Community Solar: Reviving California's Commitment to a Bright Energy Future

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Summary

Although California has typically led the nation's march toward a renewable future, the state's tenacious reliance on the traditional, centralized model of energy generation has artificially stunted the potential growth of the renewable energy sector. California's current dichotomous incentive structure—which fosters only household-scale or utility-scale solar energy generation—stifles monumental market demand and perpetuates inequitable access to these technologies. Under the current system, 75% of ratepayers—particularly those without on-site generation capabilities—cannot access solar energy. California should therefore adopt legal structures prerequisite to widespread penetration of the community solar model in the state. Community solar is a mechanism through which multiple ratepayers can buy "shares" in a local, off-site solar system and receive bill credits for energy generated by the system. The California Legislature must make key changes to eviscerate various legal barriers to the adoption of community solar in California.

In the wake of rising fuel prices, a sustained desire to decrease dependence on foreign oil and hedge against future price increases and shortages, and concerns over climate change and air pollution, California has led the U.S. march toward a renewable energy future. Pursuant to an aggressive Renewables Portfolio Standard (RPS) Program that mandates that 33% of the state's total electricity retail sales be derived from eligible renewable sources by 2020,[1] California has passed a variety of statutes and incentive programs. Large-scale wind, solar, and other renewable projects are steadily replacing construction of new coal power plants. On the opposite end of the scale, the number of government-sponsored, residential rooftop photovoltaic (PV)[2] panel solar systems cropping up in neighborhoods across the state has grown exponentially.

However, the desire to contribute to a renewable future is not limited to homeowners and venture capitalists able to take advantage of current government sponsorship. Indeed, a 2009 study indicated that 80% of consumers support and would even pay a premium for renewable energy.[3] Nevertheless, renters, condominium owners, or others without on-site generation capabilities are often excluded from opportunities to own or purchase energy from renewable sources.[4] This failure is especially problematic in a state like California, which bears the third lowest home ownership rate in the nation, coming in just behind New York and the District of Columbia.[5] Even many homeowners are excluded, including those unable to afford the multiple thousands of dollars in up-front project costs,[6] as well as

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1. California's RPS has been codified in California Public Utilities Code §§399.11-399.31.
2. PV panels are comprised of semi-conductor "cells" that generate electricity when exposed to sunlight. Larry Sherwood, Interstate Renewable Energy Council, U.S. Solar Market Trends 2010, 3 (2011), *available at* http://irecusa.org/wp-content/uploads/2011/06/IREC-Solar-Market-Trends-Report-June-2011-web.pdf.
3. *See* Lyn Rosoff, SmartPower and Mark Sinclair, Clean Energy Grp., Smart Solar Marketing Strategies: Clean Energy State Program Guide, 8, 20 (2009), *available at* http://www.cleanegroup.org/assets/Uploads/2011-Files/Reports/CEGSolarMarketingReportAugust2009.pdf.
4. Jason Coughlin et al., Nat'l Renewable Energy Lab. (NREL), U.S. Dep't of Energy (DOE), A Guide to Community Solar: Utility, Private, and Non-Profit Project Development, 2 (2010), *available at* http://www.nrel.gov/docs/fy11osti/49930.pdf.
5. Danter Co., *Home Ownership Rate by State 2010*, *available at* http://www.danter.com/statistics/ho2010.pdf.
6. Notably, this large up-front cost barrier to small-scale solar has been largely eviscerated through creative financing models, such as lease-and-power purchase agreements, in which a third-party developer fronts the costs of the solar PV system. The homeowner then pays for the system plus interest out of his monthly electric bill savings and may enjoy a small net economic benefit if bill savings outweigh monthly system costs. *See, e.g.*, SolarCity, *Solar Lease*, http://www.solarcity.com/residential/solar-lease.aspx (last visited May 20, 2013) (advertising solar leasing through which the homeowner receives "free installation"); Tioga Energy, *Solar Financing PPA*, http://www.tiogaenergy.com/tioga-energy-resource/other-solar-information/financing-solar-

those with structurally unsuitable roofs, excessive shading problems (shadows caused by trees, dust, chimneys, or other buildings), or restrictive neighborhood covenants.[7] In fact, the U.S. Department of Energy (DOE)[8] estimates that only 22-27%[9] of residential rooftop area is suitable for hosting on-site PV systems.[10]

This range reflects regional climate variations: cooler, wetter climes tend to foster tall tree growth, which in turn reduces the percentage of viable roof space as compared to arid or semi-arid regions. The use of this range is appropriate in California, given the state's varied climate. The cumulative effect of these constraints is that current incentives are most accessible by—and thus confer the majority of benefit to—wealthier Americans, whether as capital investors for renewable projects modeled after traditional, industrial-scale energy generation, or as homeowners with sufficient liquid capital to buy solar panels outright.[11] Although California has extended very limited access to solar energy to certain low-income residents,[12] the vast majority of electricity ratepayers and nearly all middle-income individuals are conspicuously ignored.

In short, California's current dichotomous incentive structure stifles monumental market demand and promotes inequitable access to solar energy. This Article advocates for California's adoption of community solar, a mechanism through which multiple ratepayers can buy "shares" in an off-site solar array, as a principal means of achieving widespread solar energy penetration in the state. Part I introduces the essentials of community solar and illustrates its relative advantages over both industrial-scale and residential solar systems. Part II surveys the three community solar models that have been piloted to date and the success with which various projects have overcome legal complexities. This part concludes by advocating that California adopt the Special Purpose Entity (SPE) model as the most profitable, widely replicable, and politically viable alternative. Part III delineates the greatest state and federal obstacles to proliferation of community solar, to which Part IV responds by exploring the steps that the California Legislature should promptly undertake in order to eviscerate California's self-imposed impediments and navigate federal barriers.

I. Community Solar Defined and Relative Benefits

A. *What Is Community Solar?*

Often referred to as a community solar farm or solar garden, community solar projects offer a mechanism through which multiple ratepayers or community members can jointly own, lease, or invest in a single solar PV system and receive a return on investment in the form of bill credits or direct payments for the energy produced and sold. An individual's gross receipts are proportionate to that individual's percentage ownership in the entire project; this return can also include rights to all benefits flowing from the electricity generated, including transferrable Renewable Energy Certificates (RECs).[13] Often built on existing structures in the community, community solar projects are relatively small and located in urban or suburban areas. Because these projects are closer to the point of use than traditional industrial generation, they represent a form of "distributed" or "decentralized" energy generation.[14] Moreover, because community solar shares may be as small as a single PV panel, an investor can enjoy many of the same noneconomic benefits as an on-site residential system owner, but at a fraction of the cost.

B. *Market Potential*

Although community solar has not yet gained a foothold in California, the demand for community solar by currently excluded ratepayers would be robust, as demonstrated by the fact that California consumers are currently willing to pay a premium for the assurance that their electricity usage is supplied by renewable means. In fact, 80% of consumers report a desire to purchase their energy from renewable sources.[15] Perhaps in recognition of this, the city of Sacramento has put its money where its mouth is. The only program of its kind in California, the Sacramento Municipal Utility District's (SMUD's) Solar Shares Program offers customers the option to lease rights to energy produced by a SMUD solar farm. The program is currently sold out, even though participating customers pay roughly 9% more

ppa (last visited May 28, 2013) (promoting the benefits of solar financing power purchase agreements (PPAs), including "no expensive installation and servicing cost").

7. *See* Coughlin et al., *supra* note 4.
8. Research conducted by DOE's "the principal research laboratory," the National Resource Energy Laboratory. NREL (Aug. 22, 2012), http://www.nrel.gov/overview.
9. *See* Paul Denholm & Robert Margolis, NREL, Rep. No. TP-6A0-44073, Supply Curves for Rooftop Solar PV-Generated Electricity for the United States, 4 (2008), *available at* http://www.nrel.gov/docs/fy09osti/44073.pdf.
10. *Id.*
11. Although the proliferation of financing mechanisms has allowed more homeowners to install PV panels (*see supra* note 6), homeowners who must rely on financing receive a noticeably lower rate of return over the life of the system and experience longer payback periods, since the original cost plus interest must be repaid before the homeowner "breaks even" and begins to profit. Thus, a homeowner who can afford the system's up-front costs receives a greater return on investment.
12. *See* Go Solar Cal., *Solar for Affordable Housing*, http://www.gosolarcalifornia.org/affordable/index.php (last visited May 28, 2013) (providing descriptions of California's two distributed solar programs catering to low-income residents, the Single-Family Affordable Solar Housing (SASH) and the Multiple-Family Affordable Solar Housing (MASH) programs).
13. An REC is essentially a metric used to represent the bundle of "collective environmental benefits, such as avoided mercury, CO_2 [carbon dioxide], and other environmentally harmful pollutants, [that] result of generating one megawatt-hour (MWh) of renewable energy" as opposed to equivalent conventional energy production. *See* Coughlin et al., *supra* note 4, at 3. These metrics are valuable and can be sold to help fund the community solar garden. *Id.*
14. *See Distributed Energy Basics*, NREL (May 18, 2012), http://www.nrel.gov/learning/eds_distributed_energy.html (last visited June 3, 2013).
15. *See supra* note 3 and accompanying text.

for solar energy than their nonparticipating counterparts.[16] This willingness to pay a premium for renewable energy is often referred to as green pricing.[17] Based on this evidence, the availability of a community solar model that offers ratepayer-investors a long-term profit, as set forth herein, stands to garner even greater popular support than SMUD's program.

From the supply side, the time is ripe for widespread distributed solar deployment. In 2012, Forbes and Bloomberg New Energy Finance (BNEF) both reported that record deployment of PV worldwide had led to a 50% price drop for solar PV between 2008 and 2009 alone and a total price decrease of 75% between 2009 and 2012.[18] Moreover, the cascading costs of PV are poised to intersect with rising residential electricity rates in the 40 largest U.S. cities within the next 10 years.[19] And in cities with sunny weather and high electricity rates, such as Hawaii, New York, and San Diego, "energy parity" has been achieved, meaning the unsubsidized cost of solar PV is equivalent to the unsubsidized costs of nonrenewable generation.[20] With the cumulative installed capacity of solar in the United States satisfying less than 1% of the nation's electricity consumption, mammoth development potential exists.[21] And California is uniquely poised to take advantage of this favorable pricing. The state possesses sufficient capacity for community solar installation in populous areas to achieve its 33% RPS goal by relying on community solar generation alone, as demonstrated below.[22]

As of March 1, 2012, California's three for-profit, investor-owned utilities (IOUs), Pacific Gas & Electric (PG&E), San Diego Gas & Electric (SDG&E), and Southern California Edison (SCE) reported that an aggregate average of 20.6% of the state's electricity was generated from qualified RPS sources in 2011.[23] Given this data, the California Energy Commission (CEC) reported a current renewable net short of between 35 terawatt hours (TWh)[24] and 47 TWh,[25] which equates to approximately 22 gigawatts (GW) of installed system capacity.[26] The renewable net short is "the estimated amount of renewable electricity needed in addition to generation from existing renewable facilities to meet the 33% RPS mandate in 2020."[27] According to a 2010 report sponsored by the California Public Utility Commission (CPUC), California possesses 66.8 GW of community solar raw potential, which refers to the total area identified as suitable for distributed solar PV systems of 20 megawatts (MW) or less.[28] This raw potential includes both rooftop and urban ground-mounted siting locations near urban distribution centers, as well as potential rural ground-mounted sites near local transmission substations.[29] The report then employs a number of "screening" techniques in order to reflect structural and technical obstacles that limit actual realization of California's raw potential.[30] Even after aggressive screening, the report conservatively identified an estimated 18.4 GW of generation that could connect easily and inexpensively.[31]

