Building-Related Renewable Energy and the Case of 360 State Street

Sara C. Bronin[*]

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[*] Associate Professor and Program Director of the Center for Energy & Environmental Law, University of Connecticut School of Law. I wish to thank Professor J.B. Ruhl and Vanderbilt University Law School for inviting this Article; the student staff of the Vanderbilt Law Review for their careful edits; Dean Jeremy Paul and Professor Steven Wilf from the University of Connecticut for providing research support and a fertile academic environment for early-career scholars; and Commissioner (and Professor) Daniel C. Esty for his comments on the Article and his ongoing work to facilitate projects like 360 State Street. In addition, Professor Celeste Hammond and the Kratovil Conference at the John Marshall Law School; Florida State University College of Law; the Association of Law, Property, and Society; Yale Law School and the student leaders of the Yale Environmental Law Conference; and the American Institute of Architects deserve my sincere thanks for graciously hosting presentations of earlier versions of this Article and providing meaningful feedback.

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I. INTRODUCTION

Currently, our buildings consume 40% of our energy,[1] use two-thirds of our electricity,[2] and emit 40% of our greenhouse gases.[3] To reduce this negative environmental impact, public policymakers and advocates have encouraged demand reductions, while private industry has made building systems more efficient. Yet, with population growth and the expansion of human activity, energy consumption shows no sign of abating.[4] Thus, while continuing demand-side, consumption-reduction strategies, it will be important to develop and facilitate supply-side solutions, including the construction of building-related renewable energy ("BRRE")—that is, renewable energy incorporated into inhabited structures and used by those structures' occupants. Because most human activity takes place in buildings, a well-

1. DAVID MALIN ROODMAN & NICHOLAS LENSSEN, WORLDWATCH PAPER NO. 124: A BUILDING REVOLUTION: HOW ECOLOGY AND HEALTH CONCERNS ARE TRANSFORMING CONSTRUCTION 5 (1995).

2. *Green Buildings Introduction*, SMART COMMUNITIES NETWORK, http://www.smartcommunities.ncat.org/buildings/gbintro.shtml (last visited Sept. 6, 2012).

3. *Securing America's Future with Energy Efficient Buildings*, U.S. DEPARTMENT OF ENERGY, http://www1.eere.energy.gov/buildings/about.html (last updated Apr. 18, 2012). In addition, construction activities use most of the nonfood, nonfuel raw materials we consume every year. *See* John L. Sznopek & William M. Brown, *Materials Flow and Sustainability*, U.S. GEOLOGICAL SURV. (June 1998), http://pubs.usgs.gov/fs/fs-0068-98/fs-0068-98.pdf ("[U]se of construction materials . . . has increased from about 35 percent to 60 percent of total non-food, non-fuel raw materials consumption in the United States.").

4. According to the United Nations Population Division, the world's population has increased from 2,532,000,000 in 1950 to 4,453,000,000 in 1980 to 6,974,000,000 in 2011. UNITED NATIONS DEP'T OF ECON. & SOC. AFFAIRS, POPULATION DIV., WORLD POPULATION PROSPECTS: THE 2010 REVISION 2 (2011). By 2100, the world's population may reach 10.1 billion (according to the medium variant). *Id.* at 1; *see also infra* notes 31–32 for more on energy consumption trends.

conceived policy approach to BRRE could transform the American energy landscape.

The vast majority of Americans favor renewable energy.[5] Renewable energy has two primary selling points: it minimizes the negative impact of energy production on the environment, and it enhances energy security by reducing American reliance on foreign oil. Despite these positive attributes and favorable public opinion, the latest numbers show that renewable energy comprises just 8% of total domestic energy consumption[6] and 10.3% of total domestic electricity.[7] Moreover, the types of renewable energy that can be most readily incorporated into building design—solar, wind, and geothermal—comprise just 15% of the renewable energy share, or about 1.2% of total energy consumption.[8] Fuel cells, a fourth type of arguably renewable technology, are devices that use fuel and oxygen to create electricity and can be incorporated into a building.[9] Exact figures of

5. *See*, *e.g.*, PIKE RESEARCH, ENERGY & ENVIRONMENT CONSUMER SURVEY 5 (2012) (surveying more than one thousand adults and finding that over 75% of respondents favored wind and solar energy, although only 47% supported biofuels, another touted form of renewable energy); Jeffrey M. Jones, *In U.S., Alternative Energy Bill Does Best Among Eight Proposals*, GALLUP (Feb. 2, 2011), http://www.gallup.com/poll/145880/Alternative-Energy-Bill-Best-Among-Eight-Proposals.aspx (surveying more than a thousand adults and finding that 83% of respondents would support congressional legislation that provides incentives for the use of solar and other renewable energy sources); *Large Majorities in U.S. and Five Largest European Countries Favor More Wind Farms and Subsidies for Bio-fuels, but Opinion Is Split on Nuclear Power*, HARRIS INTERACTIVE (Oct. 13, 2010), http://www.harrisinteractive.com/NewsRoom/HarrisPolls/FinancialTimesHarrisPolls/tabid/449/ctl/ReadCustom%20Default/mid/1512/ArticleId/584/Default.aspx (surveying more than one thousand adults in a Financial Times/Harris poll and finding that 87% of respondents favored an increase in the number of wind farms).

6. U.S. DEP'T OF ENERGY, RENEWABLE ENERGY CONSUMPTION AND ELECTRICITY PRELIMINARY STATISTICS 2010, at 1 fig.1 (2011) (showing that renewable energy comprises 8% of the nation's energy supply, led by nuclear power at 9%, coal at 21%, natural gas at 25%, and petroleum at 37%). Globally, renewables supply 16% of energy consumed, but most of that (10%) is devoted to "traditional biomass," for example, firewood, used for cooking and heating in rural parts of the developing world. RENEWABLE ENERGY POLICY NETWORK FOR THE 21ST CENTURY, RENEWABLES 2011 GLOBAL STATUS REPORT 17 (2011) [hereinafter RENEWABLE ENERGY POLICY NETWORK FOR THE 21ST CENTURY].

7. RENEWABLE ENERGY POLICY NETWORK FOR THE 21ST CENTURY, *supra* note 6, at 18. Note that the renewable energy share of global electricity production in 2010 is 19.4%, including 16.1% from hydropower and 3.3% from other renewables. *Id.* at 18 fig.3.

8. *See* U.S. DEP'T OF ENERGY., *supra* note 6 (showing that of the renewable energy share of the nation's energy supply, 53% is biomass, 31% hydroelectric, 11% wind, 3% geothermal, and 1% solar).

9. *Fuel Cells: Basics*, U.S. DEP'T OF ENERGY, http://www1.eere.energy.gov/hydrogenand fuelcells/fuelcells/basics.html (last updated Nov. 19, 2010) (describing the way a fuel cell works and the various types of fuel cells).

U.S. generating capacity for fuel cells have not been compiled, but it is important to note here that fuel cells generate additional energy.[10]

Anecdotally, much of the 1.2% figure for solar, wind, and geothermal appears to be made up primarily of rural, large-scale generating facilities meant to serve many end users in urban areas. The challenges that out-of-the-way generating facilities pose to both energy efficiency and land consumption required to accommodate energy infrastructure (deemed "energy sprawl") are well documented.[11] By contrast, on-site (or near-site) BRRE that is located near end users presents the possibility of maximizing efficiency while simultaneously minimizing energy sprawl.

If the benefits of BRRE are clear, then why is there so little of it? The most widely recognized and obvious reason is that there are high financial barriers to entry, given initial cost and limited financing options for BRRE. Solutions to these financial barriers are being developed by governments at all levels, which have pioneered programs ranging from grants, to loans, to green banks.[12] Perhaps because concerns about initial costs are straightforward and are being addressed by policymakers already, scholars have paid little attention to them. Scholars who have addressed the question of relatively low adoption of BRRE have focused on other issues related to BRRE installation, including neighbor objections and legal ambiguities.[13]

There is no doubt that the laws that affect BRRE installation present problems for some projects. But for other projects, laws concerning installation are irrelevant or insignificant to a property owner's BRRE-related decisionmaking process. Instead, laws affecting

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10. Some question whether fuel cells should be considered a form of renewable energy. While some states have excluded fuel cells from their definitions of renewable energy, the State of Connecticut, where 360 State Street is located, explicitly includes them by statute. CONN. GEN. STAT. § 16-1(a)(26) (2012). In addition, the National Renewable Energy Laboratory, a public division of the U.S. Department of Energy that focuses on renewable energy technology, includes fuel cells in its research portfolio. From a practical standpoint, fuel cells can connect to solar or wind grids for their power. And they are zero-emission sources of electricity, as long as the hydrogen fueling them comes from nonpolluting sources. U.S. DEP'T OF ENERGY, OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY, 2010 FUEL CELL TECHNOLOGIES MARKET REPORT 1 (2011).

11. *See* Sara C. Bronin, *Curbing Energy Sprawl with Microgrids*, 43 CONN. L. REV. 547, 549 (2010) (defining "energy sprawl" as "the phenomenon of the ever-increasing consumption of land, particularly in rural areas, required to site energy generation facilities"); Robert I. McDonald et al., *Energy Sprawl or Energy Efficiency: Climate Policy Impacts on Natural Habitat for the United States of America*, 4 PLOS ONE, Aug. 2009, at 1, 1 (coining the term "energy sprawl" and starting the debate regarding the relative acreage occupied by energy infrastructure).

12. *See infra* text accompanying notes 54–60.

13. *See infra* Part III.A (discussing various approaches for dealing with BRRE installation issues).

the *operation* of BRRE projects may be more consequential, especially when operating costs will be shared by multiple end users. Operating costs may relate to maintenance, repair, administration, billing, and inputs (such as electricity, water, and/or natural gas) required on an ongoing basis for certain BRRE technologies to function.

This Article uses a case study—the 360 State Street project, a mixed-use LEED® Platinum project in downtown New Haven, Connecticut—to illustrate the barriers to maximizing the operating capacity of BRRE.[14] 360 State Street is an ideal case study for several reasons. First, enough information about financing and decisionmaking by project leaders is available for study. Supplementing the ample material placed in the public domain is the knowledge and information I acquired serving as the developer's lead attorney on a range of legal issues and as a key member of the project team.[15] Second, the 360 State Street team pursued feasibility studies of multiple types of BRRE and coupled one type of BRRE with significant energy-efficiency measures. Among other unique features, the project features one of the first fuel cells in a multifamily residential building in the world,[16] uses 55% less electricity than a standard code-compliant building, must abide by a development agreement with the municipality requiring certain commitments to sustainability, and has become a poster child for the LEED for Neighborhood Development program.[17] The team's research and its

14. *See LEED Projects & Case Studies Directory: Certified Project Directory*, U.S. GREEN BUILDING COUNCIL, http://www.usgbc.org/LEED/Project/CertifiedProjectList.aspx (last visited Sept. 6, 2012) (listing 360 State Street as a Platinum project in the LEED-ND 1.0 Pilot Program). Note that "LEED" is a registered trademark of the U.S. Green Building Council. For ease of reading, I will not include the "®" throughout the rest of this Article.

15. Note that this relationship to the project presents special ethical issues related to a scholarly account of its development. I have taken care in this Article to discuss only those issues and facts that are in the public domain and have made efforts to safeguard other issues and facts that fall within information privileged by the attorney-client relationship.

16. Only a handful of apartment projects, mostly on a very small scale and mostly in Europe, have used fuel cells. *See Fuel Cell Databases: State Fuel Cell and Hydrogen Database*, FUEL CELLS 2000, http://www.fuelcells.org/info/statedatabase.html (last visited Sept. 6, 2012) (including all fuel cell installations in the United States since 2010); *Fuel Cell Databases: Worldwide Fuel Cell Installation Database*, FUEL CELLS 2000, http://www.fuelcells.org/info/databasefront.html (last visited Sept. 6, 2012) (identifying all fuel cell installations worldwide, from the 1980s, excluding the United States after 2010); *Worldwide Fuel Cell Installations*, FUEL CELLS 2000, http://www.fuelcells.org/info/charts/FCInstallationChart.pdf (last updated Oct. 2005) (listing known fuel cell installations by manufacturer, date, and type, including several small apartment buildings, mostly in Europe).

17. For an overview of the LEED-ND program, see John R. Nolon, *Land Use for Energy Conservation and Sustainable Development: A New Path Toward Climate Change Mitigation*, J. LAND USE & ENVTL. L. (forthcoming 2012).

subsequent choices illustrate why developers might choose one type of renewable energy over another. Finally, the project was overwhelmingly privately funded by a single source, meaning that the impact of renewable energy financing rules on decisionmaking is clearer than it might be in other projects that involve primarily public, or multiple private, sources.[18]

A case study can help confirm or rebut assumptions in the legal literature about the impact of BRRE-related law and policy on private decisionmaking. The 360 State Street case study confirms that, while legal scholars have focused primarily on issues related to the *installation* of BRRE, issues related to the *operation* of BRRE may be just as, if not more, significant to prospective BRRE developers. For example, laws that prohibit submetering or net metering, or fail to fairly set rates for BRRE users, are among the barriers to fully operating BRRE once it is installed.[19]

The Article proceeds as follows. Part II defines BRRE and explains why legal reform is needed now to facilitate BRRE. Part III reviews and considers the implications of legal scholars' focus on installation issues and also describes the limited extent to which the literature has focused on operational issues related to BRRE. Part IV moves on to the case study, describing the disposition of the site, its program and design, and the legal issues regarding BRRE operation that the project continues to face. Part V concludes, arguing that BRRE can be expanded if scholars and policymakers address barriers, particularly at the state level, to fully utilizing BRRE capacity once it is installed.

II. BUILDING-RELATED RENEWABLE ENERGY

Building-related renewable energy provides an opportunity to reduce our carbon footprint and bring energy directly and efficiently to end users. This Part defines BRRE and explains how it can help reduce the negative impact of buildings.

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18. As of the writing of this Article, the project has received approximately $36 million in public subsidies, out of a total project budget of $179 million, meaning that 80% of the project has been privately funded. The impact of law and policy on decisionmaking is clearer than for projects with multiple private sources because there are fewer variables and entities involved in the decisionmaking process. It is clearer than for public projects because public actors do not have the same motivations as private actors.

19. *See infra* Parts III.B.1 and III.B.2 for more on the submetering and net metering issues.

A. Definition of Building-Related Renewable Energy

Building-related renewable energy[20] is renewable energy—primarily solar, wind, geothermal, and fuel cell technologies—incorporated into inhabited structures and used by those structures' occupants. The definition encompasses both small-scale and midsized generating facilities.

"Small-scale" means individual distributed generation: the production of electricity by a small-scale source located at or very near the end user it serves. Examples of small-scale projects include a rooftop solar collector, a homeowner's geothermal well, or a set of small wind turbines on a commercial building.

"Midsized" means BRRE projects that serve one or more buildings featuring multiple occupancy types, multiple users, and/or large square footages. These projects can serve large, single-owner[21] real estate developments with one or many users, such as 360 State Street, a mixed-use complex with approximately 420,000 occupiable square feet[22] and more than 500 unique users.[23] That complex uses a fuel cell that captures waste heat to serve the heating needs of occupants (an arrangement known as combined heat and power). Midsized projects may also cross property lines and serve different property owners. Some midsized projects may be defined as renewable energy microgrids: low-voltage distributed generation that produces energy from renewable sources, often utilizing waste heat and energy

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20. A reader might ask why a new term has been created, when the term "distributed generation" (also called "on-site generation") appears to have similar meaning. "Distributed generation" refers to energy produced on or near the end user as part of a network of small-scale generating facilities connected to the grid. *Distributed Energy Basics*, NAT'L RENEWABLE ENERGY LABORATORY, http://www.nrel.gov/learning/eds_distributed_energy.html (last updated May 18, 2012). This term can refer to both renewable and nonrenewable sources, and it also does not necessarily apply to installations connected directly to an inhabited structure. For example, a distributed generation facility could be developed to power an electric car charging station. Thus, it does not encompass all of the resources "building-related renewable energy" is intended to include.

21. As used here, "single-owner" includes not just individual persons or business entities but also joint tenancies, tenancies in common, shared condominium property, cooperatives with multiple shareholders, and business entities with multiple shareholders or owners. The term is intended to include all those arrangements where one person, entity, or group (loosely defined) controls the parcel being served.

22. Becker Dev. Assocs., LLC, Application for Development Permit Worksheet Submitted to the City of New Haven, July 19, 2007 (showing an anticipated floor area—a rough proxy for occupiable square feet—of 419,508 square feet, a figure that does not include the square footage of the five-story parking garage).

23. *See infra* Part IV.B.1 (describing these users and their energy demands).

storage facilities.[24] Only a handful of microgrids (mostly publicly owned) have been deployed in the United States.[25] Most existing projects have tended to be microgrids serving individual users, such as government institutions.[26] Examples of multiple-user microgrids could include a wind turbine installed on a vacant lot and shared between the property owners on the block, or a solar facility installed on one homeowner's roof whose produced electricity is sent across property lines to several neighbors.

This Article focuses on small-scale and midsized facilities and does not consider large-scale facilities, which tend to be located far from population centers. These facilities certainly raise pressing legal concerns, not least of which is how the energy sprawl they create

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24. For more on renewable energy microgrids, see Bronin, *supra* note 11, at 559–65 (defining a microgrid and explaining why alternative energy microgrids can help reduce the spread of energy sprawl). *See also* N.Y. STATE ENERGY RESEARCH & DEV. AUTH., MICROGRIDS: AN ASSESSMENT OF THE VALUE, OPPORTUNITIES AND BARRIERS TO DEPLOYMENT IN NEW YORK STATE 12–21 (2010) (describing the technical aspects of microgrids, including grid connectivity, metering, switches, energy management, and storage); *Microgrids at LBNL*, LAWRENCE BERKELEY NAT'L LABORATORY, http://der.lbl.gov (last visited Sept. 6, 2012) (defining a microgrid as "a localized grouping of electricity sources and loads that normally operates connected to and synchronous with the traditional centralized grid (macrogrid), but can disconnect and function autonomously as physical and/or economic conditions dictate"). Although microgrids do not necessarily have to incorporate renewable energy, I use the term microgrid throughout this Article to refer only to renewable energy microgrids.

25. *See* N.Y. STATE ENERGY RESEARCH & DEV. AUTH., *supra* note 24, at A1–A82 (describing in great detail the background, ownership structure, and technical components of six microgrid projects); *Current Project: Santa Rita Jail*, LAWRENCE BERKELEY NAT'L LABORATORY, http://der.lbl.gov/microgrids-lbnl/santa-rita-jail (last visited Sept. 6, 2012) (describing a microgrid with a 1.2 megawatt solar panel array and a 2/4 megawatt battery at a California jail); *Enhancing the Smart Grid: Integrating Clean Distributed and Renewable Generation*, U.S. DEPARTMENT OF ENERGY, http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/RDSI_fact_sheet-090209.pdf (last updated Sept. 2, 2009) (listing nine projects in eight states supported by the Department of Energy's Renewable and Distributed Systems Integration Program); *SPIDERS*, SANDIA NAT'L LABORATORIES, http://energy.sandia.gov/?page_id=2781 (last updated Feb. 23, 2012) (describing the joint effort between the federal Departments of Energy, Defense, and Homeland Security to develop a microgrid project through the Smart Power Infrastructure Demonstration for Energy Reliability and Security Initiative).

