severity of global warming trends, the economic consequences of potential efforts to curb global warming, and other large polluting country obligations have led the United States to forego signing the Kyoto Protocol.[14] Nevertheless, policy makers have begun to promote RE policies, primarily in response to pressure from the international community. International movements toward sustainable development along with the promotion of the Kyoto Protocol and the Energy Charter Treaty have put an extraordinary amount of pressure on the United States to collaborate as well.[15] While the United States remains reluctant

11. S. Con. Res. 18, 109th Cong. (2005).

12. *See* Claude Mandil, Exec. Dir., Int'l Energy Agency, Statement announcing remarks to be made at G8 summit on July 7, 2005 (July 1, 2005), http://www.iea.org/textbase/papers/2005/gleneagles.pdf; Union of Concerned Scientists, 2005 Vies for Hottest Year on Record, http://www.ucsusa.org/global_warming/science/recordtemp2005.html (last visited June 17, 2006); Union of Concerned Scientists, Global Warming Science, http://www.ucsusa.org/global_warming/science (last visited June 17, 2006).

13. George W. (Rock) Pring, *The United States Perspective, in* KYOTO: FROM PRINCIPLES TO PRACTICE 185, 196 (Peter D. Cameron & Donald Zillman eds., 2001).

14. *See* Press Release, Centre for Science and Environment, George Bush: "I Oppose the Kyoto Protocol" (Mar. 16, 2001), http://www.cseindia.org/html/au/au4_20010317.htm (last visited June 17, 2006).

15. Pring, *supra* note 13.

to comply with internationally established standards, these issues can no longer be ignored and must be addressed within U.S. borders.

III. DEFINING A LEGAL FRAMEWORK

Supporting literature emphasizes the importance of defining a legal framework through which a conversion to RE deployment can be realized.[16] To date, however, a legal framework for RE is largely undefined and unexplored, although this is likely to change within the coming years as energy security becomes increasingly compromised. As the need to transition away from traditional fossil fuels becomes more imminent, so will a need for legal protection of RE. A comprehensive legal framework must focus on the following objectives, as outlined in the relevant literature.

1. Security—Energy security is defined as "a condition in which a nation and all, or most, of its citizens and businesses have access to sufficient energy resources at reasonable prices for the foreseeable future free from serious risk of major disruption of service."[17] In order to provide secure access to energy, the United States must diversify its energy options with non-depletable resources.[18] In the case of RE, sage policies will promote energy security, protect the environment, and commit to securing and managing the world's natural resources.

2. Investment—Legal protections are needed to secure and promote investment in RE technologies by consumers and manufacturers, as well as the government. A legal framework will provide incentives for investment in RE technologies through tax relief, production incentives, rebates, loans, and grants. Because private investment in RE technology is essential for a successful transition to RE—by supporting start-up costs, covering the premium cost before the technology is cost-competitive with other fuel sources, and accounting

16. *See* Bradbrook, *supra* note 3, at 315; Antonia V. Herzog et al., *Renewable Energy: A Viable Choice*, 43 ENVIRONMENT, Dec. 2001, at 8; Daniel M. Kammen, *An Energy Policy for the 21st Century*, 2 POLICY MATTERS, Spring 2005, at 14, *available at* http://rael.berkeley.edu/apers.html; Robert M. Margolis & Daniel M. Kammen, *Evidence of Under-Investment in Energy R&D in the United States and the Impact of Federal Policy*, 27 ENERGY POLICY 575 (1999) [hereinafter Margolis & Kammen, *Evidence*], *available at* http://rael.berkeley.edu/apers.html; Robert M. Margolis & Daniel M. Kammen, *Underinvestment: The Energy Technology and R&D Policy Challenge*, 285 SCIENCE 690 (1999) [hereinafter Margolis & Kammen, *Underinvestment*].

17. Barry Barton et al., *Introduction*, *in* ENERGY SECURITY: MANAGING RISK IN A DYNAMIC LEGAL AND REGULATORY ENVIRONMENT 3, 5 (Barry Barton et al. eds., 2004).

18. A.B. Lovins, *Energy Strategy: The Road Not Taken*, 55 FOREIGN AFF., 65 (1976–1977).

for externality costs—the legal system needs to protect and encourage private investment in RE systems.[19]

3. Protection—Legal safeguards are necessary for protecting the rights of consumers and manufacturers to, for instance, build solar PV panels or install wind turbines. Local planning departments need to adopt ordinances and zoning codes to help legitimize and foster RE systems.[20]

4. Competition—A legal framework is needed to stimulate the RE market as well as to ensure that these technologies can enter the energy market and are competitive with traditional fossil fuel technologies.[21] The law should protect independent RE electricity producers by ensuring legal access to the grid and assurance of back-up generation by fossil fuel electricity companies.

5. Cooperation—A plan for RE development must emphasize cohesion and cooperation between all public actors and levels of government.

6. Demand-side Promotion—Policies that focus on energy should not be limited to the promotion of renewables; it is imperative to simultaneously place legal regulations on electricity generation and draft policies that focus on demand-side management, including energy efficiency and conservation.

While the literature does emphasize the need for a cohesive framework, it does not provide a comprehensive analysis of all policies, incentives, and obstacles to RE development and deployment. Gaining an understanding of the complexity of the RE policymaking and operating system is the first step toward building a viable legal framework. The remainder of this analysis focuses on this complexity, as well as potential and evolving incentives and obstacles to policy implementation.

IV. FEDERAL AND STATE ENERGY AGENCIES AND THEIR COMMITMENT TO REDEVELOPMENT

A variety of federal and state agencies oversees energy-related policies. Because each agency has its own agenda, it is imperative that all agencies work in synergy to implement RE development.

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19. *See generally* Ryan H. Wiser & Steven J. Pickle, *Financing Investments in Renewable Energy: The Impacts of Policy Design*, 2 RENEWABLE & SUSTAINABLE ENERGY REVS. 361 (1998).

20. *See* Bradbrook, *supra* note 3, at 316.

21. *See* 42 U.S.C. § 5581 (2000) (stating the importance of developing photovoltaic technology in the United States); 42 U.S.C. § 9201 (2000) (stating the importance of developing wind energy technology in the United States).

A. Federal Energy Agencies

In order to protect and support economic development, as well as public health, safety, and welfare, the United States dedicates funds and experts to developing renewable energies. The Department of Energy (DOE) supports research and development initiatives, manages the U.S. energy supply and transport sector, and promotes and maintains energy security.[22] The Energy Efficiency and Renewable Development office (EERE), a branch of the DOE, focuses specifically on promoting RE and energy efficiency through public-private partnerships.[23]

The Secretary of Energy is authorized to ensure that the DOE promotes RE information dissemination.[24] The DOE works with various public and private organizations as well as other federal agencies to achieve this objective. The Secretary provides an annual report on the progress of these programs and policies to Congress.[25] In addition to information dissemination, the Secretary ensures that the following objectives are met:

1. RE policies advance energy self-sufficiency;
2. Programs are established to stimulate private investment in RE technologies;
3. Creative solutions focus on ways to use abandoned industrial waste as fuel; and
4. RE technologies are combined to effectively provide supply at different levels of demand load.[26]

The Environmental Protection Agency (EPA) and the Federal Energy Regulatory Commission (FERC) are also directly involved in U.S. energy policy and decision making. The EPA is responsible for managing environmental standards, enforcing nuclear and emissions regulations, and providing guidance for general environmental activities that affect health and safety, as well as overseeing specific cases of nuclear waste management.[27] The FERC was created by the Department of Energy Organization Act of 1977 as an organization to oversee the interstate

22. *See* Dep't of Energy, About DOE, http://www.doe.gov/about/index.htm (last visited June 17, 2006).

23. *See* Office of EERE, Karsner: Advanced Energy Initiative Is a "Vision for Victory" (Apr. 19, 2006), http://www.eere.energy.gov/news/news_detail.cfm/news_id=9921.

24. 42 U.S.C. § 7373 (2000).

25. *Id.*

26. 42 U.S.C. § 7374 (2000).