16. *See* Connie Zheng, *Sacramento Offers Solar Shares for Renters*, GETSOLAR.COM (Mar. 16, 2012), http://www.getsolar.com/blog/sacramento-offers-solar-shares-for-renters/4522/ (last visited June 3, 2013).
17. Green-e, *Green-e Dictionary*, http://www.green-e.org/learn_dictionary.shtml (last visited May 28, 2013).
18. Michael Liebreich et al., Bloomberg New Energy Fin., *Re-Considering the Economics of Photovoltaic Power* at 3 (2012); *see also* Justin Gerdes, *Solar Power More Competitive Than Decision-Makers or Consumers Realize*, Forbes (May 24, 2012), http://www.forbes.com/sites/justingerdes/2012/05/24/solar-power-more-competitive-than-decision-makers-or-consumers-realize/ (last visited June 3, 2013).
19. John Farrell, Inst. for Local Self-Reliance, Rooftop Revolution: Changing Everything With Cost-Effective Local Solar, 3, n.5 (2012), *available at* http://www.ilsr.org/wp-content/uploads/2012/03/rooftop-revolution-ilsr.pdf (charting the trajectories of solar and traditional residential energy pricing based on statistics from the Energy Information Administration, the Lawrence Berkeley Laboratory's "Tracking the Sun" series, and the Bureau of Labor Services' electricity price index); *see also* Yale University, *Map Projects When U.S. Cities Will Reach Solar Grid Parity*, Yale Env't 360 (Dec. 28, 2011) ("If energy cost trends remain consistent, solar energy could become cheaper than power from the grid in most major U.S. metropolitan areas by 2027 . . . .").
20. Farrell, *supra* note 19 at 3, 23, 30-31.
21. *Solar Power*, Nationalatlas.gov (Jan. 26, 2011), http://www.nationalatlas.gov/articles/people/a_energy.html (last visited June 3, 2013).
22. Al Weinrub, Community Power: Decentralized Renewable Energy in California, 17 (2010), *available at* http://www.clean-coalition.org/storage/CommunityPowerPublication _Online.pdf.
23. Cal. Pub. Util. Comm'n, Renewable Portfolio Standard Quarterly Report: 1st and 2nd Quarter 2012, 3, 4 (2012), *available at* http://www.cpuc.ca.gov/NR/rdonlyres/2060A18B-CB42-4B4B-A426-E3B-DC01BDCA2/0/2012_Q1Q2_RPSReport.pdf (noting that 20.6% represents an increase from 17.0% in 2010 and a significant upward trend moving forward).
24. The CEC reported 284,953 gigawatt hours (GWh) of total system power generation for 2011 (equivalent to roughly 284 TWh). The renewable net short is thus 13% of this total (calculated by reducing the 33% goal by the 20% current renewable reliance), or 37 TWh. *Total Electricity System Power*, Energy Almanac, Cal. Energy Comm'n (Aug. 1, 2012), http://energyalmanac.ca.gov/electricity/total_system_power.html (last visited June 3, 2013).
25. Cal. Energy Comm'n, Pub. No. CEC-150-2011-002-LCF-REV1, Renewable Power in California: Status and Issues, 33 (2011) [hereinafter CEC Status and Issues], *available at* http://www.energy.ca.gov/2011publications/CEC-150-2011-002/CEC-150-2011-002-LCF-REV1.pdf. The lower estimate of 35 TWh assumes constant future electricity usage at 2011 demand levels, as discussed *infra* note 16, which is possible with advances in energy efficiency and/or a rise in energy prices sufficient to curb demand, while 47 TWh provides the highest estimated energy demand scenario.
26. A "1 MW system" has an expected output of 1 MW, or 1,000 kW [kilowatt], per hour. The standard assumption is that a solar system will produce for an average of only five hours per day, 365 days per year (although this assumption will obviously vary based on climate). Therefore, a 19,178-MW system will generate 35 TWh annually (19,178 MW x 5 x 365 = 35,000,000 MWh = 35 TWh), and a 25,753-MW system will generate 47 TWh annually (25,753 MW x 5 x 365 = 47,000,000 MWh = 47 TWh). An average of these two estimates produces my final approximation of 22,465 MWh. *See Solar and Wind Energy Calculations: The (Very) Basics*, Solar-Estimate.org, http://www.solar-estimate.org/index.php?page=solar-calculations (last visited May 29, 2013).
27. CEC Status and Issues, *supra* note 25.
28. Ryan Pletka, Black & Veatch, *LTPP Solar PV Performance and Cost Estimates*, Cal. Pub. Util. Comm'n, 37 (2010), http://www.cpuc.gov/NR/rdonlyres/AOCBE958-E2C4-4AC7-9D56-3AB4D14D723D/O/BVE3PVAssessment.ppt (prepared for the CPUC as input to Long-Term Procurement Proceeding).
29. *See* Weinrub, *supra* note 22; Pletka, *supra* note 28, at 33, 36-37.
30. *See* Pletka, *supra* note 28 (recognizing, for example, that penetration of decentralized solar often cannot exceed 30% of any given substation's peak load without jeopardizing the stability of the grid, unless curtailment measures are instituted).
31. *See id.* at 37.

In summary, the existence of somewhere between 18.4 and 66.8 GW of unexploited capacity for community solar in California offers copious opportunity, not only for economical attainment of California's RPS, but also for expansion of the other social benefits associated with investment in renewable energy. Community solar represents a relatively low-cost alternative because it requires minimal governmental resources to administer as soon as proper market mechanisms are set in play. In light of the demonstrated market demand across the country[32] and other states' nascent success[33] in beginning to cultivate community solar (as further discussed in Part II), California should also act quickly to remove its archaic regulatory barriers to community solar.

C. Benefits Over Residential On-Site PV Systems

In addition to greater siting flexibility that encourages more efficient land use and other social benefits, community solar gardens generally offer the consumer a more reliable system while simultaneously eliminating the owner's maintenance burden and providing numerous price advantages. Although both community solar and homeowner-installed residential systems rely on similar federal tax incentives for funding, community solar's ability to take advantage of economies of scale, additional business tax credits, and more attractive rates from utility companies renders it a more attractive investment. To illustrate, a homeowner investing in on-site solar PV can claim a federal Residential Renewable Energy Tax Credit, which reduces the homeowner's tax liability by 30% of eligible system costs. Moreover, California offers a variety of state-sponsored incentives, such as the California Solar Initiative (CSI), which provide homeowners with additional cash rebates based on expected or actual energy generation.[34] As of January 2011, the average Californian residential PV system cost $8.70 per watt, including permitting, labor, and equipment expenses.[35] With the average residential system size rising to 6 kilowatts (kW) in 2010,[36] this translates into $52,200 in gross up-front costs. Even assuming the homeowner recoups maximum available state and federal governmental incentives, the average net cost of a California residential PV system hovers around $35,000.[37]

Like single-family home residential programs, community solar promotes distributed, or relatively small-scale and diffuse, generation from a broad array of source projects. Instead of the Residential Tax Credit, community solar systems enjoy both the federal government's 30% Business Energy Investment Tax Credit (ITC),[38] as well as California's commercial system per-watt incentives, both of which are virtually identical to its residential rebate rates.[39] Unlike residential systems, however, community solar projects may be able to exploit greater economies of scale, enjoy depreciation tax benefits, and generate additional revenue through the up-front sale of RECs. These benefits considerably reduce both individual net up-front costs,[40] as well as a system's per-watt cost. For example, Colorado's Clean Energy Collective (CEC), a community solar developer, constructed a 77.7 kW system, which offered ownership to community members starting at $725 (the cost to purchase a panel, each of which possessed a 230-watt generation capacity). Economies of scale resulted in an initial system cost of $6 per watt, which was further reduced by the combination of rebates and REC sales, resulting in an average buy-in price of $3.15 per watt.[41] Likewise, Maryland's University Park Solar project, perhaps the most successful community solar model in the United States to date, used federal tax credits, the Modified Accelerated Cost-Recovery System (MACRS), bonus depreciation,[42] REC sales, and economies of scale to reduce the "effective cost per Watt to investors [to] $2.27."[43] As is further discussed in Part II, both of these projects utilized the limited liability company (LLC) model to raise investor capital; without this and other strategic legal planning by project organizers, the reduction of up-front cost to a fraction of those associated with residential solar would have been infeasible.[44]

In addition to a low cost of entry, Colorado's community solar project provided owners with a well-maintained, "hassle-free" system that, therefore, commanded a pre-

32. In addition to California's sold-out SMUD example, a recent Colorado project by Xcel Energy was filled within one-half hour of opening, receiving three times as many applications as it could accept. *See* Mark Jaffe, *Solar Gardens Set to Bloom in Unusual Places in Colorado*, DenverPost.com (Aug. 30, 2012), http://www.denverpost.com/business/ci_21430989/solar-gardens-set-bloom-unusual-places-colorado.
33. *See, e.g.*, John Farrell, Inst. for Local Self-Reliance, Community Solar Power: Obstacles and Opportunities 5-30 (2010) (revised version), *available at* http://www.ilsr.org/community-solar-power-obstacles-and-opportunities/ (comparing the success and future viability of projects developed in various states, including Colorado, Florida, Maryland, North Carolina, Oregon, Utah, and Washington).
34. Currently in the final program stages, CSI benefits have been largely phased out, now offering only $0.20 to $0.35 per watt of installed capacity. *See California Solar Initiative—Statewide Trigger Tracker*, GO Solar CALIFORNIA (Sept. 30, 2012), http://www.csi-trigger.com/ (last visited June 3, 2013).
35. GO Solar CALIFORNIA, *Pricing PV Systems and Financing Ideas*, http://www.gosolarcalifornia.org/solar_basics/pricing_financing.php (last visited May 30, 2013) [hereinafter *Pricing PV Systems*].
36. *See* Sherwood, *supra* note 2, at 7.
37. Calculation: $52,200 (gross cost) minus $15,660 (assumes entire $52,200 is "eligible" for 30% federal tax credit) minus $1,650 (depending on whether service area offers $0.20 or $0.35 per watt, customer will receive either $1,200 or $2,100 in California incentives, equating to an average of $1,650) = $34,890, rounded to $35,000.
38. The American Recovery and Reinvestment Act of 2009 actually conferred a temporary additional benefit to commercial installations over residential systems by giving commercial systems the option to substitute the ITC for an equivalent direct grant from the U.S. Treasury Department. This option, however, has since expired; it was only briefly accessible to systems able to begin construction prior to December 31, 2011. *Federal Incentives/Policies for Renewables & Efficiency: Business Energy Investment Tax Credit (ITC)*, Database of St. Incentives for Renewables & Efficiency (Sept. 22, 2012), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_ Code=US02F (last visited June 3, 2013).
39. *See California Solar Initiative—Statewide Trigger Tracker*, *supra* note 34.
40. Assuming the homeowner is not relying on third-party financing, as discussed *supra* note 6.
41. *See* Farrell, *supra* note 33, at 5.
42. *See infra* notes 119-23 and accompanying text, for a discussion of the value of MACRS and bonus depreciation.
43. Farrell, *supra* note 33, at 9.
44. *Id.* at 22.

mium from the local utility company, which paid $0.11, instead of $0.08 per watt.[45] The utility explained its willingness to extend this additional pricing advantage as reflective of the relative reliability of a single community solar project over a multitude of homeowner installations, each of which may or may not be adequately maintained and whose future distribution and size were unpredictable.[46] The consolidation of solar ownership to one "garden" is also beneficial from the community-investors' perspective; community solar increases efficiency and alleviates the burden borne by individual homeowners who otherwise have to research, install, and maintain their own systems. Frequently, these high transaction costs alone are sufficient to deter homeowners completely.[47] Thus, community investors reap twofold benefits, receiving higher bill credits against their energy usage, while simultaneously delegating system maintenance to the developer, who often subcontracts to a third party.

Finally, community solar offers increased siting flexibility over residential solar, where the location of the PV system is confined to the homeowner's roof or property. The flexibility of community solar allows these projects to confer additional auxiliary social benefits. For example, a community solar project can be placed on otherwise unexploitable space, such as on retired landfills, blighted lands, and above parking lots.[48] This innovative placement promotes sustainable land use and local economic growth. When placed in public areas, community solar can also increase awareness of renewable energy and encourage energy conservation behavior.

As previously discussed in Part I,[49] this combination of price and siting flexibility extends opportunities for solar participation to an additional 75% of ratepayers who are now effectively barred. Those currently excluded include renters, condominium owners, and single-family homeowners lacking suitable roofs or large sums of disposable income.[50] The limitation of solar benefits to roughly 25% of ratepayers not only poses substantial fairness concerns, but, as a purely economic matter, imprudently cripples the free market's ability to recognize and respond to robust demand, an allowance which would increase solar energy's long-term price competitiveness. Moreover, because an embrace of community solar would exponentially expand market potential for distributed solar, the risk that community solar would simply "replace" current residential program demand is negligible. Rather, California legislators' swift and decisive action will bolster the state's budding success in spurring ratepayer action toward a renewable future.