26. Elsewhere, I have analyzed microgrids that serve multiple users. *See* Bronin, *supra* note 11, at 550 (stating that single-user microgrids "fall outside of the definition of microgrids used by this Article"). Since publication of that article, several public entities have definitively defined microgrids as including one or more users. *See*, *e.g.*, N.Y. STATE ENERGY RESEARCH & DEV. AUTH., *supra* note 24, at S-1 (defining microgrids as "small-scale distribution systems that link and coordinate multiple distributed energy resources (DERs) into a network serving some or all of the energy needs of one or more users located in close proximity"); LAWRENCE BERKELEY NAT'L LABORATORY, *supra* note 24 (defining a microgrid without reference to the number of owners). To conform to current common usage in this rapidly changing field, I use the term "microgrid" in this Article to include both single-user and multiuser microgrids.

should be managed.[27] Indeed, siting (along with initial start-up financing) is a primary barrier to large-scale renewable energy.[28] This Article sets large-scale facilities aside and focuses primarily on projects whose scale allows them to be incorporated into inhabited structures.

It is important to identify two additional limitations on the scope of the definition of BRRE. First, transmission infrastructure—the infrastructure through which the energy created by generating facilities is taken to the end user—is not considered in this Article.[29] BRRE does not rely heavily on transmission lines, like large-scale, outlying facilities do, because BRRE is located next to end users. BRRE only includes generating facilities: panels, turbines, wells, and similar equipment attached to or adjacent to an inhabited structure, using a limited length and number of distribution lines. Second, as may be obvious, offshore facilities (which have become front and center in recent policy debates) are excluded. Offshore facilities raise complicated legal questions, the result of which, perhaps, is that no renewable energy facility has yet been constructed in the waters off American shores. And of course, traditional real estate development does not occur offshore.

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27. *See* Bronin, *supra* note 11, at 547 (identifying concerns with large-scale renewable energy generating facilities and advocating for midsized facilities known as microgrids); McDonald et al., *supra* note 11 (coining the term "energy sprawl").

28. Certain publicly sponsored or publicly funded projects could trigger, for example, the National Environmental Protection Act, 42 U.S.C. § 4321 (2006), or the National Historic Preservation Act, 16 U.S.C. §§ 470a–470w-6 (2006).

29. Several commentators have explored transmission line siting issues. *See, e.g.*, Tara Benedetti, *Running Roughshod? Extending Federal Siting Authority Over Interstate Electric Transmission Lines*, 47 HARV. J. ON LEGIS. 253 (2010) (detailing the consequences of expanding federal jurisdiction over siting interstate electric transmission lines and proposing various measures to ensure greater procedural efficiency and maintenance of state-level expertise); 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 (2010) (explaining how state public utility laws inhibit the siting of new high-voltage transmission lines); Joshua D. Fershee, *Reliably Unreliable: The Problems with Piecemeal Federal Transmission and Grid Reliability Policies*, *in* UNIV. OF CONN. CTR. FOR ENERGY & ENVTL. LAW POLICY PAPER SERIES (2011) (describing how states deal with approvals of projects with spillover effects, and how the federal government has been challenged in its attempts to exercise its authority over siting in the national interest energy transmission corridors); Jim Rossi, *The Trojan Horse of Electric Power Transmission Line Siting Authority*, 39 ENVTL. L. 1015 (2009) (describing how a patchwork of state statutes on transmission thwart new transmission line siting but expressing doubt about current proposals for increased federal authority over transmission lines); Sandeep Vaheesana, *Preempting Parochialism and Protectionism in Power*, 49 HARV. J. ON LEGIS. 87 (2012) (advocating for more comprehensive analysis of the costs and benefits associated with the site selection of electric power transmission lines).

B. Reducing the Negative Impact of Buildings

To repeat the startling statistics mentioned above: our buildings consume 40% of our energy, use two-thirds of our electricity, and emit 40% of our greenhouse gases.[30] These numbers, which present the impact of buildings in relative terms, are expected to keep growing. In the United States, the building and appliance sector is expected to see an average of 2% growth in greenhouse gas emission rates annually between 2006 and 2030—a higher growth rate than any other sector.[31] Global consumption trends suggest that demand for energy will increase 2.2% annually each year until 2020,[32] and there is no reason to believe that the U.S. building and appliance sector will not either match or outstrip this level of growth.

Reducing the current and projected negative environmental impacts of buildings can be achieved most effectively in two ways: energy efficiency and BRRE.

1. Energy Efficiency

One way to reduce the negative environmental impact of buildings is to make them more efficient—that is, to address their demand for energy. Energy efficiency is commonly called a "fifth fuel," next to coal, nuclear, petroleum, and renewable energy, and the measure of wattage saved by energy-efficient technology has been termed a "negawatt." The idea behind these terms—and many of the policies supporting energy efficiency—is that increases in efficiency reduce overall usage.

Policymakers and politicians have touted other benefits of energy efficiency, including reducing our dependence on foreign oil, cutting individuals' energy-related expenses over the long term, and creating jobs (e.g., research and development, retrofitting). President Obama and his Secretary of the Department of Energy (a Nobel Prize–

30. *See supra* text accompanying notes 1–3.

31. MCKINSEY & CO., REDUCING U.S. GREENHOUSE GAS EMISSIONS 7, 10 (2007) (citing for the 2% statistic U.S. ENERGY INFO. ADMIN., ANNUAL ENERGY OUTLOOK 2007 (WITH PROJECTIONS TO 2030) (2007)).

32. MCKINSEY & CO., CURBING GLOBAL ENERGY DEMAND GROWTH: THE ENERGY PRODUCTIVITY OPPORTUNITY 9 (2007). Global energy consumption increased just 23% (or 1.5% annually, on average) between 1990 and 2005. *See also* INT'L ENERGY AGENCY, WORLDWIDE TRENDS IN ENERGY USE AND EFFICIENCY 9 (2008) (noting that energy use would be substantially higher if not for simultaneous efficiency gains).

winning scientist who is a self-professed "energy efficiency nut"[33]) have been particularly vocal supporters.[34] Federal incentives for energy efficiency have been robust.[35] State legislatures have also provided a range of incentives for energy efficiency, including personal and corporate tax deductions and credits, sales tax exemptions, property tax benefits, rebates, grants, loans, and bonds.[36]

To some extent, and perhaps spurred by these incentives, a transformation in energy efficiency has already occurred. A 2008 report from the nongovernmental International Energy Agency ("IEA") concluded that energy-efficiency improvements in certain countries across all sectors (not just the building sector) averaged 2% per year between 1973 and 1990, and that they averaged about 1% per year between 1990 and 2005.[37] The report also found that: "Without any energy efficiency gains since 1973, energy use . . . would have

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33. Steven Chu, *Weatherization: Saving Money by Saving Energy*, HUFFINGTON POST BLOG, (Oct. 30, 2009, 10:49 AM), http://www.huffingtonpost.com/steven-chu/weatherization-saving-mon_b_339935.html ("Energy efficiency is simply good economics. It will save you money. It will create jobs. It is a way for you to personally decrease your carbon emissions and help save our planet.").

34. One of the programs the Obama administration has emphasized most is the Better Building Initiative, which provides incentives for state and local governments to retrofit their buildings; focuses on training and education programs for the energy-efficiency workforce; and creates a network of public and private partners seeking to share information and success stories about energy-reducing retrofits. *Overview*, U.S. DEPARTMENT OF ENERGY, BETTER BUILDINGS, http://www1.eere.energy.gov/buildings/betterbuildings/ (last updated Aug. 14, 2012); *see also* Jackie Calmes, *Obama Announces Backing for Energy-Efficiency Initiative*, N.Y. TIMES, Dec. 2, 2011, http://www.nytimes.com/2011/12/03/us/politics/obama-announces-backing-for-energy-efficiency-initiative.html (describing the President's announcement of $4 billion in public and private commitments regarding building retrofitting); Rick Pierson, *Chu Proposes Energy Efficiency Initiative at Clinton Conference*, CHI. TRIB., June 30, 2011, http://articles .chicagotribune.com/2011-06-30/business/chi-energy-secretary-steven-chu-announces-business-initiative-at-clinton-conference-20110630_1_efficiency-energy-dept-energy-waste (discussing the administration's Better Buildings Initiative).

35. *See, e.g.*, 26 U.S.C. § 136 (2006) (exempting from federal income taxation energy conservation subsidies granted by utility companies); *id.* § 25C (providing tax credits for purchases of energy-efficient technologies in the years 2010 and 2011); *id.* §§ 54A, 54D (defining and setting forth the calculation as a federal tax credit of "qualified energy conservation bond[s]," issued by state or local governments and the purpose to which such bonds could be put, including capital expenses to reduce energy consumption of buildings); *id.* § 45L (authorizing a corporate tax credit for homebuilders' whole-building energy-efficiency measures, expiring in 2011). In addition, among other programs, the federal government offers energy-efficient mortgages through the Federal Housing Authority and the Veterans Affairs agency and provides grants for tribes and for rural energy-efficiency projects.

36. *See Financial Incentives for Energy Efficiency*, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY, http://www.dsireusa.org/summarytables/finee.cfm (last visited Sept. 6, 2012) (identifying the existence of these and other programs on a state-by-state basis).

37. INT'L ENERGY AGENCY, *supra* note 32, at 9.

been 58% higher in 2005 than it actually was."[38] Other organizations have estimated energy-efficiency gains for certain aspects of the building sector. The nonprofit organization American Council for an Energy-Efficient Economy ("ACEEE"), for example, has studied the impact of appliance, equipment, and lighting standards.[39] It has concluded that, since the time of the Council's inception through the year 2035, such standards will have saved consumers more than $1.1 trillion cumulatively, with a reduction in energy use by the equivalent of two years of total U.S. energy consumption.[40] In addition, the standards reduced electricity use by 7% in 2010; by 2035, the reduction in electricity use will be 14%.[41] The global consulting firm McKinsey estimates that improving energy efficiency in buildings and appliances could reduce greenhouse gas emissions by 7 to 9% annually by the year 2030.[42]

Voluntary labeling programs that go beyond minimum standards have also helped popularize and improve energy efficiency. Programs such as the U.S. Green Building Council's[43] LEED Green Building Rating System (a whole-building labeling program[44]) require certain energy-efficiency benchmarks (for example, ensuring that the building is 30% more energy efficient than the building code requires) to be met by a project before it can be certified as "sustainable" under

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38. *Id.*

39. AMANDA LOWENBERGER ET AL., AM. COUNCIL FOR AN ENERGY EFFICIENT ECON., THE EFFICIENCY BOOM: CASHING IN ON THE SAVINGS FROM APPLIANCE STANDARDS (2012).

40. *See id.* at iii (stating in absolute terms that the reduction would equal 200 quads). The report added that as of the year 2010, existing standards annually saved 3.4 quads of energy, which is about 3.5% of total energy consumption in the U.S. *Id.* at 3.

41. *See id.* (stating in absolute terms that the reduction would be 280 terawatt-hours).

42. MCKINSEY & CO., *supra* note 31, at xiv (suggesting means such as: "lighting retrofits; improved heating, ventilation, air conditioning systems, building envelopes, and building control systems; higher performance for consumer and office electronics and appliances" and stating that possible improvements in energy efficiency could reduce greenhouse gases by 710 to 870 megatons). McKinsey cites findings from the Environmental Protection Agency and the Department of Agriculture that annual greenhouse gas emissions are expected to rise from 7,200 megatons in 2005 to 9,700 megatons in 2030. *See id.* at x.

43. While the U.S. Green Building Council adopts new versions of the rating system, it is the U.S. Green Building Certification Institute that actually performs the certifications.

44. It is important to note that a few jurisdictions have made LEED certification mandatory for certain types of buildings. *See, e.g.*, CONN. GEN. STAT. § 16a-38k(a) (2012) (requiring new state facilities costing more than $5 million to meet LEED "Silver" certification requirements); N.Y.C. CHARTER § 224.1-b (requiring new city facilities costing more than $2 million to meet LEED "Silver" certification requirements); *see also* Sara C. Bronin, *The Quiet Revolution Revived: Sustainable Design, Land Use Regulation, and the States*, 93 MINN. L. REV. 231, 255–57 (2008) (discussing a handful of municipal mandates); Sarah B. Schindler, *Following Industry's LEED: Municipal Adoption of Private Green Building Standards*, 62 FLA. L. REV. 285, 312–13 (2010) (discussing municipal incorporation of LEED into local ordinances).

the system. More than forty-seven thousand buildings covering nine billion square feet have been certified since 2000.[45] The voluntary labeling of common household appliances (and now homes) through the Energy Star® program allows consumers to estimate energy use over time and make choices accordingly.[46]

Despite these gains, many have begun to doubt the impact of energy efficiency. Some have identified an "efficiency dilemma," namely that "efforts to improve energy efficiency can more than negate any environmental gains."[47] Making air conditioners and refrigerators more efficient, for example, also makes them more

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45. *LEED Projects & Case Studies Directory*, U.S. GREEN BUILDING COUNCIL, http://www.usgbc.org/LEED/Project/CertifiedProjectList.aspx (last visited Sept. 6, 2012) (listing each of the projects in detail); *What LEED Is*, U.S. GREEN BUILDING COUNCIL, http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988 (last visited Sept. 6, 2012) (giving the nine billion figure).

46. For more on the Energy Star Program, see the federal government's website, ENERGY STAR, www.energystar.gov (last visited Sept. 6, 2012). Note that it has recently been expanded to include buildings. *See also* Alexandra B. Klass, *State Standards for Nationwide Products Revisited: Federalism, Green Building Codes, and Appliance Efficiency Standards*, 34 HARV. ENVTL. L. REV. 335, 344–45 (2010) (describing the Energy Star program for appliances and buildings). Note that "Energy Star" is a registered trademark of the U.S. government. For ease of reading, I will not include the "®" throughout the rest of this Article.

47. David Owen, *The Efficiency Dilemma*, THE NEW YORKER, Dec. 20, 2010, at 78. Academic interest in the efficiency dilemma comes and goes in waves. *See* JESSE JENKINS ET AL., THE BREAKTHROUGH INSTITUTE, ENERGY EMERGENCE: REBOUND & BACKFIRE AS EMERGENT PHENOMENA 49 (2011) (summarizing dozens of surveys related to the rebound effect and concluding that rebound effects "are real and not insignificant"); Blake Alcott, *Jevons' Paradox*, 54 ECOLOGICAL ECON. 9, 9 (2004) (reviewing literature going back decades and stemming from William Stanley Jevons' 1865 book, THE COAL QUESTION). The efficiency paradox is also known as the "rebound effect," a term that refers to the phenomenon of increased efficiency leading to a reduction of the price of services, leading in turn to increased consumption of services, which offsets the benefits of the initial improvements in efficiency. In 2000, the journal ENERGY POLICY devoted an entire issue to scholarly investigation of the rebound effect. *See, e.g.*, Lee Schipper, *On The Rebound: The Interaction of Energy Efficiency, Energy Use, and Economic Activity*, 28 ENERGY POL'Y 351 (2000) (introducing the articles in the issue); Lorna A. Greening et al., *Energy Efficiency and Consumption—The Rebound Effect—A Survey*, 28 ENERGY POL'Y 389 (2000) (reviewing prior studies on the topic and concluding that as automobiles became more fuel efficient, vehicle miles traveled increased by 10% to 30%). Skeptics of the existence and/or impact of the rebound effect are led by the Rocky Mountain Institute and its leader and chief environmental scientist, Amory Lovins. They worry that the causal links that are central to the theory of the rebound effect fail to take population growth or improved quality of life into account. *See, e.g.*, Cameron Burns & Michael Potts, *The "Rebound Effect": A Perennial Controversy Rises Again*, RMI ESOLUTIONS J., Spring 2011 (criticizing the methods of David Owen in the NEW YORKER piece cited above and those of similarly minded rebound effect theory promoters); David Goldstein, *Some Dilemma: Efficient Appliances Use Less Energy, Produce the Same Level of Service with Less Pollution and Provide Consumers with Greater Savings. What's Not to Like?*, NAT. RESOURCES DEF. COUNCIL STAFF BLOG (Dec. 17, 2010), http://switchboard.nrdc.org/blogs/dgoldstein/some_dilemma_efficient_applian_1.html (criticizing Owen's approach for incorrectly defining efficiency as "restraining energy services growth" rather than "using less for the same amount of service").

affordable, and thus more people buy them (or people buy more of them), increasing energy consumption.[48] Others have noted that energy-efficient technologies sometimes perform less well than their traditional counterparts, meaning they have to be replaced more often or used more intensively to achieve the same results as their traditional counterparts.[49] More frequent replacement or use, of course, negates environmental benefits of having an energy-efficient technology in the first place. There is also the issue of price. *The Economist* in 2008 surmised that "[i]n the eyes of many consumers, electricity and fuel are often too cheap to be worth saving, especially in countries where their prices are subsidised."[50] And finally, scholars have raised serious concerns about end-user motivation to do anything that would require specific actions.[51] It is difficult for most people to make a proactive, sustained choice to be energy efficient—say shutting off lights when leaving a room, or measuring the temperature of a hot shower. It is much easier to be efficient when the user has no choice, which is the direction that technology may need to go to ensure serious gains in energy efficiency.

While energy efficiency has become more popular and should continue to be incorporated into whole-building and appliance design, it is necessary to address the supply side of the energy equation to ensure real reductions of the negative environmental impacts of the built environment.

2. BRRE

With demand showing no signs of abating, a second way to reduce the negative environmental impact of buildings is to make the

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48. Owen, *supra* note 47, at 80, 82.

49. *See* Sara Schaefer Muñoz, *Do "Green" Appliances Live Up To Their Billing?*, WALL ST. J., Aug. 2, 2007, at D1 (citing energy-efficient washing machines that must be run twice to clean clothes).

50. *The Elusive Negawatt*, ECONOMIST, May 10, 2008, at 79.

