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Rediscovering Sustainable Development Law

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ARTICLE

Formulating a Law of Sustainable Energy: The Renewables Component

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INTRODUCTION

Law perennially chases human needs. Perhaps due in part to human psychology (including our "muddling through" tendencies), our limited resources, and the case or controversy requirement in our Constitution,[1] courts or legislatures often create law in reaction to events, rather than anticipating them. In the field of Technology Law, which is particularly familiar with this tendency, scholars point to court decisions reacting to "collisions between ships or horse-drawn carriages," for example, and "the spread of fire by sparks from railroad locomotives onto neighboring lands."[2]

Sometimes our responses to technological change involve cautious incremental adjustments to the common law or legislation. Some courts, on the other hand, "responding to the

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1. U.S. CONST. art. III, § 2, cl. 1.

2. Ivan K. Fong, *Law and New Technology: The Virtues of Muddling Through*, 19 YALE L. & POL'Y REV. 443, 455 (2001).

rise of a more industrialized economy," have adopted what Ivan Fong describes as a "dramatic" theory[3]—thus aggressively pushing the law forward. Judge Learned Hand followed this "dramatic" route in *The T.J. Hooper*,[4] which affirmed a decree finding the owners of tug boats and barges liable for damages to cargo that was lost at sea during a storm.[5] The tugs had been carrying barges with cargo; the cargo owners sued the barges under contract, and the barges sued the tugs under contract.[6] The tugs had found themselves lost at sea because "they did not carry radio receiving sets," by which they would have received warnings of the storm,[7] and the barges fared poorly because they were unseaworthy.[8] The court noted that no statutes addressed the issue of the receiving radios; a federal statute at the time required a "transmitting set," not a receiving set, and the industry custom was not clear; some tugs used receiving sets, and some did not.[9] It still held the tugs liable, though, noting that "when some have thought a device necessary, at least we may say that they were right, and the others too slack."[10]

As Fong notes, not all responses to new technology are so dramatic and far reaching, and when they are, there is a danger: "If the law responds too precipitously, market mechanisms, technological solutions, or other extralegal responses that may have been more effective may not have an opportunity to develop."[11] But slow responses can also work bad results—"there can be societal harms and losses that result from the application of outdated legal rules to the new technology."[12] And while society is waiting for the law to develop, the stopgap measures

3. *Id.*

4. *See generally* The T.J. Hooper v. N. Barge Corp. (*The T.J. Hooper*), 60 F.2d 737 (2d Cir. 1932).

5. *Id.* at 740.

6. *Id.* at 737.

7. *Id.*

8. *Id.* at 738.

9. *Id.* at 740.

10. *The T.J. Hooper*, 60 F.2d at 740.

11. Fong, *supra* note 2, at 456.

12. *Id.*

that emerge may become so entrenched as to be nearly irreversible.[13]

Renewable technology, while not a tug boat or locomotive, provides yet another interesting and important case study in the adaptation of law and the eternal conflict between predictability and flexibility in the law. As recognized in the Patent Law context:

> The complexity and rapid change of technology markets impose timing problems—laws need to be able to adapt to the pace and nature of technological change. Legal boundaries often need to be established before the nature of the underlying technology is fully understood. There are also industry differences in regulatory needs and benefits. It is critical to have lawmaking processes that can both adapt quickly and flexibly to the evolving needs of technology markets and to alter laws within the uniform patent system in a way that accommodates industry differences.[14]

Certain renewable technologies—particularly solar and wind—have only recently expanded at the utility scale, and United States law largely ignores this expansion. This presents several problems. The gap in the law can create high barriers to the development of renewable technology by forcing developers to jump through multiple, and sometimes overlapping, legal hoops that are not tailored toward renewable technologies. The law also fails to provide a comprehensive framework for ensuring that renewable development proceeds in a manner that balances economic and environmental interests and protects human health and safety. As Uma Outka has observed, "A reactive regulatory structure inevitably leads to consistent and pervasive neglect of cumulative impacts . . . ."[15] In short, our current system of law evolved without renewables in mind; the laws have not kept pace with the technologies that have developed. In response to these

13. *Id*. at 456-57.

14. Lisa Vertinsky, *Comparing Alternative Institutional Paths to Patent Reform*, 61 ALA. L. REV. 501, 513-14 (2010).

15. Uma Outka, *The Renewable Energy Footprint*, 30 STANFORD ENVTL. L.J. (forthcoming 2011) (manuscript at 36).

deficiencies, a law of sustainable energy must emerge, and this law must recognize renewables.

In the 1970s, during the last push toward renewables, legal scholars coalesced to address these system deficiencies.[16] These writers were optimistic that resources such as solar energy could "provide a significant part of our energy needs" in the future but recognized at the time that "[a] number of legal solutions are required before the expectations for this promising source of energy can be achieved."[17] They called for more solar access laws and revamped building and zoning codes and argued for better rate regulation, more tax incentives, and legislation determining "the role of utilities and oil companies in solar development," among other needed changes.[18] The U.S. Department of Energy even briefly[19] contracted out[20] for the publication a *Solar Law Reporter*, which collected relevant court decisions, state and federal legislation, and legal analysis in this area.[21] But the movement toward developing a renewable energy law faded quickly.

More recent legal literature has already begun to explore some of the broad policy- and governance-based barriers to renewable development. For small, distributed renewables—wind turbines in backyards and solar panels on roofs, for example—Garrick Pursley and I have argued that local governments must take the lead in updating their zoning laws and building codes to acknowledge the existence of these

16. *See* Garrick Pursley & Hannah Wiseman, *Local Energy*, 60 EMORY L. J. (forthcoming 2011); *see also* Troy Rule, *Shadows on the Cathedral: Solar Access Laws in a Different Light*, 2010 U. ILL. L. REV. 851, 857 (2010) ("The oil embargos of the 1970s are credited with having catalyzed a period of legislative and scholarly interest in solar energy development during that period.").

17. *Preface and Acknowledgments* to LEGAL ASPECTS OF SOLAR ENERGY vii, vii (John H. Minan & William H. Lawrence eds., 1981).

18. Barry Satlow, *Overview*, *in* LEGAL ASPECTS OF SOLAR ENERGY xi, xiii (John H. Minan and William H. Lawrence, eds., 1981).

19. *See* William S. Hein & Co., Inc., *Catalog, Solar Law Reporter*, https://www.wshein.com/catalog/107020 (last visited Jan. 28, 2011) (showing the reporter as published from 1979 through 1982).

20. *See* 3 SOLAR L. REP. v (1981-1982) (showing the publisher as "Solar Energy Research Institute, a division of Midwest Research Institute, under Contract to the United States Department of Energy").

21. *See, e.g.*, *id.* (showing contents of the journal).

technologies and to accommodate and encourage their implementation; many local governments have not yet done so.[22] Others have suggested that states must be empowered to develop distributed energy "microgrids," wherein neighborhoods band together to produce their own electricity from distributed renewables.[23] For large, utility-scale renewable technologies, on the other hand—those that produce electricity in quantities similar to traditional power plants[24]—the literature has described how the complex layer of laws and exclusion rights to land create high barriers to development and must be modified.[25] As described in previous work, renewable parcels necessary for the development of large wind and solar farms often cross multiple private property lines[26] as well as several jurisdictions[27]

22. *See* Pursley & Wiseman, *Local Energy*, *supra* note 16.

23. *See* Bronin, *infra* note 54, at 579-80.

24. *See* W. GOVERNORS' ASS'N & U.S. DEP'T OF ENERGY, WESTERN RENEWABLE ENERGY ZONES – PHASE 1 REPORT 2 n.1 (2009), *available at* http://www.westgov.org/wga/publicat/WREZ09.pdf.

25. *See* Patricia E. Salkin & Ashira Pelman Ostrow, *Cooperative Federalism and Wind: A New Framework for Achieving Sustainability*, 37 HOFSTRA L. REV. 1049, 1065-70, 1076-79, 1092 (2009) (describing local, state, and federal regulation of wind development and resulting challenges to development and arguing for a "federal wind siting policy"); Hannah Wiseman, *Expanding Regional Renewable Energy Governance*, 35 HARV. ENVTL. L. REV. (forthcoming 2011) [hereinafter *Regional Governance*] (describing the multiple layers of regulation and property rights that apply to large renewable developments and arguing for regional energy boards).

26. *See Regional Governance*, *supra* note 25; *see also* NAT'L WIND COORDINATING COMM., WIND POWER FACILITY SITING CASE STUDIES: COMMUNITY RESPONSE 17 (2005), *available at* http://www.nationalwind.org/assets/publications/NWCC_Siting_Case_Studies_Final.pdf (describing the Colorado Green wind power project in Prowers County, Colorado, which "covers 11,840 acres of land" owned by fourteen different individuals); Telephone Interview with Derek Rieman, Environmental Manager, Horizon Wind Energy (Feb. 4, 2011) (on file with author) (explaining that for the Marble River Wind Farm, Horizon had to work with approximately eighty private landowners); Marble River Wind Farm Application, Exhibit 1M: Names, Addresses, and Tax Parcel Information for Participating Landowners (Clinton), *available at* http://www.horizonwindfarms.com/northeast-region/documents/under-dev/marble-river/Permit-Application-Clinton/Exhibit1M-Clinton.pdf; Marble River Wind Farm Application, Exhibit 1M: Names, Addresses, and Tax Parcel Information for Participating Landowners (Ellenburg), *available at* http://www.horizonwindfarms.com/northeast-region/documents/under-dev/marble-river/ellenburg/Exhibit1M-Ellenburg.pdf; Letter from Patrick Doyle, Marble River, LLC, to Town of Clinton Town Board (Jan. 6, 2006), *available at*

in order to capture fugitive resources flowing over land, and this creates both anticommons and regulatory commons problems.[28]

This Article builds from these theory-based challenges already identified in the literature, focusing on utility-scale renewables and looking more closely at the pragmatic aspects of renewable development—the many laws and regulations that emerged before renewable technologies but nonetheless apply to utility-scale renewable development.[29] It also describes more recent laws that courts, municipalities, states, and the federal government have modified to specifically address changes in renewable technologies. The Article weaves these many strands of renewable governance, old and new, into a more detailed story about the practical challenges faced by renewable energy developers. Specifically, it categorizes and describes the federal, state, and local statutes, regulations, and standards that apply to utility-scale developers, argues that these regulations leave meaningful legal gaps, particularly in the field of Property Law, and briefly proposes some of the types of laws that policymakers and scholars should begin contemplating in response to—and more ideally, in anticipation of—continued growth in the renewables area.

Part I briefly introduces the need for renewable energy development as a component of a broader sustainable energy plan

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http://www.horizonwindfarms.com/northeast-region/documents/under-dev/marble-river/Permit-Application-Clinton/Cover%20Letter.pdf (showing that the proposed development would cover "approximately 17,000 acres of leased lands"). This footnote in its entirety is hereinafter referred to as "Renewable Energy Over Multiple Private Properties."

27. *See* NEXTERA, http://www.nexteraenergyresources.com/content/where/portfolio/pdf/portfolio_by_fuel.pdf (last visited Feb. 1, 2011) (showing eighteen wind development projects that cross county lines and one that crosses state lines); NAT'L WIND COORDINATING COMM., *supra* note 26, at 25 (describing the Whitewater Hill wind power project in Riverside County, California, which covered "both BLM property and property in the jurisdiction of the County"); Interview with Derek Rieman, *supra* note 26 (explaining that the Marble River Wind Farm is located in the towns of Clinton and Ellenburg, New York); *Regional Governance*, *supra* note 25.

28. *See Regional Governance*, *supra* note 25.

29. In exploring the laws that apply to renewable development, this Article relies upon pioneering works in this area, especially Ernest E. Smith & Becky H. Diffen, *Winds of Change: The Creation of Wind Law*, 5 TEX. J. OIL GAS & ENERGY L. 165 (2009-2010).

in the United States, and Part II describes the scattered and sometimes conflicting laws that apply to each phase of renewable development. Part III identifies the gaps in these laws and suggests how these laws (or the lack thereof) should be improved to address renewable development. The Article concludes by arguing that more scholarly and legislative attention should be directed toward the development of renewable energy law. While modifications have occurred and will continue—particularly in areas with high levels of renewable development—some necessary legal changes can be anticipated and should precede rather than chase after renewable development. Even where legal change occurs naturally, it is often a rushed, patchwork response to development demands; inconsistencies and irrationalities may arise in this reactionary process. These flaws could be avoided if legal needs were predicted and carefully considered in advance. Clear, comprehensive, and streamlined policies will benefit all parties involved, including developers of renewables, the public, and the many governmental entities that review renewable developments. And with better policies, opportunities for renewable development may expand. While renewable development is not the only component of a sustainable future, it is a very important one. Without an updated legal structure to address this development, however, the expansion of renewables will be much more difficult and costly than is necessary.

I. UTILITY-SCALE RENEWABLE DEVELOPMENT AS A COMPONENT OF A SUSTAINABLE ENERGY POLICY

Humans cannot agree on much, but many are unified in a desire to leave a habitable world for future generations. Our primary disputes tend to arise in defining what this habitable world should look like and determining how to preserve it. This broader goal and the underlying debate that it inspires often involve questions of "sustainability" and "sustainable development." Beginning with the formal, public introduction of

the concept of sustainability[30] in the 1987 Brundtland Report to the United Nations Environmental Program,[31] the definition of sustainable development has generally encompassed two concepts grounded in the preservation of valuable resources and the timing of resource use. The Brundtland Report defined sustainable development as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs."[32] Other, more recent definitions continue to encompass these dual time- and resource-based themes. Former President Bill Clinton's Council on Sustainable Development, for example, adopted the Brundtland Report's definition[33] and described a "sustainable United States" as a country with "a growing economy that provides equitable opportunities for satisfying livelihoods and a safe, healthy, high quality of life for current and future generations."[34] The

30. *See* John C. Dernbach, *Sustainable Development and the United States*, *in* AGENDA FOR A SUSTAINABLE AMERICA 3, 6-7 (John C. Dernbach ed., 2009) (describing the history of sustainability and how sustainability "did not address the environment and natural resources" until the publication of the Brundtland Report in 1987—a report that provided "the best known definition of sustainable development"). While 1987 marks the introduction of sustainability to the world, in 1992, "[f]or the first time, the nations of the world endorsed sustainable development" at the United Nations Conference on Environment and Development (the "Earth Summit"). AGENDA FOR A SUSTAINABLE AMERICA, PREFACE ix (John C. Dernbach ed., 2009); *see also* ROBERT H. FREILICH ET AL., FROM SPRAWL TO SUSTAINABILITY: SMART GROWTH, NEW URBANISM, GREEN DEVELOPMENT, AND RENEWABLE ENERGY 193 (2010) (observing that the "[t]he United Nations General Assembly coined the term 'sustainable development' in 1987.").

31. World Commission on Environment and Development, *Our Common Future: Report of World Commission on Environment and Development*, Oct. 7, 1987-Aug. 17, 1988, U.N. DOC. A/42/427, Annex (Mar. 20, 1987), *available at* http://www.un-documents.net/ocf-02.htm#I.

32. *Id.*

33. PRESIDENT'S COUNCIL ON SUSTAINABLE DEVELOPMENT, SUSTAINABLE AMERICA: A NEW CONSENSUS FOR THE PROPERITY, OPPORTUNITY, AND A HEALTHY ENVIRONMENT FOR THE FUTURE, http://clinton2.nara.gov/PCSD/Publications/TF_Reports/amer-top.html (last visited Jan. 31, 2011); *see also* PRESIDENT'S COUNCIL ON SUSTAINABLE DEVELOPMENT, http://clinton2.nara.gov/PCSD/index.html (last visited Jan. 31, 2011) (introducing the President's Council on Sustainable Development).

34. *Definition and Vision Statement*, PRESIDENT'S COUNCIL ON SUSTAINABLE DEVELOPMENT, http://clinton2.nara.gov/PCSD/Publications/TF_Reports/amer-def.html (last visited Jan. 31, 2011).

International Institute for Sustainable Development similarly defines sustainable development as "[e]nvironmental, economic and social well-being for today and tomorrow."[35]

The United States has taken tentative steps toward sustainability, but these have been piecemeal and generally lack enforceable goals. We have approved the 1992 Rio Declaration on Environment and Development and Agenda 21, for example, which established general sustainable development principles and goals,[36] and the parties to these agreements "reaffirmed" their commitment to sustainable development and expanded sustainability goals in the Johannesburg Plan of Implementation.[37] These international agreements tend to lack definitive targets in key areas, however,[38] and the United States has in many respects moved away from these agreements' broad goals.[39] Further, although some states and cities have adopted

35. *What is Sustainable Development?*, INT'L INST. FOR SUSTAINABLE DEV., http://www.iisd.org/sd/ (last visited Jan. 22, 2011).

36. United Nations Conference on Environment and Development, Rio de Janiero, Braz., June 3-14, 1992, *Rio Declaration on Environment and Development*, U.N. DOC. A/CONF.151/26/Rev.1 (Vol. I), Annex I (Aug. 12, 1992), *available at* http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm.; United Nations Conference on Environment and Development, Rio de Janiero, Braz., June 3-14, 1992, *Agenda 21*, U.N. DOC. A/CONF.151/26/Rev.1 (Vol. I-III), Annex II (Aug. 12, 1992), *available at* http://www.un.org/esa/dsd/agenda21/res_agenda21_00.shtml; Dernbach, *supra* note 30, at 7 (describing approval of these conventions by the United States and other countries).

37. Dernbach, *supra* note 30, at 8.

38. Jodi Britton, *The National Energy Policy, Renewable Energy, and the Johannesburg Convention: Has the United States Been All Talk and No Action?*, 12 PENN ST. ENVTL. L. REV. 241, 257 (2004) (noting that the Johannesburg "Plan of Implementation" lacks "any real measures to make certain that change will be made concerning the use of global renewable energy resources"); J.W. ANDERSON & RICHARD MORGENSTERN, RESOURCES FOR THE FUTURE, THE FUTURE OF SUSTAINABLE DEVELOPMENT: THE JOHANNESBURG CONFERENCE AND WHAT HAPPENS NEXT 3 (2003), *available at* http://www.rff.org/rff/Documents/RFF-IB-03-06.pdf (concluding that "[t]he language of the Johannesburg Plan of Implementation suggests an inability to specify the locus of responsibility for progress" and that "[t]here is a conspicuous frequency of sentences that state sweeping intentions, but give no indication who or what is to do what the statement requires.").

39. Nathaniel Aden et al., *Progress Toward Sustainability: A Report Card*, *in* AGENDA FOR A SUSTAINABLE AMERICA 15, 15 (John C. Dernbach ed., 2009) ("Since 2002, we have most often moved in the wrong direction—toward greater consumption of energy, material, land, and other resources, and more negative environmental impacts, with damaging social, economic, and security

specific sustainability policies and plans,[40] such policies are noticeably lacking at the federal level despite the United States' 2002 commitment to "promote sustainable consumption and production patterns," among many other sustainability goals.[41]

If the United States is to make a more serious commitment to sustainable development, a central focus must be on energy. Humans cannot function without energy, and our consumption of energy has and will continue to climb steeply.[42] Each short ton of coal, 3.44 barrels of oil, or 19,428 cubic feet of natural gas burned represents one less unit of energy available to future

consequences."). *Cf*. Yale Ctr. for Envtl. Law & Policy & Ctr. for Int'l Earth Sci. Info. Network, *Country Scores*, ENVTL. PERFORMANCE INDEX 2010, http://www.epi.yale.edu/Countries (last visited Apr. 16, 2011) (providing a score of 63.5 for the United States in 2010); Yale Ctr. for Envtl. Law & Policy & Ctr. for Int'l Earth Sci. Info. Network, *Country Scores*, ENVTL. PERFORMANCE INDEX 2008, http://epi.yale.edu:2008/CountryScores (last visited Apr. 16, 2011) (providing a score of 81 for the United States in 2008); Yale Ctr. for Envtl. Law & Policy & Ctr. for Int'l Earth Sci. Info. Network, *Pilot Environmental 2006 Performance Index*, http://www.yale.edu/epi/2006EPI_Brochure.pdf (last Visited Apr. 16, 2011) (providing a score of 78.5 for the United States in 2006).

40. Jonathan D. Weiss, *Local Governance and Sustainability: Major Progress, Significant Challenges*, *in* AGENDA FOR A SUSTAINABLE AMERICA 43, 43-48 (John C. Dernbach ed., 2009) (describing various local initiatives, including Fayetteville, Arkansas's hiring of a "sustainability coordinator," mayors' commitments to greenhouse gas emission reductions, and New York City's formation of the "office of Longer-Term Planning and Sustainability"); Pursley & Wiseman, *supra* note 16 (charting the ten most populous cities' commitments to renewable energy and installation of distributed renewable technologies); Memorandum of Understanding on Environmental Cooperation Between the California Environmental Protection Agency, the California Department of Food and Agriculture, and the California Resources Agency of the State of California, United States of America and the Ministry of Environment and Natural Resources of the United Mexican States, Cal.-Mex. 2, Feb. 13, 2008, *available at* http://www.calepa.ca.gov/Border/Documents/2008/021308MOU.pdf (pledging to "coordinate efforts and promote collaboration" in a range of "priority areas," including "[s]ustainable urban development, and housing.").

41. Report of the World Summit on Sustainable Development, Johannesburg, South Africa, Aug. 26 – Sept. 4, 2002, *Plan of Implementation,* § 14, U.N. DOC. A/CONF.199/20, *available at* http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/WSSD_PlanImpl.pdf.