D. Benefits Over Industrial-Scale Solar Plants

The case for community solar over industrial-scale generation is even more compelling. Not only would pervasive reliance on community solar avoid billions in transmission infrastructure costs associated with new, remote solar plants, but community solar also reduces environmental externalities, significantly expedites solar deployment rates, contributes to greater energy security, and provides other local economic and social benefits. Nonetheless, the inertia favoring traditional, industrial-scale energy generation represents perhaps the greatest impediment to realization of community solar in California. Admittedly, large, remote projects have a crucial role to play in America's clean energy future. Developers of industrial models can locate projects where land is cheap and solar rays are the strongest, thus maximizing per-panel output, while reducing system capital costs. Nonetheless, the economy-of-scale benefits of the traditional model have been overstated, as this narrow cost advantage is arguably nullified, or even superseded, by countervailing transmission and environmental review costs.[51]

Even where available transmission lines exist, the U.S. Energy Information Administration estimates that 7% of electricity generated is lost through transmission and distribution annually.[52] The nonexistence of transmission lines running to remote areas most abundant in renewable resources and the lack of capacity on existing lines are two chief obstacles to currently proposed industrial-scale projects. For example, if California continues to pursue industrial solar as the primary means of meeting its 33% RPS goal by 2020, CPUC projects that 11 new transmission lines be required—at a cost to the state of roughly $16 billion.[53] Development of these distant sites also compels substantial administrative, permitting, environmental review, and legal costs.[54] In seeking to mitigate these expenditures, California established the Renewable Energy Transmission Initiative (RETI) and delegated as one of its chief responsibilities the identification of Competitive Renewable

45. Eugene Buchanan, *Growing Solar*, Home Power (Dec. 19, 2011), https://homepower.com/articles/growing-solar/page/0/2 (last visited June 3, 2013).
46. *Id.*
47. *See* Rosoff, *supra* note 3 (finding that 80% of consumers support and would pay a premium for renewable energy, but that only 3% actually follow through to purchase renewable generation).
48. *See* Andrew Wineke, *Solar Garden to Give New Life to Old Landfill*, Gazette.com (Dec. 20, 2011), http://www.gazette.com/articles/old-130490-landfill-big.html (last visited June 3, 2013) (extolling a Colorado solar garden's ingenuity in developing its community solar project on an old landfill that has been sitting vacant since the 1980s in order to further the CEC president's "vision" that solar development is a "great use for these types of properties in the future"); *see also* Jaffe, *supra* note 32 (describing some of the creative placement of solar gardens in Colorado, including on the roof of a restored hangar and above a school parking lot).
49. *See supra* notes 4-10 and accompanying text.
50. Coughlin et al., *supra* note 4.
51. Weinrub, *supra* note 22, at 11.
52. U.S. Energy Info. Admin., *Frequently Asked Questions: How Much Electricity Is Lost in Transmission and Distribution in the United States* (July 9, 2012), http://www.eia.gov/tools/faqs/faq.cfm?id=105&t=3 (last visited June 3, 2013).
53. Cal. Pub. Util. Comm'n, 33% Renewables Portfolio Standard Implementation Analysis Preliminary Results, 62 (2009), *available at* http://docs.cpuc.ca.gov/PUBLISHED/GRAPHICS/102354.PDF [hereinafter CPUC RPS Implementation].
54. *See* Steve Stein, *The Environmentalist's Dilemma*, Hoover Inst. Stanford Univ. (Aug. 1, 2012), http://www.hoover.org/publications/policy-review/article/123656 (last visited June 3, 2013) (expressing concern that "[e]ndless demands for supplemental environmental reports and the constant threat of lawsuits" from environmental groups present a very real threat to the fledgling solar industry).

Energy Zones (CREZs), or cost-effective and relatively environmentally friendly plant siting areas.[55] Moreover, California has partnered with the Barack Obama Administration to reduce investment costs by engaging in concerted transmission line planning efforts, streamlining permitting processes, and expediting environmental and project review procedures.[56]

Even assuming these efforts successfully trim industrial solar expenditures, community solar would, nevertheless, save the state, project developers, and taxpayers (who bear the costs of complex administrative procedures) billions of dollars by avoiding inevitable costs associated with constructing new transmission lines, obtaining permit approval, conducting lengthy and contentious environmental impact reports, and defending against lawsuits filed by environmental groups. Because community solar is generated proximate to the point of consumption, it does not suffer from comparable transmission losses and negates the need for new transmission infrastructure. Similarly, since it is installed primarily in urban areas where ecosystems have already been disturbed, environmental impact analyses are typically unnecessary. Therefore, as a purely economic matter, community solar provides a net cost benefit.On top of economic disadvantages, numerous environmental groups have been critical of California's concerted efforts to "fast-track" industrial solar.[57] To begin with, industrial solar and transmission lines require millions of acres of undisturbed land to be "scraped" prior to development. Projects also consume billions of gallons of scarce desert water resources.[58] The prevalence of sulfur hexafluoride (SF_6) as an electrical insulator in new (and existing) power lines poses yet another environmental concern.[59] SF_6 is a greenhouse gas possessing 23,900 times the global warming capacity of carbon dioxide (CO_2)—*one pound* of SF_6 produces the equivalent global warming effect of *11 tons* of CO_2.[60] Alarmingly, the U.S. Environmental Protection Agency (EPA) has reported that "substantial" SF_6 leaks into the atmosphere from aging transmission equipment and through "gas losses" that occur during equipment maintenance.[61] The perceived disregard for these risks has prompted some groups to accuse the RETI and other agencies of "us[ing] the cover of being 'renewable' to sidestep adequate environmental review of these projects,"[62] finding, for example, that "[o]ne CREZ ranked by RETI as being environmentally benign . . . will destroy 4,000 acres of pristine desert considered by the latest Nature Conservancy Ecoregion Assessment to be a 'core' ecosystem area."[63] This conflict highlights yet another environmental benefit of distributed solar. Because community projects are installed predominantly on preexisting structures or blighted open space, community solar generation avoids adverse environmental impacts on sensitive desert and mountain habitats associated with industrial-scale development, as well as the need to build new SF_6-emitting power lines.

A third benefit of community solar is its superior capacity for rapid growth and deployment; under a proper regulatory scheme, it can be installed and connected to the grid in a matter of months, whereas an industrial solar plant may take 10 years from inception to completion.[64] Germany's success in facilitating decentralized PV solar illustrates this benefit over the U.S. approach favoring industrial solar. In 2000, solar PV was virtually nonexistent in both countries.[65] As of 2011, the cumulative installed PV capacities of Germany and the United States reached 25,000 MW and 4,500 MW, respectively.[66] In July 2011, the CPUC issued a press release celebrating California's triumph of having become "the first state in the nation to install more than one gigawatt of [cumulative] customer-generated solar energy."[67] In the wake of this announcement, however, Germany not only became the first country in the world to exceed 30 GW of total solar capacity, but Germany also installed almost one GW of solar PV in September 2012 alone.[68] The immense success with which Germany

55. Weinrub, *supra* note 22, at 25.
56. Memorandum of Understanding Between the State of California and the Department of the Interior on Renewable Energy (Oct. 12, 2009), *available at* http://www.doi.gov/documents/CAMOUsigned.pdf; *see also* Press Release, Bureau of Land Mgmt., Obama Administration Releases Roadmap for Solar Energy Development on Public Lands (July 24, 2012), *available at* http://www.blm.gov/wo/st/en/info/newsroom/2012/july/NR_07_24_2012.html (last visited June 3, 2013) ("In support of more detailed system-level analyses of transmission needs, the BLM is engaged in ongoing transmission planning efforts, including through the Transmission Expansion Planning Policy Committee and the Western Electricity Coordination Council's transmission study.").
57. Letter from California/Nevada Desert Energy Committee of the Sierra Club, Desert Protective Council, Mojave Desert Land Trust, The Wildlands Conservancy, Western Watersheds Project, and National Parks Conservation Association, to Clare Laufenberg Gallardo, Cal. Energy Comm'n (Nov. 19, 2008), *available at* http://www.energy.ca.gov/reti/documents/phase1B/comments/2008-11-19_Several_Enviro_Groups-Taylor.pdf:

    The bottom line is that RETI's environmental ranking system fails to indicate the relative environmental cost of the CREZs as it purports to do. More importantly, the CREZs and associated new transmission facilities are so large and widespread, particularly in the California desert, that their individual and cumulative impacts rise to an ecosystem level.

58. Alliance for Responsible Energy Policy, *The Better Way*, Desert Report, Dec. 2008, at 22, *available at* http://www.desertreport.org (last visited June 3, 2013).
59. U.S. Envtl. Protection Agency, *SF_6 Emission Reduction Partnership for Electric Power Systems* (Sept. 21, 2012), http://www.epa.gov/highgwp/electricpower-sf6/basic.html (last visited June 3, 2013).
60. *Id.*
61. *Id.*
62. Weinrub, *supra* note 22.
63. *Id.* at 56, n.57.
64. *Id.* at 28-29.
65. *See* International Renewable Energy Agency, *Renewable Energy Technologies: Cost Analysis Series, Volume 1: Power Sector*, 18 (Int'l Renewable Energy Agency, Working Paper No. 4, 2012).
66. *See* European Photovoltaic Industry Association, Global Market Outlook for Photovoltaics Until 2016, 14-15 (2012), *available at* http://files.epia.org/files/Global-Market-Outlook-2016.pdf. Between 2010 and 2011, Germany experienced an increase on cumulative PV installed capacity of roughly 8,000 MW, while the U.S. total capacity increased by only 2,000 MW, from roughly 2,500 to 4,500 MW. Therefore, between 2010 and 2011, Germany's installed PV growth rate was four times that of the United States. *Id.*
67. Press Release, Cal. Pub. Util. Comm'n, CPUC Report Shows California Leads the Nation in Customer-Generated Solar Power (July 2, 2012), *available at* http://www.cpuc.ca.gov/NR/rdonlyres/F656D3CA-7724-48FB-81C7-6BDD3AE19CB3/0/SolarReport.pdf.
68. Eric Wesoff, *Germany Added 1 GW of PV in September, 6 GW So Far in 2012*, Greentechsolar (Nov. 5, 2012), http://www.greentechmedia.com/

has stimulated the spread of solar PV, coupled with the fact that 80% of its PV capacity is derived from rooftop installations,[69] provides evidence of the vast potential for swift deployment of decentralized community solar in California if the state removes current barriers.[70]

As an aside, Germany has achieved these impressive statistics by establishing an aggressive national feed-in tariff, under which the government requires utilities to buy electricity from any qualified renewable generator at significantly higher rates than the utilities pay for nonrenewable energy, thus incentivizing green investment.[71] However, this market mechanism has repeatedly proven to be politically infeasible on a large scale in the United States, primarily because a feed-in tariff with rates as high as Germany's would breach the Public Utility Regulatory Policies Act (PURPA) and the Federal Energy Regulatory Commission's (FERC's) ratepayer indifference requirement, as discussed later in this Article.[72] It is also quite possible that the passage of Germany's feed-in tariff was only viable when implemented two decades ago, because its biggest opponents—large utilities and energy-intensive industries—"were distracted by the challenges of German unification."[73] Thus, given the U.S. Congress' failure to date, its current dysfunction, and the consistent preference for a tax-centric approach to renewable energy, feed-in tariffs are beyond the scope of this Article. As a final note, however, community solar does *not* represent a mutually exclusive alternative to the adoption of a feed-in tariff. On the contrary, although the incentives for community solar in the United States will likely continue to be rooted in the tax code, a feed-in tariff regime could foster even greater investment in community solar. The comparison of California and Germany merely demonstrates the magnitude of untapped potential for widespread deployment of rooftop PV in California, a region of similar size, possessing comparable wealth, and enjoying a climate generally more favorable to solar energy.

