Community-Scale Renewable Energy

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I. INTRODUCTION

As the movement toward cleaner energy has gained momentum within the United States, a growing number of scholars and policymakers have made the case for community-scale renewable energy: mid-sized energy sources supported by resources pooled from several private parties in

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close geographic proximity. When built and utilized at the community level, these energy facilities may allow for economies of scale that their owners could not achieve working individually.[1] Individual distributed generation, such as solar infrastructure on the roofs of homes, involves high transaction costs and creates relatively small impacts. At the same time, community-scale renewable energy has advantages over large-scale projects, which are sited beyond our central cities, leading to energy sprawl and inefficiencies in transmission.[2] Furthermore, in many neighborhoods, installing relatively new on-site distributed generation is still a bold leap even for the most innovative of consumers; those adopting new technologies benefit from the mutual support and understanding of other nearby adopters.[3] Community projects ensure the presence of this type of shared support and understanding, thus lowering individual risks.

While both individual-scale and large-scale facilities have important roles in the development of clean energy nationwide, more must be done to facilitate community-scale renewable energy. We must promote the installation of commonly-owned distributed renewable infrastructure on rooftops, backyards, common areas, and vacant lots; the formation of microgrids that give communities more independence in generating electricity or heat[4] and "communicating" with the larger grid; and the

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1. *See, e.g.*, NORTHWEST SUSTAINABLE ENERGY FOR ECONOMIC DEVELOPMENT, A GUIDE TO COMMUNITY SHARED SOLAR: UTILITY, PRIVATE, AND NONPROFIT PROJECT DEVELOPMENT 3 (2012), *available at* http://www.nrel.gov/docs/fy12osti/54570.pdf (listing "[i]mproved economies of scale" as a benefit of community shared solar projects—as compared to individual on-site solar arrays). *Cf.*, *Community Participation in Large-Scale Projects*, NORTHWEST COMMUNITY ENERGY, http://nwcommunityenergy.org/resources/community-participation-in-large-scale-projects (last visited Jan. 27, 2013) (in the utility-scale context, noting that "large renewable projects are considerably less expensive to build on a per megawatt basis than smaller ones" due to "economies of scale in feasibility studies, permitting, turbine procurement" and other factors). *But see* SCOTT WHITE, COMMUNITY WIND INCENTIVES 1 (2007), *available at* http://kec.kansas.gov/reports/Community_Wind_Incentives_July07.pdf (explaining that utility-scale projects have superior economies of scale to community wind).

2. *See* Sara Bronin, *Curbing Energy Sprawl with Microgrids*, 43 CONN. L. REV. 547, 553–57 (2010) (noting the land intensity of centralized generation, including renewable generation, and associated transmission lines); Uma Outka, *The Renewable Energy Footprint*, 30 STAN. ENVTL. L.J. 241, 249–53 (2011) (describing the land use and environmental impacts of centralized renewable energy generation and transmission).

3. *See* Joel B. Eisen, *Residential Renewable Energy: By Whom?*, 31 UTAH ENVTL. L. REV. 339, 351 (2011) (applying Professor Everett Rogers's work on the early adoption of new technologies to distributed solar, and noting that "[t]he adopters need a support system, preferably the organization from which the innovation was purchased, and access to friends or others who understand the innovation"); Garrick Pursley & Hannah Wiseman, *Local Energy*, 60 EMORY L.J. 877, 901–04 (2011) (describing the need for individual "energy entrepreneurs" to pave the way for consumer recognition and support for distributed technologies).

4. We mention heat despite focusing only on solar and wind technologies because combined heat and power (CHP) is another important distributed energy source that has potential at the community scale. *See* Alexis Saba et al., The Opportunities for and

modification of laws to accommodate and encourage these changes. In limited circumstances, communities have begun implementing these types of projects. They still face substantial legal and structural barriers, though, which must be overcome if community-scale energy is to become a widespread reality. Building from previous work, this essay provides a framework of the core legal changes that must occur in order to support widespread community-scale renewable energy. It explores these changes in the two contexts in which community-scale renewable energy would most likely operate: in existing neighborhoods, where projects would require retroactive modifications of legal and physical infrastructure, and in new subdivisions, where developers would incorporate projects into their initial planning.[5]

At the outset, we should recognize the types of renewable energy that are best suited for community-scale facilities. A broad, and commonly accepted, definition of renewable energy comes from the Energy Information Administration, which includes all resources that "are naturally replenishing but flow-limited," including "biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action."[6] Of these types of renewable energy, solar and wind have the highest potential for community-scale implementation.[7] Indeed, these have tended to dominate the community-scale renewable projects already in place. Moreover, states commonly subsidize both large-scale and individual-

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Hurdles to the Development of Combined Heat and Power in New York City 4 (unpublished manuscript) (on file with authors) (noting that CHP systems, which "use natural gas turbines or reciprocating engines to generate electricity and then capture heat from the combustion system's exhaust stream" or generate electricity "as the byproduct of heat generation," "typically range from 60 kW for many multi-family residential buildings to 4-7 MW for many hospitals, college campuses, and big office buildings to 10-15 MW for even bigger loads").

5. We acknowledge that the collective sprawl caused by the development of new subdivisions—typically at the outer edges of cities—has many negative impacts. This essay accordingly recognizes the importance of efforts to discourage sprawl but suggests that where sprawl cannot be curbed, a second-best solution is to offset some of the negative impacts through green energy production in new communities. These developments offer some of the lowest hanging fruit in community renewable generation because developers can build renewable infrastructure relatively cheaply and quickly within new subdivisions.

6. Glossary, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/tools/glossary/index.cfm?id=R (last visited Jan. 27, 2013).

7. *But see also* Saba et al., *supra* note 4 (noting the promise of microgrid-scale combined heat and power projects in New York City, which already have been implemented in many housing developments and businesses. Although CHP is not renewable, in that it typically uses natural gas, it is highly efficient).

scale solar and wind developments; these subsidies may also be used as is, or restructured, to support community-scale projects.

We further narrow the scope of our discussion of community-scale renewables based on the collective ownership and operation of the equipment, the size of the generation equipment, and the arrangement of the equipment to create a common energy source.[8] First, to be "community-scale" energy, the generation must be managed, or the generation project must at least be instigated by, a community: an organized group of residents and/or business owners must be involved in some of the stages of land use planning, acquisition, and installation of renewable equipment, maintenance and operation of this equipment, and the sale of energy—either electricity or heat—from it.[9] With respect to size, we include projects between the sizes of roughly fifty kilowatts to one megawatt:[10] substantially less generation than utility-scale installations,

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8. Others have different definitions and include more projects—including those in which residents simply buy into a share of a much larger project not within their own neighborhood. *See, e.g.*, MARK BOLINGER, LAWRENCE BERKELEY NATIONAL LABORATORY, A SURVEY OF STATE SUPPORT FOR COMMUNITY WIND POWER DEVELOPMENT 1 (2004), *available at* http://emp.lbl.gov/sites/all/files/CASE%20STUDY%20Community_Wind.pdf ("Possible defining criteria include: project size (small vs. large projects); purpose (to offset end-use power consumption vs. to sell power to the grid); ownership (single local vs. multiple local vs. municipal utility vs. commercial owners); and interconnection (behind the meter vs. to the distribution grid vs. to the transmission grid)."); Kristin L. Bailey, Note, *Insecurity for Community Solar: Three Strategies to Confront an Emerging Tension Between Renewable Energy Investment and Federal Securities Laws*, 10 J. TELECOMM. & HIGH TECH L. 123, 124 (2012) (defining projects that "allow consumers to purchase shares in solar energy generation facilities located somewhere other than on their rooftops" as "community solar").

9. *See, e.g.*, MARK BOLINGER & RYAN WISER, ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY, A COMPARATIVE ANALYSIS OF BUSINESS STRUCTURES SUITABLE FOR FARMER-OWNED WIND POWER PROJECTS IN THE UNITED STATES 1 (2004), *available at* http://eetd.lbl.gov/ea/ems/reports/56703.pdf (defining "community owned" wind projects as involving community members that make "up-front capital investment in the project, as well as oversee (though not necessarily undertake) the construction, operations, and maintenance of the project"); PATHFINDER COMMUNICATIONS ET AL., NEW SOLAR DEVELOPMENT MODELS FOR WEST MARIN: "COMMUNITY SOLAR" AND THE "SOLAR SAFETY NET" 20 (2008), *available at* http://www.energy.ca.gov/2008publications/MCF-1000-2008-021/MCF-1000-2008-021.PDF (defining community wind as "revolving around local ownership and control," in which the "key distinguishing feature is that local community members . . . have a significant, direct financial stake in the project beyond just land lease payments and tax revenues"); White, *supra* note 1, at 1 (explaining that most states and organizations define community wind projects as "having at least 51% of ownership coming from the local community or from within the state"). The focus on community involvement in planning, acquisition, and installation of renewable equipment differentiates this community-based definition from others, in which, for example, multiple users "purchase a portion of their electricity from a solar facility that may be located off-site," including from a "utility-scale facility." PATHFINDER COMMUNICATIONS ET AL., *supra* note 9, at 10.