27. *See* 42 U.S.C. §§ 4321-4347; U.S. Envtl. Prot. Agency, About EPA, http://www.epa.gov/epahome/aboutepa.htm (last visited June 17, 2006).

transmission of oil, natural gas, and electricity.[28] The FERC is comprised of a five-member commission appointed by the President with consent of the Senate.[29] General duties beyond regulation of interstate transmission include regulation of hydropower and natural gas projects, management and enforcement charges for the distribution of electricity, inspection and licensing of hydroelectric projects, approval of siting of natural gas facilities, and administration of the financial reporting of regulated companies.[30]

1. Federal Regulation of Solar Energy

A key component to diversifying U.S. energy capabilities—along with promoting energy security and expanding energy resources in order to meet rising demands—is expanding solar energy applications.[31] Congress has recognized that

> it is the proper and appropriate role of the Federal Government to undertake research, development, and demonstration programs in solar photovoltaic energy technologies and to supplement and assist private industry and other entities and thereby the general public, so as to hasten the general commercial use of such technologies.[32]

In order to vigorously pursue a solar energy development, education, and advancement agenda, the U.S. Congress established the

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28. 42 U.S.C. §§ 7171-7178 (2000).

29. *Id.* § 7171(b)(1).

30. *Id.* § 7172.

31. The sun's energy, an inexhaustible resource, can provide enough energy to fuel small projects, decentralized grid systems, or commercial and residential properties. RENEWABLE ENERGY: POWER FOR A SUSTAINABLE FUTURE 28-11-13 (Godfrey Boyle ed., 2d ed. 2004) [hereinafter RENEWABLE ENERGY]. Regions that have limited cloud cover and efficient angles of the sun can capture a high solar flux and will thus recover the highest returns from solar technologies. *See* EDWARD S. CASSEDY & PETER Z. GROSSMAN, INTRODUCTION TO ENERGY: RESOURCES, TECHNOLOGY, AND SOCIETY 231-32 (1990). Through the years, photovoltaic (PV) panels have increased in efficiency, decreased in production and installation costs, and become more reliable. Consequently, the cost of PV energy has dropped from $1 per kWh in 1980 to 20 to 30 cents per kWh today and should fall below 10 cents per kWh "early in the next decade." Selçuk Bilgen et al., *Renewable Energy for a Clean and Sustainable Future*, 26 ENERGY SOURCES 1119, 1124-25 (2004). World production of PV panels has increased dramatically, by as much as 20 percent each year. *Id.* at 1125. Although PV equipment is expensive, there are few maintenance fees and no other energy source backups or generators are needed for a decentralized system. RENEWABLE ENERGY, *supra*, at 92-94. Solar PV panels are reliable as long-term energy equipment. Solar energy is especially effective for supplying peak loads, since the greatest intensity of the sun's rays coincides with peak energy demands.

32. 42 U.S.C. § 5581(a)(10) (2000).

Solar Photovoltaic Energy Advisory Committee in the Solar Photovoltaic Energy, Research, Development and Demonstration Act of 1978.[33] The Committee reports to the DOE on the progress, efficacy, and needs of solar energy system programs. Also under this Act, the Secretary of Energy reports to the President and Congress regarding the following topics:

- Studies on how effectively solar energy is integrated into the electricity system, including analysis of barriers to entry and the competitive structure of the electricity market.
- Research on the impact of zoning laws, ordinances, building codes, and utility-rate structures on solar energy feasibility.
- Practical suggestions as to how zoning ordinances and planning codes can be modified to embrace solar energy technologies, either through direct legal modifications or exceptions.
- Creative schemes to provide incentives for commercial applications of solar energy systems.[34]

2. Federal Regulation of Wind Energy

In 1980, Congress passed the Wind Energy Systems Act to promote and protect wind energy systems.[35] As explained in the legislation, the current U.S. demand for energy does not match the supply—a dilemma that can be mitigated, at least in part, by the research and development of wind energy systems.[36] Acknowledging that wind energy systems are technologically advanced and ready for both large-scale and small-scale development, the purpose statement promotes the

33. Solar Photovoltaic Energy Research, Development and Demonstration Act of 1978, Pub. L. No. 95-590, 92 Stat. 2513 (codified at 42 U.S.C. § 5581 (2000)). *See also* 42 U.S.C. § 5588 (2000) (establishing the Solar Photovoltaic Energy Advisory Committee).

34. 42 U.S.C. § 5589 (2000).

35. Wind Energy Systems Act of 1980, Pub. L. No. 96-345, 94 Stat. 1139 (codified at 42 U.S.C. §§ 9201-9213 (2000)). Similar to PV panels, wind energy technology has continued to improve in efficiency and reliability, thereby falling in cost and increasing in marketability. As of 1995, the cost of wind energy was 5.2 cents per kWh and was slowly dropping. Bilgen et al., *supra* note 31, at 1127. Within a short period of time, wind power will cost roughly the same as fossil fuel power, making wind a better competitor in the energy market. The energy that comes from each turbine is a function of the blade's wing span multiplied by the velocity of wind cubed. *See* RENEWABLE ENERGY, *supra* note 31, at 248; RICHARD SHATEN, THE ENERGY RESOURCES AND ECONOMICS WORKBOOK 54 (2d ed. 2004), *available at* http://www.asktheenergydoctor.com/pages/882304/index.htm. Consequently, the higher the turbine, the greater the wind speed, accrued exponentially. Wind energy is not always reliable because there is no guarantee that the wind will blow. Thus, back up generators may be necessary, as centralized systems tend to rely on wind energy to fuel intermittent energy demand loads. SHATEN, *supra*, at 54-55.

36. 42 U.S.C. § 9201 (2000).

need to utilize these resources and continue to support advancement of these technologies.[37] The legislation emphasizes that the government must take

> an aggressive research, development and demonstration program to accelerate widespread utilization of wind energy [which] should solve existing technical problems of converting wind energy into electricity and mechanical energy and, supported by an assured and growing market for wind energy systems during the next decade, should maximize the future contribution of wind energy to the Nation's future energy production.[38]

The Secretary of the DOE is responsible for creating short-term and long-term wind energy system goals that are revised regularly and presented to the coordinating members of the House of Representatives and Congress.[39] In addition, the Secretary uses his or her discretion to allocate federal assistance to public and private parties through grants, loans, contracts, and cooperative agreements, as well as direct federal procurement.[40]

B. State Energy Agencies

State governments have a similar energy agency structure, which typically consists of a division of energy linked to the Department of Administration (DOA), an environmental agency, and a utility regulation agency. Taking Wisconsin as a case study, for example, state energy initiatives are led by the Division of Energy, through the DOA; the Department of Natural Resources (DNR);[41] and the Public Service Commission (PSC).[42] Other states may have a variety of other agencies, including a coastal commission, a wastewater management agency, a power authority, a water resources agency, an electricity board, or an independent system operator.

Wisconsin's Division of Energy is in charge of running RE and energy efficiency programs around the state, as well as ensuring energy security for residents of Wisconsin.[43] The Division of Energy runs the

37. *Id.*
38. *Id.* § 9201(a)(7).
39. 42 U.S.C. § 9203 (2000).
40. 42 U.S.C. § 9205(c) (2000).
41. WIS. STAT. § 15.34 (West 2003 & Supp. 2004).
42. WIS. STAT. § 196 (West 2003 & Supp. 2005) (grants authority of the PSC).
43. WIS. STAT. §§ 16.95, 16.955 (West 2003 & Supp. 2005) (outlines the DOA's energy division).

State Energy Program and oversees the operations of the Focus on Energy program, a public-private partnership that develops and supports RE projects across the state.[44] The Division of Energy promotes wind energy systems through information dissemination[45] and by providing assistance to individuals who seek to install RE systems.

Wisconsin's DNR manages the state's natural resources. The Office of Energy within the DNR conducts regulatory reviews of all DNR energy- and utility-related sitings, working with the PSC, project applicants, and other related DNR departments.[46]

The PSC regulates state public utilities and grants approval for a variety of rate structure changes and development or construction proposals.[47] For instance, a wind-farm development proposal in Wisconsin would be presented to the PSC and, after a thorough review of the case, the PSC commissioners would accept or deny the plan.[48]

V. FEDERAL AND STATE GOVERNMENT POLICY: INCENTIVES AND INITIATIVES

Responsibility for the development of energy policy is often shared by the national government—divided between Congress and the President—and state governments, with enforcement authority residing in the aforementioned federal and state agencies. The national government sets priorities, policies, and financial incentives that shape the overall RE policy framework. While state governments respond to federal policies and mould state plans to best allocate federal funds, they also create their own energy initiatives with a wide variety of financial incentives, public-private partnership initiatives, and regulatory electricity programs. The combination of these initiatives sets up a complex system of public actors and policies, most of which are not based on any form of enforcement or mandatory measures. Federal funding for these initiatives is often sporadic and state programs tend to wax and wane with budgetary cycles. Given the complexity of the

44. *See* Focus on Energy, Welcome to Wisconsin's Focus on Energy, www.focuson energy.org (last visited May 23, 2006).