42. *See* ENERGY INFO. ADMIN., INTERNATIONAL ENERGY OUTLOOK 2010, fig.12, *available at* http://www.eia.doe.gov/oiaf/ieo/world.html (last visited Jan. 23, 2011) (showing world marketed energy consumption as 355 quadrillion Btus of energy in 1990, 374 in 1995, 406 in 2000, and 495 in 2007, and projecting increasingly higher numbers for each time interval through 2035).

generations.[43] Each nuclear power plant built creates more waste for humans to manage for millions of years moving forward.[44] And each mountain toppled to reach the coal beneath represents one less viewpoint and one more segment of stream filled with debris.[45] These traditional energy resources that we are rapidly consuming—coal, oil, natural gas, and nuclear—are important because they drive the economy, development, and our attendant quality of life. Yet they are nonrenewable resources[46] and are, by their very definition, ultimately unsustainable. Experts in the field strongly disagree over how many nonrenewable resources we have left,[47] but the debate should

43. One short ton of coal produces 19,953,000 British thermal units ("Btus") of energy (assuming that coal is burned using 2009 U.S. technologies). One cubic foot of natural gas has 1,027 btus, so 19,428 cubic feet of natural gas represent 19,953,000 btus (the coal short ton equivalent). One barrel of crude oil (assuming the oil is produced in the United States in 2009) has 5,800,000 btus of energy, so 3.44 barrels of crude oil have 19,952,000 btus (the coal short ton equivalent). *See Energy Calculators*, ENERGY KIDS, ENERGY INFO. ADMIN., http://www.eia.doe.gov/kids/energy.cfm?page=about_energy_conversion_calculator-basics (last visited Jan. 23, 2011); *see also* ROY L. NERSESIAN, ENERGY FOR THE 21ST CENTURY: A COMPREHENSIVE GUIDE TO CONVENTIONAL AND ALTERNATIVE SOURCES 233 (2007) (showing a similar conversion in explaining that "[o]ne barrel of oil is energy-equivalent to 5,653 cubic feet of natural gas" (meaning that under this conversion, 3.44 barrels of oil would equal 19,446.32 cubic feet of natural gas)).

44. Marvin Baker Schaffer, *Toward A Viable Nuclear Waste Disposal Program*, 39:3 ENERGY POL. (forthcoming 2011) (explaining that about "800 nuclear waste casks exist on 34 sites," noting the "serious problems associated with long-term accumulation of this toxic material," and describing the "long half-lives" of the waste products—two of the longest of which are 4.47×10^9 years for uranium-238 and 7.04×10^6 years for uranium-235).

45. *See* Ohio Valley Envtl. Coal. v. U.S. Army Corps of Eng'rs, 556 F.3d 177, 186 (4th Cir. 2009) (describing the "mountaintop removal method of surface coal mining," which "involves the blasting of the soil and rock atop a mountain to expose coal deposits below" and the placement of overburden "into adjacent valleys," including into streams).

46. *See* NERSESIAN, *supra* note 43, at 14 (observing that "fossil fuels such as coal, oil, and natural gas cannot replenish themselves (ignoring for now speculation about the possible nonorganic origin of natural gas from deep within the earth.")).

47. *See* Tadeusz W. Patzek & Gregory D. Croft, *A Global Coal Production Forecast with Multi-Hubbert Cycle Analysis*, 35 ENERGY 3109, 3110 (2010) ("Faced with the imminent global peaks of oil and coal production, economists, scientists, and policy makers have been taking radically different positions."); *id.* at 3115 (concluding that "the peak of global coal production from the existing coalfields is imminent, and coal production from these areas will fall by 50% in

already have expanded well beyond this basic question. Eventually, nonrenewable resources will be much more expensive to locate and extract—both in terms of the cost of the technologies and resources required for the extraction and transport of fuels[48] and in terms of the environmental and social costs.[49] Looking to offshore oil spills, mining accidents, mountaintop removal, and tar sands mining, some argue that these costs are already too high or that, at minimum, we are not sufficiently addressing the risks of nonrenewable resource production.[50] Over time, humans

the next 40 years"); Stephen F. Lincoln, *Fossil Fuels in the 21st Century*, 34 AMBIO 621, 622 (2005) , *available at* http://rlib.pace.edu/login?url=http://proquest.umi.com/pqdweb?did=976146841&sid=1&Fmt=6&clientId=2088&RQT=309&VName=PQD (estimating that "global proven reserves [of coal] would last for approximately 192 years" "[a]t the 2003 production rate," and that at the 2003 oil production rate "it appeared that proven global oil reserves would last for 41 years"); David Pimental et al., *Renewable Energy: Economic and Environmental Issues*, 44 BIOSCIENCE 536, 536 (1994) (arguing that "[t]he US coal supply . . . could be used up in a much shorter period than the projected 100 years if one takes into account predicted oil and gas depletion and concurrent population growth"); *see also generally* Adam R. Brandt, *Review of Mathematical Models of Future Oil Supply: Historical Overview and Synthesizing Critique*, 35 ENERGY 3958 (2010).

48. *See, e.g.*, NERSESIAN, *supra* note 43, at 206 (explaining that "the frequency of discovering major oil fields is dropping; the size of newly discovered oil fields is falling; and consumption is getting ahead of additions to proven reserves"); *id.* at 255 (describing the vast reserves of natural gas remaining in the world (which amount to approximately twice the reserves of oil), many of which can be "misleading," however, because of their remote location and the prohibitive expense of transporting gas from the reserves via pipelines); Pimental et al., *supra* note 47, at 536 (observing that although "new technologies will be developed that make it possible to extract more oil and coal," "this extra extraction can only be achieved at greater energy and economic costs").

49. *See, e.g.*, JOHN S. DUFFIELD, OVER A BARREL: THE COSTS OF U.S. FOREIGN OIL DEPENDENCE 208 (2008) (arguing that "American diplomacy and various forms of military and economic assistance aimed at strengthening and influencing the policies of oil producing states have involved additional financial expenditures" as well as "numerous intangible costs," including "reduced freedom of action and a reluctance to pursue other valued foreign policy goals," "increased entanglement, or risk thereof, in local and regional conflicts," and "weakened regimes," among other intangible costs).

50. *See, e.g.*, Oliver A. Houck, *Worst Case and the Deepwater Horizon Blowout: There Ought to Be a Law*, 24 TUL. ENVTL. L.J. 1, 17, (2010) (arguing that outer continental shelf drilling "is the tip of the iceberg, a dangerous tip to be sure, but much the same can be said for coal mining, oil shale, tar sands, natural gas fracturing, renewed nuclear energy development, and similar ventures that ignore worst cases at their (and our) peril"). *Cf.* NAT'L COMM'N ON ENERGY POLICY, ENERGY POLICY RECOMMENDATIONS TO THE PRESIDENT AND 110TH

will also increasingly expand our understanding of the consequences of relying primarily upon nonrenewable resources for our energy, from water and air pollution[51] to the ever-present challenge of climate change, and we may be increasingly displeased with the results.

Developing a more sustainable energy policy should not, however, involve immediately transitioning to full reliance on renewable energy resources—those that replenish themselves within a human lifetime.[52] This would be extremely costly and would require an enormous commitment of valuable materials, such as steel and rare metals, to one sector of our economy.[53] Further, renewable energy technologies ("renewables" for short) themselves have economic, environmental, and social costs,[54] which must be weighed against those of traditional, nonrenewable energy resources. On balance, at least from an environmental perspective, renewable technologies win.[55] And

CONGRESS 21 (2007), *available at* http://bipartisanpolicy.org/sites/default/files/Energy%20Policy%20Recommendations%20to%20the%20President%20and%20the%20110th%20Congress.pdf (noting that "the Commission is concerned about the potential climate impacts from expanding fuel production from coal and other unconventional fossil sources, such as oil shale, tar sands, and heavy oil," that "current coal-to-liquids technologies generate nearly twice as much carbon dioxide as conventional petroleum on a full fuel-cycle basis," and that "the climate impacts of existing methods for unconventional oil production are similar or even worse.").

51. *See, e.g.*, H. Spencer Banzhaf et al., *Assessing the Externalities of Electricity Generation in the Midwest* 18 RESOURCE & ENERGY ECON. 395, 412 (2006) (charting damages caused by pollution from electricity production).

52. *See* Alicia Valero et al., *Inventory of the Exergy Resources on Earth Including its Mineral Capital*, 35 ENERGY 989, 989 (2009).

53. *See* Lincoln, *supra* note 47, at 626 (observing that "even if viable technologies were now available to completely replace the use of fossil fuels, the enormity of the infrastructures change required to sustain present energy demand and allow its growth would take decades to achieve.").

54. *See* Sara Bronin, *Curbing Energy Sprawl*, 43 CONN. L. REV. 547, 553-58 (2010) (describing some of the environmental effects).

55. *See* Pursley & Wiseman, *supra* note 16 (arguing that "renewables have fewer negative impacts on human health, security, and the environment than do traditional fuels" and describing a European Commission study that compared the environmental and health-based risks of energy, which showed all renewable sources of energy as having fewer externalities of nonrenewables, with the exception of nuclear power in some countries (citing EUROPEAN COMM'N, EXTERNE: EXTERNALITIES OF ENERGY 13–14 (Peter Bickel & Rainer Friedrich eds., 2005), *available at* http://www.externe.info/brussels/methup05a.pdf)).

for a sustainable future, humans will be forced to eventually move away from depletable, nonrenewable fuels[56] toward renewables. But this article does not delve into the optimal rate of transition toward renewables. Rather, it views these technologies as an essential component[57] of a sustainable energy policy and sustainability generally, both in the United States and abroad, and suggests how law could better enable a transition toward renewables in the United States.

A sustainable energy policy for the United States would allow moderate consumption of nonrenewable resources to maintain relatively low-cost energy, require steady development of alternatives such as energy efficiency measures and renewable energy, and avoid unacceptable environmental and social costs both for the present and future. The formulation of such a policy will require careful analysis by scientists and economists, but several factors are already known, particularly from a domestic perspective. Consumption of nonrenewable energy resources continues to rise rapidly,[58] energy prices are already volatile,[59] and fuel imports will continue to expand, thus potentially affecting national security.[60] This pattern has already generated

56. *See* Pimental et al., *supra* note 47, at 536 (arguing that "[w]ithin a decade or two US residents will be forced to turn to renewable energy for some of their energy needs").

57. For supporting arguments that renewables are a necessary part of a sustainable policy, or simply necessary for human comfort, see, for example, CLARISSE FRÄSS-EHRFELD, VOL. 1, RENEWABLE ENERGY SOURCES: A CHANCE TO COMBAT CLIMATE CHANGE 109-10 (2009) (arguing that "[t]hese days, one thing is clear and proven: To bring rapid climate change to a halt, GHG [greenhouse gas] emissions that are primarily due to the use of fossil fuels, must be reduced significantly," that renewable energy resources "are an essential alternative to fossil fuels," and that "increasing [renewable energy's] . . . share in our energy mix is a must"); FREILICH ET AL., *supra* note 30, at 194 (explaining that the authors view "solar and other renewable energy to supplement or replace electricity" as a component of one category of sustainability, a category which "embodies the notion of development's impact on the environment, public infrastructure and services, and other resources").

58. *See* text and sources cited *supra* notes 42-43.

59. U.S. DEP'T OF ENERGY, ENERGY INFO. ADMIN., ANNUAL ENERGY OUTLOOK 2011 EARLY RELEASE OVERVIEW 3-4 (2011), *available at* http://www.eia.gov/forecasts/aeo/pdf/0383er%282011%29.pdf (describing historic and potential future prices of fuels).

60. *See generally* DUFFIELD, *supra* note 49 (describing national security concerns associated with oil imports); Pimental et al., *supra* note 47, at 536

both positive and negative environmental and social consequences. While air quality has improved since the implementation of the Clean Air Act,[61] many regions have not attained the safe levels of air quality required by the Environmental Protection Agency under the Act.[62] Climate change issues from burning fossil fuels[63] loom large, and mining and drilling accidents have harmed ecosystems and communities.[64] Domestic drilling and mining operations, on the other hand, have created valuable jobs[65] and have helped to reduce United States dependence on foreign energy sources.[66] Ignoring the externalities of fossil fuels, the price of these fuels is also dramatically lower than most renewable sources of energy, thus providing an essential, affordable energy supply for present

(arguing that U.S. dependence on fuel imports "portends future negative effects on national security and the economy"); NAT'L COMM'N ON ENERGY POLICY, ENDING ENERGY THE STALEMANTE: A BIPARTISAN STRATEGY TO MEET AMERICA'S ENERGY CHALLENGES vi (2004), *available at* http://bipartisanpolicy.org/sites/default/files/endi_en_stlmate.pdf (describing security concerns).

61. *See* Robin Kundis Craig, *The Public Health Aspects of Environmental Enforcement*, 4 PITTSBURGH J. ENVTL. & PUB. HEALTH L. 1, 15 (2010) (observing that "[t]he public health focus of the CAA has paid off, both literally and figuratively").

62. *Id.* (describing how "air quality in Los Angeles and Houston regularly violates the Clean Air Act's ambient air quality requirements); U.S. EPA, *Currently Designated Nonattainment Areas for All Criteria Pollutants*, http://www.epa.gov/oaqps001/greenbk/ancl.html (last visited Feb. 1, 2011) (describing hundreds of counties that fail to attain the Clean Air Act's health-based ambient concentration of pollutants in the air).

63. In 2008, 85.1% of all U.S. greenhouse gas emissions were carbon dioxide emissions. Of this 85.1%, 80% of America's carbon dioxide emissions (weighted for global warming potential) were from fossil fuel combustion. U.S. EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2008 EXECUTIVE SUMMARY 4, 6 (2010), *available at* http://www.epa.gov/climatechange/emissions/downloads10/US-GHG-Inventory-2010_ExecutiveSummary.pdf.

64. *See Regional Governance*, *supra* note 25, at nn. 5-6.

65. *See* Am. Petroleum Inst., *Oil, Natural Gas Supports 9 Million American Jobs, 7.5 Percent of GDP*, API NEWSROOM, Sept. 24, 2009, http://www.api.org/Newsroom/industry-supports.cfm (estimating that "[t]he U.S. oil and natural gas industry supports more than 9 million American jobs").

66. *See* U.S. DEP'T OF ENERGY, ENERGY INFO. ADMIN., *supra* note 59, at 1 (explaining how future "[p]rojected demand for energy imports is moderated by increased use of domestically produced biofuels," among other factors" and how imports, although rising overall, are projected to decline to 18 percent of net U.S. energy consumption as "compared with 24 percent in 2009").

generations.[67] A sustainable energy policy must take into account all of these factors and reach a balance, ensuring that an adequate energy supply remains for future generations without placing too high of a burden on current generations or on the environment.

No matter the exact balance agreed upon, any sustainable energy policy adopted in the United States must encourage the growth of renewable energy development. In 2007, the bipartisan National Commission on Energy Policy recommended that the United States adopt a requirement that at least fifteen percent of electricity in the United States come from renewable resources by 2020.[68] Indeed, renewable energy fits nearly all of the National Science Board's definitions of "sustainable energy": It is an energy source with "lower total and per unit green house gas emissions," which "reduce[s] U.S. dependence on imported energy sources" and is "available in sufficient quantity to enable continued economic and social development while promoting environmental stewardship."[69] To enable an expansion of renewables as part of a sustainable energy future, however, a new body of law must emerge.

II. CURRENT LAWS ADDRESSING RENEWABLE ENERGY DEVELOPMENT

The current legal system that governs renewable energy development consists of an incoherent patchwork of statutes, regulations, and common law court decisions geared toward older, nonrenewable technologies. As occurs in many areas of the law—

67. *See, e.g.*, Matthew L. Wald & Tom Zeller, Jr., *Cost of Green Power Makes Projects Tougher Sell*, N.Y. TIMES, Nov. 7, 2010, at A1, http://www.nytimes.com/2010/11/08/science/earth/08fossil.html (describing how state regulators rejected a proposal to sell wind energy to a Virginia utility, "citing the recession and the lower prices of natural gas and other fossil fuels").

68. NAT'L COMM'N ON ENERGY POLICY, *supra* note 50, at 7.

69. NAT'L SCI. BD., BUILDING A SUSTAINABLE ENERGY FUTURE 9 (2009), *available at* http://www.nsf.gov/nsb/publications/2009/comments_se_report.pdf; *see also* Hannah Wiseman, *Regulatory Adaptation in Fractured Appalachia*, 21 VILL. ENVTL. L.J. 229, 231 n. 9 (2010) (referencing the report). Many renewable technologies are not yet "affordable," however, and therefore do not meet this National Science Board criterion; the fuels are free, but the technologies to capture them are expensive. *See id*. (listing "affordable" as a criterion).

from property to privacy—it is difficult for entrenched governance frameworks to keep pace with technological change,[70] and this lack of legal flexibility may, in turn, impede the pace of the change. Although the recent growth of wind energy has been dramatic,[71] this expansion might have been larger, safer, better planned, and more efficient if more comprehensive and coherent laws governing renewable technologies were in place.[72]

This Part describes the laws that currently create a makeshift governance framework for renewables. It focuses on wind (one of the fastest growing areas of renewable development),[73] briefly discusses the laws' application to solar energy, and organizes the laws by the phases of renewable development that they affect, including identifying a potential site for renewable technology and associated transmission lines, constructing and siting the technology, connecting to the

70. *See, e.g.*, Gaia Bernstein, *Toward a General Theory of Law and Technology: Introduction*, 8 MINN. J. L. SCI. & TECH. 441, 442 (2007) (describing state legislation "targeting privacy threats imposed by cell-phone cameras"); David F. Fidler, *Global Health Jurisprudence: A Time of Reckoning*, 96 GEO. L.J. 393, 400 (2008) (arguing that "traditional public health law largely failed to keep pace with changes in science, epidemiology, information technologies, and conceptions of civil and political rights"); 134 CONG. REC. S16971-72 (daily ed. Oct. 18, 1988) (statement of Sen. DeConcini) (amending the Lanham Act, which addresses trademarks, partially out of concern that "that existing law could no longer keep pace with societal changes and modern commercial realities" (*quoted in* Bick Pisarsky, Note, *Potayto-Potahto-Let's Call the Whole Thing Off: Trademark Protection of Product Sources*, 40 CONN. L. REV. 797, 840 (2008)).

71. Press Release, Am. Wind Energy Ass'n, U.S. Wind Energy Industry Finishes 2010 with Half the Installations of 2009, Activity Up in 2011, Now Cost-Competitive with Natural Gas (Jan. 24. 2011), *available at* http://www.awea.org/newsroom/pressreleases/release_01-24-11.cfm (describing how "[t]otal U.S. wind capacity" is currently 40,180 MW, an "increase in capacity of 15% over the start of 2010").

72. As is discussed in more detail in this Article's conclusion, arguments suggesting that inflexible laws have slowed the expansion of renewable development are purely hypothetical at this stage. Careful empirical analysis would be necessary to identify the causal factors driving the pace of renewable development.

73. U.S. Dep't of Energy, *Renewable Energy Consumption and Electricity Preliminary Statistics 2009*, http://www.eia.doe.gov/cneaf/alternate/page/renew_energy_consump/rea_prereport.html (last visited Apr. 15, 2011) (explaining that the largest renewable increases in 2009 were in biofuels, "conventional hydroelectric power," and wind).

transmission grid, and selling electricity generated by the technology.

A. Identifying a potential site for renewable technology

When a developer proposes to build a large solar or wind farm, she must first locate land. Through the siting process, the developer must find a piece of land that has adequate sun or wind flowing over it, both in terms of quantity and duration, and open surface area that allows for the construction of technology to capture those resources.[74] Further, the developer must find land that is close to infrastructure to transport the produced energy resource to consumers. In the case of renewables, this transportation infrastructure is a complex grid of high-voltage transmission lines. The challenge—which oil and gas developers similarly face—is to match fugitive property resources with accessible, immovable land and sophisticated transportation infrastructure. Following previously-used nomenclature in the renewables context, this Article describes the resulting piece of land, which offers an ideal combination of fugitive resources, open space for renewable technology development, and available transmission capacity, as a "renewable parcel."[75]

74. *See* W. GOVERNORS' ASS'N, *supra* note 24, at 6-7 (describing how the best general regions for solar energy receive 6.5 or more "kilowatt hours per square meter per day of direct normal insulation" and a "terrain slope" not greater than 2 percent," and how the best general regions for wind have a certain wind class, as defined by the National Renewable Energy Laboratory, "at 50 meters above the ground and a "terrain slope" of "less than 20 percent"). Wind classes represent "a range of mean wind power density (in units of . . . [watts per square meter]) or equivalent mean wind speed at . . . specified height(s) above ground"). *See* Nat'l Renewable Energy Laboratory, *Wind Energy Resource Atlas of the United States*, http://rredc.nrel.gov/wind/pubs/atlas/chp1.html (last visited Feb. 2, 2011). The classes range from 1 to 7, with class 1 representing areas "generally not suitable" to wind development and class 7 representing the best wind development areas. *Id.*

75. *See Regional Governance*, *supra* note 25, at 27.

1. Measuring fugitive resources: trespass, permitting, environmental review, and zoning regulations

From the fugitive resources perspective, if the sun only shines weakly on the property for half a year, the development may not be economically feasible. The same may be true if wind only blows forcefully over the property for an hour each day.[76] To ensure an economical renewable development, the developer must first measure the sun or wind resources flowing over land, and a legal framework applies even at this early stage. If the land includes private properties, the developer must approach each property owner for permission to enter in order to avoid trespass charges; any unwanted physical invasion of property can lead to civil and even criminal liability.[77] Developers have already encountered similar issues in the oil and gas context, where production companies must conduct tests to identify the quality and quantity of underground resources. In one extreme example in Texas, BGP International, an oil production company, contracted with a land service company to "conduct seismic exploration services" on land "owned by approximately 15,000 different parties."[78] The service company failed to first obtain permission from all of these property owners, and forty-three of the owners sued, alleging trespass violations and negligence.[79] A

76. *See* Nat'l Renewable Energy Laboratory, *supra* note 74.