10. As described *infra* note 11, size estimates for community-scale renewables vary dramatically, depending on the size of the block of a neighborhood served by the

yet substantially more generation than would be used by the typical single end user,[11] while still being able to be located on several acres or fewer. Finally, we limit projects to those with a common source of generation, meaning that the physical array must be somehow connected both to a central power distribution node and to individual end users:[12] solar panels or small- to medium-sized wind turbines could be installed on separate properties and sent to a common transformer, or the equipment could be constructed within a common area, such as a public park.

Three major changes will be necessary to realize substantial growth in community-scale renewables, as we have defined them. First, communities must be able to form business enterprises that govern the purchase, installation, operation, and maintenance of generation infrastructure and that manage the sale of energy produced.[13] Currently, the types of business enterprises that would allow community-scale generation are limited. We suggest three new and existing business structures that could accommodate the needs of owners of community-scale renewable energy.

Second, communities must facilitate the construction of physical infrastructure, including homes, public spaces, and streets, that house renewable generation. This infrastructure must allow for the adequate flow of renewable fuels, namely sunlight and wind, through the community.[14] It also must ensure that residents can install the equipment

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project, as well as how much electricity, if any, the neighborhood anticipates selling back to a utility.

11. *See, e.g.*, MASS. CLEAN ENERGY CTR., MASS CEC'S STEP-BY-STEP GUIDE TO THE COMMONWEALTH WIND INCENTIVE PROGRAM: COMMUNITY SCALE WIND (2011), *available at* http://www.masscec.com/masscec/file/Community%20Scale%20Step-by-Step_V2_Final.pdf (describing "community-scale wind" as renewable energy systems with nameplate capacity "greater than or equal to 100 kW"); *cf.* PAUL KOMOR, RENEWABLE ENERGY POLICY 40 (2004) (explaining that photovoltaic models (panels) each "have a peak power output of 50 to 300 watts" and that just two of these modules could form a small residential system, whereas "thousands of modules" would be used in a "utility-scale system of 100 kW or more"). *But see Community Wind*, NORTHWEST COMMUNITY ENERGY, http://nwcommunityenergy.org/wind (last visited Jan. 29, 2012) (describing community wind as including projects "up to 10 MW in size"); BOLINGER, *supra* note 8, at 1 (describing community wind projects as "locally owned, *utility-scale* wind projects on either side of the meter" (emphasis added)); *Community Energy*, NORTHWEST COMMUNITY ENERGY, http://nwcommunityenergy.org/ (last visited Jan. 29, 2013) (describing projects up to 20 megawatts).

12. *See, e.g.*, MASS. CLEAN ENERGY CTR., *supra* note 11, at 2 (defining community-scale wind as projects for which the utility meter is "grid-connected").

13. *Cf.* BOLINGER & WISER, *supra* note 9 (describing options for farmers' business structures).

14. *See, e.g.*, Sara C. Bronin, *Solar Rights*, 89 B.U. L. REV. 1217, 1220, 1222 (2009) (noting the need for a property owner to be able to "to enjoy or utilize a defined

needed to capture these fuels, whether in commonly owned open spaces or on individual rooftops. We suggest ways in which zoning, easements, exactions, planning, and restrictions—such as restrictive covenants—can make these goals possible.

Finally, the utility-consumer relationship must be redefined if community-scale generation is to become a reality. Most public utility laws do not address community-scale generation that involves multiple end users. State legislatures and utilities will have to recognize communities as producers of energy, implement more consistent policies, and expand distribution and some transmission infrastructure to accommodate the sale of community-generated energy among end users and back to the grid. We briefly suggest three areas—third-party sales through power purchase agreements, submetering and rate-setting—that policymakers should consider changing in order to better accommodate community-scale renewable energy.

II. PROMISING BUSINESS ENTERPRISE TYPES

A group seeking to establish community-scale renewable energy must organize itself into a business enterprise that can own, finance, operate, and maintain the infrastructure, and sell any energy produced. By "business enterprise," we mean an entity, other than a simple partnership or other loose affiliation of individuals, which is organized under and follows the formalities of the applicable state business organization laws. These types of business enterprises may provide certain benefits: they may limit liability, unlock financing opportunities, prevent free-riding, or offer tax advantages.

In choosing a business structure, groups seeking to undertake community-scale renewable energy projects must evaluate their expected needs to find the most suitable type. At the initial project stages, community members will need to fund site surveys and permitting work before acquiring renewable infrastructure and paying for its installation.[15] They also will have to cover ongoing maintenance, insurance, and operation costs, and pay relevant government taxes and fees over the long term. A

amount of sunlight on her parcel" and defend this right); Energy Star, *Renewable Energy Ready Home Solar Site Assessment Tool*, ENERGY STAR, http://www.energystar.gov/index.cfm?c=rerh.assessment (last visited Jan. 29, 2013) (providing a tool to allow home builders to assess "whether a new home has the proper physical orientation to support a future installation of a solar energy system").

15. *See Development Phase: Concept to Pre-Construction*, NORTHWEST COMMUNITY ENERGY, http://nwcommunityenergy.org/project-design-management/typical-project-phases/development-phase (last visited Jan. 29, 2013); MARY KNIPE, UNIV. OF MASS. WIND ENERGY CTR., SITING CONSIDERATIONS FOR A WIND TURBINE (2009), *available at* http://www.mtpc.org/Project%20Deliverables/MillburyWECWindSiteAnalysisJune09.pdf.

related issue, explored further in Part IV, is whether the enterprise type can facilitate the sale or other distribution of any energy produced; many states prohibit entities that are not utility companies from selling electricity.[16]

To carry out these tasks, a group seeking to undertake a renewable energy project must be able to form innovative business structures or modify existing ones. Three business enterprise types have particular promise for community-scale renewable energy: energy improvement districts and cooperatives in existing neighborhoods, and homeowners' associations in new subdivisions. We suggest each of these types of structures because they present different opportunities for self-governance by end users, which seems to be the key to a harmonious allocation of limited common resources, such as shared energy.[17]

A. For Existing Neighborhoods

Building community-scale renewable energy in an existing neighborhood is a difficult task, primarily because the physical and legal infrastructure must be retroactively imposed. It is much harder to undertake a community-wide physical intervention after buildings are constructed, roads are laid, and utilities are routed. It is also sometimes harder to engage entrenched interests in the development of an entirely new business venture, although existing community relationships might aid this development.

If the status quo bias created by existing institutional and physical infrastructure can be overcome, there are two ways to approach a community-scale energy project in an existing neighborhood. One way is to require participation among all residents and businesses in a given neighborhood by creating a public governing institution, in which case an energy improvement district may be a suitable option. A second way is to make participation voluntary, with participants opting in to a private cooperative-type arrangement. These two types of business enterprises are discussed below.

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16. *See* KATHARINE KOLLINS ET AL., SOLAR PV PROJECT FINANCING: REGULATORY AND LEGISLATIVE CHALLENGES FOR THIRD-PARTY PPA SYSTEM OWNERS 3 (2010), *available at* http://www.nrel.gov/docs/fy10osti/46723.pdf.

17. *See generally* Carol Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 U. CHI. L. REV. 711 (1986) (describing various regimes by which common resources have been managed).

1. Energy Improvement Districts

The energy improvement district (EID) is one possible business structure that could facilitate the growth of community-scale renewable energy. This arrangement would be a special district[18] that required all of those within the area served by a renewable energy project to participate, financially or otherwise, in a way that is proportionate to their interest in the project. EIDs could provide participants with the power to acquire, install, and operate community-scale renewables in a manner that is consistent with and complementary to existing state public utility laws—allowing participants to acquire local common space and fund and maintain a solar panel array or wind turbine, for example. Alternatively, EIDs could themselves purchase and maintain collectively owned individual equipment for rooftops or backyards, enabling equal allocation of construction and maintenance costs and other burdens. Participants would pay into the EID through a tax based on their energy usage, ability to pay, acreage of property ownership, number of end users, or similar criteria.

The mandatory approach of the EID could help overcome the problem of free-riders, who may somehow benefit (in the form of lower utility rates, for example) from, without contributing to, the renewable energy project. On the other hand, a mandatory approach may be onerous for those within the boundaries of the energy service area who would not have voluntarily chosen to participate, for financial or other reasons.