45. WIS. STAT. § 16.959 (West 2003 & Supp. 2005).

46. *See* Wis. Off. of Energy, Office of Energy Staff Contacts, http://dnr.wi.gov/org/es/science/energy/oe.htm (last visited May 23, 2006).

47. WIS. STAT. § 196 (West 2003 & Supp. 2005). *See* Public Service Commission of Wisconsin, http://psc.wi.gov (last visited May 23, 2006).

48. *See* Kevin Murphy, *PSC Approves Huge State Wind Farm*, CAP. TIMES (Madison, Wis.), July 9, 2005, at 8C (reporting Wisconsin PSC approval of a 200 MW, 130-turbine wind energy project for Fond du Lac and Dodge counties).

system, a comprehensive RE framework must strive to coordinate these agencies and actions.

A. Federal Government Renewable Energy Policies

1. Tax Incentives

One of the main duties of the federal government is to provide funding for RE initiatives, both through the states and directly to individuals and organizations. Federal funds are distributed through loan, grant, subsidy, and tax incentive measures. For instance, tax credits are a viable and highly effective method of providing incentives for RE development and production. The energy production tax credit (PTC) is the central federal policy for promotion of RE development.[49] First enacted in 1992 as part of the Energy Policy Act, the PTC provides 1.8 cents per kWh for the first ten years of RE facility operation.[50] This credit has expired on several occasions since it was first enacted and Congress has reenacted it several times—though with a significant lag each time. Congress recently extended the PTC until December 31, 2005,[51] and expanded it to include other applications besides wind and bioenergy sources.[52] The Energy Policy Act of 2005 extended the PTC for another two years.[53] This on-again, off-again legislation has weakened the positive effects of the PTC, which is tradtionally one of the most powerful tools for RE promotion.[54]

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49. 26 U.S.C. § 45 (2000).

50. *See* Database of State Incentives for Renewable Energy (DSIRE), Federal Incentives for Renewables and Efficiency, *available at* http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=US33F&State=federal&currentpageid=1&ee=1&re=1; The Union of Concerned Scientists, Renewable Energy Tax Credit Saved Once Again, but Boom-Bust Cycle in Wind Industry Continues, Clean Energy, http://www.ucsusa.org/clean_energy/clean_energy_policies/production-tax-credit-for-renewable-energy.html (last visited May 23, 2006) (Formerly 1.5 cents per kWh, the credit was later raised to 1.8 cents. The credit applies to facilities that were built and in service after October 22, 2004.).

51. Working Families Tax Relief Act of 2004, Pub. L. No. 108-311, 118 Stat. 1166, 26 U.S.C.A. § 1 (West 2006).

52. American Jobs Creation Act of 2004, Pub. L. No. 108-357, 118 Stat. 1418.

53. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594; *see* Union of Concerned Scientists, The 2005 Energy Bill, http://www.ucsusa.org/clean_energy/clean_energy_policies/energy-bill-2005.html (the federal government also administers the Solar and Geothermal Business Energy Tax Credit, a ten percent tax credit given to businesses that invest in solar or geothermal projects).

54. *See* The Union of Concerned Scientists, *supra* note 50 (For instance, wind energy development has lapsed and soared in conjunction with PTC expiration and re-adoption.). As the Union of Concerned Scientists explains,

2. Production Incentives

The federal government provides a few direct production incentives, one of which is the Renewable Energy Production Incentive (REPI) program.[55] REPI was introduced as part of the Energy Policy Act of 1992 as a means to subsidize RE production in order to make it competitive with other forms of energy. For every kWh of electricity production, the federal government grants 1.5 cents to the producer.[56] This program covers the first ten years of operation, although the REPI authority expired in 2003 and has not been renewed.[57] A second example of direct governmental production incentive is the Renewable Energy Systems program, whereby the U.S. Department of Agriculture administers direct loans, loan guarantees, and grants to rural small businesses and agricultural producers.[58]

3. Research and Development

Research and development (R&D) is a substantial component of national RE policy. The federal government allocates funding to RE research programs[59] intended to develop PV, wind, biomass, and other RE technologies. The U.S. government recognizes that it is imperative to understand the current conditions surrounding RE technology and development.[60] Such conditions include the cost structure of renewables, the ability of renewables to satisfy demand loads, the locational requirements that ensure maximum power output, and the ability of renewables to be competitive in the global energy market.[61] R&D can promote the reduction of electricity prices of alternative fuels, operations

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> The planning and permitting process for new wind facilities can take up to two years or longer to complete. As a result, many renewable energy developers that depend on the PTC to improve a facility's cost effectiveness may hesitate to start a new project due to the uncertainty that the credit will still be available to them when the project is completed.

Id.

55. Renewable Energy Production Incentives, 10 C.F.R pt. 451 (2006).

56. *See* U.S. Dep't of Energy, Energy Efficiency & Renewable Energy [hereinafter EERE], Renewable Energy Production Incentive, http://www.eere.energy.gov/wip/program/repi.html (last visited May 23, 2006).

57. *Id.*

58. Farm Security and Rural Investment Act of 2002, Pub L. No. 107-171, § 9006, 116 Stat. 134 (codified at 7 U.S.C. § 8106 (2000)).

59. 42 U.S.C. § 12,003 (2000).

60. *Id.* While it is fair to point out that the federal government understands this necessity, one must bear in mind that RE R&D funding is significantly less than it needs to be to make RE cost-competitive with other fuels and technologically advanced enough for wide-scale deployment. Margolis & Kammen, *Evidence, supra* note 16, at 575–76.

61. *See* 42 U.S.C. § 12,003.

and maintenance costs, and the risks involved in structural mishaps.[62] As RE technology continues to improve, costs of production continue to decline and renewables become more competitive with fossil fuels.

4. Public-Private Partnerships

The federal government also facilitates public-private partnerships through energy policy incentive-based programs.[63] Promotion of such partnerships helps encourage private development of decentralized systems and renewable energy sources that can be connected to centralized systems. One example of such a program is the Million Solar Roofs Initiative established by the DOE in an attempt to create public-private partnerships through the sale and distribution of one million solar roof energy systems by 2010.[64] The program provides educational opportunities and professional workshops to connect members of a given community with other governmental and non-governmental organizations.

5. Regulation

While most of these initiatives merely provide incentives to purchase or develop RE systems, the federal government has also established regulatory policies to ensure a more competitive playing field in the electricity market. The Public Utility Regulatory Policies Act (PURPA) was passed in 1978 to keep the electricity market open to non-utilities.[65] Under PURPA, utilities are required to purchase power from independent providers that can generate power at less expense than the utility.[66]

B. Jointly Promoted, Collaborative Renewable Energy Policies

1. Lead by Example

One of the most significant roles of the federal and state governments in promoting energy efficiency and RE is that of the

62. *Id.*

63. 42 U.S.C. § 12,001 (2000).

64. *See* U.S. Dep't of Energy, Million Solar Roofs Initiative, http://www.millionsolarroofs.org (last visited Aug. 20, 2005).

65. Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, 92 Stat. 3117 (codified at 16 U.S.C. § 824a-3 (2000)).

66. *Id.* The issues behind PURPA would be far more relevant in an analysis that focuses on hydropower and biomass. For the purpose of this analysis, however, it is important to mention PURPA in order to document the ways in which renewable energies have been given access to the grid and incorporated into electricity mixes.

exemplar. The federal government promotes RE and energy efficiency use in their own buildings through the Federal Energy Management Program (FEMP), under the aegis of EERE, with loosely set targets,[67] a task force, annual reports to Congress, and legislative tracking.[68] The federal government also encourages states to set energy efficiency regulations for state government buildings in the form of set targets, loan programs, or building standards.[69] Many state energy plans include some type of loose target for RE and energy efficiency in state government buildings. Such initiatives may include a simple cost-benefit analysis, the purchase of energy efficient equipment or "green" building materials, or abidance by conservation-minded construction procedures.[70] The government believes that its programs and fiscal incentives send the message to Americans that adopting RE technologies and working toward energy efficiency is the responsible way to live.[71]

2. The State Energy Program

The State Energy Program (SEP) is another RE-related initiative that involves coordination between the federal and state governments.[72]

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67. As established in the Energy Policy Act of 1992, the federal government is "called upon" to reduce energy consumption in federal buildings by 35 percent by 2010, as compared to the 1985 levels. Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2776 (codified in titles 16, 25, 26, 30, & 42 U.S.C. (2000)). For more information, see U.S. Dep't of Energy, Fed. Energy Mgmt. Program Overview, http://www.eere.energy.gov/femp/about/ (last visited Mar. 22, 2006).