51. *See* Hope M. Babcock, *Assuming Personal Responsibility for Improving the Environment: Moving Toward a New Environmental Norm*, 33 HARV. ENVTL. L. REV. 117, 174 (2009) (placing stock in education and the development of new norms to change individual behavior in ways that will reduce negative impacts on the environment); Stephanie M. Stern, *Smart Grid: Technology and the Psychology of Environmental Behavior Change*, 86 CHI.-KENT L. REV. 139, 139–40 (2011) (arguing that "[i]t is not despite cognitive and behavioral limitations but because of them—and because of technology specifically adapted to human limitations—that we are likely to see major reductions in individual emissions" through energy-efficient means); Michael P. Vandenbergh & Anne C. Steinemann, *The Carbon-Neutral Individual*, 82 N.Y.U. L. REV. 1673, 1678 (2007) ("[T]he carbon-neutrality norm can be linked to the norm of personal responsibility, which entails the commitment not to take actions that harm others.").

buildings themselves the source of clean energy production. Incorporating building-related renewable energy into new or existing structures targets the supply side of the energy equation. Focusing on energy supply does not reflect a concession that demand will always increase, and it should not detract from the quest for energy efficiency or other strategies to address demand. But as the next Part will describe, while BRRE has the potential to provide substantial benefits, there are barriers to BRRE that exceed barriers to energy efficiency or other demand strategies. Before turning to an explanation of those barriers, it is important to first discuss five key reasons why now is a good time to facilitate BRRE and to change the laws that thwart it.

First, from a practical standpoint, BRRE is more feasible than it ever has been. Advances in solar, wind, geothermal, and fuel cell technologies have allowed for easy integration into building systems.[52] The variety of BRRE technologies now available in the consumer market—everything from solar-collecting windowpanes to tiny roof-mounted wind turbines—allow for application and integration in any architectural style and building use. In addition, state governments and utility companies have developed interconnection standards for various technologies, meaning that BRRE can be connected to the larger grid without causing any technical problems.[53]

Second, the price of purchasing BRRE technologies continues to drop, and as prices drop, BRRE becomes more attractive to more builders and building owners. Especially over the last decade, BRRE technologies have become less expensive per unit of power produced.[54] Several research teams have projected that their price will continue to

52. *See* N.C. SOLAR CTR. & INTERSTATE RENEWABLE ENERGY COUNCIL, CONNECTING TO THE GRID: A GUIDE TO DISTRIBUTED GENERATION INTERCONNECTION ISSUES 26–45 (2009) (focusing on a range of technical issues and concepts related to distributed generation and applicable to most types of BRRE).

53. *See Interconnection Policies*, DATABASE OF STATE INCENTIVES FOR RENEWABLE ENERGY & EFFICIENCY (Aug. 2012), http://www.dsireusa.org/documents/summarymaps/interconnection_map.pdf (showing that forty-three states and the District of Columbia have adopted interconnection standards or guidelines, primarily for investor-owned utilities); *see also* INTERSTATE RENEWABLE ENERGY COUNCIL, MODEL INTERCONNECTION PROCEDURES (2009) (offering a "best practices" guide for interconnecting systems of various sizes and configurations).

54. *See, e.g.*, WORLDWATCH INST. & CTR. FOR AM. PROGRESS, AMERICAN ENERGY: THE RENEWABLE PATH TO ENERGY SECURITY 26, 30 (2006) (noting that generating costs for wind have been driven down to 3–5 cents per kilowatt-hour; for solar energy, costs have decreased from 45 cents per kilowatt-hour to 9–12 cents today, and are expected to decrease to 4–7 cents by 2020).

drop even further.[55] Price reductions have been driven by increased demand, which has in turn introduced economies of scale that make it more efficient for suppliers to produce BRRE technologies.[56] Indeed, the renewable energy sector is one of the fastest growing in the world.[57] At the same time, policymakers have begun to recognize that most Americans favor renewable energy.[58] Many federal and state entities now provide financial incentives for renewable energy installations.[59] The state of Connecticut, as just one example, offers an array of subsidies for solar, geothermal, and fuel cell programs; a statewide commercial property assessed clean energy program; and the first statewide "green bank," which offers financing mechanisms that allow more funds to flow to BRRE projects.[60] Private entities, such as banks and investment firms, increasingly offer loans that provide attractive terms for renewable energy projects. Such public and private initiatives increase access to capital and drive down costs, leading (at least in theory) to greater rates of adoption of BRRE.

Third, energy sprawl—the amount of land occupied by energy infrastructure—is becoming an increasingly pressing problem.[61] With growing frequency, landscapes, habitats, waterways, and flora and

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55. MCKINSEY & CO., SOLAR POWER: DARKEST BEFORE DAWN 2 (2012) (stating that costs to develop solar panels will drop by as much as 10% annually); WORLDWATCH INST. & CTR. FOR AM. PROGRESS, *supra* note 54, at 26, 30.

56. WORLDWATCH INST., ENERGY FOR DEVELOPMENT: THE POTENTIAL ROLE OF RENEWABLE ENERGY IN MEETING THE MILLENNIUM DEVELOPMENT GOALS 7, 16 (noting "[t]he rapid recent growth in solar, wind, geothermal, and biomass energy, coupled with ongoing technology improvements and cost reductions").

57. RENEWABLE ENERGY POLICY NETWORK FOR THE 21ST CENTURY, *supra* note 6, at 12, 15, 17 (2011) (citing increases of between 15% and 50% in various renewable energy sector capacities, and steadily increasing investment in renewable energy globally ($211 billion in 2010, up from $130 billion in 2008)).

58. *See supra* text accompanying note 5.

59. *See* DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY, *supra* note 36 (identifying state and federal agencies and nonprofits that offer such incentives). Federal incentives include: personal income tax credits for certain renewable energy installations; renewable electricity production tax credit for businesses; and grants for tribes and rural property owners to study or build projects; clean renewable energy bonds for the public sector. *See id.* Similarly, state incentives include: personal tax credits/deductions/exemptions (twenty-four states); corporate tax credits/deductions/exemptions (twenty-five states); sales tax exemptions (twenty-nine states); property tax incentives (thirty-six states); rebate programs (forty-eight states); grants and/or loans (forty-eight states); and even bonds (three states). *See id.*

60. *See Who We Are*, CLEAN ENERGY FIN. & INVESTMENT AUTHORITY, http://www.ctcleanenergy.com/Default.aspx?tabid=62 (last visited Sept. 17, 2012) (describing its mission as the statewide green bank to "achieve cleaner, cheaper, and more reliable sources [of] energy through clean energy finance").

61. *See* Bronin, *supra* note 11, at 549 (explaining that "demand for energy [is] showing no signs of abating" and that there are serious reasons for concern regarding energy sprawl in the coming decades).

fauna are being negatively affected by both the large-scale energy-generating facilities built in rural areas and the transmission lines that bring energy from them to the end users. BRRE developed in conjunction with, or directly adjacent to, end users will reduce energy sprawl because it will reduce the need to build rural generating facilities.

Fourth, the technological capabilities of BRRE provide many benefits, including meeting dual goals of efficiency and national security. The generation of energy in places at or near human habitation maximizes efficiency, because little energy is lost during transmission. Thus, nearly all of the energy produced by the generator can be directly used by the end user. In addition, BRRE that can be operated independently of the grid can help meet national security goals because users served by BRRE can maintain power even if the grid goes down or transmission lines are compromised. In these ways, BRRE is more efficient and secure than large-scale facilities far away from end users.

Finally, and perhaps most importantly, we have a tremendous opportunity in the near term to positively shape our built environment. Over the next twenty-three years, three-fourths of our building stock will be built new or renovated.[62] In light of that opportunity, the ease with which property owners could either develop buildings with BRRE, or retrofit existing buildings with BRRE, is a matter of pressing concern. If we get the legal framework correct now, it is more likely that we will be able to count on more BRRE being developed in the future.

III. SCHOLARLY APPROACHES TO BRRE

If building-related renewable energy is such a good idea, then why has its adoption been so limited? Initial cost and financing are clearly barriers, although they are being recognized and addressed by an increasing number of public and private entities. Similarly, the technical feasibility of BRRE is no longer in question: as noted above, we have the technical knowledge needed to integrate a wide variety of renewable energy systems into buildings.[63] These systems can serve either individual, small-scale users and projects or larger, midsized users and projects. Even renewable energy microgrids—a type of

62. *A Historic Opportunity*, ARCHITECTURE 2030, http://architecture2030.org/the_solution/buildings_solution_how (last visited Sept. 6, 2012).

63. *See supra* Part II.B.2 (describing developments that have made BRRE "more feasible than it ever has been").

midsized BRRE that has rarely been used in the United States—have been proven to be technically feasible and have the capacity to be integrated into regional electric grids.[64]

Legal academics have focused on the nonfinancial, nontechnical issues related to the installation—namely, the siting—of BRRE to explain why more BRRE has not been built. The literature seems to involve two key topics: first, issues related to third-party objections to siting specific infrastructure; and second, ambiguities in public regulatory frameworks.[65] Scholars' treatment of both of these topics is described in this Part.

After reviewing these analyses, this Part then examines existing scholarly treatments—to the extent they are available—of a second concern: laws or regulations that impact the operation of BRRE. Each type of BRRE has ongoing maintenance costs. When there are multiple users, there may be billing and administrative costs; and some types of BRRE have costs related to inputs (such as natural gas supply for certain fuel cells, or water for certain solar panels). The ability of a prospective BRRE developer to recoup these costs may affect project feasibility and may determine whether the project is pursued.

A. Treatment of BRRE Installation Issues

1. Third-Party Objections

To be sure, when it comes down to choosing where, exactly, to install renewable energy infrastructure, opposition sometimes surfaces. Neighbors, for example, may object to real or perceived

64. *See* N.Y. STATE ENERGY RESEARCH & DEV. AUTH., *supra* note 24, at S-1 (2010) (discussing the feasibility of microgrid use on a large scale).

65. A focus on literature applicable to building-related renewable energy necessarily excludes recent writing on transmission lines, because BRRE does not require long-distance transmission due to its nearby positioning to end users. Several commentators, chief among them Jim Rossi, have focused on this concern. *See supra* note 29 (describing the basis for Rossi's concern). To some extent, scholars have also considered constitutional issues that may affect the way BRRE is regulated, but these arguments do not dominate the literature and are not further considered by this Article. *But see* Robin Kundis Craig, *Constitutional Contours for the Design and Implementation of Multistate Renewable Energy Programs and Projects*, 81 U. COLO. L. REV. 771, 792 (2010) (dealing with the constitutionality of multistate agreements regarding renewable energy marketing, transmission, and distribution); Steven Ferrey et al., *Fire and Ice: World Renewable Energy and Carbon Control Mechanisms Confront Constitutional Barriers*, 20 DUKE ENVTL. L. & POL'Y F. 125, 127 (2010) (dealing with supremacy clause challenges to state actions regarding renewable energy).

negative impacts, such as noise or visual pollution.[66] They may also object to restrictions placed on their activities when a renewable energy project is sited nearby.[67] Environmentalists, meanwhile, may question the environmental impact of certain types of projects: growing biofuels utilizes too much land; large wind turbines kill birds; and so on.[68] Cultural activists and historic preservationists, too, may believe that particular renewable energy projects threaten protected resources.[69] I have explored these issues in earlier work, writing articles on environmental objections to large-scale projects that create

66. *See, e.g.*, Stephen Harland Butler, *Headwinds to a Clean Energy Future: Nuisance Suits Against Wind Energy Projects in the United States*, 97 CALIF. L. REV. 1337, 1337–38 (2009) (describing the phenomenon of neighbors bringing nuisance suits); John Upton, *Nimby Rears Its Head Against Wind Power Project*, N.Y. TIMES, Nov. 11, 2010, at A21B (describing the fight between a property owner and neighbors, who objected to the property owner's installation of a windmill "because it will make noise, create movement with odd shadows and be an eyesore to look at").

67. In California, for example, the erection of a solar collector may require a neighbor to trim shrubs and trees that could shade the collector at key times of the day. *See* CAL. PUB. RES. CODE §§ 25980–25986 (West 2007) (describing statutory obligations imposed on those living within close proximity of a solar collector); Felicity Barringer, *Trees Block Solar Panels, and a Feud Ends in Court*, N.Y. TIMES, Apr. 7, 2008, at A14 (describing the fight between two neighbors, one of whom owned redwood trees shading the solar collectors of the other).

68. *See, e.g.*, McDonald et al., *supra* note 11, at 1 (citing ecosystem damage as a key negative impact of large-scale renewable energy projects); Ronald H. Rosenberg, *Making Renewable Energy a Reality: Finding Ways to Site Windpower Facilities*, 32 WM. & MARY ENVTL. L. & POL'Y REV. 635, 668–69 (2008) (chronicling environmental concerns with wind energy such as "the aesthetic or visual impact of a large number of wind turbines, interference with communications, shadow flicker, the noise produced by rotating blades, effect on hunting and other forms of recreation, health effects of low-frequency sound, impact on aircraft communications, radar navigation and surveillance systems, safety issues, and ice throws from the blades of turbines").

69. *See*, *e.g.*, Quechan Tribe of the Fort Yuma Indian Reservation v. Dep't of the Interior, 755 F. Supp. 2d 1104, 1122 (S.D. Cal. 2010) (sustaining tribal objections to the development of a large-scale solar energy project because it disturbed cultural and historic resources). Similarly, the Cape Wind project, an offshore wind farm expected to be built in Nantucket Sound, has involved objections both by Native American groups and by preservationists. The Aquinnah and Mashpee Wampanoag tribes filed a lawsuit against various parties related to the Department of the Interior in 2011, arguing that the defendants violated the National Historic Preservation Act and that the project would hinder their ability to conduct certain rituals and disturb ancestral burying grounds. *See* Complaint for Declaratory & Injunctive Relief at 25–27, Wampanoag Tribe of Gay Head v. Bromwich, No. 1:11-cv-01238 (D.D.C. July 6, 2011). Preservation groups such as the National Trust for Historic Preservation have argued that the project would visually detract from designated historic properties onshore, among other negative impacts on historic and cultural resources. *See, e.g.*, Letter from Richard Moe to John Nau, Chairman, Advisory Council on Historic Preservation (Mar. 15, 2010) ("[T]he damage the project would cause to a diverse range of nationally-significant historic resources and Traditional Cultural Properties . . . is too great to justify approval of the applicant's requested development permit").

energy sprawl and neighbor objections to small-scale solar BRRE.[70] But several others have also weighed in.

Troy Rule and Uma Outka have written (separately) several important articles about regulatory frameworks for siting. Outka has evaluated state laws dealing with the location of solar and biomass facilities.[71] She has reviewed not only disputes among individual neighbors over the location of small-scale BRRE but also objections by localities when states choose to site renewable projects in an undesirable location.[72] In a recently published piece, Outka proclaimed that "[s]iting is . . . the context in which we can readily see energy policy made tangible on the land—and . . . its importance has increased sharply with the shift to renewable energy."[73] Rule, similarly, has written that: "The greatest opponents of renewable energy development are often those living next door."[74] His two articles on the applicability of Calabresi and Melamed's concepts of entitlements and rights[75] to both the solar and wind contexts have elevated the siting debate.[76] He has also framed third-party objections as disputes over airspace, which allows property and land use law to inform the way we think about third-party objections.[77]

A handful of disputes over renewable energy involving third-party objections has drawn particular scholarly attention. One such dispute is enshrined in *Prah v. Maretti*, a 1982 Wisconsin decision in which a homeowner (who owned and operated a solar collector) successfully sued a neighbor for solar rights under nuisance law.[78] The decision, which found that shading a solar collector could be considered a nuisance, was a surprising departure from prior jurisprudence and a boost to solar property rights. Although the

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70. *E.g.*, Bronin, *supra* note 11; Sara C. Bronin, *Modern Lights*, 80 U. COLO. L. REV. 881 (2009); Sara C. Bronin, *Solar Rights*, 89 B.U. L. REV. 1217 (2009).

71. *See* Uma Outka, *Siting Renewable Energy: Land Use and Regulatory Context*, 37 ECOLOGY L.Q. 1041, 1067–96 (2010) (discussing Florida's existing legal framework for these issues).

72. *Id.* at 1062, 1080–81.

73. Uma Outka, *The Renewable Energy Footprint*, 30 STAN. ENVTL. L.J. 241, 244 (2011).

74. Troy A. Rule, *Renewable Energy and the Neighbors*, 2010 UTAH L. REV. 1223, 1223.

75. Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972).

76. *See* Troy A. Rule, *Shadows on the Cathedral: Solar Access Laws in a Different Light*, 2010 U. ILL. L. REV. 851 (dealing with solar technology siting); Troy A. Rule, *A Downwind View of the Cathedral: Using Rule Four to Allocate Wind Rights*, 46 SAN DIEGO L. REV. 207 (2009) (dealing with wind technology siting).

77. Troy A. Rule, *Airspace in a Green Economy*, 59 UCLA L. REV. 270, 270 (2011).

78. Prah v. Maretti, 321 N.W.2d 182, 242–43 (Wis. 1982).

decision has not influenced other courts,[79] no fewer than 121 law review articles (and forty-two other secondary sources) have cited *Prah*.[80] Among them is an article by Alexandra Klass, which mentions *Prah* during a discussion about new regulatory frameworks for solar law.[81] More broadly, Klass provides historical perspective to modern renewable energy siting disputes, likening neighbor objections to siting renewable energy to the competing use claims that historically underlay water and mineral law.[82]

Another, more recent dispute that has been chronicled in numerous law review articles is the battle over Cape Wind, a large-scale offshore wind project slated to be located in Nantucket Sound. Although large-scale and offshore projects are not included in the definition of BRRE, a brief description of this high-profile battle underscores why siting disputes are so fascinating. The Cape Wind project is designed to include 130 wind turbines, each 440 feet tall and spaced a third of a nautical mile apart.[83] High-profile third-party objections (and several lawsuits) have come from several Indian tribes, the Kennedy family, preservationists, and environmentalists, who have managed so far to delay construction on the project.[84] The law review commentary (much of it written by students) on Cape Wind has primarily tried to address objections to the project by proposing legal strategies that fast-track wind projects of all sites and sizes.[85]

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79. Bronin, *supra* note 70, at 1254 ("Wisconsin courts have cited it only for its unrelated holding on summary judgment, and only two or three courts outside of Wisconsin have cited *Prah* favorably for its findings on nuisance.").

80. To determine these numbers, I looked up the *Prah v. Maretti* case on Westlaw and clicked on "Citing References," narrowing the search down to "Secondary Sources," which yielded 163 results. Of these, I counted both the number of law review and the number of other secondary sources.

81. Alexandra B. Klass, *Property Rights on the New Frontier: Climate Change, Natural Resource Development, and Renewable Energy*, 38 ECOLOGY L.Q. 63, 99 (2011). Klass recommends a hybrid approach to renewable energy siting that includes elements of both traditional natural resources law and land use law. *Id.* at 95–96.

82. *Id.* at 79–80.

83. *Frequently Asked Questions*, CAPE WIND, http://www.capewind.org/FAQ-Category4-Cape+Wind+Basics-Parent0-myfaq-yes.htm (last visited Sept. 6, 2012).