In addition to superior deployment potential, decentralized solar can contribute to greater energy security as compared to remote, industrial solar plants that are subject to risks associated with long transmission lines, including single points of failure. Perhaps even more importantly, widespread decentralized generation protects consumers against artificial energy shortages and market manipulations[74] (like those created by Enron), which, in 2001, led to the bankruptcy and $16 billion bailout of PG&E.[75] This bailout has been paid off by PG&E's unwitting customers at a total cost of $1,500 per customer.[76] Furthermore, a survey of community solar projects found that participants also consistently report that this self-reliance, in turn, confers psychological benefits by "provid[ing] a tangible sense of investment in energy production, shifting the owner's mindset"[77] in a manner that may lead to greater energy-efficiency awareness, creating a ripple effect throughout the community. In contrast, "an urban community relates to electricity from remote, central-station power plants as an imported commodity that results in the *export* of wealth *from the community*."[78]

This shift to the importation of wealth into the community highlights the economic and social benefits of local energy control. Community solar creates long-term, well-paid employment opportunities for a range of skill levels, including manufacturing, installation, maintenance, sales, finance, marketing, and engineering jobs, the majority of which, by their nature, are necessarily local.[79] As further explicated in Part III.C., in the 2011-2012 term, the California Legislature considered a proposal, Senate Bill 843 (SB 843), that would have opened channels for the establishment and growth of community solar programs in the state. Had the bill passed, it would have created at least 12,000 new California jobs and generated $230 million in tax revenue.[80] SB 843 would have also generated an addition $7.5 billion in economic output for the state.[81] Nevertheless, these benefits would have accrued to ratepayers, while simultaneously reducing the need for IOU profit-generating projects. Many bill supporters, therefore, attribute the bill's demise in the summer of 2012 to

articles/read/Germany-Added-1-GW-of-PV-in-September-6-GW-So-Far-in-2012 (last visited June 3, 2013).

69. John Farrell, *Over 80 Percent of German PV Installed on Rooftops*, Inst. for Loc. Self-Reliance (Jan. 29, 2011), http://www.ilsr.org/over-80-percent-german-pv-installed-rooftops/ (last visited June 3, 2013).

70. *See* Weinrub, *supra* note 22, at 29:

> In the case of California, there are substantial barriers to the approval of decentralized generation proposals given that the state's utilities reject most of them. . . . [O]ut of 139 MWh/year proposed in 2007 and 2008, only 9 MWh/year (roughly six percent) were accepted by the utilities for California Public Utilities Commission (CPUC) approval.

(citing Cal. Pub. Util. Comm'n, Renewables Portfolio Standard Quarterly Report, Q4 7 (2009), *available at* http://ww.cpuc.ca.gov/NR/rdonlyres/52BFA25E-0D2E-48C0-950C-9C82BFEEF54C/0/Fourth-Quarter2009RPSLegislativeReportFINAL.pdf).

71. Christoph H. Stefes, *The German Solution: Feed-In Tariffs*, N.Y. Times (Sept. 21, 2011), http://www.nytimes.com/roomfordebate/2011/09/20/why-isnt-the-us-a-leader-in-green-technology/us-should-emulate-germanys-renewable-energy-model (last visited June 3, 2013).

72. *See infra* notes 148-54 and accompanying text, for a discussion of PURPA and FERC regulations.

73. Stefes, *supra* note 71.

74. Weinrub, *supra* note 22, at 32.

75. Dennis Herrera, *Bailout Makes the Case for Public Power*, Off. of the City Att'y (Dec. 19, 2003), http://californiaphoton.com/cache/g/sfgov_cityattorney_pgebailout.html (last visited June 3, 2013) (disparaging the CPUC's decision to bail out PG&E and asserting that "[w]e shouldn't be surprised. . . . PG&E fought a long, hard and ultimately successful battle to ensure that its own corporate interest prevailed over that of the public it purports to serve"); *see also* Ralph E. Stone, *Ratepayers on the Hook for PG&E's Neglect*, Fog City J. (Sept. 22, 2010), http://www.fogcityjournal.com/wordpress/2344/ratepayers-on-the-hook-for-pges-neglect/ (last visited June 3, 2013).

76. Stone, *supra* note 75.

77. Farrell, *supra* note 33, at 22.

78. Weinrub, *supra* note 22, at 23 (emphasis added).

79. The Vote Solar Initiative, Economic and Job Creation Benefits of California SB 843: Community Based Renewable Energy Self Generation Program, 3 (2012), *available at* http://votesolar.org/wp-content/uploads/2012/06/SB-843-job-econ-impacts-report-6-6-12.pdf.

80. *Id.* at 2 (using DOE's NREL model to calculate job creation that would result from SB 843).

81. *Id.* at 5 (defining *economic output* as "the total value of goods and services generated in the state as a result of installation and operation of the renewable energy systems").

California's IOUs, who were the only parties to oppose the bill.[82]

II. The Best Model for California Community Solar

Despite a smattering of small, motley efforts across the United States to develop community solar, no uniform and replicable model has emerged. This absence is largely due to the significant federal barriers previously discussed, as well as reflective of disparate state regulatory regimes. However, three general models have developed: the nonprofit model, the utility-sponsored model, and the special-purpose entity model (SPE). For the reasons subsequently described, the SPE model provides the brightest future for Californian solar policy.

The following explicates the basic framework of each of the three aforementioned community solar models. Under the nonprofit model, startup capital is obtained from donor contributions, grants, and other federally issued debt instruments, such as Clean Renewable Energy Bonds (CREBs).[83] The solar garden is then owned and operated by the nonprofit, often an electrical cooperative or municipal utility.[84] The second option, the utility-sponsored model, has been most commonly employed by member-managed utilities, such as city- or county-owned electricity providers (not investor-owned providers).[85] Under this model, the utility provider owns and operates the community PV system and offers ratepayers the opportunity to voluntarily participate by purchasing rights to the solar energy generated thereby.[86] The utility issues bill credits to participating ratepayers for energy produced in proportion to each ratepayer's investment.[87] However, this model typically requires ratepayers to accept green pricing, since the investment cost (whether monthly, annual, or one-time upfront) often exceeds the bill credits the ratepayer receives. For example, Sacramento's Municipal Utility's "Solar Shares" Program and Colorado's "Sol Partners Cooperative Solar Farm," two of the most proven and prototypical utility-sponsored projects, both require that ratepayers have accepted green pricing.[88]

In contrast to the previous two models, however, the SPE model involves a private business arrangement, usually organized as an LLC,[89] "in which individual investors join in a business enterprise to develop a community solar project."[90] Ratepayer-owners "sell" the energy produced by the system to local utility providers in exchange for bill credits against the ratepayer-owners' household usage. An SPE's distinguishing features include its ability to offer ratepayer-investors actual system ownership, as well as the potential to realize a profit if the system's financing is properly structured.

In crafting policy to foster the most advantageous model for California, legislators must be cognizant of the unique fact that 68% of California's retail electricity service is monopolized by three for-profit IOUs.[91] The dominance of these IOUs threatens both the political and economic viability of any community solar bill, as described further in Part III.B.-C. For example, California guarantees PG&E, the largest of these IOUs, at least an 8.79% profit margin.[92] Thus, like any venture undertaken by a for-profit IOU, administration of community solar programs by IOUs would necessitate that a portion of ratepayer-investors' profits be siphoned off for the IOUs' shareholders. Ensuring an annual profit of 8.79% for a utility's shareholders would consume any profits community members would otherwise receive were the project administrated by a nonprofit municipal or cooperative utility. Additionally, the IOUs' influential lobbyists are largely credited with "killing" California's proposed community solar bill, SB 843, in the summer of 2012.[93] Therefore, given California's IOUs' open opposition to SB 843, California should avoid the utility-sponsored model, as it would vest too much power with parties whose economic interests are hostile to the successful adaptation of distributed solar.

Even in states where the utility-sponsored model may be politically viable, such as where ratepayers own or manage municipal or cooperative utility companies that dominate the electricity market, the SPE model offers definitive advantages. For example, an SPE's ability to fully exploit federal tax incentives signifies a major benefit

82. *See* Sen. Lois Wolk, *PG&E, So. Cal Edison Kill Bill to Increase Consumer Access to Renewable Energy*, Lois Wolk Homepage (Aug. 31, 2012), http://sd05.senate.ca.gov/news/2012-08-31-pge-so-cal-edison-kill-bill-increase-consumer-access-renewable-energy (last visited June 3, 2013) (explaining that SB 843 "died in the Assembly Committee on Utilities and Commerce" because "PG&E and Southern California Edison control the committee").
83. Coughlin et al., *supra* note 4, at 30 ("Qualified tax credit bonds are a mechanism to lower the cost of debt financing for non-tax-paying entities . . . . Two tax credit bonds in particular—Clean Renewable Energy Bonds (CREBs) and Qualified Energy Conservation Bonds (QECBs)—were created to finance renewable energy projects and programs.").
84. *Id.* at 6, 28.
85. *Id.* at 7.
86. *Id.* at 6.
87. *Id.* at 8.
88. *See id.* at 11 (detailing the financial data of Colorado's Sol Partners Cooperative Solar Farm, in which ratepayers expend a one-time subscription cost of $1,050 in exchange for a value of approximately $900 in electricity credits that will be generated over the next 25 years); *see also supra* notes 15-16 and accompanying text, for a description of Sacramento's "Solar Shares" Program.
89. However, most states offer a "range of business entities that could be suitable for a participant-owned community solar project." Coughlin et al., *supra* note 4, at 12.
90. *Id.* at 5.
91. *Background: Provision of Electricity Service in California*, Legislative Analyst's Office (July 7, 2009), http://www.lao.ca.gov/ballot/2009/090395.aspx (last visited June 3, 2013).
92. John Upton, *PG&E Faces High Costs on Pipelines*, N.Y. Times, Mar. 4, 2011, at A21A, *available at* http://www.nytimes.com/2011/03/04/us/04bcgas.html?_r=0 (last visited June 3, 2013).
93. *See* Chris Clarke, *Utilities Kill Community Solar Bill*, KCET (Sept. 4, 2012), http://www.kcet.org/news /rewire/solar/photovoltaic-pv/utilities-kill-community-solar-bill.html (last visited June 3, 2013) ("[Senate Bill 843] died . . . after heavy lobbying by Pacific Gas & Electric (PG&E) and Southern California Edison . . . ."); *see also* Wolk, *supra* note 82 ("Unfortunately, the coalition of support behind [Senate Bill 843] was simply no match for the high paid lobbyists and the campaign contributions of these monopoly corporations.").

of the SPE model over the competing utility-sponsored model, as discussed in further detail in Part III.A.[94] SPEs are also superior to the utility model because they allow community members to actually own—as opposed to lease—a solar system. Community ownership aligns the interests of system owners and beneficiaries, incentivizing the maximization of the system's lifespan. Member ownership further ensures that community investors reap system benefits for the entire life of the panels. In contrast, a solar subscription, lease, or license requires a community participant to pay an up-front lump sum, or agree to pay periodic installments,[95] in exchange for the right to electricity generated over a fixed lease term (usually 20-25 years), while the utility retains ownership of the system.[96] However, because utilities are ineligible for certain federal tax benefits and usually retain some profit margin for their investors, utilities are less capable of reducing high up-front system costs as compared to SPEs. As a result, many utility-sponsored projects take 20 and 35 years to break even.[97] These long payback periods often exceed the participant's lease term, leaving the ratepayer in the red.[98] In fact, many solar projects break even just as system benefits revert back to the utility-owners, to whom pure profits accrue for the remainder of the system's lifespan (up to 40 years, and possibly longer if current technology is fully exploited).[99]

Undeniably, ownership carries its own risks, as well as rewards. As owners, SPEs must pay maintenance costs, which are minimal, and bear the risk of equipment failure.[100] However, the LLC organizational structure protects community investors against personal liability, so an investor's risk exposure is, in fact, limited to the risk that the investor may not fully recoup his initial expenditure (a result that is virtually guaranteed under the utility-sponsored model anyway). Moreover, liability concerns can be minimized and ongoing maintenance costs easily administered by setting up a "maintenance escrow" upon commencement of the project, as pioneered by Colorado's Clean Energy.[101]

Likewise, the SPE provides greater long-term viability over the competing nonprofit model, which would be comparatively plagued by donor-funding shortages, the limited availability of government grants, and its inability to take advantage of considerable federal tax benefits. This is not to say that the nonprofit model should be discarded altogether, but rather that the inherent limitations of the nonprofit model prevent its use on a large scale. For example, Washington State, one of the few states to enact community solar legislation, has aggressively promoted community solar.[102] Nevertheless, as of November 2010, only two small nonprofit projects had located funding and been developed.[103] In 2006, the Ellensburg Community Solar Project pieced together funding from individual donations, as well as grants from Central Washington University and the Bonneville Power Administration, to become the first community solar project in Washington State.[104] Although donors do receive bill credits for energy produced at Ellensburg, donors are unlikely to recoup their donations, as it would take more than 50 years for the system to generate sufficient electricity to exceed the donors' initial investments.[105] The second nonprofit model, Solar for Sakai, is a small, 5.1-kW system erected on the rooftop of a local school.[106] All project capital was supplied by the donations of 26 community members and a small state grant, and the school reaps all the benefits of the PV system.