68. U.S. Dep't of Energy, Fed. Energy Mgmt. Program Overview, http://www.eere.energy.gov/femp/about/ (last visited Mar. 22, 2006).

69. *See* SEP 21ST CENTURY STRATEGIC PLANNING COMM., STATE ENERGY PROGRAM STRATEGIC PLAN FOR THE 21ST CENTURY, http://www.eere.energy.gov/state_energy_program/pdfs/plan_final.pdf (last visited Oct. 15, 2006).

70. 42 U.S.C. § 6322 (2000 & Supp. 2005).

71. In recent testimony before the House Subcommittee on Energy and Water regarding the Comprehensive and Balanced Energy Legislation, David Garman, the Assistant Secretary of the Energy Efficiency and Renewable Energy Department, stated that "[the EERE] share[s] the view that the Federal Government, the largest single user of energy in the nation, should 'lead by example' in using energy more efficiently, and the Federal Government should be encouraged to do so." *Hearing on FY 2006 DOE EERE Budget Request, Before the S. Comm. on Appropriations, Subcomm. on Energy and Water*, 109th Cong. (2005) (statement of David Garman, Assistant Secretary for Energy Efficiency and Renewable Energy, U.S. Department of Energy), *available at* http://www1.eere.energy.gov/office_eere/congressional_test_021005.html.

72. *See* EERE, *supra* note 56, Energy, State Energy Program, http://www.eere.energy.gov/state_energy_program (last visited Mar. 22, 2006); SEP's origins were made possible by a variety of legislation including the Energy Policy and Conservation Act of 1975, Pub. L. No. 94-163, 89 Stat. 871, the Energy Conservation and Production Act of 1976, Pub. L. No. 94-385, 90 Stat. 1125, the State Energy Efficiency Programs Improvement Act of

Established by Congress in 1996 and administered by the DOE, the SEP provides states with grants to pursue RE and energy efficiency programs.[73] States use these funds to develop their own programs, which are managed by each state's energy office and coordinated by DOE's regional offices. Wisconsin, for instance, used its 2004 general SEP grants to expand public benefits initiatives through energy information dissemination, ENERGY STAR and other building efficiency support, energy forums, and small retail grants, among a wide variety of other initiatives.[74] Wisconsin applied SEP special projects money toward the Job CORPS, Rebuild America, and the Clean Cities programs, to name a few.[75]

3. State Energy Conservation Plans

According to the Energy Policy and Conservation Act of 1975, the Secretary of Energy "shall invite" all state governors to prepare a state energy conservation plan.[76] The Act states that "the Federal Government has a responsibility to foster and promote comprehensive energy conservation programs and practices by establishing guidelines for such programs and providing overall coordination, technical assistance, and financial support for specific State initiatives in energy conservation."[77] The intent of state plans is to provide a means by which each state can reach its conservation goals—as set forth in the plan—by establishing comprehensive requirements for specific conservation actions and running a cost-benefit analysis on every energy decision. Each state plan should include lighting for public buildings and thermal efficiency standards for renovated buildings, transportation demand management promotions, a set of mandatory energy efficiency standards, and policies that enforce cooperation between local, state, and federal governments.[78] Optional state plan features include a variety of

1990, Pub. L. No. 101-440, 104 Stat. 1006, and the Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2776.

73. SEP funding may also be applied toward the following goals: reducing energy costs; improving energy, electricity, and fuel transmission; reducing oil dependency; and promoting environmental and economic growth. *See* EERE, *supra* note 56, State Energy Program, http://www.eere.energy.gov/state_energy_program (last visited Mar. 22, 2006).

74. *See* EERE, *supra* note 56, State Energy Program, Projects by State, http://www.eere.energy.gov/state_energy_program/grants_by_state.cfm/year=2004/state=WI (last visited Mar. 22, 2006).

75. *See id.*

76. Energy Policy and Conservation Act of 1975, Pub. L. No. 94-163, § 362, 89 Stat. 871, 933 (codified as amended at 42 U.S.C. § 6322 (2000 & Supp. 2005)).

77. 42 U.S.C. § 6321(a)(3) (2000).

78. 42 U.S.C. § 6322.

programs that emphasize transportation and residential energy efficiency, reduce peak demands, work in conjunction with economic development efforts, and provide a method for evaluation of progress.[79] Preparation of a state energy conservation plan is the primary method by which a state can secure federal funds for energy policies and programs. The Secretary may provide federal funds to a state, which the state is required to match by at least 20 percent, to help the state reach its energy efficiency goals.[80]

The federal government envisions that each state will have a comprehensive timeline with set targets, as well as a board to oversee state development. The Act states that "[e]ach State energy conservation plan...shall contain a goal, consisting of an improvement of 25 percent or more in the efficiency of use of energy in the State concerned in the calendar year 2012 as compared to the calendar year 1990, and may contain interim goals."[81] The Secretary ensures that each state has a state advisory board, consisting of 18 to 21 members from state government agencies, state and local assistance programs, and professionals in the field.[82] The board meets at least twice a year to draft recommendations for the DOE's Conservation and Renewable Energy program and prepare reports for the Secretary and Congress.[83]

C. State Government Renewable Energy Policies: Standards, Funds, and Net Metering

When compiling state energy plans, individual states have a variety of energy policies to choose from. It is the responsibility of each state to decide how best to allocate funds among different loan, grant, and incentive programs.[84]

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79. *Id.*

80. 42 U.S.C. § 6323-6323a (2000 & Supp. 2005).

81. 42 U.S.C. § 6324 (2000 & Supp. 2005).

82. 42 U.S.C. § 6325(g)(1)(A) (2000 & Supp. 2005).

83. *Id.* § 6325(g)(8).

84. Capital is drawn from the federal government, as well as the following additional sources: state and local general funds, state or local bonds, earmarked taxes, electric service wire charges, voluntary customer payments, and blended price of electricity. NANCY A. RADER & RYAN H. WISER, STRATEGIES FOR SUPPORTING WIND ENERGY: A REVIEW AND ANALYSIS OF STATE POLICY OPTIONS 16 (1999), *available at* http://www.nationalwind.org/publications/statepolicy/default.htm (follow "State Policy Options Publications" hyperlink).

1. Renewable Portfolio Standards

One of the most common state RE policies is the Renewable Portfolio Standards (RPS) Program.[85] An RPS is a percentage mix of RE—including PV, wind, biomass, geothermal, tidal, and hydropower—that every electricity company in the state must include in the total fuel batch.[86] An RPS is a method to facilitate RE integration into the energy market, eventually driving down the cost of RE by making technologies more dependable and predictable and promoting competition. Each state that opts for an RPS program must decide an appropriate RE percentage to enforce based on a number of factors including the availability of RE fuels, the structure of the electricity market and the stage of deregulation, and the environmental goals of the given state; this percentage is gradually increased over time.[87] The portfolio standards are tradable in the sense that one electricity company that operates above percentage can accredit another company for financial compensation.[88] Leading RE policy analysts contend that a federal RPS is needed as a measure to mandate the diversification of fuel sources with the integration of RE.[89]

2. Tax Incentives

State legislatures also have a variety of tax incentives at their disposal to help bring down the costs of RE projects and make them more cost-competitive with other fuel methods. Many states have adopted tax incentive systems that can be applied to corporate, income, property or sales taxes.[90] Such corporate and income tax incentives provide deductions or credits for purchased RE equipment. For instance, some states provide Investment Tax Credits (ITC) for either centralized or decentralized wind energy systems.[91] Property and business owners who invest in wind energy systems are granted ITCs equal to a

85. *See* Herzog et al., *supra* note 16, at 13–14.

86. *See* NAT'L RENEWABLE ENERGY LAB., RENEWABLES PORTFOLIO STANDARD OVERVIEW (2005), *available at* http://www.nrel.gov/docs/fy05osti/37627.pdf.

87. *Id.*

88. For information on Wisconsin's tradable permit options, see the Wisconsin Public Service Commission's Administrative Code provisions on its Renewable Resource Credit Trading Program. Wis. Admin. Code [PSC] § 118 (2001).