84. *See* Kenneth Kimmell & Dawn Stolfi Stalenhoef, *The Cape Wind Offshore Wind Energy Project: A Case Study of the Difficult Transition to Renewable Energy*, 5 GOLDEN GATE U. ENVTL. L.J. 197, 216–24 (2011) (recounting many of the cases and objections by neighbors from the perspective of an attorney involved in the state permitting process); Ernest Smith, *Wind Energy: Siting Controversies and Rights in Wind*, 1 ENVTL. & ENERGY L. & POL'Y J. 281, 284–90 (2007) (reviewing legal disputes at Cape Wind as part of an article exploring possible analogies between wind and oil and gas law).

85. *See, e.g.*, Ryan Kusmin, *Sucking the Air Out of Wind Energy: Nuisance Litigation and Its Effect on Wind Energy Development*, 88 WASH. U. L. REV. 707, 727 (2011) (describing how nuisance litigation imposes costs on wind development); Susan Lorde Martin, *Wind Farms and*

With fascinating—and "live"—conflicts like Cape Wind, which sometimes pit one environmental interest against another, it is no surprise that scholars have focused on siting disputes.

2. Ambiguities in Public Legal Frameworks

Scholars have also been attracted to the question of installing renewable energy because this area of law remains unsettled, with federal, state, and local governments sometimes asserting concurrent jurisdiction.[86] Currently, the federal government has intervened in large-scale projects, offshore projects, and projects on federal and tribal lands. It also plays a role in siting certain transmission lines.[87] Some local governments (about one hundred of the forty thousand general-purpose local governments nationwide) have expressly asserted siting authority over small-scale (individual) generating facilities through zoning and other land use regulations.[88] State governments have also gotten in the game, through public utility commissions, statewide siting councils, regulations, permitting systems, or other legal controls. The regulatory overlap, lack of consistent rules, and failure of law to account for all possible project configurations have caused confusion for consumers, investors, utilities, and public entities.

Attempting to analyze or clear the confusion, scholars have dug into the question of the level of government best suited to oversee siting of renewable energy—whether such renewable energy is

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NIMBYs: Generating Conflict, Reducing Litigation, 20 FORDHAM ENVTL. L. REV. 427, 462–65 (2010) (suggesting that wind companies pay disgruntled neighbors to allay siting concerns and reduce neighbors' burdens); Gregory J. Rigano, *The Solution to the United States' Energy Troubles Is Blowing in the Wind*, 39 HOFSTRA L. REV. 201, 202–03 (2011) (advocating that the Bureau of Ocean Energy Management have exclusive authority over permitting for offshore projects); Erica Schroeder, *Turning Offshore Wind On*, 98 CALIF. L. REV. 1631, 1657–58 (2010) (advocating changes in the Coastal Zone Management Act that would facilitate offshore wind projects); Dominic Spinelli, Note, *Historic Preservation & Offshore Wind Energy: Lessons Learned from the Cape Wind Saga*, 46 GONZ. L. REV. 741, 763 (2011) (advocating for changes in the National Historic Preservation Act to ease review of wind developments).

86. *See, e.g.*, Outka, *supra* note 73, at 244–45 ("Siting is a threshold of implementation for renewable energy policy, yet it is governed in an almost entirely distinct regulatory landscape that varies significantly from jurisdiction to jurisdiction and is evolving rapidly."); Patricia E. Salkin, *Renewable Energy and Land Use Regulation (Part 2)*, ALI-ABA BUS. L. COURSE MATERIALS J., Apr. 2010, at 27, 27–30 (describing various state and local approaches to siting renewable energy, particularly wind energy).

87. *See* 16 U.S.C. § 824p (2006) (granting the Federal Energy Regulatory Commission the authority to approve of certain transmission lines within designated national interest energy transmission corridors).

88. For a thorough account of local assertions of siting authority, see Garrick B. Pursley & Hannah J. Wiseman, *Local Energy*, 60 EMORY L.J. 877, 911–15 (2011).

building related (as this Article defines that term) or not. Hannah Wiseman has led the discussion on this topic, recently observing: "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."[89] In Wiseman's view, the development of a body of renewable energy law that is clear and predictable could help renewable energy expand.[90]

Many scholars share this view. They may not, however, share Wiseman's proposed antidote to the problem she diagnoses: greater local and regional government involvement in creating renewable energy law. Wiseman has articulated a framework for regional governance structures to address "renewable parcels," which she defines as "the best sites for large arrays of renewable technology."[91] She suggests that states delegate certain powers to regional energy boards, including the power to preempt contrary state and local law.[92] (Of course, regional energy boards could not preempt federal law absent explicit statutory authority.[93]) Elsewhere, she has, with Garrick Pursley, pushed for localities to have more power in siting.[94]

One alternative to regional and local development of renewable energy law is development by the states. In another article, I have suggested that the state should "take back" certain local land use powers they have granted to localities, in part to help facilitate the

89. Hannah Wiseman et al., *Formulating a Law of Sustainable Energy: The Renewables Component*, 28 PACE ENVTL. L. REV. 827, 842 (2011) (focusing on "utility-scale" renewable energy facilities).

90. *Id.* at 833.

91. Hannah Wiseman, *Expanding Regional Renewable Governance*, 35 HARV. ENVTL. L. REV. 477, 494 (2011). She argues that "[a] new form of regional governance institution must . . . emerge to address the anticommons and related regulatory commons tragedy in renewable development." *Id.* at 483.

92. *Id.* at 530–32.

93. The Supremacy Clause establishes federal law as "the supreme Law of the Land; . . . any Thing in the Constitution or Laws of any State to the Contrary notwithstanding." U.S. CONST. art. VI, cl. 2. Preemption may occur when Congress explicitly states that a law preempts state laws to the contrary, when federal and state laws are in direct conflict (or when state laws frustrate a particular purpose of Congress), and when Congress has indicated an intent to "occupy the field" in a particular regulatory arena.

94. Pursley & Wiseman, *supra* note 88, at 879 ("[L]ocal governments—cities and towns—have one of the most significant roles to play in the transition to renewable energy, particularly in the near term as distributed renewable technologies are deployed."); *see also* James M. McElfish Jr. & Sara Gersen, *Local Standards for Wind Power Siting: A Look at Model Ordinances*, 41 ENVTL. L. REP. 10825, 10825 (2011) (advocating local control of wind energy via model ordinances).

siting of renewable energy projects.[95] States are more likely agents of change than regional authorities, which have proven to be hard to create except in a few geographic locales or in relation to a few narrowly defined substantive areas. In my opinion, states are also better than localities at dealing with siting questions for several reasons, including neutrality, competency, and programmatic consistency. States have the ability (in theory, anyway) to be neutral arbiters of extralocal siting conflicts involving public and private actors from different localities. States have the substantive competency to analyze siting questions, since they routinely deal with transmission lines and other related physical issues. Finally, states have been leaders in supporting renewable energy initiatives: they have pioneered the development of renewable portfolio standards,[96] provided incentives for qualifying projects, and supported political institutions (from legislative committees on energy to public utility commissions) with special expertise in energy issues.

Finally, there is a group of scholars who have advocated for greater federal involvement in overseeing the installation and placement of renewable energy. Ashira Ostrow and Patricia Salkin, two key members of this group, have urged Congress to preempt state and local siting authority.[97] They suggest that the Federal Telecommunications Act of 1996, which deals with siting of cell phone towers, could provide a useful model for federal preemption of wind energy installation.[98] Ostrow separately has expanded upon her argument with an insightful proposal for a theory of "process preemption."[99] By this, Ostrow means a federal approach that allows for local decisionmaking in siting, while providing both substantive and procedural constraints within which such decisions must be

95. Bronin, *supra* note 44, at 266–69.

96. *But see* Lincoln L. Davies, *Power Forward: The Argument for a National RPS*, 42 CONN. L. REV. 1339, 1397 (2010) (advocating that state renewable portfolio standards be superseded by a national renewable portfolio standard).

97. Patricia E. Salkin & Ashira Pelman Ostrow, *Cooperative Federalism and Wind: A New Framework for Achieving Sustainability*, 37 HOFSTRA L. REV. 1049, 1082–96 (2009) (suggesting that Congress preempt state and local rules, at least with respect to the siting of wind technology); *see also* Sandeep Vaheesana, *Preempting Parochialism and Protectionism in Power*, 49 HARV. J. ON LEGIS. 87, 87 (2012) (advocating Federal Energy Regulatory Commission control over transmission lines); Wiseman, *supra* note 91, at 532 (recognizing the significance of this work).

98. Salkin & Ostrow, *supra* note 97, at 1093–97.

99. Ashira Pelman Ostrow, *Process Preemption in Federal Siting Regimes*, 48 HARV. J. ON LEGIS. 289, 320–35 (2011).

made.[100] Ostrow views the Telecommunications Act—which engages in a form of process preemption—as a good, though not entirely perfect, model for a federal renewable energy siting statute.

With advocates of local, regional, state, and federal authority for renewable energy siting all engaging in scholarly debate, a single best answer seems elusive, or at least evolving. The discussion in this Section was not meant to be exhaustive, and a wide array of opinions and perspectives has not been included. But even with the descriptions that have been included, there is no doubt that the initial installation of renewable energy (whether building related or not) presents interesting and challenging issues. Unfortunately, in focusing so heavily on siting, scholars have neglected to consider the perhaps theoretically less interesting, but more practically relevant, area of financing renewable energy projects' operation.

B. Treatment of BRRE Operation Issues

All types of BRRE have significant costs during their usable lives. Three key areas of state law affect whether these costs can be recouped by an owner or operator of BRRE from multiple end users: submetering, net metering, and rates being paid by or to the owner of the BRRE. Each of these areas implicates complexities within the legal framework regulating electricity delivery, and each deserves more study. With the exception of one energy law professor, no one has written a law review article that covers submetering in any detail. Net metering has generated a limited amount of scholarly interest, including one article and one student note that focus primarily on net metering. However, most articles that cover net metering in a less substantive way fail to discuss implications for BRRE specifically. Rate setting has long been a subject of scholarly analysis, but only a handful of articles tie rates to motivations for BRRE adoption. While scholarly attention does not guarantee quick or easy solutions, the dearth of writings on BRRE operation-related issues suggests that lawyers—among those best suited to advocate for legal reform that would better facilitate BRRE—may not be exposed to important strategies to enable such reform.

100. *Id.* (describing the requirements and advantages of such an approach, including "increasing the consistency and transparency of the local decisionmaking process and allowing for more effective judicial review of zoning decisions").

1. Submetering

Submetering refers to the measurement and billing of energy (electricity or heat) usage of individual users within a multiuser property or development. Submetering is thus relevant to midsized BRRE projects where multiple users (tenants, neighbors, BRRE co-owners, or others) are involved. As is obvious from this definition, individual, single-user BRRE systems are not implicated by rules prohibiting or allowing submetering.

How does submetering work? When a project is connected to infrastructure owned or controlled by a public utility, submetering occurs "after" the point of connection to the utility infrastructure. There may be one master meter at this point of connection, meaning that one party (presumably the owner of the project) will receive bills for overall usage from the utility company. That party will then obtain information through the submetering monitoring equipment (the meters) for the same period and pass bills reflecting respective shares, based on usage, to the other users. Incorporating BRRE may reduce this bill to a marginal or low amount, and (as explained in the next Section) the owner of the BRRE facility may actually receive a credit back from the utility if net metering laws are in place.[101] When a project is not connected to such infrastructure and is "off the grid," submetering occurs within the project boundaries. The end users pay the owner of the BRRE pursuant to rules established by the state. In either form, bills can be read through wired or wireless communication systems, and many companies offer reliable technologies and services for bill collection and processing.

Submetering has many benefits for the owner of a project incorporating BRRE. Most significantly, it allows her to recoup the costs of operating the BRRE by charging end users for their use of the energy produced by BRRE. Submetering also benefits the tenants themselves. Instead of being billed by square footage or number of occupants, they are billed for their usage. In some cases, their bills are actually lower than the bills they would receive from a utility company because of the rates that states require them to charge. Monitoring equipment is developed to high standards put forth by building industry professionals and adopted by many jurisdictions that enable submetering.[102] And overall, there are environmental benefits

101. *See infra* Part III.B.2 (explaining net metering).

102. *See*, *e.g.*, ANSI C12.1-2008, ELECTRIC METERS CODE FOR ELECTRICITY METERING (2008) (setting forth certain technical standards for electric metering equipment).

associated with reductions in usage that submetering generally inspires.[103] For these reasons and more, in 2011, a multiagency federal task force issued a report recommending submetering in building design and retrofits wherever there is economic justification.[104]

There are currently three legal alternatives to submetering. The first is direct metering: that is, simply having each end user contract with, and obtain power from, the utility. The disadvantage of this alternative for BRRE is that it provides no incentive for an owner to incorporate BRRE into a project, except to the extent necessary to meet her own energy needs. In addition, it may not be physically or financially feasible to retrofit with individual utility-grade meters an existing building that has one master meter. The second alternative is having the owner pay for the usage of the entire project and not billing end users separately for usage, but instead incorporating usage (perhaps using historical building usage data) into aggregate rents. This is a master-metered, but not submetered, arrangement.[105] The third alternative is having the owner submit a separate bill to each end user based on an allocation formula (also known as ratio utility billing) using square footage, number of occupants, or some other measure that may be roughly correlated with, but not directly tied to, usage. While the second and third alternatives are compatible with BRRE installation, these alternatives do not encourage individual conservation as much as submetering does.[106]

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103. *See*, *e.g.*, N.Y. STATE ENERGY RESEARCH & DEV. AUTH., RESIDENTIAL ELECTRICAL SUBMETERING MANUAL 7 (2001) (reporting results of several studies done in the 1990s of submetered apartment buildings and showing average usage reductions of 20% to 30% over pre-submetered usage). Water submetering is a valuable point of comparison because there is more data on usage as a result of submetering than there is on electric usage as a result of submetering. All fifty states allow property owners to submeter water in new multifamily construction projects. (Most allow water submetering in a wide variety of other types of multiuser projects, including commercial applications.) Several comprehensive studies have been done on water submetering and have found that submetering significantly decreases usage. *See*, *e.g.*, A&N TECHNICAL SERVS., BMP COSTS & SAVINGS STUDY 2-2 (2005) (citing several studies that measured the effect of submetering, ranging from 18% to 68% of water savings); AQUACRAFT, INC., NATIONAL MULTIPLE FAMILY SUBMETERING ALLOCATION BILLING PROGRAM STUDY 254 (2004) (concluding that "[s]ubmetering achieved statistically significant water savings of 15.3% (21.8 gal/day/unit) compared with traditional in-rent properties after correcting for" various factors).

104. NAT'L SCI. & TECH. COUNCIL COMM. ON TECH., SUBCOMM. ON BLDGS. TECH. RESEARCH & DEV., SUBMETERING OF BUILDING ENERGY AND WATER USAGE, at x, 15 (2011).

105. *See generally* William M. Flynn & John T. McManus, *Inside the World of Residential Electricity Submetering*, N.Y. L.J., Mar. 15, 2010 (explaining some of the characteristics of direct and master metering in light of a discussion on submetering).

106. *See*, *e.g.*, OLIVIA WEIN & CHARLIE HARAK, NAT'L CONSUMER LAW CTR., SOAKING TENANTS: BILLING TENANTS DIRECTLY FOR WATER AND SEWER SERVICES 1 (2003) (citing studies

Despite dissatisfaction with alternatives and the potential benefits of submetering, submetering is prohibited, in whole or in part, in many states. Elsewhere, I have criticized the outsized sway of utility companies over state legislatures that make rules with significant impacts on the availability of renewable technologies.[107] Utility companies often lobby against submetering legislation for fear that liberalizing submetering rules will result in less revenue and less demand for their services.[108] In some states, their views have been held up in court under the theory that state policy intended to create an electricity monopoly by designating public utilities in the first place.[109]

Consumer groups have different concerns about submetering.[110] They view the manipulation of usage data as a real possibility, since in the past, technology has not been good enough to accurately monitor usage, and some property owners have been unscrupulous. Consumer groups also worry about the effect of submetering on low-income populations, especially in a situation

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that show that ratio utility billing reduced water usage by 6% to 27% compared with those paying for water in rent, while submetering reduced water usage by 18% to 33%).

107. Bronin, *supra* note 11, at 569–70 (charging that utility companies sometimes raise false concerns about technical feasibility and safety, and set rates that are not favorable to operators of renewable energy technology).

108. Utility companies are often the best-organized and most ardent opponents of laws and policies that benefit renewable energy. For a surprising analysis of utilities' actions across a range of case studies, see R. BRENT ALDERFER ET AL., U.S. DEP'T OF ENERGY DISTRIBUTED POWER PROGRAM, NAT'L RENEWABLE ENERGY LAB., MAKING CONNECTIONS: CASE STUDIES OF INTERCONNECTION BARRIERS AND THEIR IMPACT ON DISTRIBUTED POWER PROJECTS (2000).

109. Electric public utilities were originally created as monopolies to reduce confusion in the marketplace and coordinate the construction of infrastructure and delivery of services. *See* Charles G. Stalon & Reinier H.J.H. Lock, *State-Federal Relations in the Economic Regulation of Energy*, 7 YALE J. ON REG. 427, 437 (1990) (describing this historical approach and pointing out that "[b]y the mid-1920s, most utilities were operating under a state-sanctioned monopoly retail franchise with a general obligation to provide end-use service"). Accordingly, courts were reluctant to allow private entities to infringe on any of the powers that electric public utilities maintained, fearing that private entry into the market could confuse consumers or disrupt services. *See*, *e.g.*, Bos. Real Estate Bd. v. Dep't of Pub. Utils., 334 Mass. 477, 492 (1956) (finding that landlords who submetered electricity were not entitled to do so, and that allowing submetering in this case would lead to the "threat of expansion, absent restriction or prohibition of the practice"). More recently, some jurisdictions have experimented with the deregulation and privatization of public utilities, although monopolies over the distribution infrastructure often remain.

110. *See* WEIN & HARAK, *supra* note 106, at 3–5 (presenting the perspective of the National Consumer Law Center); Steven Ferrey, *Cold Power: Energy and Public Housing*, 23 HARV. J. ON LEGIS. 33, 47–48 (1986) (identifying some potential problems with energy submetering but concluding that "[s]tates have adopted a myriad of solutions" including capping billable costs to actual costs and allowing the owner to resell utility service at whole rates plus administrative costs incurred)

where a building is being shifted from a master-metered building to a submetered one.[111] There is also the prospect that residential tenants may be forced to pay overly high bills for electric service simply by virtue of living in an energy-inefficient building—something that the landlord could remedy, but the residential tenants cannot. Defective meters, poorly installed equipment, or unfair distribution of nonmetered costs also present concern.