EIDs would be modeled on a business type that addresses these collective action issues in the land use context: the business improvement district (BID), developed by private citizens and governments, to address concerns of business owners within existing neighborhoods.[19] Commercial property owners across the country worked with state legislators to design the BID form when they recognized a need to implement and maintain infrastructure and services to improve aesthetics and security,

18. The U.S. Census Bureau defines "special district governments" as "All organized local entities (other than counties, municipalities, townships, or school districts) authorized by state law to provide only one or a limited number of designated functions, and with sufficient administrative and fiscal autonomy to qualify as separate governments; known by a variety of titles, including districts, authorities, boards, and commissions." *See Federal, State, and Local Governments, Definitions*, U.S. CENSUS BUREAU, http://www.census.gov/govs/definitions/index.html#s. *See also* DAVID L. CALLIES ET AL., CASES AND MATERIALS ON LAND USE 682 (5th ed. 2008) (suggesting funding of distributed solar through, among other solutions, "special district assessments").

19. *See generally* Richard Briffault, *A Government for Our Time? Business Improvement Districts and Urban Governance*, 99 COLUM. L. REV. 365 (1999) (providing the leading summary of the history, formation, and utility of business improvement districts).

beyond what was provided by the municipality;[20] there are now more than one thousand BIDs in operation around the country.[21] Once set up, the BID coordinates with the municipality to collect an incremental property tax on all properties within the boundaries of the district.[22] Even those property owners who did not choose to create the BID are bound by this tax.[23] While some have criticized this practice as undemocratic or defended it as encouraging local participation in decisions that impact the community,[24] the BID, regardless of its democracy-based merits, largely avoids the free-riding problem, requiring participation and pooling the resources amassed for common ends.

New York City has seen the formation of at least 64 BIDs,[25] and the city's implementation of its BID program has been fairly typical.[26] The

20. Indeed, the ability for neighborhoods to allocate their own resources is seen as one of the greatest benefits of the BID form. *See, e.g.*, Richard Briffault, *The Business Improvement District Comes of Age*, 3 DREXEL L. REV. 19, 22 (2010) ("[T]here is great value in an institutional form that allows neighborhoods to raise additional revenue from property owners or businesses within the community to be used to finance programs for and activities within the community, rather than to depend entirely on city hall for public services").

21. Briffault, *supra* note 19, at 367 n.1 (describing why the one thousand figure is an "order of magnitude" and not a precise measurement).

22. *Id.* at 368 (describing a BID as "a territorial subdivision of a city in which property owners or businesses are subject to additional taxes").

23. *Cf.* Amnon Lehavi, *Property Rights and Local Public Goods, Toward a Better Future for Urban Communities*, 36 URB. LAW. 1, 19 (2004) (describing BIDs as "mandatory membership").

24. *See* Brian R. Hochleutner, *BIDs Fare Well: The Democratic Accountability of Business Improvement Districts*, 78 N.Y.U. L. REV. 374, 377–78 (2003) (concluding that "BID officials are (properly) most accountable to property and business owners . . . [and that] the BID model also includes safeguards to ensure that the interests of BID and city residents are not disregarded"); David J. Kennedy, *Restraining the Power of Business Improvement Districts: The Case of Grand Central Partnership*, 15 YALE L. & POL'Y REV. 283, 285 (1996) (asserting that BIDs "are undemocratic, enjoy unwarranted s 501(c)(3) not-for-profit status, harm other parts of the city, and lack sufficient oversight"). For a summary of key scholarly debates regarding BIDs, see Lorlene Hoyt & Devika Gopal-Aggem, *The Business Improvement District Model: A Balanced Review of Contemporary Debates*, GEOGRAPHY COMPASS 1/4, 946, 951–52 (2007), *available at* http://web.mit.edu/dusp/dusp_extension_unsec/people/faculty/lhoyt/Hoyt_Gopal-Agge_GECO.pdf.

25. *See About Us*, NEW YORK CITY BID ASSOCIATION, http://www.nycbidassociation.org/about-us.html (stating that its membership includes managers of all of New York City's 64 BIDs). For two law review comments describing in detail two of the districts, see Kennedy, *supra* note 24, at 283 (describing the success of the Bryant Park BID in transforming a drug-infested park into a center of economic activity in Midtown Manhattan but criticizing the city's BID implementation) and Daniel R. Garodnick, *What's the BID Deal? Can the Grand Central Business Improvement District Serve a*

city defines a BID as a "public/private partnership in which property and business owners elect to make a collective contribution to the maintenance, development, and promotion of their commercial district."[27] To form a BID in the city, area property owners organize a group that surveys area needs for infrastructure and services, proposes a specific territory and services to be provided within it, and implements mechanisms for assessing the amount of money that each owner will pay for these services.[28] Various municipal decision-makers (such as the city council) must review and approve the plan that is created.[29] Once the BID is created, an elected board of directors with fiduciary duties to its members oversees the district and hires the managers who administer daily BID services.[30] When a BID is established for a certain territory—often one or several blocks—property owners within this territory must become members and pay a tax for upkeep of the area.[31] BIDs can be imposed upon unwilling members, but this typically occurs after an extensive notice and comment process, through which existing property owners can file formal objections.[32] Furthermore, different levels of assessment sometimes apply to different properties, thus alleviating the burdens on those who may benefit less from common infrastructure and services or have fewer resources. In New York, government and non-profit owners typically pay no fees, while residents pay lower fees than do business owners.[33]

Professor Robert Ellickson has shown how BIDs serve as institutional models for smaller, non-commercial collective arrangements, which he calls Block-Level Improvement Districts (BLIDs).[34] Ellickson envisions BLIDs as providing life safety services, such as sidewalk and street

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Special Limited Purpose?, 148 U. PA. L. REV. 1733, 1740 (2000) (asserting that none "can deny the positive impact" of the BID).

26. Richard Briffault has also assessed the effectiveness of Philadelphia's fourteen BIDs, in Briffault, *supra* note 20, at 20 (arguing that his and other research has shown that the "BID needs to be seen as part of a broader ecology of urban governance structures").

27. N.Y.C. DEP'T OF SMALL BUS. SERVICES, STARTING A BUSINESS IMPROVEMENT DISTRICT, A STEP-BY-STEP GUIDE 1 http://www.nyc.gov/html/sbs/downloads/pdf/neighborhood_development/business_improvement_districts/11_step_bid_formation_guide.pdf [hereinafter N.Y.C. DEP'T OF SMALL BUS. SERVICES].

28. *Id*. at 4–17. *See also* N.Y. GEN. MUN. LAW § 980-a (McKinney 2012) (describing the information the State of New York requires to be in the initial plan for the district).

29. *See* N.Y.C. DEP'T OF SMALL BUS. SERVICES, *supra* note 27, at 23 (demonstrating that this is also required in BIDs outside of New York).

30. N.Y.C. DEP'T OF SMALL BUS. SERVICES, *supra* note 27, at 4.

31. Robert C. Ellickson, *New Institutions for Old Neighborhoods*, 48 DUKE L.J. 75, 77–78 (1998).

32. N.Y.C. DEP'T OF SMALL BUS. SERVICES, *supra* note 27, at 6. If fifty-one percent of the property owners file an objection, the BID will not be created.

33. N.Y.C. DEP'T OF SMALL BUS. SERVICES, *supra* note 27, at 3.

34. Ellickson, *supra* note 31, at 78–79.

repair, sanitation, beautification, culture and entertainment, political activity, street furniture, landscaping, and land purchases such as community gardens.[35] At this time, states and localities have not authorized BLIDs on any widespread basis, but the concept is an intriguing one and may serve as an important hypothetical model for community-scale energy projects.

In theory, both BIDs, which cover neighborhoods, and BLIDs, which cover blocks, could provide energy resources themselves; indeed, Portland, Oregon, has used one of its existing BIDs to develop community-scale energy infrastructure.[36] More realistically, however, the BID/BLID concept will be adapted to the energy context in the form of energy improvement districts. EIDs would have several important differences from BIDs and BLIDs: they would deal exclusively with energy and be explicitly authorized to own energy infrastructure and sell energy. Moreover, EIDs might include primarily non-commercial participants, while BIDs are designed primarily to benefit commercial members. As is the case with BIDs, EIDs also likely would require state enabling legislation.

States' and municipalities' recent support for BIDs, combined with a growing number of state monetary incentives for community wind and solar, suggests that persuading legislatures to support EIDs would be possible. At least one state—Connecticut—has nominally authorized EIDs, although not yet with much success.[37] The state allows city legislative bodies to vote to form an EID, which, if formed, is then administered by an energy improvement district board.[38] Members opt in to the district, and the board may charge these members fixed fees in order to "own, operate, and maintain" all energy improvement district distributed resources and to determine their "location, type, [and] size."[39] The legislation provides EIDs with inadequate power to achieve the goal of community-scale renewable energy,[40] however, and none have been made fully operational to date. A start-up project in Stamford failed

35. *Id.* at 97–98.

36. *See* Genevieve Rose Sherman, Sharing Local Energy Infrastructure: Organizational Models for Implementing Microgrids and District Energy Systems in Urban Commercial Districts 27–39 (June, 2012) (unpublished graduate thesis, Massachusetts Institute of Technology) (on file with MIT) (describing Portland's EcoDistrict system, including one model project implemented through a city BID).