89. *See* Herzog et al., *supra* note 16, at 13–14.

90. *See* EERE, *supra* note 56, State Energy Alternatives, http://www.eere.energy.gov/states/alternatives (follow "state energy efficiency index" hyperlink; then follow "tax incentives" hyperlink) (last visited Mar. 22, 2006).

91. *See* State Envtl. Res. Ctr., http://www.serconline.org/RenewableEnergyIncentives/stateactivity.html (last visited Mar. 22, 2006). Participating states include Hawaii, Idaho, Massachusetts, Minnesota, New York, Pennsylvania, Rhode Island, and Washington as of March 22, 2006. *Id.*

percentage, as established by the state legislature, of the amount invested in the project.[92] Some states have adopted sales tax incentives that either exempt or reduce the sales tax on RE equipment.[93] Sales tax reductions may be placed on land assets, materials or equipment, and energy transfer. Yet another, comparatively popular, option is a property tax reduction, granted to RE facility owners.[94] Property tax incentives include property tax and special assessment exemptions based on value-added RE additions, calculated as a percentage of the total assessed value of the facility.[95]

3. Grants and Loans

Most states offer a number of loans and grants to residential, commercial, industrial, transportation, and public and non-profit sectors. These grants and low-interest loan programs assist with equipment, research, and other associated costs. While the various tax reductions and exemptions provide incentives to investors and developers, they are confined to taxable equity and generally do not assist with sustained payments.[96] An alternative method is a direct payment production incentive resembling the federal government's REPI program; Minnesota is currently the only state to implement this incentive.[97] Minnesota's direct payment system targets small RE producers (2 MW or less) that provide electricity to the grid, with a 1.5 cents per kWh subsidy for the first ten years of operation.[98] Other states create funds that are distributed in the form of grants to applicants with qualifying RE projects, such as Wisconsin's Focus on Energy program.[99]

4. Contractor Licensing and Equipment Certification

To ensure that contractors are able to install solar and wind energy equipment, many states require contractors to have professional training and licenses in these technologies. In order to acquire a license, contractors must complete a minimum number of years of study and

92. RADER & WISER, *supra* note 84, at 26.
93. *Id.* at 30.
94. *Id.* at 33.
95. *See* EERE, *supra* note 56, Energy Alternatives, http://www.eere.energy.gov/states/alternatives/tax_incentives.cfm.
96. *Id.*
97. *See* Am. Wind Energy Ass'n, *Small Wind in Minnesota*, http://www.awea.org/smallwind/minnesota_sw.html (last visited July 4, 2005).
98. *Id.*
99. *See* Focus on Energy, *supra* note 44 (follow "Renewable Energy" hyperlink; then follow "Incentives & Grants" hyperlink).

pass an exam. Similar to building and energy efficient equipment certifications, a series of RE certification criteria must be satisfied by developers seeking permits.

5. Green Powering Programs

Many states adopt green powering programs by which customers are able to select a percentage of their energy electricity demand that will be fueled by renewable energy. Customers will often pay a premium, on top of their regular electricity bill, for the portion of renewables that they choose.

6. Net Metering

Net metering is a program by which individuals can power their own home or business with decentralized RE technology, with their system also linked to the centralized grid. At times when the individual has excess capacity—such as mid-day, during peak sunlight hours, or in the evenings, when the wind blows the strongest—they can sell it to the utility for the full retail value of solar or wind energy. During the hours that the RE system does not provide enough power for the individual's needs, the electricity company sells the centralized system's power to the individual. At the end of each period, the individual pays the net balance for his or her energy consumption.[100]

7. Public Benefits

Some states have implemented Public Benefits programs, also referred to as Systems Benefit Charges. Such programs are funded by surcharges that appear on all customers' electric bills and are applied toward public benefits. The funds are allocated between energy efficiency measures, low-income weatherization programs, RE projects, and various energy R&D projects.[101]

8. Case Study: Wisconsin's State Energy Plan

The State of Wisconsin has a fairly extensive State Energy Plan that includes several grant, loan, and tax incentive programs; net metering; green pricing; and mandated licensing. Wisconsin is also one of 25 states that has adopted a Renewable Portfolio Standard (RPS)

100. *Id.*

101. *See* EERE, *supra* note 56, State Energy Alternatives, http://www.eere.energy.gov/states/alternatives/ (last visited Oct. 15, 2006).

platform. Adopted in 1999, Wisconsin's RPS platform aims to increase the use of RE technologies to ten percent by 2015.[102]

Wisconsin also has a public benefits program[103] that is funded by a surcharge on electricity bills, utility contributions and mandatory fees, personal contributions, and low-income assistance federal funding.[104] The Public Benefits program is currently administered by the DOA and largely funds the Focus on Energy program and the Home Energy Assistance program, both of which provide grants, services, and loans for energy efficient and RE projects. Budget cuts for 2004 and 2005 have diminished the Public Benefits program funds and directly cut the small portion of funding allocated to RE projects.[105]

In furtherance of the Energy Priorities Law,[106] which calls for state attention to be given to energy efficiency and RE development and deployment, Wisconsin Governor Jim Doyle created the Task Force on Energy Efficiency and Renewables in October 2003.[107] The Task Force's mission was to come up with energy policy options that stress energy efficiency and RE development as top priorities.[108] In October 2004, the Task Force recommended a number of policy actions. Among several recommendations, the Task Force concluded that the structure of the Public Benefits program should be modified to allow for joint responsibility between the PSCW and the Department of Administration (DOA).[109] The Task Force also recommended that the RPS should be raised from 2.2 percent to ten percent by 2015, the state should provide model zoning ordinances and reference guides for local planning offices, state agencies should purchase ten percent RE generated electricity by 2006 and 20 percent by 2010, and a sales tax and use tax exemption

102. Wis. Act 9, 1999, § 2334t, 1999 Wis. Sess. Laws 511-13 (codified at Wis. Stat. § 196.378(2)(a) (1999) (amended 2005)).

103. Wis. Act 9, 1999, § 109m, 1999 Wis. Sess. Laws 34-38 (codified at WIS. STAT. § 16.957 (1999)).

104. *See* DSIRE, Wisconsin Incentives for Renewables and Efficiency (Aug. 31, 2006), http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=WI15R&state=WI&CurrentPageID=1&RE=1&EE=1.

105. JOHN PEACOCK, THE SKY IS DESCENDING: AN OVERVIEW OF BUDGET CUTS IN PROGRAMS FOR CHILDREN AND FAMILIES 2 tbl. 2 (2003), http://www.wccf.org/pdf/BudgetCuts.pdf (showing cut in utility public benefits of $17,600,000 (26%) from 2002-2003 base of $67,155,100).

106. WIS. STAT. § 196.025(1) (1993).

107. LEE CULLEN ET AL., REPORT OF THE GOVERNOR'S TASK FORCE ON ENERGY EFFICIENCY & RENEWABLES 2-3, 5 (2004) (report to Wisconsin Governor Jim Doyle), *available at* http://energytaskforce.wi.gov (follow "Task Force Final Report" hyperlink; then follow "Task Force Final Report Archives" hyperlink).

108. *Id.* at 7.

109. *Id.* at 5, 15-23.

should target customer-owned RE systems.[110] While all of these suggestions may not be entirely feasible due to legislative priorities, partisan conflict, and budget constraints, Wisconsin has demonstrated that it is willing to take a proactive step toward strengthening the public benefits program, the RPS program, and the state's role as an energy leader.[111] This is a necessary first step toward a transition away from fossil fuels for Wisconsin. However, it is important to recognize the degree to which the aforementioned obstacles can hinder RE development and proceed accordingly.

D. A Role for Local Governments

Thus far, this analysis has focused on the ways in which the federal and state governments promote RE applications. Coordination of federal and state efforts has proven immensely difficult given the complexity of agencies and policies. However, the federal and state governments are not the only actors involved in RE policy making; power over energy initiatives and regulation can also be delegated to or sought by local governments.[112] Local governments can have a prominent role in RE promotion, since they tend to have a significant control over local planning and land use, building codes, and air quality management.

Local governments play an important role in RE regulation and development through the modification of zoning ordinances, codes, and subdivision bylaws; such planning and land use developments can be used to help guide the application of decentralized RE systems.[113] Local

110. *Id.* at 5–6.