In my opinion, the benefits of submetering far outweigh potential concerns, and regulations (especially if modeled after those of New York State, a pioneer in submetering) can address many concerns by placing limitations on billing procedures, billable costs, and rates.[112] Only one other scholar, Steven Ferrey, appears to have weighed in in any substantive way—and he appears to also favor submetering. In articles published in 1986 and 1995, Ferrey considered submetered rental apartment units as part of an extended discussion of the type of metering and utility allowances appropriate for public housing.[113] He concluded that "[b]y combining the advantages of individual and master metering, submetering appears to offer the best of both worlds to tenants and building owners."[114]

Aside from Ferrey's article, among thousands of articles available in searchable format, just nineteen pieces that could be identified as "law review and journal articles" include reference of any kind to electric submetering. Of these, nine were treatises, case updates, or newsy items less than a page long, which provided minimal analysis. Four others included the term only in cited material or in footnotes. Five articles mentioned submetering while attempting to explain other, sometimes wholly unrelated, areas of law.[115]

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111. *See* Flynn & McManus, *supra* note 105, at 1–3 (describing recent opposition from tenant advocates in New York State to submetering conversions from master metering).

112. *See*, *e.g.*, NAT'L SCI. & TECH. COUNCIL COMM. ON TECH., *supra* note 104, at 18, 32 (describing the attributes, performance metrics, and data protocols related to submeters and the information they collect); N.Y. STATE ENERGY RESEARCH & DEV. AUTH., *supra* note 103, at 32–34, E-1 (2001) (explaining the detailed procedures in New York for resolving disputes between the owner of a master meter and residential tenants, which are enshrined in state laws and regulations governing submetering).

113. Ferrey, *supra* note 110, at 46–51; Steven Ferrey, *In from the Cold: Energy Efficiency and the Reform of HUD's Utility Allowance System*, 32 HARV. J. ON LEGIS. 145, 164–80 (1995).

114. Ferrey, *supra* note 110, at 47.

115. *See* G.E. Hale & Rosemary D. Hale, *Competition or Control V: Production and Distribution of Electric Energy*, 110 U. PA. L. REV. 57, 64 (1961) (making an argument about antitrust enforcement and mentioning submetering in two sentences, to underscore utility company monopoly over electric supply); Eileen Lunga & Rosamond Mandell, *Survey of Developments in Maryland Law, 1983-84*, 44 MD. L. REV. 254, 641 n.315 (1985); Amy A. Nichols, *Texas Opens for Business: An Analysis of Deregulation of the Electric Industry in Texas*, 3 TEX.

While Professor Ferrey's analysis provided important insights, the dearth of analysis on submetering amidst thousands of law review articles is striking. I describe the available literature in detail to underscore the lack of visibility—even among energy law scholars—of this important topic. If we are serious about facilitating BRRE, we should hear more voices from the academy suggesting ways to evaluate and advocate for some type of submetering at the state level.

2. Net Metering

Net metering is a second area of law governed by states with significant influence over the financial feasibility of BRRE configurations. Net metering refers to the ability of a grid-connected, nonutility electricity producer to sell electricity back to the supplier at predetermined rates. Unlike submetering law, which only applies to BRRE (and not renewable energy generally), net metering rules apply to renewable energy generally, with no special provisions for BRRE. Still, the positive impacts that net metering can have on BRRE are clear.

State laws used to require that utility customers who generated excess electricity would receive payment from the utility at the utility's "avoided cost" rate.[116] As experts on net metering have explained, the avoided cost rate, which "is often less than half the retail rate paid by the customer . . . is an insufficient economic rationale for a customer to size an on-site generation system so that it will export energy—given that every kilowatt-hour exported would represent a financial loss to the customer."[117] Net metering rules were first adopted in the 1980s to address this concern and to reverse negative incentives for BRRE and other types of renewable energy.[118]

TECH J. TEX. ADMIN. L. 179, 183 (2002) (mentioning submetering twice while making a broader point about Texas's definition of "wholesale" utility rates); Note, *Primary Jurisdiction—Effect of Administrative Remedies on the Jurisdiction of Courts*, 51 HARV. L. REV. 1251 (1938) (dealing with the "primary jurisdiction" rule in administrative law and including a case involving an administrative determining of submetering); Jake Seligman, Comment, *Electric Vehicles and Time-of-Use Rates: The Impending Role of the New York State Public Service Commission in Regulating our Transportation Future*, 28 PACE ENVTL. L. REV. 568, 587–88 (2011) (focusing on rates relating to grid-enabled vehicles and briefly criticizing a state commission's decision to treat owners of grid-enabled vehicles in the same way that it treats submetered tenants).

116. LAUREL VARNADO & MICHAEL SHEEHAN, N.C. SOLAR CTR. & INTERSTATE RENEWABLE ENERGY COUNCIL, CONNECTING TO THE GRID: A GUIDE TO DISTRIBUTED GENERATION INTERCONNECTION ISSUES 11 (6th ed. 2009).

117. *Id.*

118. *See id.* (identifying Iowa and Minnesota as among initial states that found avoided costs as insufficient incentive for promoting customer investment in distributed technology);

Net metering policies that require utilities to reimburse electricity generators with higher rates than the avoided cost rate, or to supply them with in-kind credits for future power usage, have now been widely adopted. In 1997, only fourteen states had adopted net metering policies.[119] Today, forty-three states and the District of Columbia have them.[120] The Interstate Renewable Energy Council, which has issued a set of model net metering rules,[121] calls net metering "one of the most important, least-cost policies by which owners of . . . renewable systems may recoup their energy investment."[122] In states that offer net metering, building owners have some incentive to oversize, or at least not to undersize, renewable energy components, because they know they will be reimbursed for costs incurred at an attractive rate.

Net metering is less controversial than submetering, and even utility companies have not appeared to resist net metering as much as they have resisted submetering. Still, there are legal issues that merit further analysis. Seven states lack any form of net metering policy, and three states (Idaho, Texas, and South Carolina) make it voluntary on public utilities.[123] Understanding the regulatory framework in these states could help interested parties understand how to facilitate BRRE even where net metering is not occurring or is not required. In addition, there are special concerns in retail choice (as opposed to regulated) markets.[124] Regulated markets have just one public utility, while retail choice markets may involve competitive suppliers of electricity. Figuring out how an excess electricity generator will be reimbursed, and by whom, is a complex task, and suggestions for streamlining decisionmaking might be helpful. Lastly, some states have allowed utility companies to limit the benefits of net metering by charging high fees for grid connections or raising costs through other

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Steven Ferrey, *Nothing but Net: Renewable Energy and the Environment,* MidAmerican *Legal Fictions, and Supremacy Doctrine*, 14 DUKE ENVTL. L. & POL'Y F. 1, 52 (2003) (identifying Minnesota as the first state to adopt net metering).

119. Christopher Flavin & Seth Dunn, *Renewable Energy Technologies and Policies: Status and Prospects*, 5 BUFF. ENVTL. L.J. 1, 12 (1997).

120. *Net Metering*, DATABASE OF STATE INCENTIVES FOR RENEWABLE ENERGY & EFFICIENCY (Sept. 2012) [hereinafter NET METERING MAP], http://www.dsireusa.org/documents/summarymaps/net_metering_map.pdf.

121. INTERSTATE RENEWABLE ENERGY COUNCIL, NET METERING MODEL RULES (2009).

122. JUSTIN BARNES & LAUREL VARNADO, N.C. SOLAR CTR. & INTERSTATE RENEWABLE ENERGY COUNCIL, THE INTERSECTION OF NET METERING & RETAIL CHOICE 2–3 (2010).

123. U.S. DEP'T OF ENERGY, NET METERING MAP, *supra* note 120.

124. BARNES & VARNADO, *supra* note 122, at 3 (defining a retail choice market as involving "competitive suppliers that provide energy, distribution utilities that deliver the energy, and end-user customers, all operating in a functioning competitive energy market").

means.[125] Further analysis of this aspect of net metering law could illuminate its impacts on BRRE.

To some extent, law professors and others have begun to tackle issues related to net metering. The law review databases reveal 165 articles that mention renewable energy net metering issues, all written after 1997. Digging into these articles, however, yields just five substantive, in-depth discussions of net metering. Many of the articles dispose of net metering in a paragraph or so.[126] Many more articles list net metering once, or include it in a footnote. Two articles deal with the very interesting parallels between net metering for buildings and net metering for grid enabled vehicles, but do not focus on traditional renewable energy projects.[127] More broadly, the applicability of the 165 articles to BRRE (as opposed to renewable energy generally) varies. As one measure, it may be interesting to note that of all of the articles that discuss net metering, none discuss submetering, an issue squarely related to BRRE.

A brief characterization of the five articles that more substantively deal with net metering will illuminate key perspectives in this area of law. The two most recent articles should be considered together because both deal with regulatory barriers to renewable energy broadly, with the authors' suggestions on net metering reform playing a supporting role. In one article, a public policy professor and her student identify possible changes to net metering laws, including

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125. *See* Rustin P. Diehl, *Transitioning to a Clean Renewable Energy Network in the West*, 27 J. LAND RESOURCES & ENVTL. L. 345, 354 (2007) (discussing the effects of renewable energy subsidies and certain incentives); *see also* ALDERFER, *supra* note 108, at 57–58 (describing the failure of a fuel cell project because the utility company required a $10,000 grid connection fee, even though it had not required such a fee for the customer's prior equipment).

126. *See*, *e.g.*, Sanya Carleyolsen, *Tangled in the Wires: An Assessment of the Existing U.S. Renewable Energy Legal Framework*, 46 NAT. RESOURCES J. 759, 779 (2006) (providing a single paragraph overview of net metering generally); Steven Ferrey, *Power Paradox: The Algorithm of Carbon and International Development*, 19 STAN. L. & POL'Y REV. 510, 528–29 (2008) (discussing net metering as a concept being exported to foreign countries); Ronald H. Rosenberg, *Harmonious Federalism in Support of National Energy Goals—Increased Wind Renewable Energy*, 85 N.D. L. REV. 781, 820 (2009) (listing net metering as one of several state-level financial incentives for renewable energy).

127. *See* Matthew Hutton & Thomas Hutton, *Legal and Regulatory Impediments to Vehicle-to-Grid Aggregation*, 36 WM. & MARY ENVTL. L. & POL'Y REV. 337, 354–56 (2012) (discussing net metering legislation and regulation); Bryan Lamble, *Of Nesting Dolls and Trojan Horses: A Survey of Legal and Policy Issues Attendant to Vehicle-to-Grid Battery Electric Vehicles*, 86 CHI.-KENT L. REV. 193, 194 (2011) (referring to a vehicle-to-grid concept as "a kind of net metering for an 'appliance' that you can drive and that possesses enough electricity storage in its battery to allow the larger grid to take electricity back from it").

modifying the rates associated with excess electricity.[128] Specifically, they advocate time of use pricing, which would allow for excess electricity to be sold at the rates in place at the time it is produced.[129] This suggestion affects solar panels more than any other type of renewable energy because solar energy is produced during the day, when utility companies tend to impose peak pricing on utility users.

Similarly, in another article, a practicing attorney offers ideas to clarify legal frameworks governing renewable energy.[130] Among other things, he suggests that the size limitations that many states impose on net metered projects should be either increased, as some states have recently done, or lifted altogether.[131] As he notes, the majority of states allowing net metering have only allowed it for projects with less than a certain output.[132] Recognizing and attempting to address this potential barrier could help facilitate future projects.

There are also two student notes that consider other aspects of net metering law. One of the students advocates for greater federal involvement in facilitating distributed generation, saying that a net metering program "with federally-set standards implemented through the states would be one of the most effective ways of introducing" renewable energy distributed generation.[133] She also believes that this solution should be combined with increased market transparency[134] and should draw from the successes at the state level—specifically, those of New York—that have streamlined net metering rules for certain projects.[135]

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128. Marilyn A. Brown & Sharon (Jess) Chandler, *Governing Confusion: How Statutes, Fiscal Policy, and Regulations Impede Clean Energy Technologies*, 19 STAN. L. & POL'Y REV. 472, 492–93 (2008).

129. *Id.* at 483 ("When net-metering is used in conjunction with TOU pricing, customers who generate electricity during the day (when use is at peak and prices are high) could offset their costs for electricity used off-peak when prices are low.").

130. *See generally* Trevor D. Stiles, *Regulatory Barriers to Clean Energy*, 41 U. TOL. L. REV. 923, 923–42 (2010).

131. *Id.* at 934 (arguing that the "upfront costs of renewable energy combined with small net metering limits makes it difficult for a facility to be large enough to capture economies of scale for generation, and yet small enough to fit within the confines of the state net metering program").

132. *See id.* (discussing limitations of net metering); *see also* NET METERING MAP, *supra* note 120 (providing certain state specific metering information).

133. Kristin Bluvas, *Distributed Generation: A Step Forward in United States Energy Policy*, 70 ALB. L. REV. 1589, 1607 (2007).

134. *Id.* at 1598–99.

135. *Id.* at 1612–14.

The other student provides a more sustained analysis, offering insights into the unfair utility company practices that tend to thwart participation in net metering programs.[136] She chronicles utility company objections to net metering, including safety and liability, difficulties with interconnection and maintenance, and overly favorable rate structures for qualifying facilities.[137] And she explains the hidden costs that utilities impose on net metering projects, including "connection fees, competitive transition charges (CTC), design and engineering fees, building fees, property taxes, sales taxes, utility-metering fees, . . . standby charges, . . . complex utility power purchase agreements (PPAs), interconnection requirements, and liability insurance."[138] She offers suggestions for proceeding, concluding that "[t]he economic limitations to net metering are the biggest problem" to renewable energy generation using net metering.[139]

Steven Ferrey is the only legal academic who has written an article dealing primarily with net metering.[140] He focuses on an important net metering decision,[141] arguing that it was wrongly decided.[142] In his view, the case would raise tensions between the federal government and the states: "The constitutional constraints on state regulation of the traditionally federally governed American energy system are contested on the net metering battleground."[143] The article goes through an exhaustive analysis of Federal Energy Regulatory Commission issues, the definition of "qualifying facilities" under federal law (a definition tied to state net metering rules), and concepts involving the sale of power. There is no doubt that Ferrey's treatment is the most thorough on the matter of net metering, just as his submetering articles were for that topic. But it was written nearly a decade ago, and its topic (states' net metering rules) has since evolved. So, there is certainly room for more scholarly engagement with this issue.

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136. Valerie J. Faden, *Net Metering of Renewable Energy: How Traditional Electricity Suppliers Fight to Keep You in the Dark*, 10 WIDENER J. PUB. L. 109, 121–23 (2000).

137. *Id.* at 121–22. Note that "qualifying facility" is a term of art under the Public Utility Regulatory Policy Act of 1978, Pub. L. No. 95-617, 92 Stat. 3117.

138. Faden, *supra* note 136, at 128–31.

139. *Id.* at 133.

140. Ferrey, *supra* note 118.

141. MidAmerican Energy Co. v. Iowa Utils. Bd., No. AA3173, AA3195, AA3196 (Iowa Dist. Ct. Aug. 24, 1999) (cited in Ferrey, *supra* note 118).

142. Ferrey, *supra* note 118, at 117 (calling the decision "a leap of faith from a supposed springboard of precedent that does not exist").

143. *Id.* at 1, 3.

In sum, as this survey of the literature reveals, scholars have written more about net metering than they have about submetering. And while the articles found make contributions to this emerging area, it would be helpful to gather more views.

3. Rates Related to Renewable Energy

A third issue key to BRRE operation is the way in which state legislatures and state public utility commissions regulate certain rates relating to the sale and distribution of electricity. The two types of rates that most directly impact the financial feasibility of BRRE operation are: the rate at which BRRE producers can "sell" electricity to third-party end users (through submetering, where it is allowed); and the rate at which BRRE producers can "sell" electricity back to the grid (through net metering, where it is allowed). These rates are important to BRRE operation because they determine the amount of income that an electricity producer might gain from selling electricity.[144] The higher the rate, the greater the income for the owner of the BRRE facility.

Submetering laws vary from state to state, and there is no consensus about prevailing trends in the way states establish submetering rates.[145] Net metering laws, too, vary from state to state, and for the most part, an electricity producer can sell excess produced by a renewable resource at what is known as the retail rate.[146] The retail rate is the rate paid by the utility's average retail customer. For BRRE owners, the advantage of using the retail rate as the submetering or net metering rate is that the retail rate is generally higher than other rates used in the public utility context. Going further, a retail rate that incorporates time-of-use pricing (that is, higher prices during peak periods, and lower prices during off-peak periods) would be most beneficial to BRRE owners. Time-of-use pricing especially benefits owners of solar collectors, which generate

144. This Article does not cover other issues related to rate setting, such as whether there is a connection fee for BRRE owners doing net metering or submetering or connecting to the grid, or whether net metering credits can be banked for future use. Some of these other issues can be significant. *See*, *e.g.*, Brown & Chandler, *supra* note 128, at 481–82 (describing a $10,000 connection tariff imposed by the mid-Atlantic independent system operator for small generators of electricity).

145. *See* Ferrey, *supra* note 113, at 176 (noting "changing rate structures and technologies" affecting the economic feasibility of submetering).

146. *See* Stiles, *supra* note 130, at 932–34.

the most electricity during the peak daytime periods, and the least electricity at night during the off-peak periods.[147]

There are two main alternatives to the retail rate. One alternative is what is known as the utility's avoided cost, defined as the incremental increase in cost to the utility of itself generating the equivalent power produced by a qualifying facility, or in buying the power from another source.[148] Under the Public Utility Regulatory Policy Act of 1978, utilities must pay this rate to qualifying facilities, including certain nonutility renewable energy producers. The calculation of the avoided cost considers only the incremental increase in constructing infrastructure needed to match the output of the BRRE facility.[149] Another alternative to the retail rate is the wholesale rate, representing the cost of purchasing power on the regulated wholesale market from anyone authorized to generate electricity.[150] Buyers of wholesale power include entities (such as public utilities) that interact directly with end users and resell electricity at retail rates. Sellers of wholesale power may include independent power producers, such as qualifying BRRE owners. As this description suggests, the wholesale rate is the lowest rate in the energy regulatory system. Because the retail rate represents a premium over both the wholesale rate and the avoided cost rate, the retail rate is preferable for owners of BRRE.

There has been some resistance to the development of favorable rates for BRRE and other forms of distributed generation. A growing concern among policymakers is the extent to which an increase in distributed generation may end up harming the grid and creating economic inequities. The risk is that as BRRE and other forms of distributed generation expand, the costs of incremental additions to the transmission and distribution system (which serve as a grid-based backup for distributed generation) will be borne by fewer

147. For a thorough analysis of the impact of rate setting and more on retail rate structures, see generally STEVEN BRAITHWAIT ET AL., EDISON ELEC. INST., RETAIL ELECTRIC PRICING AND RATE DESIGN IN EVOLVING MARKETS (2007).

148. *See* 18 C.F.R. § 292.101(b)(6) (2012).

149. *See id.* A clarifying order in 2011 allows qualifying facilities using renewable energy to calculate avoided cost based on the actual costs of building that renewable energy. *See* Order Granting Clarification and Dismissing Rehearing, Ca. Pub. Utils. Comm'n, 133 FERC ¶ 61,059 (2010).