37. For an unparalleled analysis of the operation, management, risk distribution, financing, and other dimensions of Connecticut's EID experiment, see *id.* at 40–51.

38. CONN. GEN. STAT. § 32-80a (b) (2011).

39. *Id.* § 32-80a(c).

40. *See id.* § 32-80a.

because of concerns about reliability, third party management, and property owner risk.[41]

Despite the failure of initial efforts to form EIDs in Connecticut, Portland's successful application of a BID to a community energy project shows the promise of this concept; with further modification, EIDs likely could become successful business models for community-scale energy.

2. Cooperatives

A private, voluntary alternative to the public, mandatory energy improvement district is an electric cooperative, in which members of the cooperative build, own, and maintain the renewable energy infrastructure and share in the energy produced, paying in based on energy use. Cooperative associations are nonprofit organizations set up exclusively for the benefit and advancement of their members. While state laws regarding the creation of cooperatives vary, cooperatives are generally characterized by four principles: "(1) democratic ownership and control by users; (2) limited returns on capital; (3) return of benefits or margins to users on the basis of use; and (4) the obligation of user-owner financing."[42] The first principle generally translates into "one person, one vote," meaning that each member of a cooperative has a vote, regardless of any other measure, such as money invested into the cooperative.[43] The second reflects the concept that cooperatives are not meant to be investment vehicles, but rather to help a group of individuals reach "common business goals,"[44] and the third and fourth principles are interrelated, reflecting the "for the members, by the members" approach upon which cooperative financing is based.

Cooperatives have existed for at least 150 years and have mostly been used for agricultural purposes—performing, for example, marketing or procurement services for a group of farmers.[45] Other types of cooperatives include consumer (such as member-owned food stores), purchasing (such as pharmaceutical buying clubs), and worker cooperatives (professional firms that workers own and control).[46] These types of

41. *See* Sherman, *supra* note 36, at 47–48.

42. James B. Dean & Thomas Earl Geu, *The Uniform Limited Cooperative Association Act: An Introduction*, 13 DRAKE J. AGRIC. L. 63, 66 (2008).

43. *Id*. at 66.

44. *Id.*

45. *See*, *e.g.*, U.S. DEP'T OF AGRIC., RURAL DEV., COOP. INFO. REPORT 65, THE NATURE OF THE COOPERATIVE 4, (Feb. 2012), *available at* http://www.rurdev.usda.gov/supportdocuments/cir65.pdf.

46. *Types of Cooperatives*, UNIV. OF WISCONSIN-MADISON, CTR. FOR COOPS., http://www.uwcc.wisc.edu/whatisacoop/TypesofCooperatives/ (last visited Apr. 12, 2013).

business structures allow their members to maximize benefits, and profits must be distributed among members in proportion to their use of the services provided by the cooperative (called "patronage refunds"). Cooperatives cannot, however, be run purely for profit-maximizing purposes: states often impose a limitation on the net profit that cooperatives—agricultural or otherwise—can realize without jeopardizing their nonprofit status.[47]

Some states explicitly allow for cooperatives to be organized for energy purposes, although these statutes primarily anticipate cooperatives serving rural residential areas.[48] At least four hundred non-profit rural electric cooperatives have been formed pursuant to these statutes.[49] Many of these cooperatives are decades old, and it is not clear how many use renewable energy. But these types of entities, organized at a smaller scale than they typically are in rural areas, might be attractive vehicles for those who want to initiate modern community-scale renewable energy projects. Potential participants could form a cooperative association, designating themselves as members, and electing a board to manage the cooperative's affairs. The cooperative would purchase and maintain the equipment and distribute its energy to members. It would also decide how the patronage refunds would be distributed among members. One potentially significant advantage of this structure is that public utilities may prefer it to for-profit business entities, which they would likely view as direct competitors.

Despite the promise of cooperatives, few, other than rural electric cooperatives, focus specifically on the provision of energy.[50] An analysis funded by the Lawrence Berkeley National Laboratory suggests several

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47. *See* U.S. DEP'T OF AGRICULTURE, COOPERATIVE FINANCING AND TAXATION 6, *available at* http://www.rurdev.usda.gov/rbs/pub/cir1sec9.pdf (summarizing "[t]he 8 percent [limitation on dividends] is a historical level contained in many State laws").

48. *See*, *e.g.*, MO. REV. STAT. § 394 (2012) (dealing with the creation and requirements for rural electric cooperatives); S.C. CODE ANN. § 33-49-250 (2012) (defining the powers of the cooperative, including to "generate, manufacture, purchase, acquire, accumulate, and transmit electric energy and to distribute, sell, supply, and dispose of electric energy to its members"); OKLA. STAT. ANN. tit. 18 § 437.1 (West 2012) (stating: "Cooperative, nonprofit, membership corporations may be organized under this act for the purpose of supplying electric energy and promoting and extending the use thereof in rural areas").

49. NAT'L RURAL ELECTRIC COOP. ASS'N,, AMERICA'S COOPERATIVE ELECTRIC UTILITIES 2, *available at* http://www.nreca.coop/members/Co-opFacts/Pages/default.aspx (listing 239 residential cooperatives, 84 commercial cooperatives, and 90 industrial cooperatives).

50. BOLINGER & WISER, *supra* note 9, at 7.

reasons for the limited use of energy cooperatives so far, which primarily relate to the fact that profit and taxation rules limit interest from typical renewable energy companies and investors.[51] As noted above, cooperatives typically divide profits among member-owners based on how much they use a resource rather than how much they invest.[52] This allocation deters for-profit investment. Moreover, cooperatives are often pass-through entities that create little tax liability, meaning that cooperative members do not benefit from the many incentives for renewables that take the form of tax credits (intended to reduce tax burdens of those with significant tax liability).[53]

Despite the limitations of this business structure for energy, a handful of community solar projects have begun to use cooperative-type mechanisms. For the "Solar Pioneers II" project in Ashland, Oregon, citizens and businesses purchased upfront "¼, ½, or full solar panel increments" and now receive "payment for the value of the corresponding energy produced for a term of 20 years," as well as rights to the Renewable Energy Credits generated by the project.[54] Similarly, in Colorado, the Clean Energy Collective allows "individuals to directly own panels in a community solar farm."[55] Although some communities have been hesitant to sell shares in projects due to concerns about state and federal securities regulations,[56] non-profit cooperative structures may provide exemptions from these regulations.[57]

In sum, in proposing cooperatives as a second business model that, with modification, could effectively support community-scale projects, it is worth noting that cooperatives would work best with renewable energy projects that are truly community-based: where member-investor-users are fairly homogenous in terms of financial capability and investment, and where the provision of energy (and not the maximization of profit) is the end goal.

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51. *Id.*

52. *Id.* at 7.

53. *Id.* This comparative disadvantage does not apply to incentives that take the form of grants or low-interest loans.

54. *Ashland Oregon's Solar Pioneers II*, NW. COMMUNITY ENERGY, http://nwcommunityenergy.org/solar/solar-case-studies/the-vineyard-energy-project/ (describing a system of four photovoltaic panels that produced a total of 30 kW).

55. *Clean Energy Collective LLC, Colorado*, NW. COMMUNITY ENERGY, http://nwcommunityenergy.org/solar/solar-case-studies/CEC_colorado (last visited Apr. 12, 2013).

56. *See Sacramento Municipal Utility's (SMUD) Solar Shares Program*, NW. COMMUNITY ENERGY, http://nwcommunityenergy.org/solar/solar-case-studies/navajo-nation (last visited Apr. 12, 2013).

57. *See Winthrop Community Solar Project*, NW. COMMUNITY ENERGY, http://nwcommunityenergy.org/solar/solar-case-studies/winthrop_solar (last visited Apr. 12, 2013) (describing a 22.8 kilowatt ground-mounted solar array for which a nonprofit partnership obtained a "Nonprofit Notification of Claims of Exemption" from the Washington State Division of Securities).

B. For New Subdivisions

Developers building new subdivisions face several advantages over property owners in existing neighborhoods in terms of setting up business structures for the installation and ongoing operation of community-scale renewables. The key advantage is that these developers do not have to impose new institutions on residents *ex post*. Rather, they can establish, up-front, common fees for the construction and maintenance of renewable infrastructure through the covenants, conditions, and restrictions (CC&Rs) that attach to each deed within the subdivision. In this way, the developer can bind future residents to community-scale energy while placing them on notice[58] of the fees and their purpose. Moreover, subdivision developers can potentially avoid inequitable cost burdens by defining fee structures based on the size or cost of residents' lots or similar income proxies; EIDs can use similar, varied fee structures, but these must be approved by a city government.

The homeowners' association—a private organization that collects fees, maintains property, and enforces CC&Rs within a subdivision[59]—is a natural vehicle for funding and overseeing the operation of community renewable infrastructure. HOAs, much like the boards of directors of

58. *But see* Hannah Wiseman, *Public Communities, Private Rules*, 98 GEO. L.J. 697, 745–47 (2010) (surveying the literature and describing interviews with residents in subdivisions to suggest that a substantial number of prospective residents may not receive notice of CC&Rs and fees or receive notice but do not read it).