77. Criminal trespass liability in many states will only arise where a property owner has posted "keep out" or similar no trespassing signs and the renewable developer still chooses to enter without the owner's permission. *See* Byron Kahr, *The Right to Exclude Meets the Right to Ride: Private Property, Public Recreation, and the Rise of Off-Road Vehicles*, 28 STAN. ENVTL. L.J. 51, 84-85 (2009) (describing state civil and criminal trespass laws and explaining that "[t]he general principle is that unenclosed and uncultivated lands are presumed to be open to the public, and an individual will not be held criminally liable for entering onto private land unless he or she has knowledge of the owner's desire to keep the public out"); *see also id*. at 84 nn. 99-100 (and statutes cited therein); ARIZ. REV. STAT. ANN. § 13-1502 A (2010) (defining criminal trespass as "[k]nowingly entering or remaining unlawfully on any real property after . . . reasonable notice prohibiting entry"); CAL. PENAL CODE § 602 (h)(1) (West 2010) (defining a "trespass constituting a misdemeanor" as the act of "[e]ntering upon lands or buildings owned by any other person without the license of the owner or legal occupant, where signs forbidding trespass are displayed").

78. English v. BGP Intern, Inc., 174 S.W.3d 366, 369 (Tex. App. 2005).

79. *Id.*

renewable developer might plausibly face similar difficulty, as the developer typically must approach hundreds of individual landowners for permission to enter the property for measurement purposes.[80] A developer on local, state, of federally-owned property will not face such high transaction costs at the initial survey stage, but more hurdles will emerge during the next phase of measurement.

Simple entry to conduct an initial survey of fugitive resources using rudimentary meteorological devices is not overly difficult, provided that private landowners give permission to enter or the property is open to the public. But large renewable developments, which require high up-front capital costs,[81] also require more careful measurement to ensure that fugitive energy resources flowing over the land will be abundant in the long-term. Wind developers, for example, must install equipment to measure wind velocity and other meteorological factors,[82] and this creates legal burdens. When the developer "Cape Wind™"[83] planned to construct a temporary measurement tower on the ocean floor off of Cape Cod, Massachusetts, the company had to apply to the U.S. Army Corps of Engineers to receive a permit under the Rivers and Harbors Act before the tower could be built.[84] Citizen groups unsuccessfully argued that Massachusetts—not the federal government—had to first grant a permit for the

80. *See* Renewable Energy Over Multiple Private Properties, *supra* note 26 (describing wind energy projects with large acreages and identifying one developer who had to work with approximately eighty landowners when building one wind farm).

81. *See* U.S. DEPT. OF ENERGY, ENERGY INFO. ADMIN., UPDATED CAPITAL COST ESTIMATES FOR ELECTRICITY GENERATION PLANTS 7 (2010), *available at* http://www.eia.doe.gov/oiaf/beck_plantcosts/pdf/updatedplantcosts.pdf (estimating overnight capital costs ranging from $2,438 to $6,050 per kilowatt-hour of electricity produced for utility-scale solar and wind plants); *see also* U.S. Dep't of Energy, *Wind Power Pioneer Interview: Jim Dehlsen, Clipper Windpower*, WIND POWERING AMERICA (Oct. 1, 2003), http://www.windpoweringamerica.gov/filter_detail.asp?itemid=683 (last visited Feb. 2, 2011) (describing his $157 million 75-megawatt wind facility).

82. TORE WIZELIUS, DEVELOPING WIND POWER PROJECTS 51 (2007) (describing the importance of measurement).

83. CAPE WIND™, http://www.capewind.org/ (last visited Feb. 1, 2011).

84. Ten Taxpayer Citizens Grp. v. Cape Wind Assocs., LLC, 373 F.3d 183, 186 (1st Cir. 2004), *cert. denied*, 543 U.S. 1121 (2005).

measurement tower,[85] and this led to a long, drawn-out battle in state and then federal courts, which Cape Wind ultimately won.[86] Notably, this extensive legal battle arose from one measurement tower, not the proposed wind turbines themselves.

The legal hurdles at the measurement stage do not only arise in the offshore context. At least one town in New York has modified its zoning code to ban both wind turbines and measurement towers within town boundaries.[87] Further, whenever a developer proposes to construct a measurement tower on federal lands (onshore), she must obtain permission from the relevant government agency. The most recent directive from the Bureau of Land Management, for example, requires the developer to submit an application for a "site-specific FLPMA [Federal Land Policy and Management Act] right-of-way grant," to pay a rental fee of "a minimum of $100 per year for each meteorological tower or instrumentation facility location," and to post a minimum $2,000 bond.[88] When the BLM issues a "site-specific site testing and monitoring authorization" for the meteorological tower, the authorization requires the wind developer to follow certain best management practices for protection of the environment and "follow appropriate site-specific stipulations, including but not limited to road construction and maintenance, vegetation removal, and number and location of wind monitoring sites."[89] A proposed measurement tower on state lands may also require lease permission and permitting from the state, and, additionally,

85. *Id.* at 196-97.

86. Ten Taxpayers originally filed in state court, which granted a temporary restraining order against the construction of the measurement tower, and Cape Wind successfully removed to federal district court. Ten Taxpayers Citizens Grp. v. Cape Wind Assocs., LLC, 278 F. Supp. 2d 98, 99-100 (D. Mass. 2003). The federal district court held that the Corps, not Massachusetts, had jurisdiction to authorize construction of the measurement tower. *Ten Taxpayers*, 373 F.3d at 196-97.

87. Sarah Haase, *Henderson Bans Wind Development*, WATERTOWN DAILY TIMES, Nov. 11, 2010, http://www.watertowndailytimes.com/article/20101111/NEWS03/311119946.

88. BUREAU OF LAND MGMT., U.S. DEP'T OF THE INTERIOR, INSTRUCTION MEMORANDUM, WIND ENERGY DEVELOPMENT POLICY 1, 4, 7 (2008), *available at* http://windeis.anl.gov/documents/docs/IM_2009-043_BLMWindEnergyDevelopmentPolicy.pdf (directive expired Sept. 30, 2010).

89. *Id.* at 5.

a state environmental review in the approximately fifteen states that require this review.[90]

Regardless of the proposed location of the renewable development, local, state, and federal laws may all apply at the measurement stage. By this point, the developer has already incurred substantial costs both for the measuring equipment and to obtain permission to enter land; the developer will still not be sure, however, that the site is compatible. While the developer surveys fugitive resources, the real property factors cannot be ignored.

2. Identifying compatible land uses

When a renewable energy developer measures the fugitive renewable resources flowing over the property, she must also ensure that the land beneath these resources will accommodate relatively permanent physical equipment necessary to capture these fugitive resources; she must identify both the physical and legal impediments to placing large built structures on the land. Physical impediments include natural geographic features, such as excessively steep valleys and mountains[91] or seismic zones,[92]

90. Philip Michael Ferester, *Revitalizing the National Environmental Policy Act: Substantive Law Adaptations from NEPA's Progeny*, 16 HARV. ENVTL. L. REV. 207, 248 (1992) (describing New York's having modeled its state environmental quality act after eleven other similar state acts); Ben Schifman, Note, *The Limits of NEPA: Consideration of the Impacts of Terrorism in Environmental Impact Statements for Nuclear Facilities*, 35 COLUM. J. ENVTL. L. 373, 403 (2010) (describing fifteen state laws modeled after the National Environmental Policy Act).

91. Mountains and valleys do not always pose impediments to development, however, and can provide some of the most desirable locations for onshore wind energy, at least from the perspective of the wind developer. Laura C. Rodman & Ross K. Meentemeyer, *A Geographic Analysis of Wind Turbine Placement in Northern California*, 34 ENERGY POL'Y 2137, 2142 (2005) ("Ridge crests or other high ground are generally preferred for wind turbine placement, and flat valleys may also be suitable if they act as a wind channel."); NAT'L WIND COORDINATING COMM., *supra* note 26, at 25 (describing the Whitewater Hill wind power facility "located in a mountain pass . . . along with many other previously developed wind power projects"); Candace Page, *Lowell Mountain Wind-Project Opponents Carry On Despite Setbacks*, BURLINGTON FREE PRESS, Jan. 30, 2011 (describing a proposed wind development on a mountain in Vermont); Eileen M. Adams, *Wind Development Opponents Meet*, SUN J., July 21, 2010, http://www.sunjournal.com/

(which could make construction costly or too risky), or existing land uses such as residential or industrial development that cannot easily be removed.[93] Where natural geographic features cannot be modified absent high expenditures, or would have unpopular environmental and social effects if modified, the developer will have to locate another site. Existing human-derived impediments to renewable development might be more easily modified, depending on their nature.

A developer facing existing artificial land uses on a renewable parcel will not likely be able to buy out residential, commercial, and industrial users of property. Renewable developments often cross property lines,[94] so the developer will have to persuade each individual owner to sell out and will face hold-outs demanding large payments. Many public utilities have eminent domain powers both for the siting of power plants and transmission lines,[95] in which case the utility developer can force

river-valley/story/881406 (describing a proposed wind development on a mountain range in Wyoming).

92. *See* OR. DEP'T OF ENERGY, GUIDELINES FOR APPLICANTS FOR ENERGY FACILITY SITE CERTIFICATES 1 (2008), *available at* http://www.oregon.gov/ENERGY/SITING/docs/2008Guidelines.pdf?ga=t.

93. *See, e.g.*, W. GOVERNORS' ASS'N, *supra* note 24, at 9 (describing how the "presence of structures" "will limit the 'developability' of even the most high quality resources").

94. *See* Renewable Energy Over Multiple Private Properties, *supra* note 26.

95. *See, e.g.*, CAL. PUB. UTIL. CODE § 612 (West 2011) ("An electrical corporation may condemn any property necessary for the construction and maintenance of its electric plant."); CAL. PUB. UTIL. CODE § 625 (West 2011) (allowing a "public utility that offers competitive services" to condemn property only if the California Energy Commission "finds that such an action would serve the public interest," but providing broad eminent domain authority where property is "necessary solely for an electrical company . . . to meet its commission-ordered obligation to serve"); 220 ILL. COMP. STAT. ANN. 5/8-509 (West 2011) (providing utilities with eminent domain authority for projects necessary under other portions of the Illinois Statutes, which are listed immediately following this citation); 220 ILL. COMP. STAT. ANN. 5/8-406.1 (West 2011) (describing the "construction of any new high voltage electric service line and related facilities" as one of the projects); 220 ILL. COMP. STAT. ANN. 5/8-503 (West 2011) (describing "additions, extensions, repairs or improvements to, or changes in, the existing plant, equipment, apparatus, facilities or other physical property of any public utility" and construction of "a new structure or structures [that] . . . is or are necessary . . . to promote the security or convenience of . . . the public or promote the development of an effectively competitive electricity market, or in any other way to secure adequate service or facilities" as one of the

the sale of land at its market value. Because renewable developers are often not traditional public utilities, however,[96] eminent domain authority will frequently not be available for the renewable generation development,[97] and even where it is available, a developer will face long and costly legal battles over the value of the land being taken and the validity of using eminent domain for what some would argue (likely unsuccessfully[98]) is not a public use.[99] Finally, even if the

projects); 735 ILL. COMP. STAT. ANN. 30/5-5-5 (West 2011) (providing a "rebuttable presumption" that condemnation of property is for public use when a public utility condemns property where there has been a finding of public convenience and necessary or where property is acquired under the Public Utilities Act); TEX. UTIL. CODE ANN. § 181.004 (West 2011) ("A gas or electric corporation has the right and power to enter on, condemn, and appropriate the land, right-of-way, easement, or other property of any person or corporation."); TEX. UTIL. CODE ANN. § 181.001 (West 2011) (defining "electric corporation" as an "electric current and power corporation").

96. Renewable developers are often simply builders of generation who then sell wholesale to other utilities and municipalities, not directly to end-users. As generators of wholesale electricity, the developers must therefore obtain a tariff from FERC but are not traditional state-regulated public utilities—those utilities that "own generation, transmission, and distribution; provide retail service directly to electricity endusers; and are granted a natural monopoly in a service area (including eminent domain authority) in exchange for state regulation of services and rates." *See* Federal Power Act, 16 U.S.C. § 824(a)-(b) (2006) (establishing federal jurisdiction over wholesale sales of electricity); WILLIAM A. MOGEL & DAVID J. MUCHOW, ENERGY LAW AND TRANSACTIONS 52-22-21 (1997) (defining the "public utility").

97. *See, e.g.*, COLO. REV. STAT. § 40-2-125 (West 2011) ("A qualifying retail utility shall not have the authority to condemn or exercise the power of eminent domain . . . pursuant to section 38-2-101, C.R.S., to site the generation facilities of a renewable energy system used in whole or in part to meet the electric resource standards" in Colorado's renewable portfolio standard). *But see* Jaclyn K. Casey, *Can a QRU Take From You?,* ROTHGERBER, JOHNSON & LYONS, LLP, Nov. 1, 2010, http://www.rothgerber.com/showarticle.aspx?Show=1377 (describing how renewable developers may be able to make an end-run around this eminent domain restriction by, for example, using portions of the Colorado statutes (other than § 38-2-101) that grant specific eminent domain powers to certain corporations).

98. *See* Kelo v. City of New London, 545 U.S. 469, 490 (2005) (holding that using eminent domain to purchase land and transfer it to a private party for economic development is a "public use" under the Fifth Amendment).

99. In Texas, where the state has mandated the construction of transmission lines for renewables and granted broad eminent domain powers to the utilities building these lines, *see infra* notes 128-29, there has been strong landowner opposition to the lines. A review of the docket for the siting of one component of these transmission lines reveals twenty-eight complaints filed with the Public

developer found land owned by one individual who was willing to sell, buying out existing uses is a costly proposition and not likely an attractive one. The available empirical data suggest that leases, rather than purchases of land, are the most common mechanism for obtaining use rights to land and that wind developers tend to locate on lands with few existing competing uses.[100]

If a renewable developer wishes to build in a populated area where existing land uses are fading or have been abandoned altogether, the developer may have better options. Brownfields, for example—contaminated lands that are no longer being productively used[101]—offer strong opportunities for renewable development. A renewable developer proposing to build on a

Utility Commission by various landowners, organizations, and the U.S. Air Force. *See* PUC Docket No. 37409, Request to Intervene in PUC Docket No. 37409 (Sept. 30, 2009); Summary of Comments and Requests to Intervene (on file with author); TEX. UTIL. CODE § 39.203(e) (2011) (requiring the construction of transmission).

100. NAT'L WIND COORDINATING COMM., *supra* note 26, at 8 (describing a wind project in Oklahoma on the rural "rugged Slick Hills," where "only one family lives in the area" and "the land is used primarily for animal grazing"); *id.* at 10 (describing a wind project in Minnesota in a "mostly rural" area where "[l]ocal land use is agricultural with intensive farming and grazing activities" with "a few trees or structures in the area" and eleven other wind projects in the vicinity); *id.* at 13 (describing a wind project in New York on "mostly rural farmland, with animal grazing on the smaller farms"); *id.* at 17 (describing a wind project in Colorado on "11,840 acres of land, used primarily for grazing"); *id.* at 19 (describing a wind project in Oregon on land "used for dry land wheat farming"); *id.* at 21 (describing a wind project in Texas on "a flattop hill" "used primarily for grazing," with "oil and gas production" in the surrounding area); *id.* at 22 (describing a wind project in Washington in an area that "is not densely populated" with a primary use of "dry land wheat farming"); *id.* at 24 (describing a wind project in Wyoming in an area that "is not densely populated" with land "that is "primarily non-irrigated pasture and high desert with sagebrush"); *id.* at 25 (describing a wind project in California "located on a mountain pass . . . along with many other previously developed wind power projects"); *id.* at 27 (explaining that the highest population density of any of the areas in which the surveyed wind projects were constructed was a density of 214.4 people per square mile" but concluding that no causal connection could be drawn between low population density and the success of wind projects because no high-density or unsuccessful sites were "studied for comparison").

101. *See* 42 U.S.C. § 9601 (39) (2006) (defining a "brownfield site" as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant").

brownfield will have to pursue several legal steps, but they are already relatively well-defined and clear. The developer will have to ensure, for example, that she will not face strict, joint, and several liability for clean-up costs under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA")[102] or for clean-up and response costs under the Resource Conservation and Recovery Act ("RCRA"),[103] both of which address prior releases of hazardous wastes on the property.[104] If a developer succeeded in obtaining an assurance of nonliability from state, federal, and local governments,[105] she could remove the competing land uses on the property, such as abandoned factories, and assure a clear site for development.

In New York, a renewable developer has successfully navigated this process. BQ Energy proposed to construct a wind facility on the site of a former steel mill, but the EPA had issued

102. When a property has been contaminated and placed on CERCLA's National Priorities List, the Environmental Protection Agency can clean up the contamination and collect the costs of clean-up from all potentially responsible parties, or it can force the parties to conduct the clean-up themselves. 42 U.S.C. § 9607(a) (2006) (defining "owner" as "the owner and operator of a vessel or a facility and making owners liable for "all costs of removal or remediation action"); 42 U.S.C. § 9601(9) (2006) (defining "facility" as "any site or area where a hazardous substance has been deposited"); TODD D. DAVIS & SCOTT A. SHERMAN, BROWNFIELDS 16 (2010) (explaining that "[t]he federal EPA typically requires and oversees cleanups only at those sites that it ranks on the NPL"). Each party is strictly, jointly, and severally liable for the clean-up, meaning that the EPA will not have to prove negligence or intent behind the contamination and can hold each party liable for the full costs of clean-up. *United States v. Shore Realty Corp.*, 759 F.2d 1032, 1042 (2d Cir. 1985) (explaining that liability under CERCLA is strict).

103. Under the Section 3008(h) order, the EPA can require various responses by parties where improper hazardous waste releases have occurred at certain facilities covered by the Resource Conservation and Recovery Act. *See* DAVIS & SHERMAN, *supra* note 102, at 77; Resource Conservation and Recovery Act § 3008(h), 42 U.S.C. § 6928 (2006) (providing that "the Administrator may issue an order requiring corrective action or such other response measure as he deems necessary to protect human health or the environment" where a "release of hazardous waste into the environment" has occurred from certain facilities").

104. *See* 42 U.S.C. § 9601(9); *see also* Resource Conservation and Recovery Act § 3008(h).

105. *See* DAVIS & SHERMAN, *supra* note 102, at 41-52, 77 (describing the "Bona Fide Prospective Purchaser" defense and the "innocent landowner" defenses under the Brownfields Revitalization and Environmental Restoration Act of 2002).

an order under RCRA, which required various studies to be conducted of hazardous waste deposited at numerous locations on the site and mandated responses at these locations.[106] New York has a state brownfields program that would have offered BQ Energy liability protections, but these protections would not have applied if the site remained under the RCRA order; the site would also have been ineligible for New York's brownfields development tax credits.[107] EPA and New York officials worked with BQ Energy to "carve out" one portion of the brownfield from the order, thus freeing it from certain RCRA response requirements while still requiring cleanup of the entire brownfield site over time.[108] New York, in turn, "agreed to take the 80-acre site into its brownfield program and oversee the site preparation activities and related environmental work."[109] This made BQ Energy a non-liable party but still required the third-party owner of the brownfield site to "recognize its ongoing obligations for the continued assessment and cleanup."[110] The site now has eight 2.5-megawatt wind turbines, which the company estimates could power "about 9,000 New York homes" each year.[111]

As demonstrated by BQ Energy's Steel Winds development, developers can successfully complete projects despite the presence of existing land uses on renewable parcels, although often at a high financial and legal cost. Natural physical barriers, on the other hand, will preclude renewable development on certain parcels. The final obstacle to the initial location process—locating an available transmission line—may be the most imposing, however.

3. Locating a site near transmission

A renewable development is useless if it lacks access to a high-voltage transmission line that carries electricity to a

106. *Id.* at 41-52.
107. *Id.* at 77-78.
108. *Id.* at 78.
109. *Id.*
110. *Id.*
111. *About Steel Winds*, FIRST WIND, http://www.steelwinds.com/steelwinds/about.cfm (last visited Feb. 16, 2011).

consumer population. Yet ideal renewable parcels, which have abundant fugitive resources flowing over relatively clear physical land, are often located in remote, rural areas,[112] far from the populations to be served by electricity[113] and far from transmission lines.[114] Considering the remoteness of many renewable projects and existing grid congestion problems,[115] transmission constraints pose one of the highest barriers to the development of renewable energy and the selection of an ideal renewable parcel.

Regardless of how close a renewable parcel is to an existing transmission line, each renewable developer must construct a wire between her renewable facility and the transmission line. This wire and its supporting equipment, such as the towers that hold the wire up as well as necessary grid upgrades, are an "interconnection facility,"[116] and the renewable developer must cover the costs of building it.[117] The expense of the

112. *See* Adam Wenner, Presentation at American Wind Energy Association Wind & Transmission Workshop: Ownership and Financing Options for Wind Interconnections 2 (Mar. 17-18, 2009) (defining interconnection facilities as "the equipment between the wind project and the point of interconnection to the utility transmission system").

113. *See* Aaron Bennett, Presentation at American Wind Power Transmission Workshop: Integration of Variable Generation Task Force 6 (Mar. 17, 2009) (showing "high wind availability" as being far from electricity "demand centers" and indicating that with the exception of Texas, only seven percent of the U.S. population lives in the ten states with the highest wind capacity).

114. *See, e.g.*, ANDREW MILLS ET AL., ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY, EXPLORATION OF RESOURCE AND TRANSMISSION EXPANSION DECISIONS IN THE WESTERN RENEWABLE ENERGY ZONE INITIATIVE v (2010), *available at* http://eetd.lbl.gov/ea/ems/reports/lbnl-3077e.pdf (describing how, for the ideal potential areas for renewable development identified by the Western Governors' Association, some new transmission lines will have to be 800 miles long).