150. Wholesale rates are established by either the Federal Energy Regulatory Commission (for interstate commerce) or, in the case of most of Texas, the Electricity Reliability Council of Texas. *See* 16 U.S.C. § 824 (2006) (discussing FERC's jurisdiction over interstate wholesale rates); *see also* Mont.-Dakota Utils. Co. v. Nw. Pub. Serv. Co., 341 U.S. 246, 251–52 (1951) (establishing the filed-rate doctrine).

and fewer ratepayers. Because distributed generation is currently deployed primarily by upper-income users, the smaller number of less well-off ratepayers who rely on the grid may bear a disproportionately high burden for the maintenance of the grid. These issues should be considered as we consider the ideal rates for BRRE.

Beyond this basic analysis, this Article will not further discuss rates, which are complicated and vary immensely from state to state. In any case, the literature regarding rates is more robust than the literature relating to submetering or net metering. About four hundred articles cover electric rates in some form or fashion. The most cited pieces are historical overviews describing the evolution of the rate structure and the federal-state regulatory framework[151] or arguments for or against deregulation.[152] A healthy subset deals with the antitrust or monopolization issues related to rate setting.[153] None of the key articles cover BRRE specifically, but all are helpful for a deeper understanding of the continuing evolution of the various rates in the context of the broader history of the electric industry.

No doubt there are many other issues, not covered in this Article, that affect the financial feasibility of operating BRRE, and thus the choice about whether someone would incorporate it into their building or buildings. But highlighting these three issues, and scholars' treatment of them, reveals that much more could be done to

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151. *See*, *e.g.*, Joseph D. Kearney & Thomas W. Merrill, *The Great Transformation of Regulated Industries Law*, 98 COLUM. L. REV. 1323, 1329 (1998) (analyzing various regulated industries, including the electric industry, and concluding that recent changes to such industries' law resulted from interest group efforts and a consensus among the elites about regulatory failure); Rossi, *supra* note 29, at 1044–48 (advocating for carbon neutral transmission pricing and noting that currently transmission costs are incorporated into retail rates); Sidney A. Shapiro & Joseph P. Tomain, *Rethinking Reform of Electricity Markets*, 40 WAKE FOREST L. REV. 497, 502–42 (providing historical background on the electric industry, including trends in rate setting, and advocating for a "smarter" grid); Stalon & Lock, *supra* note 109, at 429 (focusing on conflicts between state and federal decisionmakers and predicting that the states will lose power to regulate rates over time).

152. *See*, *e.g.*, Richard J. Pierce, Jr., *A Proposal to Deregulate the Market for Bulk Power*, 72 VA. L. REV. 1183, 1204 (1986) (advocating incorporating marginal cost principles into retail rate structures and suggesting that then-current retail rates led to both overconsumption and underconsumption); J. Gregory Sidak & Daniel F. Spulber, *Deregulatory Takings and Breach of the Regulatory Contract*, 71 N.Y.U. L. REV. 851, 909 (1996) (describing the rationale for standardized rate regulation, within a larger article about potential takings claims related to deregulation).

153. *See*, *e.g.*, James E. Meeks, *Concentration in the Electric Power Industry: The Impact of Antitrust Policy*, 72 COLUM. L. REV. 64, 117 (1972) (charging that "[v]irtually all electric systems engage in price discrimination," a characteristic of an illegal monopoly); Note, *Refusals to Deal by Vertically Integrated Monopolists*, 87 HARV. L. REV. 1720, 1720 (1974) (using a recently decided Supreme Court case as a springboard for discussing the role of monopolies in the electric utility context).

improve our understanding of how BRRE can be facilitated within the legal frameworks that we have, and what needs to change about those frameworks to ensure fewer barriers exist to encouraging property owners to choose BRRE.

IV. INSTALLATION AND OPERATION OF BRRE AT 360 STATE STREET

With this background in mind, I turn now to the case study, 360 State Street. This complex, mixed-use project, located in downtown New Haven, Connecticut, was completed in October 2010. It incorporates a four hundred–kilowatt fuel cell that has the capacity to meet nearly all energy and electricity needs of users. This Part describes three aspects of the project's development: disposition of the site, its program and design, and BRRE-related legal and financial issues.

These details will show that installation of the project was not problematic in any respect: no local authorities, state laws, or federal requirements stood in the way of siting any of four types of BRRE. Indeed, the city encouraged BRRE, and the state contributed a large grant to help purchase it. The problems for the project arose after the fuel cell was installed. The owners of 360 State Street remain unable to recoup the costs of operating the fuel cell at full capacity from the building's multiple users because of state laws that prohibit submetering and set rates unfavorable to BRRE. Thus, the fuel cell is currently running at about half of its intended capacity. The irony for states like Connecticut is that they are subsidizing BRRE—at a significant cost to taxpayers—but not allowing it to be fully utilized.

A. Site Disposition

The story of the disposition of the 360 State Street site (the "Site") provides some important context. The Site, at the corner of Chapel and State Streets, is comprised of 1.605 acres on about a third of a city block. It is one block away from the New Haven Town Green, which is the heart of the city: a large, open park occupying the central "square" of the seventeenth-century nine-square urban plan.[154] On the

154. ELIZABETH MILLS BROWN, NEW HAVEN: A GUIDE TO ARCHITECTURE AND URBAN DESIGN 13–14 (1976) (describing the early history of the area around the Green and stating: "By 1835 the Green had become the undisputed psychological center, and the corner of Church and Chapel had become the crossroads of the city, as it still is."); Floyd M. Shumway & Richard Hegel, *New Haven: A Topographical History*, J. NEW HAVEN COLONY HISTORICAL SOC'Y, Spr. 1988, at 57 ("The central Green and the area surrounding it have always been New Haven's psychological

other side of the Green from 360 State Street is Yale University, the city's oldest educational institution and largest employer.

1. Site History

For decades, the Site was part of a bustling, primarily commercial core with retail shops, company offices, and service providers of various types and sizes.[155] By the early twentieth century, the Shartenberg-Robinson department store occupied most of the Site's frontage along Chapel Street. The store was one of the "high-volume, broadband marketers of this era . . . [that] worked as 'anchors' in close association with an endless variety of small enterprise."[156] The store's fortunes depended on a vibrant, well-populated urban core. The city's population peaked between 1920 and 1950,[157] when it hovered just above one hundred and sixty thousand persons.[158] But by the middle of the twentieth century, "white flight" to the suburbs had begun in earnest.[159]

To try to stem the tide, New Haven decisionmakers implemented "urban renewal" strategies that other cities had experimented with around the country. Urban renewal—now widely seen as a failed movement—often consisted of razing entire city blocks to build large, publicly funded (and often soulless) structures. As part of an anticipated urban renewal effort along State Street, the city razed the Shartenberg-Robinson department store and every other building on the Chapel and State Street sides of the block some time in the 1960s.[160]

In 1969, the City of New Haven adopted a plan, called the State Street Redevelopment Plan, for the Site and other parcels along the State Street corridor.[161] The redevelopment plan called for "a comprehensive development program that will stimulate economic

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center and the location of a continuing concentration of governmental, commercial, religious, educational, and cultural activities.").

155. For a thorough urban history of New Haven, focusing in part on changes from the early twentieth-century small-scale urban shopping through urban renewal, see DOUGLAS W. RAE, CITY: URBANISM AND ITS END (2003).

156. *Id.* at 96–97.

157. *Id.* at 233.

158. Shumway & Hegel, *supra* note 154, at 49.

159. RAE, *supra* note 155, at 340–43; Shumway & Hegel, *supra* note 154, at 50–51.

160. Sources are not clear about the date of the demolition. Many refer to 1962, but others refer to 1964, and still others to the 1970s.

161. City of New Haven, Conn., State Street Redevelopment and Renewal Plan (Apr. 15, 1968, amended Dec. 23, 1969), City of New Haven Land Records, Vol. 2430 at 141.

growth and promote the welfare of its citizens" through the revitalization of State Street, an important thoroughfare that was "seriously threatened by blighting conditions."[162] The plan called the Site "Parcel D"[163] and required that it be developed for central business uses including retail, commercial, office, underground parking, and private or public housing.[164] While ambitious in scope, the State Street Redevelopment Plan was never fully realized, and Parcel D languished, eventually becoming a City-owned, privately operated surface parking lot.

Over the years, various proposals were considered for the Site. In the 1980s and 1990s, several proposals came from the Chase family, who owned the nearby Connecticut Financial Center (an office tower that was the city's tallest building). Market conditions and litigation with the City of New Haven stalled their plans.[165] In 1999, however, the family obtained the rights to operate the Site for three years as a surface parking lot in exchange for making certain improvements.[166] In addition, the Chase family received a use license for between 100 and 175 parking spaces at the Site until the year 2075.[167] The agreement with the City covering this exchange provided that if the City ever redeveloped the Site for anything other than a surface parking lot, the Chase family would be entitled to at least 175 parking spaces in any redeveloped property.[168] This agreement would influence the parking requirement ultimately incorporated into the 360 State Street project. In 2000, the City offered the site to private developers through a competitive process, but that process did not result in a viable proposal.[169]

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162. *Id.* at 148.

163. *See id.* at 200 (providing a map of the State Street Redevelopment Plan corridor, including special parcels called out by the plan).

164. *Id.* at 163 ("Serious consideration shall be given to the provision of the permitted housing uses.").

165. Some elements of this complicated history are covered by a recent student paper. Jeremy Kutner, The Accidental Success of Connecticut's Largest Housing Development: 360 State Street in New Haven 12–14 (Dec. 17, 2010) (unpublished Student Prize Paper, Yale Law School) (on file with author).

166. Parcel D License by and between the City of New Haven and Conn. Fin. Ctr. Assocs., Ltd. (Mar. 2, 1999), City of New Haven Land Records, Vol. 5462 at 115. The City required the Chase family to make improvements to Parcel D, such as providing two inches of crushed stone and replacing fencing and signage, in Schedule B of the agreement. *Id.* at 130.

167. *Id.* at 115–16, 118 (providing that if the City does not redevelop the Site for something other than a surface parking lot, the use license terminates on September 4, 2075).

168. *Id.* at 118.

169. Request for Proposals, City of New Haven, Bureau of Purchases, Dev. of Shartenberg Site (May 22, 2000).

As this greatly abbreviated history reveals, the Site was a failure of urban renewal, a vacant lot in the heart of the commercial urban core. By the time the Site was slated for disposition to a private owner in 2006, it had been operated as surface parking for at least three decades.

2. Picking a New Owner

In 2006, the City of New Haven announced a request for proposals ("RFP") for private parties' purchase and redevelopment of what it called "the former Shartenberg Site."[170] Often, a locality issues an RFP for a publicly owned property with some statement about specific uses, amenities, or building configurations it hopes to see on that property. In this case, the City of New Haven left the RFP for the Site open-ended, stating: "Rather than prescribe a specific mix of uses . . . the City is . . . seek[ing] proposals for development which is market-driven and which will fit into the downtown development."[171] The City included among its goals increasing density, promoting street-level retail, generating tax revenue, and "support[ing] projects that are high-quality and economically feasible."[172]

As the RFP makes clear, the City was attempting to attract much-needed private investment. With the city's high poverty rate (25%), a low homeownership rate (32%), and low levels of household income (about $39,000),[173] it had seen very little private investment since the 1950s. At the time, nonprofit and educational uses proliferated in the city, and as a result fully 50% of real estate in the city was tax exempt.[174] Indeed, at the time of the RFP, the city's largest employer and largest contributor to the city's coffers (primarily in the form of payments in lieu of taxes) was Yale University, a nonprofit institution.[175] Over the years, Yale had almost single-

170. *See* Request for Proposal, City of New Haven, Bureau of Purchases, Dev. of 745 Chapel St., No. #26-08-475 (June 16, 2006) (requesting proposals to develop the Former Shartenberg Site). At the time the Request for Proposal was issued, the official address of the Site was 745 Chapel Street. In 2008, the developer requested and received approval from the City of New Haven to change the address of the tower (the primary entrance to which fronted State Street) from 745 Chapel Street to 360 State Street. *See* Confirmation Slip, Bureau of Eng'g, City of New Haven, Conn. (Mar. 20, 2008).

171. Request for Proposal, City of New Haven, *supra* note 170, at 8.

172. *Id.*

173. *State & County Quickfacts: New Haven (City), Connecticut*, U.S. CENSUS BUREAU (Aug. 16, 2012), http://quickfacts.census.gov/qfd/states/09/0952000.html.

174. Mary O'Leary, *Yale Kicks in Millions to Help New Haven*, NEW HAVEN REG., Apr. 13, 2005 (stating that the university had made voluntary payments of $26 million since 1991).

175. *Id.*

handedly kept the city's flagging economy going. In the 1990s, Yale purchased large swaths of retail space in the commercial core and started a multimillion dollar program that subsidized Yale employees' home purchases within New Haven city limits.[176] By 2007, around the time of the Shartenberg RFP, Yale had an annual capital budget of $400 million, which it used to employ thousands of local construction laborers.[177] But the city was still struggling for additional investment, recognizing that it needed to diversify and strengthen property ownership in the city by adding a major new development downtown.

Put in the context of contemporaneous development, the Shartenberg RFP was thus highly significant. In August 2006, nine firms submitted proposals in response to the RFP.[178] After a five-month review process involving many stakeholders, the City announced the selection of Becker + Becker ("B+B"), a Connecticut-based architecture, planning, and development firm.[179] In a press release, the City cited the firm's "proven track record in urban areas," "more than $100 million in equity financing from a union-backed pension fund," and "important community benefits."[180] One student commentator has characterized the City's choice as "prioritiz[ing] security of financing and speed over other considerations."[181] In retrospect, given the imminent nationwide crisis in real estate financing, the City was probably justified in its approach.

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176. David McKay Wilson, *Yale and New Haven Find Common Ground*, N.Y. TIMES, Dec. 16, 2007, at 14CT (noting that the university had spent $18 million through 2007 in the homebuyers' program).

177. *Id.*

178. David McClendon, *9 Firms Submit Bids to Develop Downtown Tract*, NEW HAVEN REG., Aug. 17, 2006, at A1; Announcement, City of New Haven, Shartenberg Site Receives Nine Suitors (Aug. 16, 2006) (listing the firms, six of which were based in New Haven).

179. Press Release, City of New Haven, City Selects Developer for Shartenberg Site (Feb. 13, 2007). Note that the entity that actually ended up being designated as the developer (and signatory to all binding legal documents that the developer would sign) was Becker Development Associates, LLC, a single-purpose entity affiliated with the principal (Bruce Becker) of Becker and Becker Associates, Inc. Other entities affiliated with Bruce Becker, such as 360 State Street, Inc., played other roles in the project. For ease of reading this Article—but not by implication merging any or all of these entities in a legal sense—all entities are referred to as B+B.

180. *Id.*

181. Kutner, *supra* note 165, at 3 (recounting a "forty-year string of city-backed development failures" at the Site, including a 2000 RFP and various lawsuits by and between the City of New Haven and the Chase family enterprises, which may have led to the City's favoring speed and financial security).

3. Terms of Disposition & BRRE Requirements

Once the City announced its choice, it and B+B immediately entered into talks to finalize the land disposition agreement, which would specify the terms under which the Site would be transferred to B+B, and development agreement, which would specify the terms of the eventual development of the Site. After intense public negotiations, the City agreed to sell the Site to B+B for the price of $1, as long as B+B took on all obligations for environmental cleanup[182] and the Chase parking obligations.[183] In addition, B+B agreed to build at least four hundred thousand square feet of "usable space," five hundred parking spaces, fifty affordable housing units, and a grocery store.[184] B+B's agreements with the City did not explicitly require that BRRE be incorporated into the firm's plans for the Site.

Did they, alternatively, require BRRE by implication? The short answer is no. Of the requirements imposed on the developer, the most relevant to this question is contained in section 6.4(A)(iv) of the development agreement, in which B+B agreed to design the project to be certified under the U.S. Green Building Council's LEED Green Building Rating System.[185] Because of the way the LEED program is set up, B+B had to select and register for a rating program before construction began. In 2007, when B+B was making this choice, two rating systems were possible options. The first was the LEED for New Construction rating system, which required a building to achieve a certain minimum level of energy efficiency for it to be considered certifiable at all.[186] Up to fourteen additional points (out of sixty-nine available) could be obtained through various energy-efficiency and renewable energy measures.[187] A building had to achieve twenty-six

182. Dev. Agreement, City of New Haven and Becker Dev. Assocs., LLC, §§ 4.1–4.2 (Oct. 4, 2007) (on file with author); Land Disposition Agreement, City of New Haven and Becker Dev. Assocs., LLC, § 3.6 (July 11, 2008) (on file with author).

183. Dev. Agreement, *supra* note 182, § 3.4; *see also supra* text accompanying notes 166–169.

184. Dev. Agreement, *supra* note 182, §§ 6.4, 8.1.

185. *Id.* § 6.4(A)(iv) ("The Developer shall design and build the Project to meet, at a minimum, certification under the LEED Green Building Rating System as to at least the residential portion of the Project and shall use commercially reasonable efforts to obtain the 'Silver Standard,' " and providing a $250,000 penalty for failure to meet this goal); *see also supra* text accompanying notes 43–45.

186. U.S. GREEN BLDG. COUNCIL, LEED FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS, VERSION 2.2, at 31 (2005) (listing "EA Prerequisite 2: Minimum Energy Performance").

187. *Id.* at 33–36, 42 (describing how to achieve up to ten points for optimizing energy performance, up to three points for on-site renewable energy, and one point for "green power").

points to be certified.[188] The second rating system, the LEED for Neighborhood Development ("LEED-ND") program, was in "pilot" mode. The LEED-ND program had no energy-performance requirement, focusing instead on the location of the building and its impact on its immediate surroundings.[189] To be certified in the pilot program, a project had to achieve 40 points (out of a possible 106).[190] The project could obtain up to nine points for energy-efficiency and renewable energy measures.[191] Regardless of which of the two programs B+B chose, neither explicitly required BRRE to be installed at 360 State Street.

After doing an assessment of costs required to comply with each program, B+B chose to register with the LEED-ND program, targeting Platinum (the highest level) certification. Construction began in September 2008, after B+B signed an agreement with an affiliate of the Multi-Employer Property Trust, a union pension fund that would (as of September 2008) own and provide all of the equity for the project.[192] B+B remained the developer of the project thereafter, directing all construction activity on behalf of the owner and advising the owner as to certain decisions throughout the design and construction process. The building received its first certificate of occupancy in July 2010, and a final certificate of occupancy in October 2010.[193]

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188. *Id.* at 7.

189. *See* U.S. GREEN BLDG. COUNCIL, PILOT VERSION: LEED FOR NEIGHBORHOOD DEVELOPMENT RATING SYSTEM 1–5 (2007) (explaining the LEED for Neighborhood Development certification requirements).