Because of these shortcomings, California should seek primarily to foster development of the SPE community solar model in order to achieve optimum pricing for consumer-investors. As evidenced by the success of this model under disparate state community solar frameworks, including in Colorado, Maryland, and North Carolina, the LLC SPE model offers clear advantages. Projects in each of these states have produced a return on investment for ratepayer-investors in a timely fashion (or are poised to do so), with payback periods ranging from five (for Maryland's University Park Solar Project) to 13 years (for Colorado's CEC Project and North Carolina's AIRE Greenhouse Solar Project).[107] These projects expanded solar ownership to otherwise excluded community members and have forged a trail through seemingly insurmountable legal barriers,

94. For example, although Congress has expanded ITC eligibility to encompass utilities, utilities are still unable to fully utilize accelerated depreciation (MACRS). *See* Michael Mendelsohn & Claire Kreycik, NREL, Rep. No. NREL/TP-6A20-48685, Federal and State Structures to Support Financing Utility-Scale Solar Projects and the Business Models Designed to Utilize Them 2 (2012), *available at* http://www.nrel.gov/docs/fy12osti/48685.pdf.
95. Ratepayer investment may take the form of a lump-sum payment or monthly installments. Payment in monthly installments may frequently take the form of green pricing.
96. Farrell, *supra* note 33, at 22.
97. *Id.* at 5-17, 22 (surveying nine projects in seven states and their respective payback periods).
98. *Id.* ("The [lease] term limits for SolPartners, SunSmart, and Solar Pioneers are shorter than the payback period, leaving community solar investors in those towns in the red. The exceptions to the limited terms were the three ownership-based projects: University Park, Clean Energy Collective, and Greenhouse Solar, which all used an LLC model.").
99. *See* Ken Zweibel, *Should Solar Photovoltaics Be Deployed Sooner Because of Long Operating Life at Low, Predictable Cost?*, Energy Pol'y 1 (Aug. 2010) (arguing that, although key components of solar systems are only warranted for 25 years, current live PV modules have proven that these systems can last for at least 40 years, and further contending that with a reinvestment of only 25% of original project costs, PV lifespans could be extended to 100 years).
100. *Id.* at 22.
101. John Farrell, *ILSR's Report on Community Solar Policy Coming Soon*, Inst. for Loc. Self-Reliance (Sept. 3, 2010), http://www.ilsr.org/ilsrs-report-community-solar-policy-coming-soon/ (last visited June 3, 2013).
102. Farrell, *supra* note 33, at 29 (noting, for example, Washington's favorable payment structure for community solar, under which the state pays twice as much per kWh for energy produced by community solar as compared to other PV projects).
103. *Id.* at 15.
104. *Id.*
105. Notably, the higher energy prices for community solar projects came as a result of a 2010 amendment to Washington's community solar bill. *Id.* at 29. Because Ellensburg was completed under the old regime, the project has not benefitted from the amendment. Thus, the 50-year payback period would be significantly shortened for a new project developed under current law.
106. *Id.* at 17.
107. *Id.* at 5-6, 9-11.

creating paradigms to aid future projects in successfully and less expensively traversing the same federal regulations.

In conclusion, the SPE model's reliance on manifold competing, market-driven actors will nurture technological innovation and boost the proliferation rate of community solar. In turn, such competition and growth will lead to lower costs—both to communities, as well as to the state—due to economies of scale and increased efficiency. This market effect is already occurring in response to exponential worldwide increases in solar PV deployment, especially in Chine and Europe.[108] Despite the myriad advantages of SPEs, a primary focus on the SPE model should not necessarily preclude supplementary use of the utility or nonprofit models in areas where rural cooperatives or municipal utilities (who are publicly as opposed to privately accountable) supply electricity and where market demand exists.[109] Although these other models often generate negative financial returns,[110] these models can nonetheless provide the same community, social, and environmental benefits as the SPE model, as long as consumers are willing to pay green pricing.[111] Even where other models supplement the SPE model, however, primary reliance on LLC SPEs is essential to achieving widespread proliferation of community solar.

III. Obstacles

Notably, the chief obstacles to community solar are neither technical nor technological. Rather, they stem from inflexible and archaic financial incentives, entrenched economic interests for certain institutional preferences, and corresponding political and structural resistance.[112] While California's range of action is constrained by certain federally imposed limitations, most notably PURPA's ratepayer indifference requirement, securities regulations, and a tax-centric incentive system, the state nonetheless retains substantial power to address and remove numerous self-imposed institutional, structural, and political obstacles to realizing community solar.

A. Financial

Because federal tax incentives are predictable and represent the primary financing mechanisms for solar project development in the United States, successful deployment of solar has been largely characterized by an ability to maximize these benefits.[113] The federal government currently offers two tax credits—the Residential Renewable Energy Tax Credit or the equivalent Business Energy ITC—both of which allow projects to recoup 30% of qualified installation costs through a one-time income tax credit.[114] Taxpayers may carry forward unused credits for up to 20 years.[115] Unless extended, however, both tax credits will revert back to 10% in 2017.[116]

Favorable depreciation policies, including MACRS and bonus depreciation, offer additional federal solar tax benefits. MACRS refers to a federal depreciation allowance that permits businesses—but not individuals—to fully depreciate the solar project's entire basis[117] within the project's first five years of operation.[118] This rate is substantially faster than actual depreciation, since the lifespan of a solar system easily ranges from 25-40 years or more.[119] MACRS allows investors, especially those with high marginal incomes, to offset other taxable passive income and thus enjoy significant net financial gains. Because of the time-value of money, economists estimate that "the 5-year accelerated depreciation schedule recovers another 26% of system costs on a present value basis . . . 12% of which is attributable to the acceleration of the depreciation schedule . . . ."[120] Another currently available mechanism that facilitates swifter and earlier recoupment of up-front system costs is bonus depreciation. In 2012, bonus depreciation allowed the project owner to take a 50% first-year project-cost deduction (as opposed to a 5% first-year deduction under a 'normalized' depreciation schedule and a 17% first-year deduction under a MACRS-accelerated schedule).[121]

108. Liebreich et al., *supra* note 18, at 5-7.
109. For example, Sacramento's municipal electricity provider operates a popular community solar program called SMUD Solar Shares. *See Solar Shares℠: Solar for Everyone!*, Sacramento Mun. Util. Dist., https://www.smud.org/en/residential/environment/solar-for-your-home/solarshares/index.htm (last visited May 27, 2013).
110. *See, e.g.*, Farrell, *supra* note 33, at 11-14, 17 (discussing, for example, Oregon's Solar Pioneer, Utah's St. George's Sunsmart, and Washington's Solar for Sakai programs, none of which produced a positive return for community members who contributed capital to community solar projects); *see also* Zheng, *supra* note 16 and accompanying text (explaining that Sacramento community solar members pay a premium for green energy).
111. Farrell, *supra* note 33, at 5, 9, 11-16 (analyzing numerous municipal utility-run projects, including Oregon's "Solar Pioneer" and Utah's "St. George's SunSmart," whose simple payback periods were 34 and 32, respectively, as compared to 5- and 13-year payback periods for LLC-financed projects).
112. *See* Weinrub, *supra* note 22, at 33.
113. *See Solar Investment Tax Credit (ITC)*, Solar Energy Industry Ass'n, http://www.seia.org/policy/finance-tax/solar-investment-tax-credit (last visited May 26, 2013).
114. *See* 26 U.S.C. §§25, 48. A tax credit is a dollar-for-dollar reduction of tax liability.
115. *Id.*
116. U.S. Energy Info. Admin., *Energy Improvement and Extension Act of 2008: Summary of Provisions* (2009), http://www.eia.gov/oiaf/aeo/otheranalysis/aeo_2009analysispapers/eiea.html (last visited June 3, 2013).
117. The solar system's adjusted basis will generally fall around 85% of the purchase price of the system (assuming the system fully utilizes the 30% tax credit and does not receive additional tax-free state funding, which will slightly decrease the adjusted basis). Coughlin et al., *supra* note 4, at 28.
118. *Modified Accelerated Cost-Recovery System (MACRS) + Bonus Depreciation (2008-2012)*, Database of St. Incentives for Renewables & Efficiency (Oct. 14, 2011), http://www.dsireusa.org/incentives/incentive.cfm? Incentive_Code=US06F&re=1&ee=0 (last visited June 3, 2013) ("The federal Economic Stimulus Act of 2008, enacted in February 2008, included a 50% first-year bonus depreciation (26 U.S.C. §168(k)) provision for eligible renewable-energy systems . . . ." This provision was extended multiple times and eventually amended in 2010 by The Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 (H.R. 4853), which allowed a 100% first-year deduction for qualifying properties placed in service between September 8, 2010, and January 1, 2012.).
119. Weinrub, *supra* note 22, at 23; *see also* Zweibel, *supra* note 99 and accompanying text.
120. Mark Bolinger, Lawrence Berkeley Nat'l Lab., Pub. No. LBNL-1410E, Financing Non-Residential Photovoltaic Projects: Options and Implications (2009), *available at* http://eetd.lbl.gov/ea/emp.
121. *Modified Accelerated Cost-Recovery System (MACRS) + Bonus Depreciation (2008-2012): Program Information*, U.S. DOE, http://www.doe.gov/savings/modified-accelerated-cost-recovery-system-macrs-bonus-depreciation-2008-2012 (last visited May 29, 2013).

Maryland's "University Park Solar" and Colorado's CEC projects stand out as the most financially successful and replicable U.S. models, in large part because they employed creative techniques to fully exploit the ITC and MACRS-accelerated depreciation schedules.[122] Conversely, the U.S. tax-centric framework only exacerbates funding difficulties for non-taxpaying entities—including electrical cooperatives, municipal utilities, and nonprofit organizations—which are altogether tax exempt.[123] Grants and CREBs substitute for tax incentives to nonprofits; however, whereas one individual's tax credit does not affect another claimant's eligibility, grant funding is necessarily finite and competitive, as well as difficult to expand given general public resistance to increased taxation. Consequently, most existing community solar projects were feasible only because of reliance on financing solutions that are difficult to replicate, especially on a large and consistent scale, including one-time local grants,[124] CREBs,[125] green pricing,[126] and sheer donor altruism.[127]

Although incentives represent the primary drivers of solar installation in the United States, securing reliable funding has proven to be an onerous task—surmountable only by flexible SPEs—as community solar fits squarely within neither residential nor commercial federal solar incentive schemes. To begin with, Congress has limited the Residential Tax Credit's application to on-site PV systems serving a single household. The credit is therefore unreachable for shared or off-site community projects.[128] Alternatively, SPE investors can use the ITC business tax credit. Because of pass-through taxation rules, the LLC can accept the ITC, MACRS, and bonus depreciation benefits and then immediately pass those tax savings directly to individual investors, even though those same investors could not realize these benefits as individuals.

Unfortunately, because wealthy investors historically abused pass-through taxation allowances to form tax shelters, the tax code has since implemented very strict passive income rules. These rules, when applied to community solar projects, essentially classify nearly all members as passive investors.[129] Problematically, passive investors can utilize the ITC and depreciation benefits only against other passive income. Congress, in turn, has very narrowly circumscribed the scope of passive income to include only earnings from rental property or from other passive investment.[130] The Internal Revenue Code also explicitly excludes capital gain, dividend, and interest income from passive income.[131] Given that a chief goal of community solar is to expand participation beyond sophisticated investors, most potential community solar participants generate very little to no passive income. Also notably is the fact that the value of depreciation increases as the taxpayer's marginal income tax bracket increases. Thus, even two investors who generate sufficient passive income to fully utilize the depreciation may not value it equally.[132]

These difficulties could be alleviated altogether by congressional action extending the Residential Tax Credit to encompass community solar investors or by amending the rigid passive income rules to provide a narrow exemption for solar energy. Because these solutions require federal action and are completely outside the realm of state power, they are beyond the scope of this Article. However, they provide a vital backdrop for understanding the difficulties that have historically plagued states and individuals seeking to implement community solar. Fortunately, the challenge created by passive income rules has spawned the following creative financing models that could be replicated on a broad scale with state support.