115. *See* SHALINI VAJJHALA ET AL., RESOURCES FOR THE FUTURE, GREEN CORRIDORS: LINKING INTERREGIONAL TRANSMISSION EXPANSION AND RENEWABLE ENERGY POLICIES 1 (2008), *available at* http://www.rff.org/rff/Documents/RFF-DP-08-06.pdf (describing "congestion on transmission lines that connect the coasts to the interior").

116. Wenner, *supra* note 112, at 2.

117. *Id.* ("Costs of IFs are included in cost of wind project for financing purposes."); *see also* Questionnaire Response from Nick Didomenico, Manager of Project Development, Kibby Wind Farm, Mar. 3, 2011 (explaining that the wind developer paid for the full costs of the project's twenty-eight mile transmission line and substations) (on file with author).

interconnection facility will vary dramatically depending on the location of the proposed site; a renewable developer will likely face one of three scenarios. First, a developer might have the good fortune of finding a site with strong fugitive renewable resources, few competing surface uses, and accessible transmission lines. In this case, the developer will only have to construct a short interconnection facility and obtain an interconnection agreement from the owner of the nearby transmission line (typically a utility) and/or a regional transmission organization.[118] This process requires a substantial investment of resources, but it is manageable. In a second, less ideal scenario, a renewable developer may find a good renewable site that is near transmission lines, but the lines already are at full capacity. Here, the developer may have to construct both the interconnection facilities and a new, parallel high-voltage line that will accommodate more electricity. In the final scenario, the renewable parcel is so far from existing transmission that the developer must build both the interconnection facilities and a new transmission line herself.[119]

To construct a transmission line herself, a renewable developer would typically have to apply to the state public utility commission for a certificate of convenience and necessity—the granting of which often requires a formal administrative hearing—and obtain local approval for siting the lines.[120] She would then have to approach multiple property owners to request

118. Jim Rossi, *The Trojan Horse of Electric Power Transmission Line Siting Authority*, 39 ENVTL. L. 1015, 1020 (2009) (explaining that many states only grant certificates of "need," which is partially defined in New York in terms of convenience and necessity, for transmission lines to "incumbent utilities or firms possessing contracts with incumbent utilities").

119. A dramatic example of independent parties' proposed construction of new transmission lines comes in the offshore context, where "Google and a New York financial firm have each agreed to invest heavily in a proposed $5 billion transmission backbone for future offshore wind farms along the Atlantic seaboard." Matthew L. Wald, *Offshore Wind Power Line Wins Backing*, N.Y. TIMES, Oct. 12, 2010, at A1. Although offshore development is not the focus of this article, this transmission project has garnered considerable attention.

120. *See* Ashley C. Brown & Jim Rossi, *Siting Transmission Lines in a Changed Milieu: Evolving Notions of the 'Public Interest' in Balancing State and Regional Considerations*, 81 U. COLO. L. REV. 705, 714-15 (2010) (discussing how, among four western states' transmission siting regimes investigated, only New Mexico preempted local authority power over siting).

transmission rights-of-way and would likely have to use eminent domain powers, if available—which they often are not for non-utilities.[121] If the developer used eminent domain, she would have to pay for the value of the property taken, including (in some cases) the losses resulting from individuals' fears about the health impacts of transmission lines.[122] Finally, she would need to obtain an agreement from the owner of the nearest transmission line to interconnect her wires with the larger grid.[123]

Developer-initiated construction of new transmission lines has been and will likely continue to be rare. Instead, utilities—particularly those in states with renewable portfolio standards that require utilities to purchase electricity from renewables[124]—will continue to build out transmission to clusters of renewable development when they are sufficiently incentivized to do so.

121. Rossi, *supra* note 118, at 1020 ("Even where nonutilities can submit an application to build a transmission line, many states do not extend the power of eminent domain to nonutilities."); *see also* Outka, *supra* note 16, at 32 (describing a one-year moratorium in Wyoming on the use of eminent domain for collector lines).

122. ELEASALO V. ALE, CONDEMNATION FOR ENERGY CORRIDORS: SELECTED LEGAL ISSUES IN ACQUISITIONS FOR PIPELINE, TRANSMISSION LINE, AND OTHER ENERGY CORRIDORS 11-12 (2009), *available at* http://www.faegre.com/webfiles/Energy%20Corridors%20White%20Paper.pdf (explaining that in proceedings for appraising property value changes resulting from the use of eminent domain for energy corridors, "[t]he majority view among courts is that evidence of fear in the marketplace is admissible with respect to the value of the property taken without proof of the reasonableness of the fear").

123. *See* Stephen M. Fisher, *Reforming Interconnection Queue Management Under FERC Order No. 2003*, 26 YALE J. ON REG. 117, 126 (2009) (describing the standardized interconnection agreements that large generators must obtain when connecting to the grid, as required by FERC Order 2003 (citing FERC Order No. 2003, 68 Fed. Reg. 49,933 (Aug. 19, 2003)); GARY D. ALLISON & JOHN L. WILLIAMS, THE EFFECTS OF STATE LAWS AND REGULATIONS ON THE DEVELOPMENT OF RENEWABLE SOURCES OF ELECTRIC ENERGY 22 (2010), *available at* http://nepinstitute.org/wp-content/uploads/2010/12/RFF-NEPI-AllisonandWilliams-StateLaws.pdf (explaining that Order 2003 "established the standardized interconnection procedures and agreement for large generators" and that from this agreement, certain variations were implemented specifically for wind generators in 2005).

124. *See RPS Policies*, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY, http://www.dsireusa.org/documents/summarymaps/RPS_map.pptx (showing twenty-nine states, the District of Columbia, and Puerto Rico as having renewable portfolio standards in February 2011).

These utilities will typically propose the new lines through a centralized process at the public utility commission,[125] where the commission will determine the location for the lines and the rates that may be charged to recover the costs.[126] In some cases, states have made this process easier by expediting siting approvals or making clear, *ex ante*, that certain costs will be recoverable. In Oklahoma, for example, the Corporation Commission presumes that "transmission upgrades approved by a regional transmission organization" are recoverable and that transmission upgrades "needed to develop wind generation" in Oklahoma that are "placed into service before December 31, 2013" are reasonable.[127]

Other states have applied similar options to address the high expense and regulatory investment required for new transmission lines constructed by utilities for renewables. In Texas, for example, the legislature required the state's public utility commission to identify areas in the state that were ideal for wind development and to select several utilities to build transmission lines from these areas on an expedited basis.[128] The Commission then commenced an ambitious hearing schedule to approve the location of the lines, sixteen of which have now been approved.[129]

125. *See* Brown & Rossi, *supra* note 120, at 707 (describing the "predominant current siting model" as one in which the "siting determination is made on a centralized basis by a designated state agency").

126. California has followed this process, for example, where San Diego Gas and Electric "successfully argued" that its newly-built $1.883 billion transmission project to support renewables "would provide system benefits so that all ratepayers would both gain from and be responsible for paying for the project." Timothy Duane, *Greening the Grid: Implementing Climate Change Policy Through Energy Efficiency, Renewable Portfolio Standards, and Strategic Transmission System Investments*, 34 VT. L. REV. 711, 774 (2010).

127. 17 OKLA. STAT. ANN. § 286 (West 2011).

128. *See* S.B. 20 § 3(g)(1), 79th Leg., 1st Spec. Sess. (Tex. 2005), *available at* http://www.capitol.state.tx.us/tlodocs/791/billtext/pdf/SB00020F.pdf (directing the Texas Public Utility Commission to "designate competitive renewable energy zones"); *id.* §§ 3(g)(2), 2(3); *see also Regional Governance*, *supra* note 25 (describing the Texas Competitive Renewable Energy Zone process).

129. *See* PUB. UTIL. COMM'N OF TEX., LANDOWNERS AND TRANSMISSION LINE CASES AT THE PUC COMPETITIVE RENEWABLE ENERGY ZONE (CREZ) PROJECTS (2010), *available at* http://www.puc.state.tx.us/electric/forms/CCN/CREZ-Brochure8x11.pdf (describing the certificate of convenience and necessity (CCN) process for transmission line siting); *see also* PUB. UTIL. COMM'N OF TEX., REPORT TO THE 82ND LEGISLATURE: SCOPE OF COMPETITION IN ELECTRIC MARKETS IN TEXAS 1-2 (2011), *available at* http://www.puc.state.tx.us/electric/reports/scope/2011/

California has embarked on a similar plan and also allows special cost sharing schemes for transmission financing in certain areas.[130] As Steven Ferrey notes, however, other states have been reluctant to allow utilities to pass on the costs of new renewable transmission to consumers.[131] One option around the ratemaking bind is for transmission utilities to build "electric merchant transmission," which relies on pre-construction negotiated purchases from large electricity consumers to establish a rate rather than following the traditional ratemaking process.[132]

As an alternative to relying on an individual utility to construct lines, a renewable developer could attempt to persuade a regional transmission organization to plan for one and for a utility within the RTO to then construct the line based on RTO recommendations. Indeed, several RTOs have begun planning for "interstate transmission line siting."[133] If a renewable developer were able to persuade an RTO to initiate planning for line construction (a process that would then encourage the states hosting the potential line to approve line siting through their public utility commissions), the utilities that ultimately constructed the lines would then recover the costs of construction

2011scope_elec.pdf (describing how the commission had approved sixteen certificates of convenience and necessity for transmission lines to competitive renewable energy zones within two years of selecting the utilities that would construct the lines).

130. *See* Steven Ferrey, *Restructuring a Green Grid: Legal Challenges to Accommodate New Renewable Energy Infrastructure*, 39 ENVTL. L. 977, 997-98 (2009) (describing the cost-sharing and how "California's Public Utility Commission allowed Southern California Edison to spend $4.5 million of ratepayer money to participate in identifying renewable resource zones and developing transmission plans to access resources placed in those zones to deliver power to load centers"); *see also* Duane, *supra* note 126 (describing how a utility within the California Independent System Operator recovered the costs of a new large transmission project for renewables through rates); Outka, *supra* note 15, at 28 (describing California's Renewable Energy Transmission Initiative).

131. Ferrey, *supra* note 130, at 999.

132. *"Anchor Shipper" Model Offers New Way Forward for Merchant Electric Transmission*, TROUTMAN SANDERS LLP, Apr. 22, 2009, http://www.troutmansanders.com/tmapril2009-03/.

133. Tara Benedetti, *Running Roughshod? Extending Federal Siting Authority Over Interstate Electricity*, 47 HARV. J. ON LEGIS. 253, 273 (2010) (describing three RTOs that have commenced interstate transmission planning processes).

through higher rates,[134] which could potentially be shared among all transmission line owners within the RTO and ultimately passed on to electricity customers.[135] The developer would likely face legal battles here, with other utilities within the regional transmission organization arguing that they should not have to contribute to the costs of the line, or at least that their contributions should be modified based on the benefits that each utility received from the line.[136]

In all three transmission scenarios, there is somewhat of a gray area between "interconnection facilities" and new transmission policies. Renewable developers must always bear the costs of interconnection facilities up front,[137] and these facilities include both the wires between generation and the grid and "network upgrades needed to accommodate the new generation facilities."[138] Although the developer must pay for the interconnection costs, the upgrades to the grid often benefit other customers, and pricing disputes emerge.[139] Whether a developer attempts to construct the transmission line herself and bear all of

134. For an example of the RTO-state process, see Press Release, Southwest Power Pool, SPP Priority Transmission Expansion Projects Endorsed, Pending Further Study (Oct. 27, 2009), *available at* http://www.spp.org/publications/SPP_Priority_Projects_Endorsed_10_27_09.pdf (describing how, once interstate transmission projects were approved by the RTO, certain transmission owners would "work with their state utility commissions on rate recovery and siting").

135. *See* Duane, *supra* note 126; Ferrey, *supra* note 130; Outka, *supra* note 15; *see also* Southwest Power Pool, *supra* note 134 (describing a regional pricing policy for new transmission).

136. *See, e.g.*, Ill. Commerce Comm'n v. FERC, 576 F.3d 470, 476 (7th Cir. 2009) (case involving construction of new transmission to reduce congestion in the eastern portion of a regional transmission organization, where the Midwestern portion of the RTO did not believe that it would benefit, determining that "FERC is not authorized to approve a pricing scheme that requires a group of utilities to pay for facilities from which its members derive no benefits, or benefits that are trivial in relation to the costs sought to be shifted to its members").

137. *See* ALLISON & WILLIAMS, *supra* note 123, at 24 (describing FERC Order 2003); Standardization of Generator Interconnection Agreements and Procedures (Order No. 2003), 68 Fed. Reg. 49,846, 49,901 (July 24, 2003) (describing how the Notice of Proposed Rulemaking would make the "Interconnection Customer . . . solely responsible for the costs of Interconnection Facilities"); *id.* at 49,847 (defining "Interconnection Customer" as "[t]he owner of the Generating Facility").

138. ALLISON & WILLIAMS, *supra* note 123, at 24.

139. *Id.*

the costs or share only a portion of the cost burden with others, the costs might be prohibitive and could force her to find a site closer to existing transmission. In this case, however, the existing transmission line might already be congested[140] and might not have room for an added electricity flow, as described in scenario two. Although transmission utilities are required to offer open access to their transmission lines, this access is provided on a first-come, first-served basis,[141] and there are often long lines of generators waiting to connect to the grid.[142]

If a developer—despite these hurdles—manages to site temporary measurement towers, locate land with abundant fugitive resource and few incompatible land uses, and find adequate transmission access, she will be ready to move to the construction phase of the process. With the successful identification of a theoretical site, the development process has only just begun.

B. Constructing and siting renewable technology

While locating her potential renewable parcel, a developer must obtain rights and permits from an array of individuals and government entities prior to commencing construction; all of these parties possess "exclusion rights," in the sense that any one party may be able to hold up one essential portion of the project.[143] Property owners may deny leases, several levels of government may require expensive environmental reviews, and

140. *See* Energy Policy Act of 2005 § 1221(a)(2), 16 U.S.C. § 824p(a)(2) (2006) (directing the Department of Energy to "designate any geographic area experiencing electricity transmission capacity constraints or congestion that adversely affects consumers as a national interest electric transmission corridor"), *available at* http://www.gpo.gov/fdsys/pkg/PLAW-109publ58/pdf/PLAW-109publ58.pdf.

141. FERC Order 888: Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities, 61 Fed. Reg. 21,540 (May 10, 1996) (codified at 18 C.F.R. pts. 35 & 385) ("A public utility must take transmission services (including ancillary services) for all of its new wholesale sales and purchases of energy under the same tariff of general applicability as do others.").

142. *See Transmission Update* (NAT'L WIND COORDINATING COMM., WASH. D.C.) October/November 2006, at 1, *available at* http://www.nationalwind.org/assets/archive/TM_Update_2006-10.pdf (describing queues for wind).

143. *See Regional Governance*, *supra* note 25.

these same levels of government also may require multiple permits for construction and siting. This section describes this complex pre-construction rights-gathering process.[144]

1. Leases, easements, and regulations affecting the property rights bundle

Just as a developer proposing to measure fugitive resources flowing over a property must receive permission to enter from all owners of the property, the developer must obtain longer-term permission to construct renewable technology on land. Due to the multiple owners of property and/or property use rights within each proposed renewable parcel,[145] this process is time-consuming and complex. As one wind developer explains, "It is not just going up to a door and knocking and engaging in a conversation. There's a myriad of different relationships and discussions based on who owns the land."[146] In some cases, for example, developers must contract with groups of landowners who have joint ownership rights to the land as part of a family business or another commercial venture.[147] Developing one piece of jointly-owned property, as opposed to a collection of many individually-owned lots, may reduce transaction costs. But bargaining with these parties in one unit can also add complexity to the land acquisition process, as the developer's attorney must be familiar with trust and corporation law principles in order to effectively contract with the landowners.

Regardless of the parties dealt with, the permission to use land for a renewable development can come in several forms—as

144. A previous article introduces these exclusion rights and provides examples and potential exclusion scenarios. *See id.* The purpose of this section is to provide more specific information about how exclusion rights apply to real renewable development projects.

145. *See* Renewable Energy Over Multiple Private Properties, *supra* note 26.

146. Interview with Derek Rieman, *supra* note 26.

147. *See id.*; *see also* MARBLE RIVER WIND FARM, EXHIBIT 2M: RECORDED AGREEMENTS FOR PARTICIPATING LANDOWNERS (CLINTON), *available at* http://www.horizonwindfarms.com/northeast-region/documents/under-dev/marble-river/Permit-Application-Clinton/Exhibit2M-Clinton.pdf (showing property in a renewable parcel owned in testamentary trusts and in family living partnerships, and by individuals, co-owners, corporations, limited liability corporations, and clubs).

outright fee simple ownership or a lesser property right in the form of a lease, easement, or license. The ownership scheme is complicated by the existence of several potential estates—including the surface and overlying fugitive estates—as well as various property relationships. The relationships between surface owners and overlying wind developers, wind developers and neighboring surface owners, and wind developers and neighboring developers are all generally governed by common law principles developed in other contexts and eras, which do not readily accommodate all of the unique contingencies of renewables. In some cases, these laws may not be easily molded to accommodate these new technologies.

a. The surface-overlying fugitive estate relationship

Typically, renewable developers purchase use rights to a portion of each property within a renewable parcel through some form of leasing scheme,[148] and developers obtain rights either to the surface, the wind estate, or both. This process has analogies in other areas of natural resource law. Historically, mineral rights have been severed from the surface estate in order to allow for oil and gas development. Under this traditional property scheme, the fee simple owner of property, who theoretically owns her property in a vertical column from the sky to the core of the earth, severs a portion of this column (the mineral estate), and transfers it to someone else. The owner who holds mineral rights can then do what she wishes with the mineral estate. She may extract the minerals herself or lease them to a third party—such as an oil, gas, or mining company—which extracts the resource and pays royalties and other fees to the mineral owner. Regardless of what the mineral owner chooses to do with her mineral rights, the owner of the surface rights must reasonably accommodate the mineral owner.[149] Because the mineral owner

148. *See* NAT'L WIND COORDINATING COMM., *supra* note 26, at 13 (describing a New York wind developer that leased land for a utility-scale project); *see also* Interview with Derek Rieman, *supra* note 26 (explaining that Horizon Wind Energy generally leases the land but has "leases, easements or purchases land for certain aspects of each project").

149. *See infra* notes 278-79 and accompanying text.

must place physical technology on the surface in order to capture the fugitive resources that she owns rights to, the surface owner is burdened in some way. The degree to which the mineral owner may burden the surface owner without paying damages varies by state, but generally, reasonable use of the surface owner by the mineral owner is allowed and expected.[150]

A similar property regime appears to be in its nascent stages, at least in some states, for renewable estates. In Texas, Ernest Smith and Becky Diffen report that wind developers are leasing wind rights in a fashion similar to the method for leasing mineral rights to oil and gas.[151] Depending on how courts and legislatures choose to address these leases, a wind lease could require a surface owner to accommodate the technology necessary to capture the wind flowing over the property. At this stage, most wind and surface rights are likely owned by one individual, as wind severances are relatively new. Even where both the wind and surface estate are owned in common, however, legal disputes will likely arise. The wind developer and surface owner may argue over how extensively the developer may use the surface, for example, and when the developer has to pay the owner damages for surface use. They may also dispute the royalties that the developer must pay to the wind rights owner and whether the developer is making full and economical use of the wind resource. Smith and Diffen note that a weak legal framework has begun to emerge to address these disputes. In Texas, for example, "many wind companies . . . obtain and record a memorandum from the owner of the underlying fee [the surface owner] acknowledging the validity of the wind lease executed by the owner of the wind rights."[152] If a surface owner were to sue to challenge the wind company's use of the rights, this would allow the wind company to argue that it owned a legitimate property right (a lease right to the wind) and an accompanying limited right to the surface in order to capture the leased wind.

As the property regime ages, Smith and Diffen suggest that more disputes are likely—particularly when the owner of the

150. *See infra* notes 279-80 and accompanying text.
151. Smith & Diffen, *supra* note 29, at 176.
152. *Id.*

surface estate transfers the surface rights to another individual.[153] This new individual, while likely having at least constructive notice of the severed right that burdens the surface, may not be fully aware of the burden. When she obtains fee simple ownership of the property she may not realize absent a thorough title search, for example, that the wind developer has a fifty-year lease on the wind rights, or that the developer might assert a right to burden the surface to build more turbines. Further, she may not predict that the developer's employees regularly enter the property to maintain the renewable equipment. Even where a previous surface owner has recorded a memorandum acknowledging the wind right, disgruntled surface owners could attempt to challenge the validity of that right.[154] In some states, these new surface owners would win because "[f]ew states have any legal authority with respect to the validity of wind severances."[155]

Other states, however, have begun to anticipate the evolution toward novel estates and have implemented legislation to protect surface owners from overlying development. Just as state statutes grant surface owners some rights against mineral lessees who use the surface to drill for oil or gas, Wisconsin is implementing a similar regime to anticipate the surface effects of capturing wind. Wisconsin favors surface owners who are farmers, for example, requiring a wind developer "to design a wind energy system to reasonably minimize the conversion of land from agricultural use."[156] Colorado has similarly anticipated surface owners' potential objections to wind. Although it declares any covenant, condition, or restriction that "effectively prohibits or restricts the installation or use of a renewable energy device" to be "void and unenforceable," it allows covenants to contain reasonable "[a]esthetic provisions," "[b]ona fide safety requirements," and other "reasonable restrictions on the installation and use of wind-electric generators to reduce

153. *Id.* at 176-77.
154. *Id.*
155. *Id.* at 177.
156. WIS. ADMIN. CODE PSC § 128.12(2) (West 2011).

interference with the use and enjoyment by residents" of nearby property."[157]

Within the existing traditional legal framework, which generally fails to recognize rights in fugitive resources flowing over the surface, the safest approach for the developer is to obtain surface rights,[158] and outright ownership of surface property offers the most convenient but expensive form of property right. Once the developer identifies a renewable parcel, she could hypothetically purchase fee simple rights to all properties within the parcel. Under fee simple ownership, she could construct wind turbines or solar equipment and leave them on the property for as long as she wished, and she and her agents could enter the property at any time to maintain the equipment, thus barring the need for complex contracts with landowners. Purchasing property outright and keeping full, fee simple ownership rights, however, might be prohibitively expensive for a renewable developer who already must spend millions of dollars on upfront investments in other capital.[159] As a somewhat cheaper ownership alternative, the developer could purchase properties in fee simple and then grant most rights to the property to other individuals, reserving for herself an easement on the property for her technology and the access roads necessary to check on and maintain the technology. This option is also expensive, and it appears that most renewable energy developers do not own renewable parcels. Some developers do purchase small portions of property for certain equipment, however, such as the property needed for the electrical substation[160] between the turbines and the grid.[161]

As an alternative to fee simple ownership, developers can approach property owners within a renewable particle and obtain surface easements or leases that accommodate wind towers, solar

157. COLO. REV. STAT. ANN. § 38-30-168 (West 2011).

158. RESTATEMENT (THIRD) OF PROP. § 1.2 (2000) ("An easement creates a nonpossessory right to enter and use land in the possession of another and obligates the possessor not to interfere with the uses authorized by the easement.").