190. *Id.* at 5.

191. *Id.* at 94–100, 123–28, 131–32 (granting up to three points for a "certified" green building, up to three points for energy efficiency, and one point each for on-site energy generation, on-site renewable energy sources, and infrastructure energy efficiency).

192. *See* Letter from MEPT Chapel St. LLC, to Suffolk Constr. Co., Inc., Authorization to Proceed (Sept. 24, 2008) (on file with author) (authorizing the construction manager to proceed with construction); City of New Haven, Bldg. Dep't, Bldg. Permit, July 31, 2008 (allowing construction to commence pending authorization by the owner).

193. A certificate of occupancy allows users other than the construction team (that is, end users) to occupy the building. *See* City of New Haven, Bldg. Dep't, Certificate of Use and Occupancy, July 30, 2010 (allowing occupancy of floors seven to twenty, portions of the first floor, and the loading dock); City of New Haven, Bldg. Dep't, Certificate of Use and Occupancy, Sept. 28, 2010 (allowing occupancy of floors twenty-one to twenty-six, two levels of the garage, and portions of the sixth floor); City of New Haven, Bldg. Dep't, Certificate of Use and Occupancy, Oct. 22, 2010 (allowing occupancy of floors twenty-seven to thirty-two, and the remainder of the sixth floor and garage).

B. Program, Design, and BRRE

If neither the City nor the LEED program required BRRE, why did the developer incorporate BRRE? To answer this question, a word about program (that is, the array of intended uses and occupancy types) and design—focusing on energy demands—is in order. Looking for a way to meet these demands, the developer turned to BRRE and, after considering four different types of BRRE, ultimately settled on a fuel cell.

1. Energy Demands

The energy demands of 360 State Street are dictated by program and design. The building was conceived as a five-story podium that covered the entire site and included the retail and parking garage components, topped by a thirty-two story tower that included five hundred residential units. The portion of the sixth floor (the roof) of the podium that was not occupied by the tower was made into a leasing office and an amenity space for tenants, complete with a pool, library, and fitness center.

With so many different spaces, 360 State Street has several different user types. In addition to up to five hundred different residential leases, B+B executed two commercial leases with the owners of a bike shop and a full-service cooperative grocery store, both located on the ground floor.[194] In addition, it entered into an operating agreement with a third-party parking company to operate the parking garage.[195] Thus, other than the common hallways on the apartment floors and sixth-floor leasing office and amenity space, all of the building's square footage was leased or operated by parties other than the developer.

A variety of users also means a variety of energy demands. Two users have constant, twenty-four–hour demands: the parking garage operators, who need to light all areas of the parking garage and power the vehicle entry and exit equipment; and the developer, who needs to light, cool, and heat the developer-controlled areas (the common hallways and sixth-floor spaces). The remaining tenants—residential and retail—both demand the most energy in the evenings and on

194. Specifically, these businesses are The Devil's Gear Bike Shop and Elm City Market. *See* THE DEVIL'S GEAR BIKE SHOP, http://www.thedevilsgear.com (last visited Sept. 6, 2012); ELM CITY MARKET, http://www.elmcitymarket.coop (last visited Sept. 6, 2012).

195. *See* ELM CITY PARKING, http://elmcityparking.com/rates-info (last visited Sept. 6, 2012) (describing parking deck rates and other pertinent information).

weekends. Apartment residents are generally gone—at work, school, or other pursuits—during the day. The retail space is active during working hours but gets busiest when many people have time to shop (that is, on evenings and on weekends).

2. Why BRRE?

After reviewing the significant demands on the grid that the building would impose and the immense carbon footprint of designing the building in a conventional way, B+B decided to explore the possibility of incorporating BRRE into 360 State Street. B+B believed that a local BRRE system could meet 100% of the owner's energy needs and most of the energy needs of its diverse group of tenants. In addition, by using BRRE and increasing the building's LEED rating, the developer could become eligible to qualify for programs, such as a then-pending state green building tax credit, that would help to subsidize the costs of constructing BRRE.

In addition to analyzing the costs of installing BRRE, B+B also analyzed the costs of operating it. B+B recognized at the outset that it could not afford to incorporate BRRE unless it could also engage in submetering tenants' usage and charge tenants for their use of the energy produced by the BRRE that B+B would eventually choose. B+B reviewed relevant state laws and found that the availability of submetering by owners of a project like 360 State Street was legally ambiguous. However, with the assistance of several well-respected energy law practitioners, B+B came to believe that it could pursue several different paths toward submetering.[196] In addition, B+B had past experience with submetering BRRE in another state. It had successfully installed a solar array at another, similarly sized, multiuser project on Roosevelt Island in Manhattan.[197] There, submetering was not only authorized but publicly subsidized.[198]

The project financing and development was proceeding at such a pace that the decision to install the BRRE had to be made before the legal issues regarding operating it could be resolved. As a result, the developer had to make a calculated gamble. B+B, perhaps wrongly

196. *See infra* Part IV.C (discussing the legal issues regarding BRRE operation).

197. That project, The Octagon at Roosevelt Island, obtained LEED for New Construction Silver certification and has the largest residential solar array in Manhattan. *See Green Design Pamphlet*, OCTAGON NYC, http://www.octagonnyc.com/pdf/Octagon_green_design.pdf (last visited Sept. 6, 2012) (highlighting the environmentally friendly features of the Octagon building).

198. *See infra* notes 243–245 (stating that there is a $250 grant available for the installation of meters at each individual unit).

optimistically, placed a multimillion dollar bet that Connecticut law would also allow it to submeter. It reasoned that there was enough ambiguity in the law to provide it with a path toward submetering and that an early and expensive commitment to BRRE in the highest-profile project in the state (the largest private real estate development at the time) would not go unrewarded. B+B thus began investigating the types of BRRE most suitable for the project site shortly after being awarded the site by the City of New Haven.

3. Four BRRE Alternatives

During the course of the design, B+B considered all four primary alternatives for BRRE at 360 State Street: geothermal wells, wind energy, solar energy, and a fuel cell. These technologies could have been used individually or together in a variety of configurations, but their suitability depended on many factors, ranging from soil conditions to wind patterns to cost effectiveness. Ultimately the developer chose to incorporate only a fuel cell, which, at least in terms of installation costs, was the best value to the owner.

Geothermal energy is energy that comes from the heat of water or earth deep underground.[199] It is typically drawn from long subsurface wells drilled into the ground near the end user and thus is a technology highly suitable to serve buildings. The productivity of wells is very site specific and heavily influenced by soil conditions, so large projects like 360 State Street typically drill a test well before proceeding with an overall design. In September 2007, B+B commissioned a geotechnical engineering firm to design and drill a fifteen hundred–foot test well. Analysis of the boring logs revealed that the well did not produce enough heat to meet the needs of the building in an efficient way.[200] These results were particularly disappointing given the potential efficiencies of a geothermal system and the fact that such wells have been used with success elsewhere in New Haven.[201] The test well was sealed and was never connected to the building systems.

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199. *See Geothermal Energy Basics*, NAT'L RENEWABLE ENERGY LABORATORY, http://www.nrel.gov/learning/re_geothermal.html (last updated May 30, 2012) (explaining the basics of geothermal energy).

200. *See* HALEY & ALDRICH, INC., GEOTHERMAL WELL BORING (DRAFT) FOR BORING NO. GW B-1 (2007) (on file with author).

201. Kroon Hall, the home of the Yale School of Forestry and Environmental Studies, is a well-known example of a New Haven building using geothermal wells. *See Design Overview*, YALE SCH. FORESTRY & ENVTL. STUD., http://environment.yale.edu/kroon/design.php (last visited Sept. 6, 2012) (emphasizing the design's sustainable features).

As an alternative to geothermal technology, B+B investigated the possibility of installing building-mounted wind turbines, beginning in the spring of 2008. Commercially productive turbines require a constant, high-volume wind.[202] Accordingly, determining the feasibility of a wind system first requires gauging area wind patterns. In general, the Northeast region of the United States is not ideal for wind power. The Pacific Northwest Laboratory has produced maps identifying wind resources, ranging from Class 1 (the lowest) to Class 7 (the highest).[203] Only wind resources identified as Class 3 or greater are suitable for most wind turbine applications; Class 2 winds are considered "marginal."[204] The maps identify New Haven as having Class 2 winds.[205] Nonetheless, the consulting firm developing an energy model for the project investigated current products and configurations to determine if there was still a way to take advantage of the area's limited wind resources. The consultant determined that, given available technologies, the wind available at 360 State Street was insufficient to make an investment in wind worthwhile.[206] In one example that the consultant used, the project's owner was expected to produce an annual savings of just $300.[207] Wind, like geothermal, was set aside.

Next, the B+B team considered installing an array of photovoltaic panels that would collect energy from the sun. Because of the way the building was configured, the only places to put solar panels were the roofs of the thirty-two story apartment tower and the two six-story stair towers at the corners of the garage. Over the summer of 2008, the solar panel designers and the structural

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202. For a basic introduction to wind turbines, see *How Wind Turbines Work*, DEP'T OF ENERGY: ENERGY EFFICIENCY & RENEWABLE ENERGY, http://www1.eere.energy.gov/wind/wind_how.html (last updated July 27, 2012) (explaining the basic science behind wind turbine energy).

203. *Chapter 1: Introduction*, WIND ENERGY RESOURCE ATLAS OF THE UNITED STATES, http://rredc.nrel.gov/wind/pubs/atlas/chp1.html#map (last visited Sept. 6, 2012).

204. *Id.*

205. *Id.* at fig.3-21. According to one source, the New Haven area has average winds of about eight or nine miles per hour. *Wind & Weather Statistic: Tweed-New Haven Airport*, WINDFINDER, http://www.windfinder.com/windstats/windstatistic_new_haven.htm (last visited Sept. 6, 2012). The firm constructing the energy model for 360 State Street, Second Law, documented a wind speed of eleven miles per hour, which possibly takes the building's height into account, as wind moves faster when it is not slowed by buildings and other near-surface protrusions. *See* SECOND LAW, 360 STATE STREET INITIAL [ENERGY] MODEL RESULTS 9 (2008) (documenting a wind speed of eleven miles per hour).

206. SECOND LAW, *supra* note 205.

207. *Id.*

engineers debated the best location and configuration for the panels.[208] They quickly ruled out placing solar panels on the roofs of the two stair towers, focusing instead on the roof of the taller apartment tower. On the taller tower, panels could be mounted in one of two ways: directly on the roof (flat-mounted) or atop some sort of structure. Because of all of the shadows created by the exit stair entryways, ductwork, and equipment (such as the elevator bulkhead), a flat-mounted array would not be productive. Raising the solar panels to about eleven feet above the roof plane would have resulted in a more productive array, but the costs of the support structure were prohibitively high. The support structure had to be strong enough to resist the full forces of wind, unimpeded by any neighboring structure, at thirty-two stories high. Solar power for the project was thus abandoned, at least at the time of initial construction.[209]

With all other BRRE options discarded for reasons of capacity or cost (or both), the team thus focused on a final BRRE technology, the fuel cell. If designed properly, a fuel cell could meet all or nearly all of the energy needs of every occupant of 360 State Street. B+B worked with its mechanical, electrical, and plumbing engineers to design an integrated combined heat and power[210] system using a four hundred–kilowatt, natural gas–fed fuel cell from United Technologies. Relative to conventional generation, the 360 State Street configuration eliminates 99.8% of pollution and triples the efficiency of production and delivery.[211] As built and operating at full capacity, the fuel cell can meet 88% of occupants' electric needs and nearly all of their heating and hot water needs.[212] In March 2009, B+B received a grant from a state clean energy fund for installation costs of up to $985,000.[213] Other incentives, including a federal tax credit, brought

208. The solar panel designer was Stephen Strong of Solar Design Associates, Inc., and the structural engineer was Ben Downing of DeSimone Consulting Engineers LLC.

209. Because solar panels can be easily retrofitted on an existing building, it is possible that the owner may place them on the building in the future—if, for example, photovoltaic arrays become more efficient or if the building's electric loads significantly increase.

210. Combined heat and power, also known as cogeneration, means using waste heat of a power-producing technology (here, the fuel cell) for heating, and not just for power.

211. BRUCE R. BECKER & SARA C. BRONIN, CONNECTING ARCHITECTURE, LAW, AND PUBLIC POLICY: A LEED-PLATINUM CASE STUDY IN URBAN SUSTAINABLE DESIGN, PANEL AT THE AIA NATIONAL CONVENTION, slide 34 (2012).

212. Becker and Becker Assocs., 360 State St. Sustainability (undated) (on file with author).

213. Standard Grant Agreement Between Conn. Innovations, Inc. and 360 State St., Inc. (Mar. 20, 2009) (on file with author).

the payback period for the fuel cell installation costs (which totaled $3.5 million) to 3.5 years.[214]

The installation of the fuel cell alone would arguably have made 360 State Street one of the greenest buildings in the country (and the first multifamily application of a fuel cell).[215] But the property owner also invested in nearly twenty energy-efficiency measures that have reduced the building's energy usage by more than 50% above conventional construction.[216] Thus, the demand from occupants of the 360 State Street project could be more economically met by a smaller BRRE system than a conventional building of the same size would have required.

Normally, property owners do not undergo such an extensive and lengthy process for testing and evaluating BRRE. The fact that the project included BRRE at all is surprising given one important fact: during the design and construction processes, B+B was unsure as to whether, or to what extent, it would be able to recoup the costs of *operating* the BRRE. The next Section will explain why the project—which is not fully utilizing the fuel cell's capacity—is a victim of legal ambiguities and barriers that thwart BRRE, even if the fuel cell itself has been physically installed.

C. Legal Issues Regarding BRRE Operation

Through the course of the development of 360 State Street, the project team has overcome numerous legal hurdles.[217] But the single

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214. BECKER & BRONIN, *supra* note 211, at slide 36.

215. *See supra* note 16 (listing 360 State Street as a Platinum project in the LEED-ND 1.0 Pilot Program).

216. Becker and Becker Assocs., *supra* note 212. These include building envelope energy-conservation technologies (enhanced glazing and insulation); HVAC energy-efficiency and load-optimization technologies (high-efficiency heat pumps, cooling towers, and boilers, and variable-speed drive pumps); centralized water-heating systems (thermal storage tanks, high-efficiency natural gas hot water heaters); electric load management and demand reduction (Energy Star appliances, occupancy sensors in common spaces, high-efficiency lighting, regenerative drive elevators, energy recovery system, demand-control ventilation); and real-time feedback monitoring, conservation, and demand response (real-time energy feedback, energy-saving algorithms, real-time water feedback, water-use occupancy sensing, demand-response programs).

217. For example, the team weathered complex negotiations with the City of New Haven regarding the disposition of the land, while successfully challenging outdated zoning, sewer connection, and building code rules. *See supra* Part IV.A (describing the disposition of the site); *see also* Notice of Special Meeting, State of Conn. Codes & Standards Comm. (June 30, 2010) (calling a special meeting at which the project successfully obtained an oral decision reversing a code interpretation from city code officials that the open-air garage be fully sprinklered); Greater New Haven Water Polution [sic] Control Auth., Revised Fee Schedule of Connection Charges, (Oct. 15, 2009) (showing the current fee schedule, the enactment of which was prompted by the

most time-consuming, expensive, and contentious legal issues involving the project have related to the operation of the fuel cell. Outlining these legal issues—with the background of the program, design, and technology of BRRE at the project in mind—is the purpose of this final Part of this Article.

Simply put, Connecticut state law prevents real estate developers and property owners from recouping the costs of installing and operating BRRE. The biggest barrier in the case of 360 State Street has been the state's prohibition on submetering in residential applications. As discussed in Part II.B., submetering allows the owners of an energy source to recoup operating costs by charging third-party end users for their usage. At 360 State Street, the inability to recoup operating costs from third-party end users (and in particular the residential tenants) means the project's fuel cell has only been operating to the extent necessary to meet the needs of the owner and the commercial tenants (that is, the retail stores and the parking garage).[218] All of the tenants of the five hundred rental apartments are using conventional electricity from the local public utility instead of clean energy from the on-site fuel cell.

The story about how the project team tried (and continues to try) to lift or work around the prohibition on submetering, and thus fully utilize the on-site BRRE, may be instructive to policymakers, real estate developers, property owners, renewable energy experts, and advocates.

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360 State Street project team, that does not charge premiums for urban residential projects, and requiring 360 State Street to pay a fee of $107,492); Greater New Haven Water Polution [sic] Control Auth., Revised Fee Schedule of Connection Charges (July 1, 2007) (showing the prior fee structure that would require a five hundred unit apartment building built in an urban location to pay the same amount as a five hundred unit suburban subdivision, and requiring 360 State Street to pay a fee of approximately $950,000); City of New Haven, Bd. of Zoning App., Permission for Application for 745-807 Chapel Street (July 31, 2007) (granting a variance from the zoning ordinance for an open space requirement for residential apartment buildings that, if followed, would effectively prohibit dense development in the urban core).

218. It may be surprising that the fuel cell is being used for the parking garage and retail spaces. But those tenants—which have regular operating hours, a stable staff size, and constant usage—have more regularly predictable energy needs than the residential tenants. Thus, rough proxies for the commercial tenants' electricity costs could be (and are) introduced into their rents. The reason that recouping costs via rents is not ideal is that it fails to provide a transparent incentive for energy conservation because tenants are not paying precisely in proportion to their usage. Overly high demands on the building's electricity supply could counter the energy-efficiency measures and increase the building's negative environmental impact.

1. A Word on Project Financing

The story begins with some background on the financing for 360 State Street. Any real estate development happening these days must be creatively conceived and financed. Project feasibility is determined primarily on development costs (surveys, architectural and engineering work, permits and approvals, the construction itself, etc.) and operating costs (utilities, maintenance, repairs, leasing and building staff, marketing, property taxes, insurance, etc.). In the case of 360 State Street, the development costs were $179 million in total, while the operating expenses per year are expected to be about $2.6 million in the first few years of operation, and increasing thereafter.[219]

The financing for the development of 360 State Street came from a mix of sources that included, among others: 80% from a $7 billion union-backed pension fund; the city's relinquishing the site (a brownfield) for $1; federal and state grants for forty-seven of the fifty affordable housing units; a $9.9 million federal grant for the transit-oriented parking garage; and federal tax credits that promote investment in low-income communities (New Markets Tax Credits).