59. *See* Wayne S. Hyatt & JoAnne P. Stubblefield, *The Identity Crisis of Community Associations: In Search of the Appropriate Analogy*, 27 REAL PROP. PROB. & TR. J. 589, 599 (1993) ("A community association is an automatic, mandatory membership organization. That means that all owners of property subject to the covenants creating the community association automatically become members of that association by virtue of taking title to that property. They must remain citizens of that association subject to its governing and taxing powers so long as they remain owners."); *id.* at 599–600 (noting that associations have "responsibility for the preservation and maintenance of the property itself" and enforces the regulatory scheme "which each purchaser agrees to comply when taking title to a unit"); Curtis C. Sproul, *The Many Faces of Community Associations under California Law*, *in* COMMON INTEREST COMMUNITIES: PRIVATE GOVERNMENTS AND THE PUBLIC INTEREST 46, 62 (Stephen E. Barton & Carol J. Silverman, eds., 1994) (describing as the "principal functions" of association "administration and enforcement of property-use restrictions among neighboring property owners" and "prudent management of the association's financial resources, including the investment, application, and collection of homeowner assessments"); WALT HUBER & KIM TYLER, HOMEOWNER'S ASSOCIATION MANAGEMENT: MANAGING COMMON INTEREST DEVELOPMENTS (CIDS) 10 (2005) (noting that "[a]lthough 'community association' is most frequently used in California, the most commonly used term is 'homeowner association'").

Business Improvement Districts, collect monthly or annual fees from all residents within their territory[60]—in this case, the subdivision. They then use these fees to hire management companies that maintain common infrastructure, such as clubhouses, parks, and streets. Some HOAs have begun to use the money collected for renewable projects: the Ocean Hills Country Club Homeowners Association in Oceanside, California, installed solar panels on the clubhouse roof and is contemplating a "wind turbine demonstration project."[61]

When thinking about how HOAs might be used more frequently in the energy context, one might consider how the organization is authorized to spend money on behalf of the subdivision (whether it can purchase energy infrastructure or enter into contracts to maintain such infrastructure, for example), what kinds of rules an HOA is authorized to make (particularly with respect to homeowners' usage of energy produced), and what state and federal laws bind an HOA with respect to the sale or distribution of energy. Identifying state-specific rules that pertain to these legal areas, and modifying them to allow for HOAs to finance or participate in renewable energy projects, is an important first step in ensuring that the HOA form may be adapted for community-scale renewable energy. States that support community-scale energy also must prevent HOAs from banning distributed renewable equipment;[62] although many are hesitant to interfere with private contracting powers,[63] there is a strong public interest in renewable energy that likely justifies this restriction.[64]

60. *See, e.g.*, CAL. CIV. CODE § 1366 (West 2012) (providing that in common interest developments "the association shall levy regular and special assessments sufficient to perform its obligations under the governing documents and this title" but limiting increases in annual assessments); Stephen E. Barton & Carol J. Silverman, *History and Structure of the Common Interest Community*, *in* COMMON INTEREST COMMUNITIES: PRIVATE GOVERNMENTS AND THE PUBLIC INTEREST 3, 5 (Stephen E. Barton & Carol J. Silverman, eds., 1994) ("Common interest development services are paid for by monthly assessments on each unit, although some funds are raised through direct charges for particular services."); *id.* at 6 (citing an older California Common Interest Development study, in which 80 percent of communities assessed "charged between $40 and $175 monthly). *See also* DAVID L. CALLIES ET AL., CASES AND MATERIALS ON LAND USE 682 (5th ed. 2008) (suggesting funding of distributed solar through, among other solutions, "homeowner association dues on the homeowner").

61. Marvin J. Nodiff, *Bright Returns*, COMMON GROUND, July-Aug. 2009, at 27.

62. *See, e.g.*, Mark A. Pike, Note, *Green Building Red-Lighted by Homeowners' Associations*, 33 WM. & MARY ENVTL. L. & POL'Y. REV. 923, 924 (2009) (making a similar argument); Evan J. Rosenthal, *Letting the Sunshine In: Protecting Residential Access to Solar Energy in Common Interest Developments*, 40 F.S.U. L. REV. (forthcoming) (same).

63. *See* Kristina Caffrey, Note, *The House of the Rising Sun: Homeowners' Associations, Restrictive Covenants, Solar Panels, and the Contract Clause*, 50 NAT. RESOURCES J. 721, 725 (2010).

64. *But see* ZOGBY INT'L, FOUNDATION FOR COMMUNITY ASSOCIATION RESEARCH TRACKING POLL 19 (2007), *available at* http://www.cmgcharleston.com/managers_files/Zogby_HOA_Survey_2007.pdf (showing that 59% of 709 common interest

Indeed, several states now prohibit the formation of servitudes that ban or have the effect of banning distributed renewables.[65]

In many respects, HOAs are easier to form than BIDs, which often require both municipal and property owner approval. For HOAs, property owner approval of CC&Rs is not required because CC&Rs are established before property owners even purchase their lots.[66] Moreover, municipalities increasingly *require* that developers create HOAs when they build a subdivision;[67] this ensures that streets and other subdivision infrastructure will be maintained and paid for by subdivision residents rather than the city.[68] Furthermore as introduced above, HOAs are not typically imposed on existing residents;[69] they, like the subdivision, are new. Residents have written or constructive notice[70] that their properties will be subject to CC&Rs—including fees—and the enforcement powers of an HOA.

If the owners of lots within the subdivision have highly differential incomes, the imposition of uniform fees could seem unfair—a problem avoided in BIDs by reducing or eliminating fees for non-profits and government owners. Subdivisions tend to offer homogenous properties within their boundaries, however, ranging from mobile-home communities to up-scale villages with club houses and large lots. This could help to

community residents surveyed responded "yes" when asked, "Should community associations, as private organizations, have the right to control the scope and placement of solar panels on individual homes to maintain architectural standards"?). This information does not indicate, however, that respondents supported a full ban.

65. *See, e.g.*, ARIZ. REV. STAT. ANN. § 33-1816 (2012) (providing that "an association shall not prohibit the installation or use of a solar energy device"); HAW. REV. STAT. § 196-7(a) (West 2012); N.M. STAT. ANN. § 3-18-32(b) (West 2012); *see also* Caffrey, *supra* note 63 (describing and critiquing state solar access laws).

66. *See* URBAN LAND INST., THE HOMES ASSOCIATION HANDBOOK 198–99 (Mary Jo Cornish ed., 1964) (explaining that developers write and record a declaration of covenants, conditions, or restrictions before the sale of the first lot in a subdivision).

67. *See* Paula A. Franzese & Steven Siegel, *Trust and Community: The Common Interest Community as Metaphor and Paradox*, 72 MO. L. REV. 1111, 1120–22 (2007).

68. *See, e.g.*, James L. Winokur, *Choice, Consent, and Citizenship in Common Interest Communities, in* COMMON INTEREST COMMUNITIES: PRIVATE GOVERNMENT AND THE PUBLIC INTEREST 87, 89 (Stephen E. Barton & Carol J. Silverman eds., 1994).

69. *See, e.g.*, Robert C. Ellickson, *Cities and Homeowners Associations*, 130 U. PA. L. REV. 1519, 1522, 1524 (1982) (differentiating HOAs from other "governments" in that in HOAs, homeowners voluntarily subject themselves to rules by moving to the community).

70. *But see* James L. Winokur, *Choice, Consent, and Citizenship, in* COMMON INTEREST COMMUNITIES: PRIVATE GOVERNMENT AND THE PUBLIC INTEREST 87, 99 (Stephen E. Barton & Carol J. Silverman eds., 1994) (arguing that few residents have full notice or understanding of the rules).

alleviate inequitable distributions of burdens within each community. And as introduced above, where properties are not homogenous, CC&Rs can include varied fee assessments that account for income differences. HOAs, with their existing authority to collect fees and provide and maintain collective infrastructure and services, are a promising business model for community renewables in new subdivisions.

III. LAND USE RULES

Even the most effective structure for the ownership and operation of community renewable infrastructure will fail if the community is not physically situated to support this technology. Renewable generation equipment must be placed where the sun or wind is strongest; communities must therefore ensure that the land or buildings beneath these resources are available for renewable development. Furthermore, in states with a serious commitment to the growth of small renewables, communities must incentivize or perhaps require the construction of renewable infrastructure.

A. For Existing Neighborhoods

Creating open land and air space for renewable infrastructure is particularly difficult in older, existing neighborhoods. Many zoning codes do not specify whether distributed renewable equipment is a permitted, accessory, or conditional/special use within a given district, and some even ban this technology—in some cases to preserve aesthetics in historic neighborhoods.[71] Vacant lots and common spaces offer promising locations for community renewables, but municipalities must find ways to ensure that new development does not excessively block wind or sunlight flowing to these properties. Similarly, community infrastructure distributed across rooftops and backyards requires assurances that neighboring uses will not interfere with efficient generation.