159. *See* ENERGY INFO. ADMIN., *supra* note 81; *see also* WIND POWERING AMERICA, *supra* note 81.

160. Interview with Derek Rieman, *supra* note 26.

161. PAUL BREEZE, POWER GENERATION TECHNOLOGIES 157 (2005).

troughs, and transmission and distribution lines, for example, at limited points on the property.[162] The surface owner can then modify her deed to reflect this easement or lease, and the deed would be recorded with the city or county clerk. This approach is likely safer than obtaining only the wind estate because it follows an old and recognized legal system in property. Landowners have long granted easements and shorter-term licenses for various use-rights to property,[163] from access roads to small incursions by buildings, and easements for renewable equipment would not stretch the legal system beyond its current familiar bounds. Indeed, several states have taken the lead in formalizing surface easements for wind energy. Wisconsin, for example, requires "a wind energy system easement or wind access easement to be recorded"[164] under the state's established deed recording system and mandates that the easement include sufficient descriptors to show its length and the property that it covers.[165] Kansas similarly requires "every instrument that conveys any interest created by any lease or easement involving wind resources and technologies to produce and generate electricity" to include "[a] description of the real property subject to the easement and a description of the real property benefiting from the wind lease or easement."[166]

From the renewable developer's perspective, however, obtaining only an easement or lease to the surface estate may be insufficient. By requesting a property right from the surface owner, the developer risks outright refusal: an owner of wind rights is likely willing to lease those rights to obtain a profit from

162. Often, leasing the entire surface may be necessary because collection lines must run underground from each turbine to an electrical substation. Telephone interview with Bristi Cure, Business Development Manager, Invenergy LLC (Apr. 1, 2011) (on file with author).

163. RESTATEMENT (THIRD) OF PROP. § 1.2 (c) (2000) (describing easements for roadways, pipelines, and transmission lines).

164. WIS. ADMIN. CODE PSC § 128.11(1) (West 2011). A wind energy system easement "permits an owner to place, construct or operate a wind turbine . . . on . . . property." WIS. ADMIN. CODE PSC § 128.01(24) (West 2011).

165. WIS. ADMIN. CODE PSC § 128.11(1) (West 2011).

166. KAN. STAT. ANN. § 58-2272(a) (West 2011). Note that both the Wisconsin and Kansas statutes also apply to wind access easements, which restrict others' use of neighboring property in order to ensure an open air space through which wind may flow.

the wind developer, and the surface owner may be required, even against her wishes, to allow the developer to capture those wind rights. A request for property rights directly from the surface owner presents a much higher risk. A developer's failure to obtain both a surface easement and a wind estate could allow competing developers to lease severed fugitive resource rights and claim their own rights to the surface. A developer's safest approach to siting renewable equipment on land would therefore be to obtain both easements from all surface owners and leases from all wind rights owners on a parcel (where wind rights are recognized). This will of course be a long and expensive process, particularly for parcels that cross numerous property lines.

Obtaining surface leases or easements and/or fugitive resource rights also requires a number of steps on public lands, but these steps are beginning to be better defined. The Bureau of Land Management, for example, runs a competitive leasing process for various types of renewable energy development.[167] It also requires renewable energy developers to submit several applications for development accompanied by extensive documentation, including for wind, for example, "a right-of-way development application" and a Plan of Development just to "retain . . . [an] interest in the project area" while the developers are conducting meteorological monitoring.[168] The Plan of Development must describe the proposed renewable project in "sufficient detail to provide the basic information necessary to begin the environmental analysis and review process for the proposed wind energy development project;"[169] other extensive review processes follow the initial plan submittal.

167. *See BLM Geothermal Lease Auction Signals New Trend in Renewable Energy*, BLM.GOV, Aug. 14, 2007, http://www.blm.gov/wo/st/en/info/newsroom/2007/august/NR_0708_04.html (describing the competitive leasing process for proposed geothermal developments on BLM lands).

168. BUREAU OF LAND MGMT., *supra* note 88, at 6.

169. *Id.*

b. Developer-neighboring developer and developer-neighboring landowner relationships

Beyond leasing the basic right to use property for a wind turbine or solar equipment and transmission lines (and potentially the fugitive estate overlying the surface), renewable developers must also ensure that neighboring surface land uses do not block their access to fugitive resources. Buildings and vegetation near solar developments can create shade and interfere with electricity production.[170] Upwind wind developments can also reduce the quantity of wind that reaches a downwind developer's site in what is called a "wake effect," which "can extend for a distance of up to ten times a turbine's rotor diameter, or more than [a] half mile."[171] On Bureau of Land Management lands, a formal policy has emerged to address this problem. The Bureau provided the following setback requirements in its most recent guidance for wind development:

> In the absence of any specific local zoning and management issues, no turbine will be positioned closer than 5 rotor-diameters from the center of the wind turbine from the right-of-way boundary in the dominant upwind or downwind direction to avoid potential wind turbulence interference issues with adjacent wind energy facilities unless it can be demonstrated that site conditions, such as topography, natural features, or other conditions such as offsets of turbine locations, warrant a lesser distance.[172]

Private lands generally lack a similar legal mechanism, although some states have imposed spacing requirements for wind turbines.[173] Many states also allow grants of limited solar

170. *See* RICHARD CHEW, SOLAR LAW: A PRACTITIONER'S HANDBOOK OF LEGAL ISSUES RELATED TO THE USE OF SOLAR COLLECTORS 14 (1979) (diagramming the "solar window," which imagines the "sky as a transparent dome with its center at the solar collector," and showing how objects in the sun's path "intrude into this 'solar window.'").

171. Troy Rule, *A Downwind View of the Cathedral: Using Rule Four to Allocate Wind Rights*, 46 SAN DIEGO L. REV. 207, 208-09 (2009).

172. BUREAU OF LAND MGMT., *supra* note 88, at 7.

173. *See* Smith & Diffen, *supra* note 29, at 188 nn. 134-45 (describing spacing requirements implemented by North Dakota and Vermont and Monroe County in Wisconsin).

access rights—wherein one landowner may covenant with another to not construct a building that will block sunlight, for example[174]—and at least four states recognize a similar sort of upwind easement to protect the flow of wind.[175] Interestingly, several state courts have also recognized common law "right[s] to wind access."[176] In most states, however, a wind developer constructing turbines on private lands risks having another, upwind development block a portion of the wind that flows to the development and substantially interfere with electricity production. On the other hand, even in states that have not officially recognized wind access or solar easements, a court addressing this sort of easement might "recognize its validity" because of its similarity to "the old common law easement for light and air."[177]

Neighboring landowners may benefit from weak solar and wind access laws, as this allows them to do what they wish with their property and ignore any wake effects or shading that they cause. But the law's general ignorance of conflicting neighboring land uses, beyond basic zoning and nuisance law, may be a

174. COLLEEN MCCANN KETTLES, SOLAR AM. BD. FOR CODES & STANDARDS, A COMPREHENSIVE REVIEW OF SOLAR ACCESS LAW IN THE UNITED STATES: SUGGESTED STANDARDS FOR A MODEL STATUTE AND ORDINANCE 6 (2008), *available at* http:// www.solarabcs.org/about/publications/reports/solar-access/pdfs/Solaraccess-full.pdf (explaining that "thirty-four states (and a handful of municipalities) have some kind of protection for solar easements or solar rights"). Only the easements are relevant to this article, however, because solar rights involve the right to place a solar panel on property, not the right to the sunlight itself. *Id.* at 1. For an overview of state solar access law, see generally Sara C. Bronin, *Solar Rights*, 89 B.U. L. REV. 1217 (2009).

175. Kansas requires "[e]very instrument that conveys any estate or interest created by any lease or easement involving wind resources and technologies to produce and generate electricity" to include "a description of the vertical and horizontal angles, expressed in degrees, and distances from the site of the wind power system in which an obstruction to the wind is prohibited or limited"). KAN. STAT. ANN. § 58-2272 (West 2011); *see also* Smith & Diffen, *supra* note 29, at 186-87 (describing three other states with "wind protection" or "wind non-obstruction" easements, including South Dakota, Oregon, and North Dakota).

176. *See* Thaddeas Baria, *Up The Creek With A Paddle: Water Doctrine as a Basis for Small Wind Energy Resource Rights,* 59 DEPAUL L. REV. 141, 152-53 (2009) (citing Okla. & Tex. R.R. Co. v. True (80 S.W. 120, 121 (Tex. Civ. App. 1904)) and Contra Costa Water Dist. v. Vaquero Farms, Inc., 68 Cal. Rptr. 2d 272 (Cal. Ct. App. 1997)).

177. Smith & Diffen, *supra* note 29, at 187.

double-edged sword. Neighbors who dislike the shadows cast by wind turbines or the view of thousands of shiny solar troughs may have few legal remedies beyond opposing a zoning approval or obtaining a restrictive covenant from the neighboring landowner and hoping that a court will recognize it. Particularly where states have centralized the renewables siting process and have preempted local zoning,[178] neighbors will have little recourse beyond attending the public meetings mandated by the state and complaining. Some states have begun to provide more substantive remedies for neighboring landowners, however—particularly for existing owners. Wisconsin, for example, requires an owner of a wind development to:

> [M]ake reasonable efforts to ascertain and accommodate any land use or commercial enterprise located on a nonparticipating property within 0.5 mile of a proposed wind turbine site if the land use or commercial enterprise exists when the owner gives notice . . . or if the use or enterprise has reached certain planning stages.[179]

A developer proposing to lease either the wind or surface rights or both faces a range of state regimes. While many states do not recognize rights in the wind estate, others are beginning to formalize the requirements for fugitive resource easements and better define the property rights of surface owners and developers. Federal agencies are also attempting to streamline their processes and offer formal guidance for leases. But this patchwork of regulation creates an imposing learning curve for any developer—particularly those with projects in multiple states.

2. Statutes and regulations that affect the rights bundle

Along with or prior to obtaining a lease right or easement to the property surface, the wind or sun, or all of these resources, a

178. *See infra* note 181 (discussing preemption).

179. WIS. ADMIN. CODE PSC § 128.12 (2010), *available at* http://www.renewwisconsin.org/windfarm/Complete%20Chapter%20PSC%20128%2012.9.10.pdf.

developer must also contend with a number of statutes and regulations that affect the use rights that she plans to acquire. A private developer may hope to lease a renewable parcel, for example, only to discover early in the process that the parcel she has identified is within a sacred cultural area, the habitat of an endangered or threatened species, or an important flyway for airplanes.[180] In all of these scenarios and many others, regulations will modify the potential private use right. This section will describe these regulations at the local, state, and federal levels.

a. Local regulation of siting and construction through zoning and building codes

The majority of states have not preempted local authority over the siting of utility-scale renewable generation,[181] and

180. It appears that developers often conduct environmental surveys early in the process and avoid even surveying property known to be in certain environmentally sensitive areas. Telephone interview with Bristi Cure, *supra* note 162.

181. States that have preempted local authority over certain renewable projects or allow for the option of preemption include, among others, California, Florida, Minnesota, New Hampshire, Washington, and Wisconsin. *See, e.g.,* CAL. PUB. RES. CODE § 25514 (a)(2) (West 2010); MINN. STAT. § 216F.07 (2010); *Wind Turbine Siting,* STATE OF MINN. PUB. UTILS. COMM'N, http://energyfacilities.puc.state.mn.us/wind.html (last visited Feb. 2, 2011) (showing that all developers of wind power projects over twenty-five megawatts are subject to state jurisdiction but that developers of projects between five and twenty-five megawatts may choose county jurisdiction "in lieu of PUC permitting"); WIS. ADMIN. CODE PSC § 128.10 (West 2011);.Uma Outka, *Siting Renewable Energy: Land Use and Regulatory Context,* 37 ECOLOGY L.Q. 1041, 1080 (2010) (describing Florida's preemption for large plants); Energy Facility Site Evaluation Council, *Siting/Review Process,* ACCESS WASHINGTON, http://www.efsec.wa.gov/cert.shtml (last visited Mar. 16, 2011) (describing optional preemption in Washington). For examples of states that have not preempted local zoning laws, see LISA M. DANIELS ET AL., HARVEST THE WIND A WIND ENERGY HANDBOOK FOR ILLINOIS 51 (2004), *available at* http://www.iira.org/pubs/publications/IVARDC_Reports_614.pdf ("Any wind turbine is subject to local zoning laws."); *Wind Energy Manual: Legal Issues in Wind Energy*, IOWA ENERGY CTR., http://www.energy.iastate.edu/renewable/wind/wem/legal_issues.htm (last visited Feb. 2, 2011) (describing how municipalities regulate wind projects); ASS'N OF FISH & WILDLIFE AGENCIES ET AL., WIND POWER SITING REGULATIONS AND WILDLIFE GUIDELINES IN THE UNITED STATES (2007), *available at* http://www.batsandwind.org/pdf/afwastsitsum.pdf (explaining that "no state agency regulates wind power" or has "wind specific siting authority" in

renewable developers' use rights are therefore substantially affected by a municipality's zoning laws. Zoning laws, as they apply to renewables, fall into three categories: some laws ban renewables altogether, others fail to address them at all, and still others have been modified to address renewables and allow renewable development within certain zones.

In states where local control over renewable technology siting and construction has not been preempted, a growing number of municipalities have chosen to ban renewable development[182] or certain types of renewable development—particularly wind farms. A potential renewable developer in one of these jurisdictions would likely not bother to obtain a use right to begin with, as the right would have no value.

Many municipalities, rather than banning utility-scale renewable developments, fail to address renewable development

Alabama, Idaho, Illinois, Kansas, Michigan, Mississippi, New Mexico (although state building permits are required), Oklahoma (although voluntary state review is available), Pennsylvania, and Texas (although voluntary state review is available)). Note that this is not an exhaustive list; many other states not included in this list also lack centralized state siting authority but indicate that they may exert such authority in the future if wind developments become more common, or the states require a certificate of convenience and necessity, which is not a siting permit but does involve state review. *See id.* Furthermore, note that a lack of centralized state siting authority does not indicate that a state lacks regulations addressing other aspects of renewable development. *See, e.g.*, NAT'L WIND COORDINATING COMM., *supra* note 26, at 9 ("Oklahoma does not have many state regulations that wind power developers are required to follow. Guidelines and regulations are typically determined by the county or local government offices."). Although Oklahoma does not regulate siting, it has state requirements that protect surface owners of property and the public by, for example, requiring proper decommissioning, statements of payments to the landowner, and insurance policies. *See* 17 OKLA. STAT. ANN. §§ 160.14 – 160.19 (West 2011). This footnote in its entirety will hereinafter be referred to as "Preemption of Siting Authority."

182. *See, e.g.*, Sarah Haase, *Henderson Bans Wind Development*, WATERTOWN DAILY TIMES, Nov. 11, 2010, http://www.watertowndailytimes.com/article/20101111/NEWS03/311119946; Matt Hopf, *Clayton Enacts Permanent Wind Energy Development Restrictions within 1.5 Miles of Town*, QUINCY HERALD WHIG, Jan. 6, 2011, *http://www.whig.com/story/news/Clayton-Wind-Ban-010511*; Bob Gough, *Golden Village Board Votes to Ban Windmill Construction*, QUINCY NEWS, Dec. 12, 2010, http://quincynews.org/local-news-archive/golden-village-board-votes-to-ban-windmill-construction.html.

in their zoning codes at all.[183] This creates uncertainty surrounding developers' use rights. Zoning codes operate by drawing zones within a jurisdiction and describing the types of development that may occur within each zone, thus providing most developers with up-front knowledge of potential legal sites. Each zone contains automatically permitted uses—such as single family houses in a residential zone or duplexes in a multifamily residential zone.[184] Many zones also contain listed conditional uses, which are not automatically allowed but may be approved on a case-by-case basis.[185] In addition to separating uses by zone, zoning codes dictate the nature and specifications of permitted development within each zone. Each zone contains maximum allowed building heights, for example, required setbacks of structures from property lines, and the number of permissible "accessory structures," such as sheds, allowed on each lot.[186] Anyone proposing to develop within a given municipality should therefore have a good idea, prior to commencing the project, of where she may develop and how she may build.

Despite the minimal level of clarity that zoning codes offer to developers—providing an up-front understanding of the general requirements for and restrictions on construction and the location of projects—a developer of a renewable project in a large industrial or agricultural zone in a rural town or county will

183. *See, e.g.*, *Wind Energy Manual: Legal Issues in Wind Energy*, *supra* note 181 (observing that "[m]ost cities and towns have ordinances to ensure that structures and activities are safe, proper and compatible with existing or planned development" but that "[f]ew ordinances specifically pertain to wind systems").

184. Alan R. Madry, *Judging Ziervogel: The Twisted Path of Recent Zoning Variance Decisions in Wisconsin*, 91 MAR. L. REV. 485, 497-98 (2007) ("The first category of uses within each zone consists of the uses that owners may make of property within the zone without having to obtain any prior approval by any governmental agency.").

185. *Id.* at 498 ("The inclusion of conditional uses for a zone reflects the decision that the conditional use, under appropriate conditions, could be compatible with the uses permitted in the zone as a matter of right.").

186. *See, e.g.*, L.A. MUN. CODE ch. I, § 12.11 (2011), *available at* http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=amlegal:lapz_ca (allowing "[a]ccessory buildings, including private garages, accessory living quarters, guest homes, recreation rooms, or private stables" under certain conditions in the "R4" zone, and requiring a setback of fifteen feet from the rear of the property line).

typically not know whether her proposed project will be permitted at all, and if so, within which zone. Where the code fails to recognize the existence of renewables, as is often the case, municipalities have taken various approaches to renewable developments. Some have applied existing zoning regulations, such as maximum height limits, to renewables;[187] others have required utility-scale renewable developers to obtain a special use permit[188] or a variance from a zoning board[189] or participate in municipal legislative processes to obtain a rezoning.[190] In several case studies, developers of wind energy projects indicated that no zoning ordinances addressing renewable energy existed during the project planning stages, and this required developers to work closely with municipal officials.[191]

In the third category of municipalities—those that have revised their zoning codes to address renewable technologies—developers' use rights will be relatively clear depending on the specificity of the code. A code that describes the zones in which utility-scale renewables are permitted, their allowed height, the acceptable decibel level for wind turbines, and the required setbacks for renewables in various zones will allow a developer to proceed with a project relatively quickly once she has obtained

187. *Wind Energy Manual: Legal Issues in Wind Energy*, *supra* note 181.

188. *See* NAT'L WIND COORDINATING COMM., *supra* note 26, at 17, 24 (explaining that two developers of wind projects in Colorado and Wyoming had to obtain special use permits).

189. *Wind Energy Manual: Legal Issues in Wind Energy*, *supra* note 181.

190. *See, e.g.*, NAT'L WIND COORDINATING COMM., *supra* note 26, at 14 (explaining that for the Fenner wind energy development in Madison, New York, "[t]he "developer worked with the county to rezone the area with a wind overlay district to accommodate the town's height restrictions"). Overlays impose additional zoning requirements on top of existing zoning codes and can therefore modify certain requirements in the underlying code (providing additional aesthetic, design, setback, or height requirements, for example) while keeping all existing provisions of the code intact. *See* Hannah Wiseman, *Public Communities, Private Rules*, 98 GEO. L.J. 697, 702-03 (2010); *see also* Didomenico, *supra* note 117 (explaining that the developer "went through a public rezoning hearing" through Maine's Land Use Regulation Commission).

191. NAT'L WIND COORDINATING COMM., *supra* note 26, at 17 (explaining that "the county had no zoning classification for wind turbines" when the Colorado Green wind project was constructed in Prowers County, Colorado); *id.* at 22 (explaining that there were "no existing wind ordinances" when the Nine Canyon Wind Project in Benton County, Washington was constructed).

the necessary use rights through a lease or easement. Fortunately, some municipalities are slowly making these needed updates. Several counties in Nebraska, for example, have modified their zoning codes to establish special requirements for commercial (utility-scale) turbines, non-commercial turbines, and meteorological towers associated with large wind developments. Howard County, Nebraska's modified ordinance establishes separate land use categories for retail, small, and commercial wind energy systems as well as for manufacturing of wind energy systems, and it establishes the zones where these land uses are allowed as permitted or conditional uses.[192] The code thoroughly describes the information that utility-scale wind developers must submit to the county in order to obtain approval for a project, including, among other documents, "documentation of land ownership or legal control of the property," "location of wetlands, scenic, and natural areas . . . within 1,320 feet of the proposed" project, an "[a]coustical [a]nalysis," and a "[d]ecommissioning plan."[193] It also establishes different minimum setback distances for small and large turbines and meteorological towers from property lines, "Neighboring Dwelling Units," "Road Rights-of-Way," certain protected environmental resources such as conservation lands and wetlands, and other resources.[194] Unfortunately, many municipalities have not yet modified their zoning codes to accommodate renewables.