With respect to the fuel cell development costs specifically, the most critical piece of financing came from Connecticut Innovations, a quasi-public authority tasked with supporting technological innovation in the state.[220] In 2009, it provided a $985,000 grant for the installation of the fuel cell, which was purchased two months later for $1,798,000.[221] This grant left an $813,000 gap in the purchase price of the fuel cell, which the owner of 360 State Street hoped to recover in part through a green building tax credit program created while the

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219. Note that the operating expenses figure assumes the amount of real estate property taxes the City had stated would be levied on the project in 2007, when the project was being negotiated. In 2012, the City reassessed the building and levied property taxes that were four times the amount the City had projected in 2007. Currently, the owner of 360 State Street is in or nearing litigation with the City as to the proper amount of real estate taxes, while also attempting other means to reduce the 2012 assessment (e.g., through an ordinance passed by the local legislative body). If the owner loses this fight, the operating costs will be significantly higher. *See* Melissa Bailey, *City Hall, 360 State Battle Intensifies*, NEW HAVEN INDEP., Sept. 29, 2011, http://www.newhavenindependent.org/index.php/archives/entry/360_state_follow/#cmt (describing the discrepancy in the context of the mayoral campaign); Mary E. O'Leary, *Owners of 360 State Street in New Haven Looking for a Tax Deal*, NEW HAVEN REG., Feb. 20, 2012, at A.1 (describing the litigation resulting from the projected $5.7 million tax bill).

220. *See* CONN. GEN. STAT. § 32-35 (2012) (establishing Connecticut Innovations).

221. Proposal, Purecell®, Model 400 Furnish and Installation Proposal for Becker & Becker 14 (May 5, 2009) (confidential document on file with author) (stating the cost of the fuel cell); Standard Grant Agreement Between Conn. Innovations, Inc. and 360 State St., Inc. (Mar. 20, 2009) (stating the grant cost).

project was under development.[222] (Unfortunately, the State did not issue the project's tax credit until two years after the project was substantially complete.[223]) In theory, the owner could also recoup some of the $813,000 through savings resulting from not having to purchase conventional electricity at retail rates from the public utility. However, the owner's use of electricity is a small fraction of the overall building electricity use, and it would take many years to make up the gap, especially considering that savings would be offset by the significant costs of operating the fuel cell, as described in the next paragraphs. Until the price of fuel cells falls for reasons related to demand increases or otherwise, public subsidies for their installation will continue to be useful.

The financing for project operating costs comes primarily from rents from the retail and residential tenants and income from the parking garage. This income covers the basic expenses of the project but does not cover the operating expenses related to the fuel cell. Operating the fuel cell to its fullest capacity, according to the manufacturer and the developer, would cost roughly $400,000 for natural gas (a required input), plus somewhere between $68,000 (in year one) and $88,725 (in year ten) for maintenance by the fuel cell manufacturer, plus other miscellaneous costs such as insurance.[224]

Federal renewable energy certificates ("RECs") will assist in offsetting some, but not all, of these costs. A REC is a type of "currency" for green power markets that is created when a generator sends one megawatt-hour of renewable electricity generation back to the grid.[225] In most states,[226] including Connecticut, the generator of

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222. *See* CONN. GEN. STAT. § 12-217mm (2012) (establishing a transferable tax credit for buildings like 360 State Street that are energy efficient and LEED Gold or LEED Platinum).

223. The developer determined that the energy savings from the fuel cell would ensure that it met the LEED level that would qualify it for the tax credit, and it proceeded with the purchase of the fuel cell with the hope that the tax credit would be quickly implemented. However, the state budget office failed to adopt regulations, as it was required to do, by January 1, 2011, *see id.* § 12-217mm(i). In addition, the tax credit was supposed to be fully operational by 2012, *id.* § 12-217mm(b), but no green building was awarded until October 2012, when 360 State Street became the first project in the state to receive the credits. *See* State of Conn., Office of Pol'y & Mgmt., Initial Credit Voucher, Green Building Tax Credit Program, 360 State Street, Oct. 26, 2012 (on file with author). The developer of 360 State Street, who relied on the text of this legislation when making decisions on what to include in the project, waited for two years after the project was completed to receive the initial tax credit reservation.

224. Purecell®, *supra* note 221, at 20.

225. *Renewable Energy Certificates (RECs)*, U.S. ENVTL. PROTECTION AGENCY, http://www.epa.gov/greenpower/gpmarket/rec.htm (last updated May 24, 2012).

226. According to the Interstate Renewable Energy Council (IREC), twenty-four states (and the IREC model rules) allow the customer and/or generator to own the RECs. Connecticut, where 360 State Street is located, is one of those states. In four states, the utilities own the RECs, and

the electricity owns the RECs and can sell one or more RECs to third parties. Purchasers use the RECs to offset conventional electricity use or to signal environmental stewardship. In the case of 360 State Street, the sales of RECs and the income from net metering do not cover the costs of operating the fuel cell, so there is no reason to generate excess capacity simply for the sake of doing so.

Having the ability to submeter individual apartment units would allow the project to break even on the operation side. Instead, the fuel cell, which was installed at a great cost to the development team, idles at just half of its available capacity. Ironically, the state of Connecticut subsidized the purchase of the fuel cell but fails to make it financially feasible for its owner to fully utilize it.

2. Strategies for Submetering

Understanding the financial position of 360 State Street illuminates why obtaining permission to submeter is so important. Over the course of the project's development, the project team pursued three major paths to attempt to submeter 360 State Street. They were: arguing on policy grounds for submetering before the state's Department of Public Utility Control ("DPUC");[227] creating an electric cooperative with apartment residents as members; and attempting to influence legislation to change submetering rules.

As a first legal strategy for pursuing submetering, B+B looked to a provision in the state statutes that allowed submetering in marinas, campgrounds, "or in any other location as approved by the" DPUC.[228] Sensing an opportunity to make a policy argument for submetering in a mixed-use building, B+B filed a request for a declaratory ruling from the DPUC in June 2008.[229] Among other things, B+B argued that for policy reasons, submetering its LEED-Platinum, mixed-use, transit-oriented building should be allowed. The request for a declaratory ruling also stated that submetering was

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in four states, the utilities and customers share the RECs in some way. In Utah, the utilities own the RECs for photovoltaics and wind in Washington City, and the customer owns the RECs for other types of uses everywhere other than Washington City. The remainder of the states have not set an explicit policy as to which party owns the RECs. *State and Utility Net Metering Rules for Distributed Generation*, INTERSTATE RENEWABLE ENERGY COUNCIL, http://irecusa.org/wp-content/themes/IREC/includes/dsire-xml-feed/fs-net-metering-table.php (last updated Apr. 27, 2012).

227. Note that the DPUC is now called the Public Utility Regulatory Authority, but to avoid confusion, I will refer to the agency by the name it had when the relevant filings were made.

228. CONN. GEN. STAT. § 16-19ff (2012).

229. Request for Declaratory Ruling from Bruce R. Becker, on behalf of Becker Dev. Assocs., LLC, to the Dep't of Pub. Util. Control 3 (June 13, 2008).

required "to fully utilize the power generated by the fuel cell which this project will utilize."[230] It described the modern technology that would allow accurate and fair billing of the building's tenants. B+B also requested that the DPUC rule that tenants who were submetered could pay for their usage at the same rate that they would have purchased power from the electric utility.

Various interventions by other parties (including two state utility companies (opposed), the Office of Consumer Counsel (opposed), and the Clean Energy Fund (for)), as well as interrogatories of B+B followed. In January 2009, the DPUC ruled against B+B's petition.[231] The DPUC disclaimed "the legal power to create a new, defacto electric company" and said that it would be unable to "regulate a multitude of such entities with existing resources."[232] At least one influential commentator publicly criticized this decision.[233] Behind closed doors, the B+B team regrouped to think of other strategies.

The second major legal strategy used by the developers of 360 State Street to effectively submeter the residential portion was to create an electric cooperative under chapter 597 of the Connecticut General Statutes. Electric cooperatives may be formed to extend "electric energy" via renewable energy resources and/or cogeneration to members, with the approval of the state's DPUC.[234] Electric cooperatives have the power to generate and sell electricity; to install equipment to allow members to utilize electricity; and to request reimbursement for expenses (presumably including capital expenses, such as installation costs).[235] State law specifically exempts an electric cooperative from being considered an "electric company," "electric distribution company," or "electric supplier," which are three terms used in connection with utility companies.[236] Taken together, these provisions seemed to provide the most straightforward path for B+B to achieve submetering. An electric cooperative could be formed and would own the fuel cell outright. Each tenant would become a member of the cooperative, and each tenant could be billed based on usage and

230. *Id.*

231. Becker Dev. Assocs., No. 08-06-18, at 16 (Dep't of Pub. Util. Control Jan. 23, 2009) (final decision).

232. *Id.* at 9.

233. *See*, *e.g.*, Tom Condon, *Rules May Bar Green Building Power Plan*, HARTFORD COURANT, Dec. 21, 2008, at C5 (calling on the DPUC to change its then-draft decision and stating that the decision would impose "a shameful loss").

234. CONN. GEN. STAT. § 33-219 (2012).

235. *Id.* § 16-246f(b) (2012) (allowing "reimbursement of expenses"); *id.* § 33-221 (enumerating all other statutory powers of electric cooperatives).

236. *Id.* § 16-1(a)(8), (29), (30).

be asked to reimburse the cooperative for capital, maintenance, and operating expenses.

Accordingly, an entity known as the Elm Electric Cooperative Inc. ("EECO") was incorporated in June 2009.[237] Six weeks later, EECO filed a petition with the DPUC to (among other things) direct the local utility, United Illuminating ("UI"), to provide service to EECO and allow EECO to net meter any excess electricity.[238] UI strenuously objected to this petition, filing numerous objections with the DPUC.[239] In December 2009, three of the five commissioners published a draft decision that was favorable to EECO.[240] After an unfortunately timed vacancy at the DPUC left just four sitting commissioners, the commission deadlocked two-to-two on whether to uphold the draft decision. Accordingly, the DPUC took the unusual step of issuing a final decision in which it stated that no final decision could be issued. In March 2010, EECO filed an appeal in state superior court.[241] That appeal was put on hold because UI agreed to negotiate with the owners of 360 State Street to come to some agreement regarding the use of the fuel cell at the project. As of the writing of this Article two and a half years later, no agreement has been reached—presumably because the terms agreeable to UI would render full utilization of the fuel cell financially unviable.

The third legal strategy pursued by the developer of 360 State Street was to influence the laws that implicate submetering. B+B thought, perhaps naively, that Connecticut's state legislature would be interested in mimicking New York's approach.[242] In New York, a state-created public benefits corporation subsidizes submetering in

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237. Articles of Incorporation of Elm Elec. Coop., Inc. (June 1, 2009).

238. Petition of Elm Elec. Coop., Inc. for Order Requiring the United Illuminating Co. to Furnish Elec. Serv. and Declaratory Ruling, No. 09-07-10, at 1 (Conn. Dep't Pub. Util. Control, July 21, 2009).

239. *See*, *e.g.*, Letter from United Illuminating, to Dep't of Pub. Util. Control (Aug. 12, 2009) (calling the basis for the petition "misplaced").

240. *See* Elm Elec. Coop., No. 09-07-10 (Conn. Dep't Pub. Util. Control, Dec. 2, 2009) (draft decision) (ruling that United Illuminating Company must provide direct retail service to Elm Electric, Inc. and that Elm Electric, Inc. is eligible to participate in the Connecticut Energy Efficiency Fund's Conservation and Load Management programs).

241. Petition for Admin. Appeal by Elm Elec. Coop. Inc. (Conn. Super. Ct. Judicial Dist. of New Britain, Mar. 23, 2010).

242. The developer B+B in 2006 completed an award-winning project, The Octagon at Roosevelt Island, which included a rooftop installation of the largest solar array in Manhattan and now also includes a fuel cell. That building, which includes four hundred apartment units, is submetered, and the developer received a state grant for submetering the building.

multifamily apartment buildings like 360 State Street.[243] New York City requires that tenant spaces of more than a certain size be submetered.[244] In 2009, the New York state bar president even included on her legislative agenda the *requirement* that all multifamily buildings be submetered.[245] There is certainly overlap in the real estate development community along the New York-Connecticut border. Under the race to the top theory, it would seem that Connecticut would try to match incentives of a neighboring state to build energy-efficient urban projects.

To help push for New York–style laws and programs in Connecticut, B+B retained a high-profile lobbyist and worked with allies such as the Connecticut Clean Energy Fund (now the Connecticut Clean Energy Finance and Investment Authority) and the Connecticut Fund for the Environment (both of which submitted letters of support in the electric cooperative proceeding) to try to influence policy at the state level. To date, it appears that the influence of the public utility lobby is much stronger at the state level than these groups. There has been no traction on the submetering issue at the legislature.

3. Lessons from 360 State Street

These brief descriptions of three years–long efforts to submeter at 360 State Street offer important lessons.

First, these descriptions highlight how difficult it is for developers of midsized BRRE, especially BRRE with many different end users, to navigate entrenched bureaucracies and understand rights ex ante. Even where a law seems clear on its face (for example, the state statute regarding the electric cooperative), there are many potential roadblocks to implementing it. The fact that the fuel cell portion of the project has not broken even financially (either on the development side or the operational side) has several project-specific implications. Financial failure discourages the project's owner-investor—a $7 billion union pension fund making all types of

243. *See* N.Y. STATE ENERGY RESEARCH & DEV. AUTH., ELECTRIC REDUCTION IN MASTER METERED BUILDINGS PROGRAM 3 (2011) (describing an available grant of $250 for the installation of meters at each individual apartment unit).

244. N.Y.C. ADMIN. CODE § 28-311.3 (2012) (requiring submeters to be installed in tenant spaces larger than 10,000 gross square feet or on floors of buildings that are greater than 10,000 gross square feet and shared with multiple tenants).

245. *See* Bernice K. Leber, *Win, Win, Win, Win Win*, N.Y. ST. B. ASS'N. J., Feb. 2009, at 5, 5 ("Customers must have 'advanced' or smart meters to take advantage of time-of-use pricing, so the law should be amended to require that all multi-unit buildings be submetered.").

investments around the country—from investing in other projects involving BRRE. Financial failure also renders the developer of this publicly beneficial project poorly equipped to do similar projects in the future. Indeed, the principal of B+B—who has admitted to being overly optimistic about the speed with which state barriers to BRRE could be overcome—has publicly stated that he will not commit to doing another BRRE project in Connecticut unless the state clarifies its regulatory framework.

Second, and relatedly, these descriptions underscore the immense power of utility companies, both at state legislatures and before industry regulatory bodies.[246] As the case of 360 State Street reveals, utility companies may see submetering and midsized BRRE as threats. Well-equipped with legal departments, budgets for outside counsel, and time, public utilities clearly have the upper hand in preventing changes to the legal status quo. Figuring out a way to either neutralize or combat (with education) the influence of utility companies should be a key consideration for advocates of BRRE.

Finally, these descriptions suggest that in states where submetering is prohibited, there may be a temptation to set aside the question of rates for a later date. If approval to submeter had been granted for 360 State Street, there may have been a subsequent debate about net metering rates or third-party end user rates. But no such debate occurred, because the threshold barrier (the prohibition on submetering) was not overcome. As Part III.B.3. described, however, the rate at which owners of BRRE can sell energy back to the grid and the rate at which they can charge third-party end users are both critically important to the financial feasibility of BRRE. So, the issue of rates should be considered front and center as we reimagine existing laws.

For the time being, the 360 State Street project remains in regulatory limbo—a lesson to the project's developers, perhaps, but more importantly, a caution to others seeking to do similar projects in Connecticut and states with similar rules regarding the utilization of BRRE. In this economic environment, certainty about applicable laws

246. Other commentators have expressed similar views. *See*, *e.g.*, Marilyn A. Brown & Sharon Chandler, *Governing Confusion: How Statutes, Fiscal Policy, and Regulation Impede Clean Energy Technologies*, 19 STAN. L. & POL'Y REV. 472, 482 (2008) (observing that "electric utilities face little incentive to promote energy efficiency or non-dispatchable distributed generation because utility company profits are a function of sales"); Valerie J. Faden, Student Article, *Net Metering of Renewable Energy: How Traditional Electricity Suppliers Fight to Keep You in the Dark*, 10 WIDENER J. PUB. L. 109, 121–22 (2000) (noting that "utilities do not want any further mandates or regulations imposed upon them" and describing common objections of utilities to net metering).

and regulations is critical to encouraging investment. Uncertainty ensures that no project like 360 State Street—an award-winning,[247] LEED-Platinum, transit-oriented, affordable housing–providing, union-built, jobcreating economic dynamo in a struggling urban environment—will be built in Connecticut in the near future.

V. CONCLUSION

This conclusion begins by repeating two well-accepted facts: First, most human activity occurs in buildings; and second, most Americans strongly support renewable energy. Yet many property owners still face significant obstacles in trying to incorporate renewable energy into their buildings.

The story of 360 State Street suggests that the biggest obstacles may not be the obvious ones. As the above analysis reveals, many legal scholars have focused on fascinating questions involving the initial installation and siting disputes of BRRE. These questions are intriguing because there are so many issues-laden examples of neighbor-neighbor arguments, of dueling environmental concerns, and of innovative siting frameworks drawing from other areas of law. But at least some property owners have struggled to overcome perhaps more mundane obstacles: those related to ongoing financing of the operation of BRRE. For more projects like 360 State Street to incorporate and fully utilize BRRE, developers need clear laws and policies that address not just installation, but operation. Advocates for this view would greatly benefit from more work by the academy in analyzing the status quo and suggesting legal reforms that would facilitate BRRE.

Some commentators have suggested that the lack of formal rules might benefit parties interested in unique arrangements (like the BRRE considered by this Article), because they can develop the rules as they go and thus have greater flexibility to adapt. Nestor Davidson, in a recent article, takes this view, arguing that some property owners "may rely on the continuity of existing rules while others may just as plausibly rely on the existence (and perhaps fairness) of a process to change the existing rules."[248] While Davidson

247. The project's awards include the American Planning Association Connecticut Chapter's 2011 Special Chapter Award; the U.S. Green Building Council Connecticut Chapter's 2011 Award of Honor; the 1000 Friends of Connecticut 2010 Smartie Award; and the Connecticut Fund for the Environment 2010 Annual Meeting Award.

248. Nestor M. Davidson, *Property's Morale*, 110 MICH. L. REV. 437, 472 (2011); *see also* Hannah Wiseman et al., *supra* note 89, at 891 ("[T]hat the law has generally developed without

denies advocating regulatory arbitrage,[249] his words have another unintended consequence, which is that they could be used by those advocating the undesirable status quo in too many states: a building-by-building negotiation between the utility company, property owner, and other actors.

As the 360 State Street case study reveals, without clear rules, such negotiations may extend, unresolved, for years—discouraging not just the property owner at the negotiating table but others down the line. In my mind, the urgent need for sweeping change in the way we treat BRRE requires top-down, ex ante expectation-setting rules that unlock the hold of utility companies on widespread deployment of BRRE. As the call for renewable energy in the United States continues to grow, we need to thoroughly examine our laws to ensure that we are doing everything we can to reduce the negative environmental effects of human activity in buildings.

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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.").

249. Davidson, *supra* note 248, at 472.