71. *Cf.* Michael Allan Wolf, *A Yellow Light for "Green Zoning: Some Words of Caution About Incorporating Green Building Standards into Local Land Use Law*, 43 URB. LAW 949, 961 (2011) (citing ADVISORY COUNCIL ON HISTORIC PRESERVATION, SUSTAINABILITY AND HISTORIC FEDERAL BUILDINGS 17–19 (May 2, 2011), *available at* http:// www.achp.gov/docs/SustainabilityAndHP.pdf) (noting that "preservationists have also raised concerns about the compatibility of renewable energy strategies . . . with historic and architectural preservation and the protection of cultural landscapes and architectural resources"). *But see* Sara C. Bronin, *The Quiet Revolution Revived: Sustainable Design, Land Use Regulation, and the States*, 40 ENVTL. L. REP. NEWS & ANALYSIS 10,733, 10,738 (2010) (noting that California "prevents local governments from denying solar energy permits on the basis of aesthetics alone," and that Connecticut limits historic district regulation of solar panels).

1. Zoning

In existing neighborhoods, the most important change needed to accommodate and encourage community-scale renewables will be the revision of zoning codes to allow for the siting of community-scale energy infrastructure.[72] These changes should include both provisions for rooftop solar and wind and for slightly larger equipment in common areas, such as an array of photovoltaic panels or a small wind turbine in a park. Many zoning codes have not yet recognized this type of mid-size equipment,[73] but several initial efforts provide useful models. Howard County, Nebraska, for example, defines a small wind energy system as one "consisting of a wind turbine, a tower, and associated control or conversion electronics, which has a rated capacity of not more tha[n]100 kW"[74] and includes height limits, setbacks, and maximum decibel levels, among other requirements, for these systems.[75] This specificity in the zoning code could both directly enable community-scale energy and ensure that it will be installed and operated safely. The county's code defines a small wind system as one that "is intended to primarily reduce on-site consumption of utility power,"[76] however, which may constrain the ability of a neighborhood to install the system in a common area and use it to both offset consumption throughout the neighborhood and to sell energy back to a utility when generation exceeds consumption.

The County of San Diego recently implemented broader zoning regulations for unincorporated areas, which support—even if inadvertently—community-scale renewables. Whereas the County previously required all off-site renewable projects to receive a Major Use Permit, it now allows offsite solar photovoltaic systems with project areas of less than

72. For a helpful exploration of zoning code changes needed for distributed renewables, *see* Patricia Salkin, *The Key to Unlocking the Power of Small Scale Renewable Energy: Local Land Use Regulation*, 27 J. LAND USE & ENVTL. L. 339, 354–62 (2012).

73. Where municipalities and states have modified land use regulations to recognize renewable energy equipment, they often include separate regulations for rooftop and large, centralized technologies—in some casing banning large-scale technologies. *See, e.g.*, Zimmerman v. Bd. of Cnty. Comm'rs, 218 P.3d 400, 407 (Kan. 2009) (confirming the validity of Wabaunsee County's amendments that banned large wind turbines and allowed small systems on parcels that included at least 20 contiguous acres, with setback and other requirements).

74. HOWARD COUNTY, NEBRASKA, PLANNING AND ZONING REGULATION § 3 (2009), *available at* http://www.howardcounty.ne.gov/pdfs/planning_zoning/ zoning_regulations.pdf.

75. *Id.* § 4.

76. *Id.* § 3.

ten acres to be reviewed through an administrative permitting process.[77] The granting of an administrative permit requires a finding by the county that the system will be "compatible with adjacent uses" and the County's General Plan, a separate finding that the system will comply with the California Environmental Quality Act (CEQA), and a consent letter from the property owner making clear that the operator of the solar energy system is allowed to use the property.[78] These requirements may be needlessly stringent, however, with respect to community-scale projects that are not on a homeowner's roof or in a backyard yet are not as large as projects that the County anticipates on parcels ten acres and smaller:[79] community-scale projects likely should be exempt from CEQA review requirements, for example, and this again highlights the need for codes to recognize the mid-level category of community-scale renewables.

San Diego County's code is more convenient for community-scale renewables that generate electricity from multiple rooftops, as onsite solar energy systems are allowed as-of-right as accessory uses to all "Agricultural, Civic, Commercial, Industrial, and Residential use types" and must meet relevant setbacks and height limits of other structures within the zone in which they are located; solar panels may, however, extend five feet "above the highest point of the roof."[80] Los Angeles also recently revised its code to allow solar structures in all zones to "exceed the roof surface by 3 feet" even if the roof already is at the maximum height for the zone.[81] For existing buildings with required off-site parking space, the code also allows reduction of the required space in order to "accommodate a structure solely supporting a solar energy system."[82]

In addition to ensuring that community-scale renewables can be placed on rooftops or in common areas within a community, states or municipalities must provide clearer standards for connecting these technologies to the grid. In the context of combined heat and power—

77. *Planning & Development Services, Amendment to the Zoning Ordinance Related to Solar Energy Systems—Customer FAQs*, CNTY. OF SAN DIEGO, http://www.sdcounty.ca.gov/pds/zoning/formfields/PDS-315.pdf (indicating approval on Sept. 15, 2010); SAN DIEGO CNTY., CAL., ZONING ORDINANCE § 6952b (2012) (codifying the change).

78. SAN DIEGO CNTY., CAL., ZONING ORDINANCE § 6952b1 (2012) (codifying the change).

79. *See also* Saba et al., *supra* note 4, at 17, 28 (noting that state and city environmental review may be required for some combined heat and power projects, and that this review requires time and is sometimes costly).

80. SAN DIEGO CNTY., CAL., ZONING ORDINANCE § 6952a (2012).

81. L.A., CAL., MUN. CODE § 5.3c (2012) (codified at § 12.21.1), *available at* http://clkrep.lacity.org/onlinedocs/2011/11-1786_ord_182110.pdf.

82. L.A., CAL., MUN. CODE § 2 (2012) (codified at § 12.21), *available at* http://clkrep.lacity.org/onlinedocs/2011/11-1786_ord_182110.pdf.

another form of energy that has promise at the community-scale level—researchers at Columbia University note that interconnection can be time-consuming and costly: the utility's distribution lines may not be able to accommodate the additional electricity generated, and the utility or developer may need to install expensive technological changes to avoid system faults as additional quantities of electricity flow backward.[83] In New York, customers can petition the public service commission for a "declaratory ruling . . . regarding the timely updating of substation circuit breakers and network protectors," but this ruling takes time.[84] As Professor Patricia Salkin has noted, however, New York has standardized the interconnection process for small-scale renewables, describing how individuals should apply for interconnection, specifying "technical interconnection standards," and requiring utilities to indicate interconnection status on the web.[85] This solves some, but not all, of the interconnection challenges likely to arise for community-scale projects.

Once a zoning code enables community-scale renewables, a variety of zoning mechanisms can prevent neighboring uses from blocking light and air that must flow to installed solar and wind infrastructure. Zoning overlays, for example, which municipalities can apply to distinct neighborhoods as an addition to base zoning codes, can limit the height of new buildings and tree plantings in order to prevent shading of renewable technology.[86] Easements, as described in the following section, are also a common and successful means of ensuring access of installed technology to light and air.

2. Easements

An effective and increasingly popular mechanism for ensuring adequate light and air for solar and wind development is an instrument that gives a property owner the right to an open "block" or "window" of air on neighboring property. Although these mechanisms are often described generally as solar or wind easements, they come in a variety of

83. Saba et al., *supra* note 4, at 15–16.
84. *Id.* at 16.
85. Salkin, *supra* note 72, at 345–46 (citing N.Y. STATE PUB. SERV. COMM'N, NEW YORK STATE STANDARDIZED INTERCONNECTION REQUIREMENTS AND APPLICATION PROCESS FOR NEW DISTRIBUTED GENERATORS 2 MW OR LESS CONNECTED IN PARALLEL WITH UTILITY DISTRIBUTION SYSTEMS (2010), *available at* http://www.nyseg.com/MediaLibrary/2/5/Content%20Management/NYSEG/SuppliersPartners/PDFs%20and%20Docs/Standardized%20Interconnection%20Requirements%20(SIR)%20Addendum.pdf.).
86. *See* Bronin, *supra* note 14, at 1247.

forms. Some are servitudes, which are positively or negatively worded—preventing the neighboring property owner from building to a certain height or requiring the property owner to maintain certain dimensions of open air.[87] Others are more traditional easements, which give the dominant owner the right to use of the servient owner's airspace and can also come in positive or negative form.[88] Some are purely private, in that legislation allows property owners to include restrictions or conditions in their deed, whereas others can be imposed on neighbors through landowner petitions.[89] Regardless of their form, easements allow communities to build renewable infrastructure even in areas with existing buildings.