111. On March 17, 2006, the state Senate authorized Senate Bill 459, the Energy Efficiency and Renewables Act. The Bill passed with an overwhelming majority, thirty-two to one. Based on the recommendations of the Task Force, the Bill will raise the RPS to 10 percent by 2015, increase state funding toward RE projects, recover the Public Benefits funds, and mandate 20 percent RE power in six major state agency buildings by 2010. Wis. S. Bill 459, 2005–06, *available at* http://www.legis.state.wi.us/2005/data/SB-459eng.pdf.

112. Donald N. Zillman & Michael T. Bigos, *Security of Supply and Control of Terrorism: Energy Security in the United States in the Early Twenty-First Century, in* ENERGY SECURITY: MANAGING RISK IN A DYNAMIC LEGAL AND REGULATORY ENVIRONMENT 145, 150–51 (Barry Barton et al. eds., 2004).

113. Local and city governments can enact their own codes and policies when the state does not directly mandate the codes. Madison, Wisconsin, for instance, has adopted an energy management strategy, along with 290 other global cities, as part of the International Council for Local Environmental Initiatives (ICLEI) Cities for Climate Protection Campaign. *See* DSIRE, *supra* note 104. This strategy includes regulations that are enforced within the city limits such as solar heater equipment certification codes, a green building program, contractor licensing, and solar access laws. *See* DSIRE, *supra* note 50, http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=WI&RE=

governments and planning departments can zone for RE development and can streamline the permitting and siting process for development.[114] They can choose to get involved in the siting process, as reviewed by the PSC of each state, in order to expedite and legitimize proposed RE developments. Local governments can also alter zoning codes and permitting ordinances to legitimize—or at least not prohibit—RE systems. As Stoloff and colleagues explain, "Though zoning ordinances can be challenged if they are discriminatory, unreasonable, arbitrary or confiscatory, these challenges are often unsuccessful. There are a number of devices, however, that allow zoning ordinances to be flexibly applied, including provisions for variances, special permits, special exception uses, planned unit development, etc."[115]

Local governments may find it in their best interest to prepare comprehensive RE plans that outline future development goals and policy objectives. A transition away from over reliance on fossil fuels and toward the general adoption of RE is in the best interest of the public for their safety, health, and general welfare. Securing RE technologies, therefore, is a method of securing future needs and development.[116] In order to realize the visions set forth in comprehensive local RE plans, local governments need to zone in accordance to the plans to ensure that established goals are adopted and successfully implemented. As Haar explained, "The plan is a long-term general guide for the development of the city; the regulatory laws are tools to bring the plan's goals into realization."[117] Comprehensive plans are routinely amended to incorporate changes that communities might face.

18EE=1. *See also* Jayne Somers, City of Madison, Wisconsin, Climate Protection Plan—Final (Jan. 2002 update, amended by David Benzschawe), *available at* http://www.dsireusa.org/documents/Incentives/WI07R.htm.

114. While local governments can work with developers to assist with the siting process, states ultimately have more leveraging power. Individual states can choose to modify their siting laws to simplify the siting process or exempt developers from the siting process altogether, as Minnesota has done. *See* RADAR & WISER, *supra* note 84, at 114. State statutes can also secure the process for solar or wind easements or prohibit local zoning covenants from prohibiting RE systems. *See* DSIRE, *supra* note 50, http://www.dsireusa.org/glossary/glossary.cfm?&currentpageID=88EE=18RE=1*solar.

115. Jonathan D. Stoloff et al., *Legal Issues Raised by the Environmental Impacts of Photovoltaic Energy and Wind Energy Conservation Systems*, 11 COLUM. J. ENVTL. L. 379, 412 (1986) (citations omitted).

116. In this sense, energy security encompasses both future demand, especially at peak loads, and future control of all negative externalities—such as poor health, environmental destruction, climate change, etc.—that result from deleterious energy methods based on fossil fuel exploitation.

117. Charles M. Haar, *The Master Plan: An Impermanent Constitution*, 20 LAW & CONTEMP. PROBS. 353, 362 (1955).

The Supreme Court of Oregon in *Baker v. City of Milwaukie* likened a comprehensive plan to a constitution, while also recognizing zoning's role in effecting a comprehensive plan.[118] The court in *Baker* stated that, "[w]hile this analogy between a comprehensive plan and a constitution may be helpful in determining the relationship between planning and zoning, it must be remembered that the comprehensive plan is flexible and subject to change when the needs of the community change."[119] It follows from this reasoning that RE comprehensive planning documents can incorporate RE initiatives that prioritize energy concerns when modeling and setting goals for cities and regions. Language can be incorporated into comprehensive plans that require local planning initiatives to identify and consider all energy options and find ways to implement RE applications. Inclusion of such language will also encourage local planning and government officials to consider how growth management strategies can be coupled with RE developments.

E. Legal Barriers to Renewable Energy Projects

There are a number of legal barriers impeding RE development and deployment that need to be addressed by all levels of government. These barriers currently remain largely unexplored in the context of a comprehensive RE legal framework. The most effective way to address these legal issues tends to be through local planning: if local governments and planners modify zoning regulations and comprehensive plans, RE will become more feasible and legitimate as both a small-scale and large-scale energy option. However, these issues may also extend beyond the powers of local governments, as is the case with electricity regulation, and, thus, it will also be imperative for the federal and state governments to extend their roles.

1. Right to Access

The first major barrier is a compromised right to access renewable energy sources, such as the sun's rays. The amount of energy that Solar PV panels produce is dependent on a number of factors including the angle of the sun; climate, weather conditions and cloud cover; time of day; and solar flux.[120] Several legal issues arise when access to any of these conditions is compromised. For instance, if a property owner builds a house that casts a shadow on a neighbor's PV

118. 533 P.2d 772 (1975).
119. *Id.* at 775.
120. RENEWABLE ENERGY, *supra* note 31, at 66–101 (ch. 3, "Solar Photovoltaics").

panels, the owner of the panels will invariably raise a complaint. In order to avoid contention, property owners often turn to property law as protection, establishing solar easements or covenants with all involved neighbors. New Pattonsburg, Missouri, for example, adopted an extensive solar codes and ordinances document, which granted both solar and wind energy equipment special provisions status.[121] Montana has a solar and wind easement law by which easements can be negotiated with neighbors of RE equipment.[122] The state of Wisconsin does not allow any city, village, or town to place any restriction on the use or installation of solar or wind energy systems.[123] Wisconsin also requires that vegetation be trimmed to allow renewable technologies full exposure to wind and sun.[124] Because solar access is not specifically built into the property law framework of many states, the solar owner has no assurance that neighbors will comply, sign an agreement, or not require a large sum of money in exchange for abiding by the covenant.[125]

In order to remove barriers to solar access, states could alter property law accordingly, or instead could provide incentives and safeguards in local planning initiatives to address solar access applications. For instance, local governments could require planning authorities to consider solar applications when approving projects, provide permits for potential solar owners, safeguard "solar envelopes," or build solar fences.[126] Zoning ordinances and building codes could include special stipulations on solar panel building and use. For example, Madison, Wisconsin, a pioneer in local RE legislation, has enacted its own solar access law, which provides that "[t]he installation of street trees shall take into account solar access objectives in the selection of tree species and planting location so as to minimize future shading of the most southerly side of contemplated building

121. Nat'l Ctr. for Appropriate Tech., Smart Communities Network, Codes/Ordinances: New Pattonsburg, Missouri Solar Codes & Ordinances, http://www.smartcommunities.ncat.org/codes/nwpatsol.shtml (last visited Aug. 26, 2006).

122. *See* DSIRE, *supra* note 50, Montana Incentives for Renewable Energy, http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=MT03R&state=MT&CurrentPageID=1&RE=1&EE=! (last visited Jan. 10, 2007).

123. WIS. STAT. § 66.0401(1) (1981). Restrictions on this rule, as outlined in the state statute, include any instance where public health and safety is compromised or when another system is more efficient or cost-effective. *Id.*

124. WIS. STAT. § 66.0401(2) (1981).

125. Bradbrook, *supra* note 3, at 318-19.

126. Solar envelopes are "three-dimensional space[s] for development on each block of land." With a legal envelope, "[a] legal remedy would be available when a structure built on neighbouring land outside the designated building envelope shades a solar user's device." Solar fences are hypothetical fences that mark the height of the shadow that would be cast on a neighbor's land. *See* Bradbrook, *supra* note 3, at 319-20.

locations."[127] The measure also facilitates solar access by requiring streets to be "oriented in an east-west direction to the maximum extent possible or to within 20 degrees of such orientation."[128] Boulder, Colorado, has also created solar access regulations.[129] Responding to the "diminishing supply and increasing cost of conventional energy resources," the ordinance "protect[s] the potential for the use of solar energy" by "guarantee[ing] access to sunlight for homeowners and renters in the city."[130] The ordinance also outlines permitted shading and solar accessible building siting.[131] These cities demonstrate that including solar access rights and solar initiatives in comprehensive plans helps establish community goals that can then be implemented through zoning and other planning legislation.