One portion of zoning codes that remains particularly murky for renewable developers is the building code, which describes the types and strengths of materials that must be used in a given development and how builders are to certify to a municipality that their construction is safe.[195] A typical building code, for

192. Howard County Neb. Planning and Zoning Regulations 9 (Nov. 24, 2009), *available at* http://www.howardcounty.ne.gov/content/content/zoning_regs.html.

193. *Id.* at Wind Generator Facilities, Section 5.

194. *Id.* at Wind Generator Facilities, Section 6.

195. *See, e.g.*, AUSTIN, TEX., CITY CODE § 25-11-33 (2011), *available at* http://www.amlegal.com/nxt/gateway.dll/Texas/austin/thecodeofthecityofaustintexas?f=templates$fn=default.htm$3.0$vid=amlegal:austin_tx$anc= (providing requirements for the materials to be used when making alterations and repairs, prohibiting a person from creating "an unsafe condition in an existing building," and providing that the building official may require a building permit applicant to test materials or construction methods in certain circumstances).

example, provides that roofs may not exceed a maximum reflectivity,[196] that foundations must be of a certain strength,[197] and that accessories must be attached to buildings in a certain manner.[198] The code requirements are often specific to certain structures, but they attempt to comprehensively anticipate and regulate each structure that may be built within a given municipality. Few of these codes, however, anticipate renewable structures. Most fail to address required strengths of wind tower materials or maximum reflectivity for solar photovoltaic panels or mirrors. A renewable developer will not know whether town building officials will require special materials to be used, for example, or whether the officials will require a safety certification from the engineer of the equipment.

Some states and municipalities have begun modifying building code and safety requirements to recognize the existence of renewable technologies and to appropriately regulate them. New Mexico makes clear, for example, that wind developers must obtain building permits from the state's Construction Industries Division.[199] Howard County, Nebraska, in turn, details "Special Safety and Design Standards" for wind developers, which require, among other things, that commercial/utility turbines and towers be "white, grey, or another non-obtrusive color" and have a "non-reflective finish," that lighting meet but not exceed Federal Aviation Administration standards, and that all wind turbines

196. *See, e.g.*, AUSTIN, TEX., CITY CODE § 25-12-502.5 (2011), *available at* http://www.amlegal.com/nxt/gateway.dll/Texas/austin/thecodeofthecityofaustintexas?f=templates$fn=default.htm$3.0$vid=amlegal:austin_tx$anc= (providing mandatory minimum reflectivity levels for various types of roof surfaces).

197. N.Y.C., BUILDING CODE art. 6, § 27-683 (2011), *available at* http://www.nyc.gov/html/dob/downloads/bldgs_code/bc27s11.pdf (cross-referencing requirements for the minimum quality of foundation materials).

198. *See, e.g.*, N.Y.C., BUILDING CODE art. 9, § 27-770 (2011), *available at* http://www.nyc.gov/html/dob/downloads/bldgs_code/bc27s11.pdf (requiring a certain type of structural base for fans on the exterior of buildings).

199. ROBERT PUTNAM, GUIDELINES FOR DEVELOPERS AND INVESTORS INTERESTED IN THE WIND ENERGY SECTOR IN NEW MEXICO 24 (2002), *available at* http://www.emnrd.state.nm.us/ECMD/RenewableEnergy/wind.htm (click link under the Resources Assessment section entitled "Guidelines for Developers and Investors").

have a "tubular, monopole type tower."[200] Unfortunately, many states and municipalities have not followed suit—leaving developers to guess about the required building standards.[201]

b. State regulation of renewable technologies through electricity regulation and environmental laws

While municipalities typically have the primary say over the location of a renewable development,[202] states also play an important role in regulating environmental effects or granting initial construction permission. The Federal Energy Regulatory Commission has jurisdiction over the interstate transmission of electricity and wholesale electricity sales,[203] but many states regulate most retail sales of electricity (sales to end users) and also certify whether a power plant or transmission line may be built to begin with.[204] Retail sales of electricity not regulated by the states are regulated by municipalities or cooperatives that provide or contract for retail electricity for their customers.[205] In some states, the developer of a power plant must therefore go through multiple stages of permitting and review to ensure compliance with the state's, municipality's, or cooperative's electricity regulations, as well as state environmental regulations.

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200. Howard County Neb. Planning and Zoning Regulations Wind Generator Facilities, Section 7 (Nov. 24, 2009), *available at* http://www.howardcounty.ne.gov/content/content/zoning_regs.html.

201. Interview by Katherine Daniels with Richard J. Graham, Esq., Lewis County Attorney, Town Attorney, Town of Lowville 4, *available at* http://www.powernaturally.org/Programs/Wind/toolkit/donovaneditsdanielsNYSERDAwindinterview2grahamcommentsaccept.pdf (describing how officials in the four different towns over which a wind energy development was located initially differed as to the requirements for building permits).

202. *See* Preemption of Siting Authority, *supra* note 181 (showing that few states preempt municipal authority).

203. Federal Power Act, 16 U.S.C. § 824(a)-(b) (2006).

204. JAMES E. HICKEY, JR. ET AL., ENERGY LAW AND POLICY FOR THE 21ST CENTURY 12-13 (2000).

205. Lynn R. Coleman & Matthew W.S. Estes, *State Utility Regulation of Energy Transactions*, *in* DAVID J. MUCHOW & WILLIAM A. MOGEL, ENERGY LAW AND TRANSACTIONS 4-1, 4-15 to 16 (1990) (explaining that "only twenty states" regulate the rates of "municipal and other publicly owned utilities").

States have historically treated electricity providers as natural monopolies and have closely regulated the generation of electricity and distribution to customers. Under the traditional model, vertically integrated utilities, which owned generation, transmission lines, and distribution lines for delivery of electricity to customers,[206] received a certificate from the state to provide electricity to customers within a certain area. In exchange for the utility's privileged monopoly over this area, the utility agreed to abide by state regulations.[207] A state agency—typically called the public utility commission or a similar variant on this term—had to approve any proposed construction of generation, transmission, or distribution lines by the utility by granting a "certificate of public convenience and necessity."[208] The agency also had to approve the rate that the utility could charge to customers and any rate increases, and it carefully controlled the manner in which the utility provided service to customers[209]—placing limits on when the utility could cut off non-paying customers, for example.

This centralized regulatory system still exists in the many states that have not restructured their electric industries.[210]

206. MOGEL & MUCHOW, *supra* note 96, at 52-14.

207. *Id.* at 52-21.

208. Coleman & Estes, *supra* note 205, at 4-20.

209. MOGEL & MUCHOW, *supra* note 96, at 52-23.

210. The majority of states have retained traditional regulation of utilities as natural monopolies, while approximately fifteen states have restructured this regulatory system in an effort to increase competition. *See* U.S. Energy Info. Admin., *Status of Electricity Restructuring by State*, DOE.GOV (last updated September 2010), http://www.eia.doe.gov/cneaf/electricity/page/restructuring/restructure_elect.html; *see also* FED. ENERGY REG. COMM'N, REPORT TO CONGRESS ON COMPETITION IN WHOLESALE AND RETAIL MARKETS FOR ELECTRIC ENERGY 6, *available at* http://www.ferc.gov/legal/fed-sta/ene-pol-act/epact-final-rpt.pdf (estimating that [b]y 2006, 16 states and the District of Columbia had restructured retail electric service"). When a state restructures, it typically attempts to divest generation and/or distribution from vertically integrated utilities, thus encouraging more competition in generation and allowing customers to choose the company from whom they purchase their power. *See, e.g.*, 66 PA. CONS. STAT. ANN. § 2804 (2)-(3) (West 2011) (requiring the Pennsylvania Public Utility Commission to "allow customers to choose among electric generation suppliers in a competitive generation market through direct access" and to "require the unbundling of electric utility services, tariffs and customer bills to separate the charges for generation, transmission and distribution"); OR. REV. STAT. ANN. § 757.601 (West 2011) ("All retail electricity

Anyone proposing to construct electricity generation and sell it retail to customers must therefore typically obtain a certificate of convenience and necessity prior to construction[211] and have a rate approved either by the state, a governing municipality (for municipal utilities), or a cooperative,[212] unless the public utility commission deems the proposed generation to be exempt. Wind and solar farms that solely sell wholesale (not directly to end users)[213] will sometimes not need to obtain a certificate of

consumers of an electric company, other than residential electricity consumers, shall be allowed direct access beginning on March 1, 2002."); OR. PUB. UTIL. COMM., ELECTRIC RATES AND PLANNING, STATUS REPORT OREGON ELECTRIC INDUSTRY RESTRUCTURING (2011), *available at* http://www.oregon.gov/PUC/electric_restruc/statrpt/2011/012011_status_report.pdf (showing several service suppliers and aggregators who allow customers to choose their power supply); TEX. UTIL. CODE ANN. § 39.051 (West 2011) (providing that "each electric utility shall separate its business activities from one another into the following units: (1) a power generation company; (2) a retail electric provider; and (3) a transmission and distribution utility"); TEX. UTIL. CODE ANN. § 39.102 (West 2011) ("Each retail customer in this state, except retail customers of electric cooperatives and municipally owned utilities that have not opted for customer choice, shall have customer choice on or after January 1, 2002."). Many of these "restructured" states still have not fully restructured their electric industries, however, and still maintain some traditional, vertically-integrated regulated utilities. *See, e.g.*, OR. REV. STAT. ANN. § 757.603 (West 2011) (providing that "an electric company shall provide all retail electricity consumers that are connected to the electric company's distribution system with a regulated, cost-of-service rate option"); ASS'N OF ELEC. COS. OF TEX., INC., VERTICALLY-INTEGRATED MARKETS IN TEXAS 4 (2007), *available at* http://www.aect.net/documents/2007/20070102_BK_VertInt.pdf (describing one of the regions in Texas where restructuring has not yet been implemented and the state continues to regulate vertically-integrated utilities).

211. *See, e.g.*, Christopher Petrie, *PSC Jurisdiction Over Wind Generation and Related Transmission*, WYO. PUB. SERV. COMM'N, http://www.uwyo.edu/enrsupport/Conferences/windsymposium/Chris_Petrie_Wyoming_Public_Service_Commission_Jurisdiction.pdf (last visited Mar. 8, 2011) (emphasizing that if "a wind developer is a public utility, then a Certificate of Public Convenience and Necessity is required" and referring to Wyoming's definition of public utility); WYO. STAT. ANN 37-1-101(a)(vi) (West 2011) ("Public utility means and includes every person that owns, operates, leases, controls or has power to operate, lease or control: . . . (C) Any plant, property or facility for the generation, transmission, distribution, sale or furnishing to or for the public of electricity for light, heat or power"); *see also* ASS'N FISH & WILDLIFE AGENCIES, *supra* note 181 (showing at least ten states that require large renewable developers to obtain certificates of convenience and necessity).

212. *See* Coleman & Estes, *supra* note 205, at 4-15 to 16.

213. It appears that many renewable generators exclusively sell wholesale. Case studies conducted by the National Wind Coordinating Committee Siting

convenience and necessity from the state or have a retail rate approved,[214] but in some states they will, at minimum, have to register with the state's public utility commission and obtain some sort of license to generate electricity.[215]

In most cases, developers of renewable projects build plants that sell wholesale to utilities.[216] The developers themselves need not go through the state certificate and ratemaking processes, but others who purchase the electricity will need to

Workgroup describe wind projects at nine sites, and many of these projects involved only wholesale sales. *See* NAT'L WIND COORDINATING COMM., WIND POWER FACILITY SITING CASE STUDIES: COMMUNITY RESPONSE 1,966-967, 1,969, 1,972, 1,975 (2005) (describing sales to Western Farmers Energy Cooperative, sales to Xcel Energy, Inc., and Niagara Mohawk Power Corporation, none of which appear to involve sales directly to end users).

214. *See, e.g.*, Petrie, *supra* note 211 ("Developers who will sell the output of a wind generation project to public utilities on the wholesale market are not subject to the . . . [certificate of public convenience and necessity requirement] or other provisions enforced by the . . . [state's public utility commission]."). In general, utility-scale renewables avoid states' certificate and ratemaking regulatory requirements both because they sell wholesale and because they do not typically fall within the definition of "utility"—the entity typically regulated most heavily by states. *See, e.g.*, TEX. UTIL. CODE ANN. § 31.002(6) (West 2011) (defining electric utility as "a person or river authority that owns or operates for compensation . . .equipment or facilities to produce, generate, transmit, distribute, sell, or furnish electricity" but excluding from the definition "a qualifying facility" (a producer of renewable electricity or a small cogenerator) and "a power generation company"); WYO. STAT. ANN. 37-1-101 (a)(vi) (West 2011) (defining public utility as an entity with control over "[a]ny plant, property or facility for the generation, transmission, distribution, sale or furnishing *to or for the public* of electricity) (emphasis added; for full definition *see supra* note 208). *But see* Duane, *supra* note 126, at 776 n. 261 (explaining that "[a]ll electric generation and transmission facilities must receive a 'certificate of public good'" from Vermont's Public Service Board" (citing 30 VT. STAT. ANN. § 248(a)(2)(b)). *But see* ASS'N FISH & WILDLIFE AGENCIES, *supra* note 181 (showing at least eight states that require large renewable developers to obtain certificates of convenience and necessity).

215. Even in Texas, which has embarked upon one of the most aggressive restructuring programs, generators still have to obtain a license from the Texas Public Utility Commission to commence construction of a plant. 16 TEX. ADMIN. CODE § 25.109(a)(1) (2011) (requiring generators who sell electricity at wholesale to register with the Public Utility Commission as a power generation company); 16 TEX. ADMIN. CODE § 25.109(a)(2) (2011) (requiring small generators to register as "self generators"). *But see* 66 PA. CON. STAT. ANN. §§ 2803, 2809 (West 2011) (only including generators that sell "to end-use customers" in the definition of "electric generation supplier"—an entity that is required to receive a license from the Pennsylvania Public Utility Commission).

216. *See* NAT'L WIND COORDINATING COMM., *supra* note 213.

implement retail rate changes to reflect the purchase of renewable electricity. In Colorado, for example, the city council of Fort Collins mandated in 2003 that the city-owned utility generate two percent of its electricity from non-hydro power renewable sources by 2004 and fifteen percent from non-hydro renewables by 2017.[217] The city utility contracted for wholesale electricity from wind projects in Wyoming, and the utility obtained a rate increase from the city council in order to pay for this power.[218] Austin, Texas, has similarly adopted a plan for its municipal-owned utility to acquire "35 percent of power from renewable resources such as wind and solar power by the year 2020,"[219] and the city estimates that rates will increase by about twenty percent over ten years.[220]

Although most renewable developers, which sell electricity wholesale, will not need to obtain certificates of convenience and necessity or an approved retail rate from the state, they will in some cases still face a lengthy state permitting process, and will often have to conduct expensive environmental reviews[221] as part of this process. While there are three core types of municipal governance approaches to renewable technologies (banning, ignoring, or specifically addressing renewables), four different types of state regimes address renewable development. Some states have almost fully centralized the approval process, sending nearly all regulatory reviews through one state agency and preempting local regulation. Others have a "hybrid regime" with a centralized approval process and partial preemption of municipal zoning powers—directing municipalities to include minimum requirements in their zoning codes, for example. A

217. Interview by U.S. Dept. of Energy with Fort Collins Utilities, in Colo. (Oct. 26, 2004), *available at* http://www.windpoweringamerica.gov/filter_detail.asp?itemid=773.

218. *Id.*

219. J.D. Mingus, *Austin Approves Ambitious Renewable Energy Plan*, KVUE NEWS, Apr. 22, 2010, http://www.kvue.com/marketplace/green/Austin-approves-ambitious-renewable-energy-plan-91861299.html.

220. *Id.*

221. *See* U.S. Dep't of Energy, *Wind Power Pioneer Interview: Dale Osborn*, WIND POWERING AMERICA (May 4, 2010), www.windpoweringamerica.gov/filter_detail.asp?itemid=681 (explaining that environmental reviews and interconnection studies can cost $150,000 per site for a proposed wind farm).

separate hybrid category of states has a centralized siting process but leaves zoning to the municipalities and determines compliance with the zoning laws as part of the central process; some of these hybrid states also offer optional preemption of local zoning powers. Finally, some states leave nearly all regulation of renewable development to municipalities.

Minnesota has gone farther than most other states in preempting municipal control over large renewable projects by preempting all local regulation[222] and providing centralized requirements for siting.[223] Developers of wind projects that will produce more than five megawatts of electricity must obtain a siting permit from the Minnesota Public Utilities Commission, although developers of projects up to twenty-five megawatts in size may opt for county permitting;[224] the permit application must contain, among other things, an "analysis of the potential environmental impacts, proposed mitigation measures, and any adverse environmental effects that cannot be avoided."[225] Florida also offers a centralized siting process for large power plants—including large solar plants—and the process "supplants all local and state permits that would otherwise be required."[226]

Wisconsin falls under the second category: the hybrid state-municipal regime, which leaves some land use regulation to municipalities (with requirements for minimum standards from the state) but also imposes environmental and land use requirements at the state level. Wisconsin's Public Service Commission, for example, has proposed to impose uniform setback requirements on wind turbines throughout the state; for

222. MINN. STAT. ANN. § 216F.07 (West 2011) (providing that the state-issued site permit "supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances adopted by regional, county, local, and special purpose governments"); *see also* Anonymous Response to Wind Energy Development Questionnaire (Mar. 14, 2011) (on file with author) (for a project in Minnesota, responding "yes" to the question of whether "all approvals—environmental, building code-related, zoning-related—done through the site permitting process with the Minnesota PUC").

223. MINN. STAT. ANN. § 216F.07 (providing that "[a] permit under this chapter is the only site approval required for the location" of a large wind energy system).

224. STATE OF MINN. PUB. UTILS. COMM'N, *supra* note 181.

225. *Id.*

226. Outka, *supra* note 181, at 1080.

residences owned by individuals who participate in the wind lease, for example, turbines in the proposed rules must be set back at least 1.1 times the distance from the ground to the farthest turbine blade time, whereas turbines must be setback much farther from "nonparticipating residences."[227] The Commission has also proposed uniform setback distances between turbines and public roads; property lines; and communication, transmission, and distribution lines.[228] Beyond uniform requirements imposed by the state, Wisconsin's proposed regulations would allow political subdivisions to require, among other things, that wind developers minimize soil compaction, provide financial assurance for decommissioning of the turbine, and offer annual compensation to residences within a half mile of a turbine when such residences have not participated in the wind lease.[229]

Oregon, Washington, and Wyoming represent a second type of hybrid category. They have a primarily centralized siting and environmental review process for renewable developments but still allow municipalities to impose independent zoning requirements. These hybrid states typically review developer compliance with the various municipal regulations that apply to a renewable parcel while granting required state permits, and they sometimes allow a developer to request preemption of local regulations. At the same time, they conduct lengthy reviews of environmental and social impacts, which are described in some detail here to provide the reader with a glimpse of the many state regulations encountered by some renewable developers.

227. WISC. ADMIN. CODE. P.S.C. § 128.13 (2011), *available at* http://www.renewwisconsin.org/windfarm/Complete%20Chapter%20PSC%20128%2012.9.10.pdf; WISCONSIN ADMIN. CODE. P.S.C. § 128.01 (2011) (defining "participating property" and "participating residence"); *see also* Wisc. S.B. 9, Jan. 2011 Spec. Sess. (Wisc. 2011), *available at* http://legis.wisconsin.gov/2011/data/JR1SB-9.pdf (proposing to modify the Public Service Commission's setback rules).

228. WISC. ADMIN. CODE P.S.C. § 128.13.

229. WISC. ADMIN. CODE P.S.C. § 128.13; *see also* Press Release, Pub. Serv. Comm'n of Wis., PSC Finalizes Wind Siting Rules (Aug. 30, 2010), http://psc.wi.gov/apps40/PressRelease/listing.aspx?yr=2010 (click link under August titled "PSC Finalizes Wind Siting Rules") (explaining that the proposed rules have been finalized and are being considered by the Wisconsin Legislature).

In Oregon, anyone proposing to construct a power plant—including a renewable plant—must obtain an Energy Facility Site Certificate[230] from the state and must show, among other things, that the applicant has "organizational expertise" to construct and operate the plant,[231] that the facility will not have structural problems resulting from earthquakes and other seismic hazards,[232] that the construction is not "likely to result in a significant adverse impact to soils,"[233] that fish and wildlife habitat impacts have been mitigated,[234] and that the facility will not "result in significant adverse impact to scenic resources and values" that are determined to be "significant" according to certain land use plans.[235] Before issuing a site certificate to a renewable developer, Oregon requires a finding that the proposed development will comply with the comprehensive plan and other "land use regulations" of the local government where the facility will be located;[236] the developer may choose to have the state's Energy Facility Siting Council verify compliance or to work with the local governments herself.[237]

Developers of commercial renewable installations of any size in Washington State may choose state certification of a project through the state's Energy Facility Site Evaluation Council, which licenses the "siting, construction, and operation" of the project after a lengthy review of "environmental and socioeconomic impacts."[238] If the developer chooses state

230. OR. DEP'T OF ENERGY, GUIDELINES FOR APPLICANTS FOR ENERGY FACILITY SITE CERTIFICATES 1 (2008), *available at* http://www.oregon.gov/ENERGY/SITING/docs/2008Guidelines.pdf?ga=t ("Wind or solar energy facilities with an average electric generating capacity of 35 MW or more" must obtain this certificate, as must geothermal facilities of this size).