3. Exactions and Other Affirmative Requirements for Community-Scale Renewables

Existing communities could go even further than enabling community renewables through easements or zoning by requiring the construction of renewable infrastructure in infill development. Zoning codes can mandate that new construction include renewable infrastructure, or at least hook-ups for such infrastructure. In the subdivision context, New Jersey, for example, requires each developer building a project with 25 or more units to offer to install, or "provide for the installation of," "a solar energy system into a dwelling unit when a prospective owner enters into negotiations with the developer to purchase a dwelling unit," where technically feasible.[90] Cities could potentially require this for all new development—including within existing neighborhoods. To ensure that new construction is compatible with renewable technology, either when built or for a later retrofit, cities also can adopt best practices developed by the Environmental Protection Agency through its Renewable Energy Ready Homes program.[91] This would create opportunities for distributed yet shared renewable infrastructure to be installed in the future.

More ambitiously, cities could require construction of renewables as a condition for development approval; this could apply in both existing neighborhoods for planned unit developments and other urban infill

87. *Id.* at 1231–32.

88. Bronin, *supra* note 14, at 1226.

89. *See, e.g.*, IOWA CODE § 564A.3-A.4 (2012) (allowing a "city council or the county board of supervisors" to "designate a solar access regulatory board to receive and act on applications for a solar access easement" and allowing property owners to apply to the border for "an order granting a solar access easement").

90. N.J. STAT. ANN. § 52:27D-141.4(a) (West 2012); *see also* Salkin, *supra* note 72, at 362 (describing this provision).

91. *Solar Photovoltaic Specification, Checklist, and Guide*, U.S. ENVTL. PROT. AGENCY, http://www.energystar.gov/ia/partners/bldrs_lenders_raters/rerh/docs/Renewable_Energy_PV.pdf?0a3e-05ee (last visited Apr. 12, 2013).

projects, as well as in new subdivisions. This "renewable energy exaction" would be similar to a number of other restrictions and obligations that already commonly attach to development approvals, such as requirements for the construction of roads or public parks. Alternatively, cities could impose renewable impact fees, requiring developers to pay a certain amount of money into a community renewable development fund per square foot of new property developed.

Either of these exaction-based approaches[92] could run up against constitutional hurdles, although it is not clear just how high these hurdles are. In the *Nollan*[93] and *Dolan*[94] cases, the U.S. Supreme Court made clear that the condition attached to the permit must have an essential nexus with the legitimate purpose espoused for the condition.[95] Furthermore, there must be rough proportionality between the impacts of the project and the conditions imposed.[96] A municipality could likely show a legitimate interest in reducing vehicular emissions and other climate impacts of new development; under *Nollan*, it is also likely that a municipality could show that this interest is sufficiently connected to the requirement for new renewable construction. The municipality would have to satisfy *Dolan*, too, by providing rough numerical estimates of the climate impacts, such as tons of carbon emitted by additional traffic trips or the heating and cooling of the new building, and the emissions offset by renewable energy.[97] Some jurisdictions that have strictly interpreted *Dolan* might reject even these rough calculations, arguing that the link between the individual emissions from a housing development and the ultimate climate impacts such as rapidity of sea level rise or increased risk of extreme weather is too tenuous, as is the link between offsetting these emissions and reducing climate effects. Focusing on the direct development effects, though, including the actual quantity of carbon emitted by the development and offset by renewables, could likely persuade even a skeptical court.

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92. Some states currently do not apply *Nollan* and *Dolan* to impact fees, although this doctrine may change. *See, e.g.*, St. Johns River Water Mgmt. District v. Koontz, 77 So.3d 1220 (Fla. 2011) (finding that *Nollan* and *Dolan* are only applicable where the condition sought involves a land dedication). *But see* Koontz v. St. Johns River Water Management Dist., 133 S.Ct. 420 (2012) (granting certiorari).

93. Nollan v. Cal. Coastal Com'n., 483 U.S. 825 (1987).

94. Dolan v. City of Tigard, 512 U.S. 374 (1994).

95. *Nollan*, 483 U.S. at 837.

96. *Dolan*, 483 U.S. at 391.

97. *Dolan*, 483 U.S. at 391 (requiring an "individualized determination" of impacts but not a "precise mathematical calculation").

In sum, older neighborhoods have a variety of existing mechanisms at their disposal to ensure that physical renewable infrastructure is installed and that neighboring uses do not unduly hinder its electricity generating potential. With several small modifications, zoning, easements, and exactions all could support community-scale renewables in these neighborhoods.

B. For New Subdivisions

New subdivisions offer a clean slate on which developers can pair renewable resources with the most abundant sun or wind, making rapid implementation of community-scale energy in these areas even more feasible than in existing neighborhoods. Developers planning new communities can identify the strongest solar or wind resources and place common areas—or buildings with renewable infrastructure—beneath them. They also can lay out streets, lots, and buildings in a manner that best encourages the flow of light and wind. This section discusses how both public and private law could best enable, and perhaps require, these types of renewable ready subdivisions.

1. Planning and Zoning

When developers propose new subdivisions, a complex public review process is triggered. Municipalities commonly require developers to provide detailed plats that identify the location of planned streets, buildings, lots, and stormwater controls.[98] After receiving a preliminary sketch plat, town or city officials negotiate with developers to ensure that these planned locations will provide access for fire trucks and will not have poorly-designed streets that block access to certain lots or cause poor traffic flow. The developer then returns with a preliminary plat, which is later approved as a final plat.[99]

Within subdivision codes, municipalities could include renewable energy considerations in the plat approval process. Through a "renewable ready subdivision" code, they could require, for example, southern-oriented lots (in certain regions), adequate space between homes to avoid shading and wind blockage, and the placement of common spaces in the areas with the strongest sun or wind. Under Eugene, Oregon's Solar Standards,

98. *See, e.g.*, Howard Geneslaw, *Coordinating Subdivision Review with New York's State Environmental Quality Review Act*, 19 COLUM. J. ENVTL. L. 445 (1994) (describing New York's process, in which applicants submit preliminary and final plats after public hearings); *How to Apply for Subdivision Approval*, SAN MATEO COUNTY, CAL., http://www.co.sanmateo.ca.us/vgn/images/portal/cit_609/15/15/72620319321024.pdf (last visited Apr. 12, 2013).

99. *See* Geneslaw, *supra* note 98, at 447.

70 percent of the lots in subdivisions in two of the City's residential zones must meet certain dimensional and orientation requirements, and all lots in the these zones must include solar setbacks in order to maximize the flow of sunlight to the lots.[100] Clackamas County, Oregon, requires 80 percent of the lots in certain new subdivisions to meet a solar design standard.[101] And Salt Lake City, as part of its Sustainable City Code Initiative, has proposed that "all new major subdivisions be laid out to require [that] a minimum percentage of the lots have optimal solar orientation for the installation of solar systems."[102] California has similarly proposed expanded "Solar Oriented Development" requirements that would provide for "maximum onsite solar energy generation . . . in the planning, entitlement, and design phases through street orientation, lot layout, house orientation," and other strategies.[103]

2. Restrictions

The detailed CC&Rs that already attach to lots in subdivisions could be expanded in ways that encouraged community renewables beyond road and lot layout. Similar to zoning restrictions, CC&Rs could prohibit the construction of chimneys or other structures on the portions of roofs that receive the most sunlight, for example, and could set height limits on accessory structures. They also could require all residents to keep individual solar panels or wind turbines in good repair, just as many CC&Rs already mandate the maintenance of building structures.[104]

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100. EUGENE, OR. CODE §§ 9.2790, 9,2795, *available at* http://www.eugene-or.gov/DocumentCenter/View/2704.

101. CLACKAMAS CNTY., OR., ZONING & DEV. ORDINANCE § 1017.04 (2005). Note that certain of these standards allow shading (in order to reduce energy for cooling homes) as opposed to access of solar equipment to sunlight. *See also Solar Siting Ordinances*, AM. PLANNING ASS'N, http://www.planning.org/pas/infopackets/open/pdf/30part4.pdf (listing solar access subdivision requirements, among other solar zoning provisions).

102. SALT LAKE CITY CORP., VISION FOR A GREEN CITY: SALT LAKE CITY'S SUSTAINABLE CITY CODE INITIATIVE 6, *available at* http://www.slcdocs.com/Planning/Projects/Sust/Vision.pdf.

103. CAL. UTILS. STATEWIDE CODES AND STANDARDS TEAM, MEASURE INFORMATION TEMPLATE–SOLAR READY HOMES AND SOLAR ORIENTATED DEVELOPMENTS 15 (2011), *available at* http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/2011-05-24_workshop/review/2013_CASE_ResSolarReady_SolarOrientedDevelopments_052011.pdf.