The first alternative, which has been employed with Internal Revenue Service approval in the wind power context, is the flip structure model.[133] Under this scheme, a tax-motivation investor with passive income (for example, a bank) agrees to front up to 99% of the project costs. The tax-motivated investor then exhausts all passive tax benefits (ITC and depreciation) that flow from the project for five years (depreciation is exhausted after five years under MACRS).[134] At this point, system ownership and benefits "flip" to community SPE investors who have the right to buy the system from the tax-motivated investor at fair market value. Although the tax-motivated investor will enjoy some rate of return, the repurchase price after five years will be significantly reduced to reflect a portion of the project costs recaptured by tax benefits, as well as the five-year diminution of the system's lifespan. The parties

122. *See* Farrell, *supra* note 33, at 5-6, 9-10. In addition to reproducibility, these projects resulted in the greatest investment returns, with investors "breaking even" after five and 13 years, respectively. *See id.*
123. 26 I.R.C. §501(c)(3) (2012); *see also* Coughlin et al., *supra* note 4, at 8.
124. *See, e.g.*, Coughlin et al., *supra* note 4, at 7 (explaining that Colorado's "Sol Partners" project is not replicable because a one-time grant from the state governor contributed significantly to project funding).
125. *See, e.g.*, *id.* at 8, 11-12 (describing how access to CREBs for projects, such as Florida's FKEC Simple Solar Program and Oregon's program, is limited, since CREBs require annual congressional appropriation and IRS allocation).
126. *See, e.g.*, *id.* at 10-11 (pointing out that North Carolina's AIRE Greenhouse Solar project will be difficult to imitate, as it required the building owner using the project's electrical generation to accept green pricing).
127. *See, e.g.*, *id.* at 17 (rejecting the replicability of Washington's Solar for Sakai model, which received the majority of its funding from donations of 26 individuals and organizations and the rest from a one-time grant).
128. The federal Residential Tax Credit applies only for "qualified solar electric property expenditure[s]," which the tax code defines as "an expenditure for property which uses solar energy to generate electricity for use in a dwelling unit . . . used as a residence by the taxpayer." 26 U.S.C. §25D(a)(1), (d)(2) (2012).
129. A passive investor is one who does not materially participate in the business. I.R.C. §469(c)(1)(A)-(B) (2012). A taxpayer materially participates only if the taxpayer is "involved in the operations of the activity on a . . . regular, continuous, and substantial" basis. *Id.* §469(h)(1)(A)-(C).
130. *Id.* §469(c)(1)-(2).
131. *Id.* §469(e)(1).
132. For example, assume two unmarried individuals, A and B, both plan to take an annual deprecation deduction of $20,000. A has $500,000 of passive income (which means the income against which the deduction will be taken is taxed at a rate of 35%). B has $35,000 of passive income (the income against which the deduction will be taken is taxed at a rate of 15%). Without the deduction, A would pay an additional $7,000 in taxes (35% of 20,000), whereas B would pay only $3,000 in taxes without the deduction (15% of 20,000). Thus, the $20,000 deduction is worth $4,000 more to A than to B (assuming 2012 rates). *See* Rev. Proc. 2011-52, I.R.B. 2011-45.
133. Coughlin et al., *supra* note 4, at 15.
134. *Id.*

will also have to contract as to how to allocate additional benefits, such as revenue from REC sales and electricity generated over the first five years of the system, both of which will directly or indirectly subsidize buy-in costs for SPE investors.

The sale/leaseback model offers a second solution. In this scenario, the community SPE develops and installs the solar PV project, sells it to the tax-motivated investor, and then leases it back.[135] The community operates, maintains, and controls all benefits flowing from the electricity produced, while the tax-motivated investor enjoys all tax benefits for five years.[136] The community SPE makes lease payments throughout this time, but retains the right to purchase the system back from the tax investor for fair market value after the tax benefits are fully exploited.[137]

Both of these models imperfectly foster the goals of community solar, as they fail to completely eliminate the need for a non-community investor with sizeable tax liabilities. Reliance on a tax-motivated investor, in turn, inevitably reduces the net financial benefit eventually received by community investors. Recall that tax benefits recapture 56% of up-front project costs in the first year when the benefits that will accrue over five years are reduced to present first-year value.[138] The tax-motivated investor and the community members will have to negotiate as to how to distribute this benefit. The final distribution will depend upon a variety of market factors, most predominantly, the ratio of tax-motivated investors to the demand by community solar projects for such parties. Problematically, the demand for investors who can utilize ITC benefits more than twice exceeds the corresponding availability of active investors with passive tax appetite.[139] This inequity creates a surplus market demand of roughly $3.6 billion,[140] which decreases the bargaining power of community members.

Hence, while many additional tax incentives are available to help finance community solar projects, passive income rules preclude full realization of these benefits. Unless Congress revises the tax code, the scope of possible action by California and SPE project developers is therefore critically constrained by this federal framework. Moreover, because a tax-centric incentive system favors high-income investors, states should consider supplementing federal incentives with mechanisms that encourage greater horizontal equity among solar energy participants.

135. *Id.*
136. *Id.*
137. *Id.*
138. Fifty-six percent represents the total value of the 30% ITC plus the 26% MACRS benefit.
139. *See* Scott Fisher et al., U.S. P'ship for Renewable Energy Fin., Tax Credits, Tax Equity and Alternatives to Spur Clean Energy Financing 1 (2011), *available at* http://www.uspref.org/wp-content/uploads/2011/09/Tax-Credits-Tax-Equity-for-Clean-Energy-Financing.pdf ("In 2010, for example, there was $3.3 billion in tax equity available . . . . According to US PREF projections, in 2011 the available tax equity will increase slightly to $3.6 billion, while the demand for renewable energy project finance will be $7.5 billion.").
140. *See id.*

B. *Institutional and Structural*

The ubiquitous influence of the "legacy model of power generation" has produced an entrenched institutional preference for industrial-sized, centrally generated power and corresponding transmission lines, which has heretofore successfully thwarted the implementation of community solar in California.[141] The deep-seated establishment of the legacy model stems in part from a continued reliance on the traditional generation model, even as the source of energy has changed from coal to nuclear, hydropower, and now solar.[142] However, the legacy model creates market inefficiencies by artificially reducing the competitiveness of distributed solar in three crucial respects.

First, current federal policies promoting clean energy nonetheless divert billions[143] in combined state and federal resources to finance projects benefitting wealthy investors, such as BP, Chevron, and Google.[144] The availability of federal loan and other benefits to *only* industrial-solar projects effectively subsidizes central generation over distributed solar, making community solar comparatively less attractive.[145] The apparent readiness of billions in solar financing has a silver lining, however, in that reallocation of this funding would be sufficient to effect aggressive support for community solar.

The second encumbrance presented by the legacy model stems from its interaction with PURPA §210, enacted by Congress in 1978. The original purpose of PURPA was to encourage increased competition for energy generation, including small project development, in order to prevent utility companies from expanding their monopoly power[146] through vertical integration.[147] In furtherance thereof, PURPA requires utilities to purchase energy produced

141. Weinrub, *supra* note 22, at 37.
142. *Id.*
143. *See, e.g.*, *id.* at 38 (listing billions in public subsidies for central renewable generation, including federal loan guarantees, multimillion dollar state fee waivers, and the 30% federal ITC tax credit); Amy Harder, *Government Races to Close Billions in Renewable Energy Loan Guarantees*, Nat'l J. (Sept. 16, 2011), http://www.nationaljournal.com/energy/government-races-to-close -billions-in-renewable-energy-loan-guarantees-20010915 (last visited June 3, 2013) (reporting that the Obama Administration had issued over $9 billion in renewable energy loan guarantees as of September 2011); *see also U.S. Department of Energy—Loan Guarantee Program*, Database of St. Incentives for Renewables & Efficiency (May 8, 2012), http://www.dsireusa.org/incentives /incentive.cfm?Incentive_Code=US48F (last visited June 3, 2013) (detailing the federal loan guarantee program, for which Congress has authorized more than $10 billion in loan guarantees).
144. *See* Craig Rubens, *Google, BP, Investors Fund BrightSource for $115M*, GIGAOM (May 14, 2008), http://gigaom.com/cleantech/google-bp-investors-fund-brightsource-for-115m/ (last visited June 3, 2013) (describing the acquisition by BrightSource, a major beneficiary public subsidies, of new corporate sponsors Google and BP).
145. Weinrub, *supra* note 22, at 38.
146. Remember, many utilities, including California's IOUs already possess geographic monopoly power. See discussion *supra* note 89 and accompanying text.
147. *See* Carolyn Elefant, Reviving's Purpose: The Limits of Existing State Avoided Cost Ratemaking Methodologies in Supporting Alternative Energy Development and a Proposed Path for Reform 5 (2011), *available at* http://www.recycled-energy.com/images/uploads/Reviving-PURPA.pdf.

from any project that meets certain PURPA stipulations.[148] Simultaneously, PURPA seeks to protect consumers by requiring that the rates utilities must pay are "just and reasonable," such that utilities' customers remain indifferent to the source of their energy.[149] Vested with the exclusive authority to enact PURPA,[150] FERC has interpreted PURPA's ratepayer indifference obligation as prohibiting states from requiring utilities to pay more than the utility's avoided cost.[151] Thus, states cannot encourage proliferation of certain energy sources by forcing utilities to pay more than the utility would otherwise have to pay to generate equivalent electricity from another source.[152]

Within these federal constraints, states retain some discretion over the methodology for calculating avoided costs.[153] For example, Washington State has complied with the ratepayer indifference requirement by compelling its utilities to pay a premium above avoided costs for certain energy sources and then reimbursing the utilities for the premium payments.[154] In 2011, however, California elected to pursue a utility-friendly competitive bidding methodology for calculating avoided cost called the Renewable Market Adjusting Tariff (Re-MAT).[155] Under ReMAT, various large-scale renewable project developers submit bids, and from these bids, the utilities select the lowest cost proposals.[156] These winning bids then represent the state's avoided costs—that is, the prices achieved at auction represent what a utility would otherwise have to pay to procure renewable power in order to meet the state's 33% RPS.[157] However, auction prices do not include new transmission infrastructure costs, which are borne by the utility (and reimbursed by the state), not the project developer. Moreover, the availability of federal loan and financing benefits, as previously discussed, further reduces costs for large projects. In short, rates generated from Re-MAT auctions are artificially low and thus preclude the development of community solar projects, which simply cannot compete financially with the cumulative effects of structural preferences for industrial generation.[158] Hence, PURPA's ratepayer indifference requirement, at least as applied in California, ultimately hinders PURPA's original purpose of encouraging smaller scale energy development.

Entrenched economic interests represent the third institutional barrier to community solar that is, ironically, in discord with the ratepayer indifference requirement. As profit-maximizing entities, IOUs lobby aggressively for new infrastructure—and new transmission lines in particular—which are "typically the most lucrative project an IOU can build."[159] However, instead of mandating financial austerity, FERC and the CPUC have consistently allowed IOUs to enjoy an 11-12% post-tax return on investments in new transmission lines.[160] Ratepayers bear the consequent costs of IOU profits, which are passed along in the form of higher energy prices.[161]

These astronomical transmission costs are arguably unnecessary. For example, California's determination that the state must invest $16 billion in new power lines in order to achieve its 33% RPS goal by 2020 relies on three assumptions that considerably inflate the projected need.[162] First, RETI's projections ignore the effects of concurrent legislation directed at increasing the penetration of energy-saving technologies, including home retrofitting, which will reduce California's energy demand.[163] Second, RETI presumes minimal construction of distributed renewable generation,[164] despite the growing popularity of such generation. Third, RETI excludes from its calculation the increase in transmission capacity that will result from decreased reliance on fossil fuel generation; this "freeing-up" of power lines is inevitable because state laws limiting greenhouse gas emissions prohibit certain coal contracts from being renewed.[165]

Although each of these exclusions distorts RETI's assessment, RETI's minimal decentralized penetration assumption is perhaps the most misleading, since the abundant capacity for community solar could nearly nullify the necessity of new transmission infrastructure. RETI's distorted assumptions are problematic because IOUs generate profits from the construction of new transmission lines and earn the same margin regardless of the future usefulness of the line. Because these projects may take years to complete, an inflated estimate may saddle ratepayers with higher prices for years to come without actually conferring any benefit.