The right to wind energy access is similar to that of solar energy. In order to generate the greatest power, a wind turbine must stand as tall as possible and have a large wing span. Any structure that blocks or redirects wind patterns will severely diminish the amount of power that a wind turbine generates. Similar to the covenants or easements established for solar panels, wind turbine owners can enter into contractual agreements with all involved neighbors to ensure that neighbors will not plant or build anything that will affect wind patterns. But again, there is no guarantee that all parties can agree to such easements, nor is there any assurance that neighbors will not require large sums of money before entering into such contracts. To remedy these potential problems, one analyst suggests that courts should have discretion to grant wind access under current property law frameworks.[132] If courts can grant wind access, the wind turbine owner will likely be required to justly compensate the affected parties. Other

127. MADISON, WIS., CODE OF ORDINANCES § 16.23(8)(g) (1983), *available at* http://www.municode.com/resources/gateway.asp?pid=50000&sid=49.

128. *Id.* § 16.23(8)(a)(2)(e).

129. BOULDER, COLO., REV. CODE § 9-8-1 to 16 (1981).

130. BUILDING SERVS. CTR., CITY OF BOULDER, SOLAR ACCESS GUIDE OR SOLAR SHADOW ANALYSIS (2000), *available at* http://www.bouldercolorado.gov/files/PDS/codes/solrshad.pdf [hereinafter SOLAR ACCESS GUIDE].

131. *See* Nat'l Ctr. for Appropriate Tech., Smart Communities Network: Green Buildings Success Stories, http://www.smartcommunities.ncat.org/success/boulder.shtml (last visited Feb. 23, 2006). Boulder's ordinance further states,

> the degree of solar access protection is defined by either a 12' or 25' hypothetical "solar fence" on the property lines of the protected buildings. The ordinance is designed to protect access for a four-hour period on December 21. Under most circumstances, new structures will not be allowed to shade adjacent lots to a greater extent than the applicable solar fence.

SOLAR ACCESS GUIDE, *supra* note 130.

132. Bradbrook, *supra* note 3, at 321.

methods for securing wind access include registration of wind turbine land in separate land titles, allocation of wind energy permits through zoning ordinances, and requiring planning initiatives to consider wind energy development for all applicable development projects.[133]

2. Covenants, Zoning, and Other Legislative Barriers That Discriminate against RE Applications

Many covenants and land titles discriminate both directly and indirectly against solar panel systems and wind turbines. Such covenants often increase the property value of houses or the endowment of amenities within a community by outlining height and setback requirements, exterior design requirements, yard projection, lot orientation, lot coverage limitations, and restrictions on what can be built on a roof.[134] Some codes specifically prohibit solar panels, despite the panels' aesthetic similarities to skylights, while others have lot setback requirements that do not allow adequate space for wind turbines.

Even if RE systems comply with local zoning ordinances, zoning restrictions raise concerns about how wind energy or solar energy systems are to be measured and classified. For example, should a wind turbine's height be measured according to the top of the blade's wing span or the center of the blades? Revision of zoning ordinances to include specific details regarding the measurement and classification of RE systems will ultimately render RE applications more feasible.[135] Local governments need to make sure that energy specifications are included in local ordinances in a manner that adequately serves the community's needs and draws from available resources.

A number of legislative measures typically exist within a given region that are intended to protect historic sites, environmental conditions of a particular piece of land, or public space.[136] These controls often function as legislative barriers to RE initiatives since they do not include stipulations or acknowledgment of renewable energies. Local governments must strike an appropriate balance between these protective measures and RE measures; if it is feasible to build RE technologies while still upholding the integrity of a historic building or preserving a natural habitat, for instance, then the legislative barriers for development should be minimized. Providing statutory exemption from legislative barriers could potentially achieve this goal.

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133. *Id.* at 321–22.
134. *See, e.g., id.* at 320.
135. *Id.*
136. *Id.*

3. Wind and Solar Excluded from Building Laws or Regulations

Most building regulations do not include stipulations for the proper solar or wind turbine installation process. For instance, a property owner who is considering building a rooftop solar panel might not find any information on this process in the city's building codes. Consequently, the builder will not know whether a specific building permit is needed for the application or whether he or she can simply confirm that the panels conform to height and setback regulations.[137] Incorporating RE codes into building regulations will make RE adoption more feasible.

4. Personal Complaints and Private Nuisance

Proposals for building RE systems in particular communities often raise vehement protest from property owners. While such issues arise for both wind turbine and solar energy systems, personalized complaints tend to be more of a problem in the case of the former. Common complaints concern the aesthetics of the structures, the obstruction of natural scenery, and the noise created by revolving wind blades.[138]

Because wind energy is a product of velocity cubed and wing span, the higher the turbine, the stronger the wind, the more power; turbines that stand 225 to 250 feet in height in a field of a couple hundred such systems may be perceived as a spectacular sight to some and a wreck of the natural landscape to others. Currently, there is heated controversy over the installation of instrumentation towers and, perhaps eventually, wind turbines off the coast of Nantucket Sound.[139] While many legal issues are at play in this debate—such as the proper application of section 10 of the Rivers and Harbors Appropriation Act of 1899, an acceptable role of the Army Corps of Engineers, and a void of federal regulation on the issue of offshore wind farm development[140]—the essence of the issue is the Nantucket Sound community's objections to the view of the turbines in the distant scenery.[141]

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137. *Id.*

138. Stoloff et al., *supra* note 115, at 411-15.

139. *See* Alliance to Protect Nantucket Sound, Inc. v. U.S. Dep't of the Army, 398 F.3d 105 (1st Cir. 2005). *See also* Ten Taxpayer Citizens Group v. Cape Wind Assocs., LLC, 373 F.3d 183 (1st Cir. 2004).

140. Guy R. Martin & Odin A. Smith, *The World's Largest Wind Energy Facility in Nantucket Sound? Deficiencies in the Current Regulatory Process for Offshore Wind Energy Development*, 31 B.C. ENVTL. AFF. L. REV. 285 (2004).

141. Beyond the community's protestations, the wind farm has yet to make it through the legislative process due to unresolved offshore wind farm issues. Nantucket Wind is

Many critics of wind energy systems also contend that wind turbine blades affect television reception. Such interference can be remedied, however, by using non-metallic blades, locating turbines in areas with interference-free cables or directional antennas, or by placing turbines out of the line of radio or television sight-beam paths.[142]

Given the typical attacks made against wind and solar energy systems, it is imperative that local governments protect the rights of RE owners through a comprehensive legislative framework. Local governments must promote RE systems as a legitimate and permissible land use.[143] Because such a precedent has yet to be established, personal complaints against system owners continue to work their way through the legal system. While one might expect the courts to give the benefit of the doubt to the system owner and rule against nuisance complaints, this is not always the case. For instance, in *Rose v. Chaiken*, neighbors claimed that a wind turbine placed in a residential neighborhood was a private nuisance.[144] The wind turbine allegedly disrupted personal sleep, recreation, relaxation, and general health. The Supreme Court of New Jersey ruled in favor of the plaintiff that the wind turbine was, in fact, a private nuisance.[145] If RE development initiatives had been written into the neighborhood's comprehensive plan, this complaint would not have had judicial credence.

5. Environmental Consequences of Using Renewable Energies

There is no single energy source that does not inflict some kind of harm on the environment; both solar and wind energy equipment pollute in some ways. Solar energy panels are made of a series of photovoltaic (PV) cells that are grouped together and connected in arrays.[146] The PV cells themselves are made of copper sulfide, cadmium sulfide, or polycrystallen silicon;[147] other materials that are used to make

currently performing an environmental impact assessment in order to track the effects of the wind turbine field on bird and bat mortality, tourism, and fish spawning. Until this report is posted, the Nantucket Sound wind field will not be developed. *See* U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DIST., CAPE WIND ENERGY PROJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT, http://www.nae.usace.army.mil/projects/ma/ccwf/deis.htm (last visited July 26, 2006).