231. *Id.* at 8.

232. *Id.* at 9.

233. *Id.* at 11.

234. *Id.* at 18.

235. *Id.* at 20.

236. OR. ADMIN. R. § 345-022-0030 (2011).

237. Or. Energy Facility Siting Council, *Energy Facility Siting Standards*, OR. DEP'T OF ENERGY, http://www.oregon.gov/ENERGY/SITING/standards.shtml (last visited Mar. 10, 2011) (describing the land use requirements).

238. Energy Facility Site Evaluation Council, *Siting/Review Process*, ACCESS WASHINGTON, http://www.efsec.wa.gov/cert.shtml#Certification (last visited Feb. 2, 2011).

certification, she must submit an original application accompanied by a $45,000 fee; this application must "fully address more than 60 subjects dealing with environmental and socioeconomic impacts."[239] The Council then begins its review of the project, holds an "initial public meeting," and holds a hearing to "ascertain if the proposed project is consistent with city, county or regional land use plans or ordinances."[240] If the Commission finds that the development is not consistent with local land use plans, it may recommend to the governor that local laws be preempted, thus offering a case-by-case preemption option.[241]

In Wyoming, developers of wind projects with "30 or more towers" must obtain an industrial siting permit.[242] Construction may not commence until a wind developer has filed an application with the Industrial Siting Council—a division of Wyoming's Department of Environmental Quality—and has obtained the permit.[243] Developers may apply for a waiver from the industrial siting requirements, but if they do so they must notify all local governments "within the potentially impacted area," discuss the project with these local governments, prove financial stability, and demonstrate "[t]hat the facility would not produce an unacceptable environmental, social or economic impact," among other factors.[244] If the developer does not receive a waiver and must obtain a full industrial certification or decides from the outset to pursue this certification, she must submit to the council, among other things, site plans; a description of the equipment that will be constructed, such as turbine generators; a description of all land ownership beneath the proposed facility; "[a]n evaluation of the social and economic conditions in the area of site

239. *Id.* (describing "Application Submittal" requirements).

240. *Id.* (describing the "Land Use Consistency Meeting").

241. *Id.*

242. *Industrial Siting,* WYO. DEP'T OF ENVTL. QUALITY, http://deq.state.wy.us/isd/ (last visited Feb. 3, 2011); WYO. STAT. ANN. § 35-12-102 (a)(vii)(E)(I) (West 2011).

243. WYO. STAT. ANN. § 35-12-106.

244. WYO. STAT. ANN. § 35-12-107; *see also* WYO. DEP'T OF ENVTL. QUALITY, RULES AND REGULATIONS OF THE INDUSTRIAL SITING COUNCIL ch. 1 § 5 (2011), *available at* http://deq.state.wy.us/isd/downloads/Proposed%20ISD%20Chapter%201%20Rules.pdf (proposing rules that would create additional requirements for the application for a waiver).

influence;" "[a] study of the area economy"; and a description of "whether or not the use of the land by the industrial facility is consistent with state, intrastate, regional, county and local land use plans, if any."[245] If an industrial site permit is obtained, this "establishes finality of local and state government requirements" that apply to the developer, except additional requirements may be imposed by the Wyoming Department of Environmental Quality and the Public Service Commission.[246] Similarly, North Dakota requires all wind facilities greater than sixty megawatts to obtain siting approval from the state's Public Service Commission; a pending bill would extend this state siting authority to even smaller projects.[247]

Finally, some states have declined to provide much, if any, centralized regulation of wind facilities. Iowa, Kansas, and Oklahoma,[248] for example, leave the majority or all of the permitting activity to municipalities, as do many other states.[249] This means that a developer proposing a wind development that crosses town or county lines may be subject to conflicting zoning and building codes, and may have to either work with town officials to revise them or modify her siting plan. Alternatively, a

245. WYO. DEP'T OF ENVTL. QUALITY, supra note 242, at § 8.

246. John Cora, Wyoming Wind Energy Symposium, Industrial Siting Overview (Aug. 14, 2009), *available at* http://www.uwyo.edu/enrsupport/Conferences/windsymposium/John_Corra_Wyoming_Industrial_Siting-Development_Act.pdf.

247. *PSC May Get Broader Authority Over Wind Farm Siting*, BISMARCK TRIBUNE, Feb. 2, 2011, http://www.bismarcktribune.com/news/local/govt-and-politics/2011_session/article_f4a00d9e-2e81-11e0-a2d6-001cc4c002e0.html.

248. *See* IOWA ENERGY CTR., *supra* note 181 ("Most cities and towns have ordinances to ensure that structures and activities are safe, proper and compatible with existing or planned development. Few ordinances specifically pertain to wind systems. Most municipalities either use existing ordinances regarding structure heights or require that an exemption from an existing zoning ordinance (a variance) be obtained from the zoning board."); NAT'L WIND COORDINATING COMM., *supra* note 213, at 9 (describing how, in Oklahoma, "[g]uidelines are typically determined by the county or local government offices" and there is little state involvement); KANSAS RENEWABLE ENERGY WORKING GROUP, SITING GUIDELINES FOR WINDPOWER PROJECTS IN KANSAS 1 (2003), http://kec.kansas.gov/wptf/Kansas_Siting_Guidelines.PDF (explaining that "[w]ind energy siting and permitting requirements vary from county to county" and how "[c]urrently, statewide regulations for siting wind projects do not exist").

249. *See* Preemption of Siting Authority, *supra* note 181.

developer in some of these "decentralized" states may encounter minimal regulation.

C. Obtaining transmission interconnection

Once a developer has obtained siting permission from the relevant state and/or municipal authorities, a transmission interconnection is still needed. As described in Part II.A.3., renewable energy development is useless if it cannot connect to a transmission line. Electricity produced by renewable technology must be transported over transmission lines to the consuming population. In the case of renewable energy, the electricity is typically transported and sold to another utility, electric cooperative, or municipality,[250] which then distributes the electricity to customers.

A generator that uses traditional fossil fuels can guarantee a consistent supply of electricity to the grid and can predict exactly how much electricity the generator will contribute to the grid at any one time. This is important, because the system requires a relatively constant voltage that must be monitored at every instant. Electricity, unlike most other goods, must be provided instantaneously to the consumer,[251] and operators of the grid never know exactly how much electricity consumers will demand. If consumers demand more electricity than expected (during times of "peak load," for example) and there is insufficient electricity in the grid to supply this load, a blackout or brownout could occur.[252] The grid could also fail if more electricity is sent through the wires than is demanded by customers at the other end, or if too much electricity is sent simultaneously through the wires and causes congestion.[253]

250. *See* NAT'L WIND COORDINATING COMM., *supra* note 213.

251. Ferrey, *supra* note 130, at 986.

252. *See, e.g.*, *Rolling Brownouts Ordered Across Texas: City Utility, BEC, PEC Customers Affected*, SAN MARCOS DAILY REC., Feb. 2, 2011, http://www.sanmarcosrecord.com/local/x663516696/Rolling-brownouts-ordered-across-Texas-City-utility-BEC-PEC-customers-affected (describing rolling brownouts in Texas during an unusual cold spell).

253. Steven J. Eagle, *Securing a Reliable Electricity Grid: A New Era in Transmission Siting Regulation?*, 73 TENN. L. REV. 1, 12 (2005) (describing increased loads (demand), electricity flows, and bottleneck areas from too much flow as straining the grid and how inadequate capacity can lead to blackouts).

Provided that a transmission line can accommodate more electricity, the transmission utility can grant requests for new, traditional generators to interconnect to the grid following an application and a series of tests that prove that the generator meets a variety of conditions. Indeed, FERC requires transmission utilities to provide open access to the wires and to accept new requests from generators to use the wires to transport electricity, provided the new use will not unduly interfere with the reliability of the grid.[254] Several forms of renewable energy generation, however, including solar and wind generation, produce varying quantities of electricity depending on the quantity of sunlight or wind that happens to be passing over property at a given instant. They do not have a steady source of fuel that they can burn on demand to produce a guaranteed output of electricity, and they cannot predict exactly when they will produce the largest and smallest quantities of energy. This creates problems for grid operators, who need predictability both in terms of timing and quantity of electricity that will be available.[255]

In order to obtain transmission service, a renewable developer must first conduct expensive studies and tests[256] addressing how her addition of electricity to the grid will affect the grid[257] and then enter into a contract with a transmission utility and/or a regional transmission organization to interconnect with and use the utility's transmission lines.[258] The

254. FERC Order 888: Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities, 61 Fed. Reg. 21,540 (May 10, 1996) (codified at 18 C.F.R. pts. 35 & 385) ("A public utility must take transmission services (including ancillary services) for all of its new wholesale sales and purchases of energy under the same tariff of general applicability as do others.").

255. *See* Rossi, *supra* note 118, at 1041-42 (describing reliability challenges posed by renewables).

256. ALLISON & WILLIAMS, *supra* note 123, at 23 (describing FERC Order 2003, which regulates generator interconnection to transmission lines).

257. *See* U.S. Dep't of Energy, *Wind Power Pioneer Interview: Dale Osborn*, *supra* note 221 (explaining that environmental reviews and interconnection studies can cost $150,000 per site for a proposed wind farm).

258. *See, e.g.*, Grossman v. C.I.R., T.C. Memo. 1988-278, 1988 WL 64621 (T.C. 1988) (describing a wind company's contract with a transmission services provider for a "non-exclusive right and license to use interconnective facilities and a transmission line for the purpose of transmitting electric power").

utility has certain discretion in awarding the interconnection contract or not, although it must closely follow rules set by the Federal Energy Regulatory Commission in granting or denying the contract. FERC, which has jurisdiction over all interstate transmission[259] (including nearly all electric transmission lines,[260] with the exception of most lines in Texas,[261] Alaska, and Hawaii),[262] has long regulated the connection of new generation to the transmission grid, and it has recently imposed specific standardized interconnection procedures for large wind generators,[263] which are "intermittent resources" and pose unique problems for the electrical grid.[264]

Despite the improved interconnection rules, renewable developers still have difficulty connecting to the grid.[265] This step in the development process may pose the highest hurdle to a successful project. Without an expanded transmission grid, few

259. *See* Federal Power Act, 16 U.S.C. § 824(a)-(b) (2006).

260. *See* Fed. Power Comm'n v. Fla. Power & Light Co., 404 U.S. 453, 463 (1972) (finding FERC jurisdiction where electricity from one electric utility "commingled" in transmission lines with power from another electric utility, and the electricity from the other electric utility sometimes commingled with out-of-state electricity).

261. Electric Reliability Council of Texas, *What is ERCOT?*, TEX. OFFICE OF PUB. UTIL. COUNSEL, http://www.opc.state.tx.us/ERCOT.html (last visited Apr. 4, 2011) (explaining that the large area of Texas governed by the Electric Reliability Council of Texas (ERCOT) is not subject to the jurisdiction of the Federal Energy Regulatory Commission because "ERCOT does not provide for interstate transmission of electricity").

262. FED. ENERGY REG. COMM'N, REPORT TO CONGRESS ON COMPETITION IN WHOLESALE AND RETAIL MARKETS FOR ELECTRIC ENERGY 11, *available at* http://www.ferc.gov/legal/fed-sta/ene-pol-act/epact-final-rpt.pdf (explaining that investor-owned utilities "in Alaska, Hawaii, and the Electric Reliability Council of Texas (ERCOT) region of Texas generally are not subject to FERC jurisdiction).

263. Interconnection for Wind Energy (Order No. 661), 70 Fed. Reg. 34,993 (June 2, 2005) (to be codified at 18 C.F.R. pt. 35).

264. *See* David B. Spence, *The Political Barriers to a National RPS*, 42 CONN. L. REV. 1451, 1458-59 (2010) (describing intermittency challenges).

265. Eagle, *supra* note 253, at 6 (explaining that "when open access is mandated to allow for competitive merchant power generation, a utility that owns both generation and transmission infrastructures will under-invest in new transmission capacity and engage in entry-deterring practices to protect its existing assets").

remedies may be available to a developer who remains in a long queue[266] waiting for a chance to interconnect.

D. Selling electricity

Two separate regimes govern electricity sales. In general, the Federal Energy Regulatory Commission regulates wholesale sales,[267] which are sales of electricity from generators or electric utilities to other utilities or to municipalities. States, on the other hand, regulate retail sales of electricity directly to the end user.[268] Utility-scale solar and wind developers typically sell wholesale to other utilities and municipalities, which then deliver electricity to customers.[269] But it is not inconceivable that as renewable development expands, full, vertically-integrated utilities will form around the renewable generation—particularly if storage technologies improve or renewable developers co-locate with natural gas plants or other back-up sources.[270] One developer, in other words, might build several wind farms, transmission lines running from these farms, and distribution lines to consumers, and then sell her electricity directly to the consumer from this vertically-integrated business, after having a retail rate approved.

Regardless of the type of electricity sold, a generator of electricity will have to obtain approval of the rate that it charges. At the wholesale level, FERC now allows almost all sales of electricity to use the market price, but the seller must still obtain a tariff and prove that she lacks market power.[271] If a utility-

266. *Transmission Update* (NAT'L WIND COORDINATING COMM., Wash. D.C.) Oct./Nov. 2006, at 3, *available at* http://www.nationalwind.org/assets/archive/TM_Update_2006-10.pdf (describing that large quantity of wind in the transmission interconnection queue).

267. Federal Power Act, 16 U.S.C. § 824(a)-(b) (2006).

268. MOGEL & MUCHOW, *supra* note 96, at 52-23, § 52.03[2][a].

269. *See* Coleman & Estes, *supra* note 205, at 1-4.

270. *See, e.g.*, *Victorville 2 Hybrid Power Project Plant Licensing Case*, http://www.energy.ca.gov/sitingcases/victorville2/index.html (describing a hybrid natural gas-solar plant proposed in California).

271. GEN. ACCOUNTING OFFICE, ELECTRICITY MARKETS: FERC'S ROLE IN PROTECTING CONSUMERS 5 (2003) ("Since 1992, FERC has granted authority to more than 850 prices to charge market prices for their electricity provided that

scale renewable were to sell retail, it would have to go through a complex ratemaking process in most states, wherein the utility would submit its operating and capital costs to the utility commission as well as data on its necessary rate of return. After contesting various costs in an administrative hearing in which the public may intervene, the utility commission would then set a rate that the utility could charge per megawatt hour.

Ultimately, tariffs, rates, leases and easements, environmental review, siting permits, and zoning and building code approvals form a complex layer of potential exclusion rights through which every renewable developer must wade. This is not unique to renewable development, of course. All power plants face extensive regulatory proceedings and property battles. But the fact that the law has generally developed without renewables in mind can make the process particularly difficult—or, from another perspective, particularly beneficial—for renewable developers, who sometimes end up shaping the law as they move through a project. The following Part discusses these gaps in the law and suggests how they might begin to be filled.

III. IDENTIFYING AND FILLING LEGAL GAPS TO A CREATE A LAW OF RENEWABLE ENERGY

Development of utility-scale renewables does not occur in a vacuum. As shown in Part II, private property rights and various components of the common law, statutes, and regulations apply to renewable development and allow for its moderate growth. This part will show, however, that these laws fail to fully address the needs of renewable development—perhaps because they emerged prior to the rapid growth in renewable energy recently experienced in America, and perhaps due to various disincentives on the parts of governments to address these issues. Further, the occasional laws that have developed in response to this growth generally fail to provide comprehensive guidance to renewable developers.

As renewables have experienced a resurgence, several authors have already begun to re-tackle the task of identifying

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the companies comply with market rules and charge wholesale prices that are just and reasonable.").

legal gaps. Ernest Smith and Becky Diffen, for example, acknowledge and describe the "one area where wind law does currently exist"—in the form of federal and state tax incentives[272]—but emphasize the lack of any case law interpreting the "hundreds of thousands of easements, wind leases, and other types of development rights"[273] obtained by wind farms as well as "scant case and statutory law on the effect and validity" of transactions where landowners have severed wind rights from surface rights.[274] Jim Rossi,[275] Ashley Brown,[276] Steven Ferrey,[277] and others have addressed deficiencies in governance frameworks for transmission development. Troy Rule has described the inconsistencies in property laws that govern competing rights to fugitive sun and wind,[278] where they exist, and Sara Bronin has similarly argued for improved solar rights laws.[279] Finally, Patricia Salkin, Ashira Ostrow,[280] John Nolon, and Jessica Bacher[281] among others, highlight needed changes in land use and zoning laws to address a growing renewables market. This part builds from this and other work, describing the lack of a comprehensive legal framework to enable and support renewable energy—with a focus on solar and wind—and suggesting how to begin constructing this framework.

A. Property rights

One of the central legal questions for renewable energy, and particularly solar and wind resources,[282] is to determine whether

272. Smith & Diffen, *supra* note 29, at 166.
273. *Id.*
274. *Id.*
275. *See generally* Rossi, *supra* note 118.
276. *See generally* Brown & Rossi, *supra* note 120.
277. *See generally* Ferrey, *supra* note 130.
278. *See generally* Rule, *supra* notes 16, 171.
279. *See generally* Bronin, *supra* note 174; *see generally* Bronin, *infra* note 283.
280. *See generally* Salkin & Ostrow, *supra* note 25.
281. *See* John R. Nolon & Jessica A. Bacher, *Wind Power: An Exploration of Regulation and Litigation*, N.Y. L.J., Feb. 20, 2008.
282. Most of the other renewables—including geothermal, hydro, landfill gas, and biogas—also have fugitive components, including heat, water, and methane from landfills and manure. Water Law already occupies a field of its own,

sun and wind are separate property rights that are severable from the surface estate, and if they are, to develop a modern legal regime that mediates competing rights to these severed estates. The "modern lights" doctrine in the common law suggests that very limited severability exists, if at all, although scattered state legislative regimes have recognized a right to fugitive resources in the solar area.[283] In one sense, the fugitive renewable resources flowing over and under property are largely analogous to oil and gas and could therefore have a property right of their

however, and landfill gas, biogas, and geothermal development could potentially be incorporated within some existing Oil and Gas principles. This is not to say that these renewable resources will require no new laws of their own, however. These resources also require more permanent equipment to capture fuel than do oil and gas and have other unique qualities not fully addressed by existing laws. *See* Hadassah M. Reimer & Sandra A. Snodgrass, *Tortoises, Bats, and Birds, Oh My: Protected-Species Implications of Renewable Energy*, 46 IDAHO L. REV. 545, 578 (2010) (explaining that producing electricity from geothermal resources requires drilling a well and then converting heat energy "into electricity at a geothermal power plant"). This process requires more surface area than an oil and gas well if the plant is built over the source of the heat, which geothermal plants often are. *See id.* at 582 (explaining that "geothermal plants must be located as near as possible to geothermal resource because steam or hot water cannot be transported economically for any great distance"). Therefore, although geothermal plants require less land area than coal or nuclear plants, see *id.*, a geothermal developer does not simply drill for heat and then send it to a power plant—as would a gas producer. The developer must wrestle with more surface estate questions, and a mere lease of the "heat estate," if it were to be severed, may be insufficient. *See also* John G. Sprankling, *Owning the Center of the Earth*, 55 UCLA L. REV. 979, 1030-33 (2008) (describing heat mining, a "novel" form of geothermal energy, which would raise new property rights issues and possibly require individual ownership of subsurface layers or, alternatively, public ownership). Biogas presents its own unique property issues. To produce energy from biogas, a company collects heat from raw sewage or uses a digester to collect methane, and then to produce electricity. *See* Steven Ferrey, *Converting Brownfield Environmental Negatives into Energy Positives*, 34 B.C. ENVTL. AFF. L. REV. 417, 432 (2007). In this case, ownership issues may arise with respect to the collection of "valuable" sewage from multiple residences and businesses or manure from farms. Might an individual producer of the raw energy resource argue that he or she deserves compensation, and would the courts find that she had abandoned the property and had no remaining ownership rights to it? In sum, renewable resources beyond sun and wind require legal attention, but this article focuses on sun and wind partially due to the current policy focus on these resources and partially due to space limitations. This footnote in its entirety is hereinafter referred to as "Differences in Renewables."

283. *See generally* Sara C. Bronin, *Modern Lights*, 80 U. COLO. L. REV. 881 (2009).

own—the "renewable estate," for example. As introduced in Part II, a landowner could sever the renewable resources, grant a lease to a renewable developer to capture these resources, and a combination of common and statutory law could define the balance between the rights of the owners of the surface and renewable estates. Indeed, a complex law has already emerged to address the surface-mineral balance. The common law generally requires mineral rights owners to use the mineral estate with "due regard" to the rights of the surface owner,[284] but in measuring this due regard, the courts first require the surface owner to consider alternative means of using her property that would not interfere with a mineral estate owner's production.[285] Numerous state statutes further define the responsibilities of surface and mineral owners—delineating the standard of proof required when surface owners allege damage from the mineral development, for example, and sometimes requiring mineral owners to consult with the surface owner and agree upon a production location before drilling.[286]

The analogy of renewable to mineral estates is not a complete one, however. Technology required to capture oil and gas typically occupies far less surface area—and stays on the surface for a shorter period of time—than do technologies that capture sun and wind for electricity. Today's natural gas producer can, for example, build a several-acre well pad[287] and access road,[288]

284. *See* OIL AND GAS LAW § 14.02[1][c] (LexisNexis 2008) (describing *Getty Oil Co. v. Jones*, 470 S.W.2d 618 (Tex. 1971)).

285. *Id.* at § 14.02[1][c].

286. *Id.* at § 14.02[1][e] (citing OKLA. STAT. ANN. tit. 52, § 318.2-9; ARK. CODE ANN. § 15-72-214 (2011); ALASKA STAT. § 38.05.130 (2011); TEX. NAT. RES. CODE ANN. §§ 52.297, 53.155 (2001)).