In conclusion, the diversion of resources to large-scale projects, California's use of Re-MAT's auction mechanisms to determine avoided costs, and the entrenched economic interests that promote a preference for new transmission

148. 16 U.S.C. §824a-3 (2005). However, a 2005 revision created a loophole through which utilities can be exempted from PURPA's mandate under certain circumstances. *Id.* at §824a-3(m)(1)(A)-(C).
149. *See* 16 U.S.C. §824e; *see also* Elefant, *supra* note 147.
150. 16 U.S.C. §824e.
151. *Id.* §824a-3(d).
152. *See, e.g.*, Conn. Light & Power Co., 70 FERC P 61012, at 61023, 61028 (1995), *reconsideration denied*, 71 FERC P 61035, at 61151 (1995), *appeal dismissed*, 117 F.3d 1485 (D.C. Cir. 1997) (invalidating state-mandated utility electricity purchasing prices that exceeded avoided costs).
153. *See* Elefant, *supra* note 147 at 13 (grouping methodologies into five general classifications, the "proxy unit methodology," the "peaker method," the "difference in revenue requirement (DRR)," "market-based pricing," and "competitive bidding").
154. See discussion on Washington's program *infra* notes 212-14 and accompanying text.
155. Order Instituting Rulemaking to Continue Implementation and Administration of California Renewable Energy Portfolio Standard Program. Cal. Pub. Util. Comm'n Decision 12-05-035, at *2 (May 24, 2012).
156. Elefant, *supra* note 147, at 15.
157. *Id.* at 20.
158. *Id.* at 21.
159. Letter from Bill Powers, Powers Eng'g, to Ryan Pletka, Black & Veatch Corp. (Nov. 19, 2008), *available at* http://www.energy.ca.gov.reti/documents/phase1B/comments/2008-11-20_Powers_Engineering.pdf.
160. Order Accepting Operating Memorandum, FERC No. ER05-985-000, 5 (July 22, 2005).
161. *See supra* note 90 and accompanying text; *see also infra* notes 159-60 and accompanying text.
162. Weinrub, *supra* note 22, at 35.
163. *Id.*
164. *Id.*
165. *Id.* at 38 (referring, for example, to the LADWP's contract with the coal power Navajo Generation Station, which will be barred from renewal in 2019).

lines over distributed sourcing, cumulatively pose a formidable institutional barrier to community solar in California. However, the state maintains significant discretion in these arenas, which it could exercise to reform—or altogether reject—these institutional barriers, as discussed in Part IV.

Conversely, some federal legal schemes, like securities regulations, are not within the ambit of state discretion and impose strict limitations on community solar developers. In addition to the tax code limitations discussed above, securities laws create a legal minefield for community solar projects. Securities laws are well-intentioned; they merely require a party selling an "interest" in property[166] to make certain disclosures for the protection of investors and are primarily directed at entities such as those operating on Wall Street.[167] However, securities laws impose expensive and time-consuming registration and disclosure requirements, as well as the risk of considerable penalties for even unintentional noncompliance.[168] Due to the relatively small size and financial fragility of community solar projects, the cost of securities compliance can be fatal. To fully comply with securities laws' registration requirement, community solar projects would have to expend hundreds of thousands of dollars.[169] Even if such projects can qualify for an exemption, projects should expect to spend tens of thousands of dollars in legal and accounting fees. Because developers must carefully circumscribe the impediments posed by securities regulations, states adopting new legislation should create an exemption to state securities regulations for community solar projects to avoid frustrating the efforts of parties who are already bending over backwards to ensure compliance with federal securities laws.

In order for securities regulations to apply, the ownership interest at issue must be characterized as a security within the meaning of the Securities Act of 1933.[170] In the vast majority of circumstances, an investor's interest in a community solar development will usually qualify as an investment contract—a type of regulated security.[171] An investment contract is merely a (1) monetary investment, (2) in a "common enterprise," (3) with the expectation of profits, (4) that accrue "solely from the efforts of the promoter or a third party."[172] Applying this broad definition, the very essence of community solar satisfies the first two prongs, as investors pool funds to finance the community solar project, which is clearly a "common enterprise." As to the third and fourth requirements, some of the greatest benefits of community solar are that community-investors can expect to receive a long-term financial benefit that exceeds their initial investment, as well as a "hassle-free" system that is managed by the developer, a "third party."

However, it is possible for an individual's interest in a community solar garden not to fall within this broad test. For example, by requiring no up-front payment and instead offering customers a lease arrangement, Sacramento's SMUD may have found one way to avoid the first and third investment contract requirements.[173] Under SMUD's program, each customer pays an additional fee on his or her monthly electric bill; thus the arrangement hardly resembles an "investment."[174] Moreover, SMUD investors and others who accept green pricing arguably do not have an "expectation of profits" and therefore fail to satisfy the third element. Finally, project managers and other active participants can circumvent regulation under the fourth prong, because such profits do not accrue solely from a third party's efforts. In order to fall beyond the scope of a security, however, projects must sacrifice profits, ownership rights, or participation beyond a few active investors.

Fortunately, Congress has created several exemptions intended to ease the burden of securities regulations on small and start-up businesses; these exemptions also provide relief in the community solar context to SPE projects that are otherwise classified as investment contracts.[175] These potential exemptions include three safe harbors under Regulation D, an intrastate exemption under §3(a)(10), and possibly a future "crowdfunding" exemption, for which the Securities and Exchange Commission (SEC) has yet to promulgate necessary regulations.[176] A comprehensive overview of how community solar projects fit within the rigid federal securities framework is beyond the scope of this Article.[177] This Article notes, however, that a community solar project can qualify for one of these exemptions only by severely limiting participation in the community solar project. For instance, many exemptions restrict the number of "unsophisticated" or "unaccredited" investors to 35 people.[178] Unaccredited investors are individuals whose net worth is under $1 million or who have earned $200,000 or less for the past two years.[179] Similarly, all current exemptions effectively ban *any* form of general

166. *Securities*, Free Dictionary, http://legal-dictionary.thefreedictionary.com/securities (last visited May 14, 2013).
167. Kristin L. Bailey, *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, 133.
168. Coughlin et al., *supra* note 4, at 32.
169. *See* Constance E. Bagley & Craig E. Dauchy, The Entrepreneur's Guide to Business Law, 173 (4th ed. 2012).
170. 15 U.S.C.A. §§77a et seq.
171. Bailey, *supra* note 167.
172. *See* S.E.C. v. W.J. Howey, Co., 328 U.S. 293, 298-99 (1946) (setting forth the test for an "investment contract," a common form of security under the Security Act of 1933).
173. Coughlin et al., *supra* note 4, at 33.
174. *See* Bailey, *supra* note 167.
175. *Id.*
176. *See* 17 C.F.R. §§230.504-230.506 (2013) (providing safe harbors for "small" and "private" placements); 15 U.S.C. §77c(a)(11) (2013) (exempting "intrastate" offerings); JOBS Act, H.R. 3606, 112th Cong. §302(a)(6)(A)-(B) (2012) (creating a crowdfunding exemption for which the SEC has blown past congressionally mandated deadlines in failing to promulgate regulations necessary to enact the crowdfunding exemption).
177. *See* Samantha Booth, Here Comes the Sun: How Securities Regulations Cast a Shadow on the Growth of Community Solar in the United States (May 16, 2013) (unpublished Comment) (on file with UCLA School of Law).
178. *See* 17 C.F.R. §§230.505-230.506.
179. *Id.* §230.501(a)(5), (6).

solicitation—which the SEC defines very broadly[180]—requiring investors to have a preexisting relationship in order to qualify for an exemption.[181] Finally, these exemptions impose monetary caps on the amount of money that can be raised,[182] resale restrictions on securities issued,[183] and geographic constraints.[184]

In short, the adoption of a statutory scheme incentivizing community solar development in California would necessarily lead to the issuance of interests in solar energy projects that are classified as security interests under federal law. Perhaps in recognition of this, the last version of California's deceased community solar bill (discussed below in Part III.C.) actually contained a provision that would have explicitly exempted developers selling shares in eligible projects from state securities regulations.[185] Although the future of that particular bill is uncertain, any future community solar legislation in California should exempt community solar developments from state securities regulation in order to avoid frustrating the efforts of developers and investors who must already navigate federal securities complexities.

C. Political

Proposed in 2011, Sen. Lois Wolk's (D-Cal.) SB 843 would have implemented many legal structures necessary for the establishment of a community solar business model in California. In particular, SB 843 would have created a program capacity for two GW of community solar in California,[186] a remarkable first step that would have provided roughly 10% of California's current renewable net short.[187] The bill also would have permitted any ratepayer to participate and receive bill credits, required utilities to administer these bill credits, and compelled utilities to purchase any excess generation directly from developers.[188] By June 2012, the bill had garnered the registered support of 63 entities, including multiple cities, the U.S. Department of Defense, and even San Diego's IOU, SDG&E.[189] In contrast, only three entities, including PG&E and SCE, opposed the bill.[190] Despite this overwhelming support, the bill died in committee on August 31, 2012, without a general Assembly vote,[191] thus leading many to attribute the bill's demise to PG&E's and SCE's control over the committee.[192]

Given the entrenched economic interests discussed above, opposition to the bill was clearly foreseeable. Thus, an understanding of this opposition is helpful in analyzing common obstacles that California confronted—and that other states may encounter in the future—in seeking to pass community solar legislation. Bill opponents primarily expressed concern that the implementation of community solar would shift millions of maintenance costs annually from participating PG&E ratepayers onto nonparticipating ratepayers.[193] Similarly, they argued that allowing participants to offset their electricity bills would result in rate increases for nonparticipating ratepayers, because the IOUs would have to compensate for revenue losses by charging nonparticipating ratepayers more.[194]

However, these cost concerns are arguably overstated for two reasons. First, the demand for IOU electricity should theoretically decrease proportionately to the increase in renewable generation; therefore, IOUs will experience correspondingly lower generation costs, which they can pass on to nonparticipating ratepayers. This rebuttal is strengthened by the fact that much of the energy consumption—and corresponding need for generation—displaced by solar production tends to occur during peak load times, such as on exceptionally hot days when many households run air conditioning. Because the cost of each marginal unit of energy increases as aggregate peak demand rises, distributed solar actually offsets some of the utility's most expensive production by removing the highest margin of demand. Second, community solar bill credits would be equivalent to the residential bill credit system that is already in use in California without detrimental effects on nonparticipants.