104. *See, e.g.*, *Declaration of Covenants, Conditions, and Restrictions for Miramont Residential Community*, MIRAMONT COUNTRY CLUB (July 2003), http://www.miramont.cc/pdf/association/Miramont_Declaration.pdf (requiring that residents keep "exterior

Several land use planning and private mechanisms exist to support community-scale renewables in both subdivisions and existing neighborhoods, thus offering promising tools for reform. Beyond the physical infrastructure, however, communities will need to implement new mechanisms for allocating electricity and profits from the renewable infrastructure, as discussed in the following part.

IV. REDEFINING THE UTILITY-CONSUMER RELATIONSHIP

The consumer-utility connection is the final strand in a bundle of regulatory and organizational changes needed to support widespread community renewables. One consideration will have to be how the owners of community-scale renewable energy generating equipment will be able to sell to multiple end users. Currently, many state public utility laws prevent private, non-utility entities from selling either electricity or heat to private end users.[105] In addition, as consumers become energy producers through community renewable generation, they will need to be able to collectively sell electricity back to the utility. This, in turn, may require changes to how utilities measure electricity use and generation, as well as the structure of rates.

To maximize the ability of generators to recoup the costs of installing their equipment, states must pass legislation that allows for non-utility generators to bill individual electricity consumers for their usage. This practice—the "measurement and billing of energy (electricity or heat) usage of individual users within a multiuser property or development"[106] —is called submetering, and has been authorized by only a handful of states, including, most significantly, New York.[107] Other states either

lighting and maintenance facilities in working order," prune trees and shrubs, repair "exterior damages to improvements," repaint "applicable improvements," and keep "parking areas and driveways in good repair"); *Declaration of Covenants, Conditions and Restrictions of Woodland Hills*, WOODLAND HILLS HOMEOWNER'S ASSOCIATION 4, http://www.woodlandhills.ws/documents/publicdocuments/DeclarationOfConvenants.pdf ("Each Owner shall have the obligation to maintain and keep in good repair the improvements on his Lot, including the exterior walls of the dwelling house thereon, and any other exterior surfaces such as garden walls, carports or garages."); *Declaration of Covenants, Conditions and Restrictions*, WAIALAE IKI V COMMUNITY ASSOCIATION 4, http://waialaeiki5.com/legal/CompleteSet.pdf (providing that "[e]ach Lot and any and all growth, foliage, landscaping and improvements located thereon shall be kept and maintained by the Owner thereof in good repair").

105. Sara C. Bronin, *Building Related Renewable Energy and the Case of 360 State Street*, 65 VAND. L. REV. 1875, 1900 (2012).

106. *Id.* (explaining the benefits of submetering and objections to it).

107. *See* N.Y. PUB. SERV. LAW § 53 (McKinney 2003) (requiring submeters to comply with other provisions of the Public Service Law).

prohibit it or allow submetering in only limited circumstances.[108] States have legitimate reasons to worry about this practice, as delegating billing to a non-utility entity that is not regulated raises concerns about improper usage measurement and billing.[109] New York has attempted to address these concerns by requiring submetering schemes to include a description of "the method and basis for calculating rates to tenants," a rate cap, and "complaint procedures and tenant protections."[110] Although even these types of protective laws may not wholly avert submetering problems, the effect of a ban on submetering means that under most current public utility rules, community-scale renewable energy generation is financially infeasible. Submetering provides a way for community-scale renewable energy generators to recoup their costs,[111] and its benefits likely outweigh concerns about potential misuse, which can be addressed through protective rules.[112]

One existing model, combined with submetering, could provide a relatively easy mechanism for an entity to sell electricity from community-scale equipment to the members of an EID, cooperative, or other energy collective. Under the third-party ownership model, which is typically used for smaller-scale distributed renewables, an energy company owns renewable equipment and enters a power purchase agreement with a homeowner or business owner of a "host site."[113] The agreement allows the company to use the owner's property for generation equipment and to enter the property to maintain the renewable energy equipment.[114] It also commits the homeowner/consumer to purchase the electricity generated from the renewable equipment at a set, long-term rate—often

108. *See* Steven Ferrey, *Cold Power: Energy and Public Housing*, 23 HARV. J. ON LEGIS. 33, 47–48 (1986) (explaining some objections to submetering).

109. *See* Bronin, *supra* note 105, at 1902–03.

110. N.Y. COMP. CODES R. & REGS. tit. 16, § 96.2 (2012). *See also* Bronin, *supra* note 105, at 1903, n.112 (citing to other sources that provided detailed descriptions of submetering protections in New York, including NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT, AUTHORITY, RESIDENTIAL ELECTRIC SUBMETERING MANUAL (2001) (1997), *available at* www.submeteronline.com/pdf/subman2001.pdf).

111. Bronin, *supra* note105, at 1900–01.

112. *Id.* at 1903 ("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 rate.").

113. KOLLINS ET AL., *supra* note 16, at 3.

114. *Id.* at 34 (explaining that the property owner does not conduct any system maintenance).

for twenty to twenty-five years.[115] The utility buys excess electricity not used by the consumer. This benefits the property owner by locking in an electricity rate, and the energy company benefits from federal tax provisions and, often, the sale of renewable energy credits, which are created when the company generates renewable electricity. This same model could work well for community-scale energy if energy companies could enter into contracts with a community cooperative, EID, or other business and submeter electricity to its members.

Like the current submetering hurdle, the effect of rate-setting on renewable energy projects can have large impacts on financial feasibility. Utilities must clarify when, and at what rate, they will pay mid-sized renewable energy generators.[116] The third-party ownership model helps here, too, in that companies that own and operate distributed renewable energy in neighborhoods sell excess electricity flowing to the grid during periods of low electricity use. Many states treat generators that use power purchase agreements as regulated entities, however—and even as utilities, in some cases.[117] Legislative changes will be needed both for power purchase agreements and other arrangements involving communities selling excess power back to the grid. If these entities are treated as utilities, the regulatory hurdles to obtaining permits for generating and selling electricity may be too high.

In order for community-scale generators to sell excess electricity back to utilities, net metering schemes also must be in place, in which utilities allow consumers to "roll their meters backward" and send electricity back into the grid—and to receive a guaranteed rate for that electricity.[118] Many utilities have begun to offer net metering, including rate schemes, at the direction of state legislative or administrative requirements.[119] Often, however, the maximum amount of electricity that consumers may

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115. *Id.*

116. *See, e.g.*, Matthew Hutton & Thomas Hutton, *Legal and Regulatory Impediments to Vehicle-to-Grid Aggregation*, 36 WM. & MARY ENVTL. L. & POL'Y REV. 337, 354 (2012) (noting that "[t]raditionally, and absent regulatory reform to the contrary, state-regulated utilities are not obliged to purchase electricity produced by customers").

117. KOLLINS ET AL., *supra* note 16, at 7–15.

118. *See* LAUREL VARNADO & MICHAEL SHEEHAN, CONNECTING TO THE GRID: A GUIDE TO DISTRIBUTED GENERATION INTERCONNECTION ISSUES 11 (6th ed. 2009) (providing a brief history of net metering). *See* Bronin, *supra* note 105, at 1904–09, for a fuller analysis of net metering and various proposals for improving net metering schemes.

119. Shannon Baker-Branstetter, *Distributed Renewable Generation: The Trifecta of Energy Solutions to Curb Carbon Emissions, Reduce Pollutants, and Empower Ratepayers*, 22 VILL. ENVTL. L.J. 1, 13 (2011) (estimating that forty-three states and Washington D.C. have net metering policies); *see also* Jim Rossi, *Clean Energy and the Price Preemption Ceiling*, 3 SAN DIEGO J. CLIMATE & ENERGY L. 243, 264 n.82 (2012) (noting that through the Energy Policy Act of 2005, which amended PURPA, states must now "consider adopting net metering policies").

send back to the grid is too low;[120] many community renewable schemes would exceed state-level net metering limits. Moreover, net metering rates may not always be favorable to renewable energy generators. Sales back to the grid in certain quantities may qualify as wholesale sales, in which case the Public Utility Regulatory Policies Act requires utilities to pay the generator the amount that it would have cost the utility to generate the electricity or purchase it elsewhere.[121] This rate, too, can sometimes be low, however, and as Professor Jim Rossi has noted, the Federal Energy Regulatory Commission has taken a relatively strong stance on preempting state efforts to make the rate more generous for renewable developers through, for example, feed-in tariffs that establish a guaranteed higher rate.[122]

These issues related to the relationship between the consumer and the utility are significant, and we only discuss them cursorily because they are explored in other articles of this symposium edition. We conclude our essay by underscoring the need for states to clarify the business enterprise, land use, and public utility rules available to generators of community-scale renewable energy. Without clarity at the state level, the path toward facilitating mid-sized community energy projects is very tough indeed.

120. *Cf.* Hutton & Hutton, *supra* note 116, at 355.
121. 16 U.S.C. § 824a-3 (2006).
122. Rossi, *supra* note 119, at 250.