287. In New York State, gas companies have applied to drill and hydraulically fracture for natural gas in the Marcellus Shale formation that lies beneath the state. Out of those applications, "[p]roposed well pad sizes range from 2.2 to 5.5. acres" (excluding the access road), and New York's Department of Environmental Conservation believes that these sizes are "consistent" with sizes required for drilling and fracturing in other formations, such as an average 3.6-acre pad in Wyoming (excluding the access road) and a maximum of 5.7 acres in the Fayetteville Shale of Arkansas. N.Y. STATE DEP'T OF ENVTL. CONSERVATION, DRAFT SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM 5-10 (2009), *available at* ftp://ftp.dec.state.ny.us/dmn/download/OGdSGEISFull.pdf.

bring large trucks, rigs, and tankers temporarily[289] on to the site to drill a well and perform production-enhancing operations, and then pull most of the equipment off of the site, leaving only minimal infrastructure on the surface to collect the gas that continues to flow out of the well.[290] A wind or solar developer, on the other hand, must leave large infrastructure on the site for as long as electricity is to be produced from these resources, and for utility-scale renewable plants, even one development often covers thousands of acres of land.[291] The surface estate is therefore likely to be more heavily burdened by the developer of the renewable estate, and a robust common law or statutory scheme needs to emerge to address this difference.

For competing upwind-downwind rights to sunlight or wind, the rule of capture in oil and gas law, which allows a party to counter drainage of resources beneath her property with a well of her own,[292] also ignores many important factors. While upwind developers do produce significant wake or shading effects[293] (just as upstream drilling for gas or oil reduces the total quantity of

288. *Id.* at 5-6 (indicating that of the applications received in New York for drilling and hydraulic fracturing in the Marcellus Shale, "the proposed disturbed access road acreage . . . ranges from 0.1 acres to 2.75 acres").

289. Many gas wells are now often drilled horizontally and hydraulically fractured. Again looking to the New York analysis, preparing for drilling a horizontal well with a large rig requires "5-30 days per well," and "the rig work for a single horizontal well . . . would generally last for about four to five weeks." *Id.* at 5-1 to 24. Preparation for hydraulic fracturing then typically requires "30-60 days per well," and hydraulic fracturing itself "typically takes two to five days," although more complex jobs can require a longer time period. *Id.* at 5-124, 5-93. Completion of the fracturing process and waste disposal require an additional two to fourteen weeks, combined, and "[w]ell [c]leanup and [t]esting" take "1/2 – 30 days per well." *Id.* at 5-125.

290. *See id.* at 5-125 ("Subsequent to drilling and fracturing operations, associated equipment is removed."); *id.* at 5-127 (explaining that an "assembly of pressure-control devices and valves at the top of the well known as the . . . 'Christmas tree'" remains at the well site for the duration of the gas production phase, as do "[a] small inline heater," "[a] two-phase gas/water separator," [g]as metering devices," "[w]ater metering devices," and "[b]rine storage tanks," in addition to several other potential pieces of equipment).

291. *See* Salkin & Ostrow, *supra* note 25 (describing wind developments of more than 11,000 and 17,000 acres).

292. Bruce M. Kramer & Owen L. Anderson, *The Rule of Capture – An Oil and Gas Perspective*, 35 ENVTL. L. 899, 899 (2005).

293. *See* CHEW, *supra* note 170 and accompanying text.

available resource in the reservoir), other surface developments, such as tall structures, might equally block the wind resource.[294] Parties from a range of interests unrelated to energy production, in other words, produce collateral damage. The rule of capture fails to account for this substantial difference—instead addressing competing interests in fugitive rights by recognizing competing rights to the production of the resource, not in a wide array of land uses, all of which affect production. The conservation statutes and individual production orders that have arisen to address overconsumption of oil and gas resources under the rule of capture[295] similarly fail to address competing land uses, which can substantially diminish fugitive estates to sun and wind.

Due to the differences in the use of the surface for the production of renewable energy and the different nature of the overlying fugitive resource, renewable energy development may require a hybrid surface-fugitive regime, wherein renewable developers acquire more surface rights than would a traditional oil or gas developer as well as a broader fugitive estate. Simply obtaining a right to sunlight or wind flowing over the property might not be enough, for example, unless this right is accompanied by a legislative requirement that other neighboring developers not unreasonably impinge on the availability of the resource. More realistically, in the short term, at least, utility-scale renewable developers will need to lease both the right to renewable resources flowing over the property (a renewable estate) and bargain for a limited servitude or other right on neighboring properties, which restricts the rights of neighboring surface owners to build other renewable equipment or structures that impede the flow of the fugitive resource. As Kansas, Oregon, and South Dakota, already have done,[296] states must legislatively recognize and validate these property rights so that their future validity is known *ex ante*.

Rather than requiring individual bargaining for these property rights, Sara Bronin has described how some states have

294. *Id.*
295. Kramer & Anderson, *supra* note 292, at 899.
296. *See* Smith & Diffen, *supra* note 29.

created zoning regimes for fugitive resources—developing zoning overlays, for example, that ensure the adequate flow of resources over property.[297] This type of system would reduce transaction costs by avoiding the need for developers to bargain individually for servitudes on neighboring properties, and it could be applied to both solar and wind. Indeed, a limited number of solar and wind overlays already have been established.[298] But a zoning regime for fugitive resources, as opposed to a system of recognized property rights that relied upon individual contract and recording, could also fail to account for very localized differences in the flow of the resources and the characteristics of property. While conditional exemptions from the code could help to account for these differences, leaving the system to individualized bargaining for property rights—as typically occurs for oil and gas—may be preferable.

Regardless of the regime chosen, relative rights of surface and renewable estate (or fugitive zoning permit) holders must be established. Due to the more permanent and bulky nature of renewable technologies (as compared to traditional oil and gas operations), states should likely require owners of solar or wind rights and accompanying servitudes on neighboring lands to also acquire easements or surface leases. This will ensure that future surface owners of property with severed wind or solar rights are fully aware of the burdens on their property and will clarify the legal rights of developers to the surface. As Wisconsin and Kansas already have required,[299] the surface easement or lease—like traditional surface rights—should adequately describe the scope of the right and should be recorded along with all other rights and servitudes. Once the surface right is established, existing common law in the oil and gas area should provide a good framework for future disputes between surface and renewable estate owners.

297. *See generally* Bronin, *supra* note 283.

298. *See id.*; *see also* NAT'L WIND COORDINATING COMM., *supra* note 190 and accompanying text (describing how a developer persuaded a town to establish a zoning overlay to accommodate the height of wind towers). A similar overlay could potentially be established to ensure adequate flow of wind resources.

299. *See supra* text accompanying notes 165-68.

B. Siting

Along with recognized property rights in the form of a renewable estate and attendant surface rights, better and clearer siting processes are needed. It is not uncommon for renewable developers to face conflicting zoning codes and overlapping environmental review and permitting requirements from state and federal agencies. Indeed, in many cases, municipal codes fail to recognize renewables at all, making developers uncertain as to the permissibility of their project and forcing them to push the law forward as they move through their project. This process is in some ways positive, as it produces incremental changes as the actual needs and challenges of development arise rather than attempting to predict and uniformly address them in advance. But it also creates uncertainty for all parties, including the public and developers, and it may encourage capture of local processes by developers eager to see their project through to completion. While all of the laws need not be written in advance, states or municipalities should provide processes that will prevent this capture, allow for public input in anticipation of a growing renewable development, and address the known barriers to renewable development as well as the identified environmental, aesthetic, economic, and social impacts.

In order to avoid an overly cumbersome process, streamlined siting regimes for utility-scale renewables must emerge. "Streamlined," as used here, does not suggest a siting process that is fast-track or substantially lighter on regulatory requirements than typical processes for the development of large infrastructure. Rather, it suggests a comprehensive state-wide or regional regime that collects all localized zoning rights and state permitting and review requirements within one process. Preemption may not be required, but at minimum, states should implement the hybrid regimes that states like Wisconsin have begun to enact.[300] In the hybrid state-municipal regime suggested here, the state would impose certain floors and ceilings on municipal zoning and building code requirements in order to ensure some level of uniformity, approve utility-scale plants through a centralized process that addresses both municipal and

300. *See supra* text accompanying notes 228-30.

state requirements, and issue all necessary permits to the developer.

The question of preemption, of course, looms large here. Ashira Ostrow and Patricia Salkin argue, however, that a balance between municipal and state (or federal) authority can effectively exist in the renewables area; the hybrid approach suggested here reflects these principles. Specifically, Ostrow and Salkin have proposed that regimes used for the siting of telecommunications equipment, such as cell phone towers, could be effectively applied to renewables.[301] Under the Telecommunications Act, Congress limits but does not wholly preempt local zoning processes.[302] It requires local zoning boards that make telecommunications equipment siting decisions to create a record, enables review of that record, and imposes certain substantive floors, for example.[303] A similar regime for renewables, which would create certain state minimum standards for renewable siting but still allow substantial local participation by municipalities, may be advisable. This could help to ensure that NIMBYism does not preclude renewable development altogether and that municipalities retain some authority over the location, safety, and aesthetics of a renewable development.

C. Infrastructure

Even where stronger and clearer property rights are established and a streamlined siting regime is established, the transmission challenge still looms large. As discussed in Part II, renewable generation often requires the expansion of transmission lines. State and municipal authority over the siting of transmission lines can create high barriers where utilities attempt to expand transmission,[304] and customers often resist the cost of the new lines, which is typically passed on to customers

301. Patricia Salkin & Ashira Pelman Ostrow, *Siting Transmission Lines in a Changed Milieu: Evolving Notions of the "Public Interest" in Balancing State and Regional Considerations*, 37 HOFSTRA L. REV. 1049, 1085-96 (2009).

302. *Id.* (citing 47 U.S.C. §332 (2006)).

303. Salkin & Ostrow, *supra* note 301, at 1094-97; *see also Regional Governance*, *supra* note 25 (discussing Ostrow and Salkin's proposal).

304. *See, e.g.*, Benedetti, *supra* note 133, at 257 (describing states having successfully blocked or stalled interstate transmission projects).

through rates.[305] Within this area, other authors have already suggested a range of needed legal changes, and this Article does not endeavor to propose an alternative. The primary debate in the literature has centered around the appropriate level of the transmission siting regime and methods of allocating cost for new transmission required for renewables.[306] In the Energy Policy Act of 2005, Congress granted FERC limited authority over transmission siting in "National Interest Electric Transmission Corridors"—those with inadequate transmission capacity,[307] but subsequent court decisions have narrowed FERC's authority in this area.[308] As a result, some authors have proposed regional and/or federal transmission siting regimes, which would ensure that high-voltage interstate transmission lines necessary to transport remote renewable electricity to populous regions were constructed.[309] As Jim Rossi has observed, any proposed governance solution to the renewables transmission challenge must be approached carefully.[310] Forging ahead with federally-approved high-voltage interstate transmission lines could result in expanded transmission capacity for entrenched nonrenewable power sources, for example, and not for new generators.[311] Further, if pricing of transmission stays at the state level and regional and/or federal authorities gain control over transmission siting, those entities that benefit the most from expanded

305. *See, e.g.*, Ill. Commerce Comm'n v. FERC, 576 F.3d 470, 472 (7th Cir. 2009) (showing electric consumer groups as intervening in a case addressing who should shoulder the burden of new transmission costs within an RTO).

306. *See, e.g.*, Duane, *supra* note 126, at 773 (describing that under California's centralized planning initiative to construct billions of dollars in new transmission lines for renewable energy, one of the greatest difficulties lies in "determining who should pay for the billions of dollars of new transmission investment identified as needed.").

307. *See* Energy Policy Act of 2005, 16 U.S.C. § 824p(a)(2) (2006).

308. Piedmont Envtl. Council v. Fed. Energy Regulatory Comm'n, 558 F.3d 304, 313 (4th Cir. 2009) (concluding that a state's denial of transmission siting in a National Interest Electric Transmission Corridor within one year of the proposed siting did not allow FERC to assert its federal backstop siting authority).

309. *See, e.g.*, Eagle, *supra* note 253, at 45-46 (arguing that transmission siting would improve if regional transmission siting were approved).

310. *See generally* Rossi, *supra* note 118.

311. *Id.* at 1043.

transmission may not shoulder the brunt of the construction costs.[312]

Transmission governance will continue to pose one of the highest hurdles to renewable development. New lines will need to be constructed if renewables are to grow substantially. In some cases, these lines can run parallel to existing corridors and can be added to expand capacity; in other cases, new corridors will need to be constructed. A governance regime must be implemented to ensure that states and municipalities coordinate transmission construction plans across boundaries, that the payments that ratepayers contribute to the expansion at least roughly correlate with the benefits that the ratepayers receive (keeping in mind the enhanced reliability afforded by expanded transmission), and that added transmission does not simply benefit the nonrenewable energy interests that already dominate the lines. This will likely require a combination of regional and state control, and this type of regime has already started to emerge as regional transmission organizations have begun planning for expanded transmission infrastructure for renewables and state utilities have relied upon these plans in siting new transmission lines. Regardless of the regime chosen, states must continue to have a role in the process to account for local costs and concerns and to ensure that wasteful lines are not constructed in the name of entrenched utilities with powerful federal clout.

D. A preliminary metric for regulatory adaptation in anticipation of technological change

All of the gaps in the law identified here raise an important overarching question: how can we develop a framework to analyze the best means of addressing these needs? Some of the factors that must be considered within this framework have emerged in the discussion above, but future work is required to establish a workable metric. As an initial matter, several categories of adaptation can be identified. First, some technological change—including the evolution of renewable technology—can be

312. *Id.* at 1044.

addressed through application of the common law and accompanying legislation that formed in other eras and contexts. Easements for example, are easily applied to solar and wind equipment. Just as developers have long acquired easements for roadways and pipelines, this legal regime—including common law decisions, legislation that more clearly describes the scope of easements, and recording statutes—can be directly applied to renewable technology.[313]

Second, some technological changes require cautious, incremental modifications in the common law and attendant legislation. This category is exemplified by the competing surface and fugitive resources estate in the renewable context. Although states have already developed a complex common law of accommodation by the surface owner and due care on the part of the mineral estate developer, as well as legislation that further defines the surface-mineral owner relationship and required duties of care,[314] renewable technologies present unique problems described above. They occupy substantially more of the surface than do oil and gas wells, and they remain on the surface for longer periods of time.[315] Small changes to existing oil and gas laws can likely ensure that surface owners are adequately notified of these differences and protected from unreasonable surface use by the owner of the fugitive estate—so that surface owners do not unreasonably impede renewables development.

Third, yet another type of technological change may require sweeping modifications of the common law and legislation, as demonstrated by the fugitive wind and solar estate. The rule of capture is inadequate for renewables,[316] and creative use of restrictive covenants, easements, or zoning overlays is likely necessary to ensure that competing land uses—which are sometimes entirely unrelated to the production of the fugitive resource—do not unduly interfere with the downstream flow of sunlight or wind. Similarly, federal, state, and local transmission siting and pricing schemes may need to be substantially revamped to accommodate intermittent renewable resources that

313. *See supra* text accompanying notes 163-65.
314. *See supra* text accompanying notes 284-82.
315. *See supra* notes 287-90 and accompanying text.
316. *See supra* text accompanying notes 288-90.

demand space on an already congested grid. The siting of generation technologies may also require substantial modification and streamlining of siting frameworks—removing some local authority while still ensuring adequate public input.

Finally, some technological changes may necessitate entirely new legal frameworks. Solar and wind may not typically fall within this last category, although certain siting challenges for utility-scale solar and wind may necessitate new governance structures. As I have observed in an earlier article, for example, renewable parcels often cross jurisdictional lines—straddling public, tribal, city, county, and state lands.[317] This, combined with interstate transmission needs, may call for a regional siting regime.

At a broad level, identifying which renewable technological changes fall within which category of regulatory adaptation may be determined by how similar or dissimilar the problems faced by renewable developers are to the typical user operating under existing legal regimes. The wider the range of users that the underlying laws are intended to serve, the more malleable these laws may be in the renewables context. A preliminary investigation of renewable technologies, however, suggests that the technologies themselves differ so widely,[318] and their applications within different jurisdictions are so diverse, that it may not be possible to broadly predict the ideal regulatory adaptation; there may be too many variables at work. Much more empirical and theoretical research will be needed to develop a stable metric to measure legal adaptation that should anticipate renewable technological change. But before developing the framework for adaptation and normative observations from this framework, we must first identify the facts on the ground. We must describe the expanding technologies, analyze their unique demands on the legal system, and then begin to suggest needed legal changes (including a broad range of possible alternatives) in anticipation of continued expansion. This Article has primarily focused on this preliminary descriptive step, building from other

317. *See Regional Governance*, *supra* note 25.

318. *See* Differences in Renewables, *supra* note 282 (describing substantial differences among renewable technologies).

renewables literature to begin to characterize renewable technologies' needs and the varied legal responses that have begun to emerge.

CONCLUSION

This Article has introduced a sampling of laws that address renewable energy at the federal, state, and local level and has highlighted some of the differences in governmental response to renewable technology from jurisdiction to jurisdiction. From the moment that a renewable developer steps on to land to conduct an initial survey of the fugitive resources flowing over it, various common law rules, legislative directives, and administrative regulations apply. Some regimes have largely relied on the common law and existing legislative and administrative rules to address technology not anticipated by those rules—leaving siting decisions entirely to municipalities, for example, despite the fact that many municipal zoning laws do not recognize the existence of renewable technologies. Others have substantially modified state siting regulations and property laws to anticipate higher levels of leasing and construction activity. The Law of Renewable Energy, in many respects, is growing on its own accord.

If this law is naturally evolving, this leaves us with an important question of need. Why must scholars, legislators, and local officials work toward forming a Law of Renewable Energy if the law is a dynamic and rational institution that effectively responds to needs as they arise? Why not allow the grand experiment to play out, encouraging jurisdictions to borrow from each other as they observe successful and unsuccessful laws? Provided that policy makers and courts respond in a relatively timely fashion as renewable developments are proposed, a law will emerge that directly understands the needs of those living with it—the developers, nearby property owners, utilities, and regulators—and that benefits from a first-hand understanding of the emerging industry's structure. Indeed, as Ernest Smith and Becky Diffen have observed in Texas, the highly-developed common law of oil and gas will likely apply to many wind

disputes, and this law may "prove as hospitable and encouraging to the development of wind energy as it has to oil and gas."[319]

Fugitive resources law takes us a long way toward a Law of Renewable Energy, but, as Smith and Diffen also note for certain renewable issues, it does not get us all the way there. Even in the property context, as this Article has noted, there are important differences, many of which may not be easily addressed through traditional doctrine that mediates disputes between surface and mineral estates. Renewable equipment may be more permanent than oil and gas production technologies, for example, and may occupy substantially more space than a typical oil or gas well. Neighboring surface developments also often have different types of impacts on sun and wind than do oil and gas. The common law and legislative property regimes that have developed in the oil and gas area can be modified to some extent to address these differences, but the continued application of old laws to new technology may not be the best approach. Perhaps the surface and fugitive estates should not be separated for renewables, for example, or perhaps we should rely entirely on zoning overlays, imposing a licensing regime with predetermined setbacks for renewable development, obligations of energy developers to surface owners, and a formalized grievance system for permit violations. This article has not investigated which laws might be superior, but it has argued that the investigation must begin and that a framework for identifying the best law to address technological change must be developed.

Rather than assuming that renewable energy can be awkwardly placed within existing laws, or that an ideal body of law will emerge through municipalities' and states' piecemeal responses to renewable development, I suggest a more anticipatory approach. Existing laws can teach us volumes about the effectiveness of various legal approaches, but they are not the only answer; they could miss crucial new variables. New laws that develop hurriedly in response to developer or landowner demands, on the other hand, may be particularly subject to capture. Where a state has not carefully developed a planning process to engage a variety of stakeholders and seek meaningful

319. Smith & Diffen, *supra* note 29, at 217.

public comment, for example, the individual with the most at stake who demands the legal change is more likely to carry the day. As lawyers attempting to comprehensively review options for solar law in 1978 notes, "Unfortunately, it may be difficult even to discuss the merits of different legislative proposals without creating the assumption that something should be done immediately," as "proponents of solar energy systems may not be very discriminating inasmuch as favorable legislation would help to promote their view."[320]

To avoid these potential flaws and to form a moderate body of "anticipatory" rather than wholly reactionary law, we should identify the new legal issues raised by renewable technology, collect the existing analogous laws, and carefully consider how these laws might be best modified to address the new technology. Recognizing that law must be predictable yet flexible and anticipatory yet responsive, it is imperative to begin efforts at prediction. Just as attorneys in 1978 produced more than nine hundred pages of work identifying "legal issues" related to solar energy systems and drafted thirty-three "suggested statutes,"[321] we must similarly collect and synthesize information with various policy goals in mind, such as valuing participatory decision-making, reducing the transaction costs of legal regimes, ensuring enforceability, and properly balancing the costs and benefits that will result from the laws. Without these efforts, the inevitable iterative responses as we muddle through may be inefficient, problematic, or simply unwise, and if these effects can potentially be avoided, they should be. It is time for legal scholars, legislatures, and municipal governments to dust off the *Solar Law Reporters* of the 1970s and embark upon a new effort to create a better governance framework for renewable development. Without this framework, the laws that develop naturally in response to technological change will fill the gaps but will fall far short of their potential. While we may not need a "dramatic" theory here,[322] we should begin to anticipate the steps that will lead us toward a more sustainable world.

320. WILLIAM A. THOMAS ET AL., OVERCOMING LEGAL UNCERTAINTIES ABOUT USE OF SOLAR ENERGY SYSTEMS 3 (1978).

321. *Id.* at vii.

322. *See* Fong, *supra* note 2, at 455.