142. Stoloff et al., *supra* note 115, at 411.

143. Bradbrook, *supra* note 3, at 322.

144. 453 A.2d 1378 (N.J. Super. Ct. Ch. Div. 1982).

145. *Id. See also* Stoloff et al., *supra* note 115, at 414. The court decision was based on the finding that the wind turbine deleteriously affected the health of the plaintiff. The court also found that the turbine exceeded the sound decibel limit set by a local zoning ordinance. *Rose*, 453 A.2d at 1380.

146. Stoloff et al., *supra* note 115, at 381.

147. *Id.* at 384.

solar panels include silicon, gallium arsenide, and cadmium sulfide.[148] While silicon is not toxic, gallium arsenide is possibly carcinogenic and cadmium sulfide is highly toxic.[149] While the mining and refining of these materials create small amounts of emissions, current technology and federal regulations effectively control these emission levels.[150]

A number of environmental land use issues also accompany centralized RE systems. For instance, PV panels are often installed in desert regions where the sun shines brightly for long hours each day. In such regions, solar panel installation may damage fragile ecosystems, clear vegetation, compact soil, or affect water runoff patterns.[151] According to the National Environmental Policy Act of 1969, all major federal projects that strongly affect "the quality of the human environment" must provide an Environmental Impact Statement.[152] Both centralized wind energy systems and centralized solar energy systems could be classified as "major" projects with notable effects on the environment.[153] Wind energy systems may also affect natural environments by disturbing wildlife and vegetation. For instance, some opponents contend that wind turbines kill an extraordinary number of birds. While wind energy engineers and developers make concerted efforts to track migratory flight patterns of birds in order to dispel these notions, this issue remains controversial in many cases around the country.[154] These potential impacts must be considered when developing a more extensive RE legal framework.

6. Product Safety/Manufacturing Standards

The personal complaints and environmental concerns raised over RE systems could be mitigated, in part, by updating manufacturing

148. *Id.*

149. *Id.*

150. *Id.* at 384-94. The release of toxic substances is regulated under the Toxic Substances Control Act, 15 U.S.C. §§ 2601-2629 (2000); manufacturing emissions are regulated by the Clean Air Act, 42 U.S.C. §§ 7401-7642 (2000); effluents in manufacturing are regulated by the Clean Water Act, 33 U.S.C. §§ 1251-1376; and solid wastes from manufacturing are regulated by the Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901-6986.

151. Stoloff et al., *supra* note 115, at 394-95.

152. 42 U.S.C. § 4332(c) (2000).

153. Stoloff et al., *supra* note 115, at 409.

154. *See, e.g.*, John Ritter, *Wind Turbines Taking Toll on Birds of Prey*, USA TODAY, Jan. 4, 2005, *available at* http://www.usatoday.com/news/nation/2005-01-04-windmills-usat_x.htm. *See also* Mike Sagrillo, *Advice from an Expert: Putting Wind Power's Effect on Birds in Perspective*, WIND ENERGY TECHNICAL INFO, AM. WIND ENERGY ASS'N (2003), http://www.awea.org/faq/sagrillo/swbirds.html.

standards.[155] Because wind turbines may affect television reception or produce micro-climate modification, as explained above, or produce a good deal of noise or vibration, the wind user must be held liable for such risks and side-effects. Liability could best be established through the adoption of manufacturing standards for national energy systems.[156] Such standards would ensure that wind energy systems, which are of particular concern in this case, are safe and reliable, thereby reducing potential risks for the owner, the community, and investors.

7. Independent Electricity Producers' Access to the Grid

Legal safeguards need to be established on both the national and the state level to protect independent electricity producers of RE generation. Such safeguards would include access to the local grid, the ability to sell excess supply to other electricity companies, and access to electrical back-up generation at nondiscriminatory rates from other local electricity producers.[157] While PURPA was intended to secure access rights, many RE policy experts stress the need for a new law that both guarantees access to the grid and has a built-in mechanism to make renewable power cost-competitive with oil and natural gas.[158]

VI. CONCLUSION: A CRITICAL LOOK AT THE CURRENT ENERGY LEGAL FRAMEWORK

A transition to wide-scale RE deployment will require continued government efforts to develop feasible and consistent economic incentives, comprehensive national- and state-level energy plans, and a stronger regulatory environment. State governments need to enhance their energy plans with tighter environmental targets and more extensive initiatives. Local governments need to expand the scope of planning initiatives to include policies that protect, legitimize, and advance RE development. All levels of government and public actors need to coordinate RE efforts in order to advance a more effective, cohesive movement.

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155. Bradbrook, *supra* note 3, at 322.

156. *Id.*

157. *Id.* at 334-35.

158. The Union of Concerned Scientists contends that "PURPA is the only existing federal law that requires competition in the utility industry and the only law that encourages renewables," thereby highlighting the importance of a PURPA function and a federal commitment to ensuring a cost-competitive energy market. Union of Concerned Scientists, *backgrounder: Public Utility Regulatory Policy Act (PURPA)*, CLEAN ENERGY (Aug. 2005), http://www.ucsusa.org/clean_energy/clean_energy_policies/public-utility-regulatory-policy-act-purpa.html (Mar. 3, 2005).

Time and again, our current national government reiterates its commitment to energy security. This commitment is embodied in legislation that supports energy efficiency, increased use of alternative technologies, promotion of state renewable portfolio standards, clean coal initiatives, commitment to nuclear energy, and upgraded energy infrastructure.[159] The federal government aims to increase and maintain a diversified mix of energy supplies.

While policies are continually adopted that enhance applied initiatives, there are many reasons to be concerned that the government is not adequately supporting a transition away from a dependency on fossil fuels and toward a cleaner, healthier future. First, while there are a wide range of policy and program options at the federal and state levels, the dearth of strict, mandatory enforcement measures for RE deployment is difficult to overlook. Reliance on fiscal incentives that encourage voluntary implementation does not provide a strong enough impetus for widespread adoption of RE, particularly when the most powerful measures, such as the PTC, are not consistently revised. Thus, voluntary programs and loose controls cannot be counted on to fully realize RE development and deployment. Without assuming a regulatory and enforcement role in the electricity market, the federal and state governments cannot expect an overwhelming participatory response to their incentives.

Second, no public agency can play the free rider and escape responsibility for promoting and advancing RE technologies. The discordant nature of involved agencies and policies makes it too easy for individual agencies to shirk responsibility and maintain a crippling inertia.

Third, the federal government's commitment to expansion of RE supplies pales in comparison to the ardent efforts to expand fossil fuel supplies through such measures as drilling in the Arctic National Wildlife Refuge; taking military action in the Middle East to secure oil; expanding subsidies for coal, oil, and natural gas companies; developing coal gasification technologies; importing greater amounts of liquified natural gas; and possibly building modern nuclear energy facilities. Further, while lawmakers increase funding for fossil-fuel initiatives, federal and state budgets for RE programs are being cut all over the country. At a time when we should be leveling the playing field to

159. *Hearing on FY 2006 DOE EERE Budget Request, Before the S. Comm. on Appropriations, Subcomm. on Energy and Water*, 109th Cong. (2005) (statement of David Garman, Assistant Secretary for Energy Efficiency and Renewable Energy, U.S. Department of Energy), *available at* http://www1.eere.energy.gov/office_eere/congressional_test_021005.html.

ensure that renewable energies are cost competitive with fossil fuels, why are we forcing a bigger gap between them?

Finally, a relentless push to expand energy supplies instead of adjusting energy demand will ultimately do little to enhance energy security. We can expand supplies until we are blue in the face—or green in the face from cleaner, greener technologies, or red in the face from rising temperatures due to global warming, as the case may be—but if we do not implement measures that aim to change consumer demand and modify consumer behavior, we will not be an energy secure nation. Federal and state governments must employ real mandates to enforce conservation and energy efficiency.

The time is ripe to develop a viable, comprehensive RE legal framework that considers security, investment protection, competition and price structure, and demand-side management. In doing so, it is imperative to understand the policy incentive opportunities—and the government structure that establishes responsibility—that will allow for the smoothest transition away from fossil fuels and toward RE development. This structure is characterized by a complexity of public actors and agencies that need to coordinate their actions in order to make RE deployment a national priority and remove the barriers to wide-scale RE development. Until the many actors and interests can cooperate to begin to build a comprehensive RE legal framework, the status quo will persist and our children will inherit a depleted, asthmatic nation.