Opponents also disparaged the bill's determined locational value method for calculating participants' bill credits, pointing out that it exceeds the absolute lowest cost of energy that would have otherwise been procured.[195] The proposed determined locational value method increases the per-kilowatt price paid to community solar participants by taking into account the cost savings associated with the avoidance of new transmission and distribution

180. The SEC broadly prohibits "(1) [a]ny advertisement, article, notice or other communication published in any newspaper, magazine, or similar media or broadcast over television or radio; and (2) [a]ny seminar or meeting whose attendees have been invited by any general solicitation or general advertising . . . ." 17 C.F.R. §230.502(c).
181. Thomas Lee Hazen, Treatise on the Law of Securities Regulation: The Basic Coverage of the Securities Laws §4.20[3][C] (2013).
182. *See, e.g.*, 17 C.F.R. §§230.504-505.
183. *See, e.g.*, 17 C.F.R. §§230.504-506.
184. Under the intrastate exemption, project organizers must incorporate in the state in which the project is located and can promote, offer, and sell securities only to in-state residents. *See* 15 U.S.C. §77c(a)(11) (2012).
185. S.B. 843, 2011-2012 Reg. Sess. §25019 (b)(5) (Cal. 2012) (as amended in Assemb., Aug. 24, 2012).
186. *Id.* §2834(a)(4)(A).
187. *Cf. supra* notes 24-27 and accompanying text, for a discussion of California's renewable net short.
188. *S.B. 843 Bill Analysis: Hearing Before the Assemb. Comm. on Util. and Commerce*, 2011-2012 Reg. Sess. (Cal. 2012) (bill summary).
189. *See id.* (registered support/opposition).
190. *See id.*
191. *See* Clarke, *supra* note 93; *see also* Jessica Lillian, *Major Community Solar Bill Falls Short in California: What Went Wrong?*, Solar Indus. (Sept. 4, 2012), http://www.solarindustrymag.com/e107_plugins/content/content.php? content.11080 (last visited June 3, 2013) (explaining that, despite a previous agreement, the bill failed to obtain the requisite eight votes in favor in order to move on to a floor vote, instead receiving four favorable votes, three in opposition, and eight abstentions).
192. *See supra* notes 82, 93 and accompanying text.
193. Fong Wang, *Another View: Solar Bill Would Shift Costs to PG&E Customers*, Sacramento Bee (Aug. 30, 2012), http://www.sacbee.com/2012/08/30/4770011/another-view-solar-bill-would.html.
194. Memorandum from Lynn Sadler, Office of Governmental Affairs—Sacramento on SB 843 Community-Based Renewable Energy Self-Generation Program, to the Cal. Pub. Util. Comm'n (July 31, 2012), *available at* http://www.cpuc.ca.gov/NR/rdonlyres/4B2ED87F-6EBF-4DE3-8CEB-25728299550F/0/CPUC01586409v1SB _843_11303_Leg_Memo_8_2_Comm_agenda.pdf [hereinafter Sadler Memorandum].
195. *Id.*

infrastructure, peak load reductions,[196] and other benefits of community solar.[197] Because of the disparities in avoided costs and generation rates in general among electricity providers, however, opponents argue that the determined locational value method would result in an inadministrable system necessitating "almost 40 different generation rates . . . ranging from ~$0.02/kWh [kilowatt hours] to $0.12/kWh."[198] An alternative to the determined locational value method that partially addresses opponents' concerns is proposed and discussed later in this Article.

Finally, opponents claimed that the bill reserved "no discretion for the [California] PUC to terminate the program or reduce the bill credit rate."[199] Quite to the contrary, however, the bill explicitly gave the CPUC the authority to evaluate the program "at any time, either on its own motion or upon motion by an interested party" and to "modify or adopt any rules it determines to be necessary or convenient to ensure that program goals can be met."[200]

While the aforementioned contentions do not exhaust every criticism of SB 843, they encompass its primary critiques and are further addressed in the discussion of solutions in Part IV. Given the entrenchment of financial interests adverse to localized energy generation, the political resistance to community solar is clearly foreseeable. In light of the strong public support for the community model, however, policymakers must be cognizant of and find a way to balance such interests. The reincarnation of SB 843—reintroduced in December 2012 as SB 43—unfortunately falls short of that goal. The new bill lacks even the limited teeth contained in the former.[201] Even if passed, SB 43 would merely document the legislature's "intent" to support community solar in the future.[202]

IV. The Solution: Proposed Legislation for California

In addition to general cognizance of the limitations imposed by federal tax, energy regulation, and securities schemes, successful deployment of community solar will require California to pass legislation to create the requisite foundation for community solar. Although community solar continues to face an uphill battle against special interests, recoiling as proponents have done with SB 43 is a mistake. Giving in to special interests will merely cause California to trail even further behind states like Washington and Colorado that have enacted measures equivalent to—or more aggressive than—those proposed under SB 843.

The following statutory framework presents the best approach to the realization of community solar in California, given the unique social and political characteristics of the state. Most importantly, the legislature must identify a mechanism for valuing the energy produced by community solar projects and for conveying this benefit to community investors. Both the extent and distribution of distributed solar will be largely dictated by the valuation method California adopts. This Article therefore proposes that, first and foremost, an effective community solar bill must contain a provision allowing for the recognition of avoided costs in determining the price paid for energy generated. Avoided costs include funds that utilities would otherwise expend for additional transmission and distribution infrastructure in order to service rising demand in the absence of new distributed solar, which would reduce the demand for energy at the point of consumption. Because of the price limitations imposed by PURPA's ratepayer indifference requirement, the inclusion of avoided costs significantly boosts the financial feasibility and attractiveness of community solar projects.

A second prerequisite to community solar is the expansion of virtual net metering, a mechanism that requires utilities to credit the energy produced by an individual's "solar shares" against that individual's household energy consumption. Without this in place, community investors cannot access the benefits of system ownership. Finally, in light of the funding difficulties that continue to plague solar projects, California should expand access to existing financial incentives to community solar developments, as well as provide equitable financing options to mitigate the federal inequities favoring wealthy investors.

A. *California Should Recognize Avoided Costs Under a Least-Net-Cost Approach*

Because decisions regarding recognition of avoided costs may determine whether a given community solar project is economically viable, the decision regarding if, and the extent to which, avoided costs should influence bill credit calculations will prove most determinative of the future quantity and distribution of California's future community solar supply. As previously discussed, opponents of avoided cost methodology criticized SB 843's determined locational value method of calculating bill credits.[203] However, given the financial obstacles to project profitability discussed in Part IV, including restricted access to tax benefits and Re-MAT's suppression of utility purchase prices, avoided costs are necessary to reflect economic realities, as

196. Because the marginal increases needed to cover peak load is substantially more expensive than the general cost of energy generation, this reduction should translate into comparatively higher payments for energy to community solar participants. *Time of Use Rates Favor Solar PV*, D-BITS (Mar. 29, 2011), http://d-bits.com/tou-rates-favor-pv/ (last visited June 3, 2013).

197. Sadler Memorandum, *supra* note 194.

198. *Id.*

199. *Id.*

200. S.B. 843, *supra* note 185, §2834(a)(4)(B):

> The rules adopted or modified by the commission may include, but are not limited to, rules establishing annual capacity authorization targets, establishment of capacity set asides based upon . . . criteria the commission determines to be reasonable, . . . disclosures to be made to participants and potential participants[,] and other safeguards to ensure the protection of consumers.

201. Chris Clarke, *Round Two For Community Solar Bill at California Legislature*, KCET (Dec. 21, 2012), http://www.kcet.org/news/rewire/government/round-two-for-community-solar-bill.html (last visited June 3, 2013).

202. *Id.*

203. *See supra* notes 192-96 and accompanying text, for opponents' criticisms of the determined locational value method.

well as to encourage community solar proliferation in areas where it is most needed.

In illustration of this conflict, the CPUC has considered the relative advantages of two procurement approaches. The current Re-MAT auction[204] system illustrates the first approach, the least-cost-procurement scenario, which seeks simply to minimize total system costs by awarding projects to developers able to sell energy for the lowest per-kWh price.[205] On the other hand, the least-net-cost-procurement approach favors development of projects with the lowest system cost after taking into consideration the avoided costs that would otherwise be incurred to procure from remote, centralized generation.[206] Because avoided costs vary substantially by substation, the per-kWh price paid to a developer would fluctuate by locality in recognition of the cost savings to a given utility of reducing a particular locality's energy demand.

1. The Case for the Least-Net-Cost Approach

To illustrate, assume that Savvy Developer is considering whether to locate a community solar project in Brownville, a rural, sparsely populated area with plenty of inexpensive real estate available, or Coal County, a metropolitan area with a rapidly rising population. Like many densely populated areas, land in Coal County is expensive and subject to strict and complicated land use controls. Savvy Developer also anticipates that workers command higher wages in Coal County because of the higher cost of living. Crucially, both Brownville and Coal County are within the same utility provider's service region, and Savvy Developer knows he can secure interconnection to the grid at either location. Under a least-cost scenario, Savvy Developer will choose to locate his project in Brownville, where he can minimize total project costs and thus will be able to offer his future community investors a potential return on their investment, for example within 10 years.

Next, further assume that Altruistic Entrepreneur wants to provide Coal County with a community solar project in order to encourage local energy conservation. She also wants to avoid the construction of a new Treehacker Transmission Line, which the Utility has proposed in order to satisfy Coal County's rising local demand. However, Savvy Developer's cost estimates were correct, and Entrepreneur's final project ends up costing 50% more than Savvy Developer's project. As a consequence, Entrepreneur must sell her solar shares for a price that is 50% higher than the cost of Developer's shares.

Unfortunately, pursuant to the state's least-cost approach, both Savvy Developer and Altruistic Entrepreneur receive the same price for the energy produced by their respective systems—10 cents per kW. Therefore, investors in Entrepreneur's project must pay 50% more upfront for their solar shares, but receive the same amount each month as they would have had they invested with Savvy Developer. This also means that investors will have to wait longer before recouping their initial investment, or risk never fully regaining their investment if the payback period exceeds the lifespan of the system. Moreover, because of the siting flexibility provided by community solar, both Savvy Developer and Altruistic Entrepreneur are selling shares in the same market and to the same potential community investors. Although some consumers might be driven by noneconomic motivations, the majority of investors will probably prefer to invest with Savvy Developer. Although evidence suggests that many consumers are willing to accept green pricing, this willingness might be diminished when the choice is between two community solar systems, as opposed to between brown energy and green energy.

From a societal and governmental perspective, the least-cost approach is also problematic because, while the rural Brownville project does confer some societal benefits, development in Brownville does not alleviate any costs associated with new transmission infrastructure. The result is higher net societal costs: Ratepayers continue to pay higher energy prices to fund the new transmission project *and* taxpayers continue to subsidize solar development in general.

Now consider, however, the outcome of these facts under a least-net-cost approach. Assume Coal County has determined that if it can incentivize the construction of 200 MW of new distributed generation capacity each year for the next five years, for a cumulative total of 1,000 MW of distributed solar capacity, it need not build Treehacker Transmission Line. The state estimates the utility's cost savings to be so substantial that the utility will be required to pay 20 cents per kWh produced to the first 1,000 MW of qualified project proposals submitted for development in Coal County within the five-year time frame. Now, both Savvy Developer and Altruistic Entrepreneur will rush to develop in Coal County. With both societal and individual economic incentives aligned, the net societal costs to the state will be lower, since distributed solar development will actually translate into real cost savings. In fact, the state will actually save money, since it will no longer have to pay the utility company's guaranteed profit margin on the proposed transmission project. Additionally, the least-net-cost approach will more effectively reduce net environmental impact, since the development of remote generation infrastructure will be reduced. Finally, the least-net-cost approach will bring community solar to the communities where the need is greatest.

Applying these principals to California, all parties win—at least hypothetically—under the least-net-cost method: The developer receives a higher per-kWh price by

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204. *See supra* notes 128-40 and accompanying test, for a discussion of difficulties community solar investors face in accessing tax benefits due to passive income restrictions; *see also* notes 155-58 and accompanying text, for the shortcomings of California's Re-MAT auction system.

205. Cal. Pub. Util. Comm'n, Technical Potential for Local Distributed Photovoltaic in California 4 (2012), *available at* http://www.cpuc.ca.gov/NR/rdonlyres/8A822C08-A56C-4674-A5D2-099E48B41160/0/LDPVPotential ReportMarch2012.pdf [hereinafter CPUC Technical Potential].

206. *Id.*

investing in currently underdeveloped communities that are characterized as high-avoided cost areas, while the utility simultaneously reduces its aggregate transmission and distribution cost burden, both in terms of new construction and ongoing system maintenance.[207] In 2012, the CPUC estimated that, if the state could actually start realizing proposed transmission and distribution avoided costs in 2012, the least-net-cost method would save the state $65 million annually over the least-cost scenario until 2016, at which point annual savings will begin to decrease as the majority of high-avoided cost areas become developed.[208] This savings estimate *excludes* other less quantifiable societal benefits, such as decreased environmental impact, creation of local employment opportunities, and increased community awareness of energy use.[209] Therefore, the CPUC's estimate understates total societal benefits. In conclusion, the least-net-cost method provides significant advantages over the least-cost method; therefore, California should adopt the least-net-cost method in valuing energy produced from community solar projects.

Even when SB 843 was alive and well, however, the bill provided that the CPUC would not even *commence* consideration of avoided costs in bill credit calculations until the *later of* January 2015 or the state's attainment of 250 MW of cumulative community solar capacity.[210] However, realization of statewide avoided cost savings requires prompt action. In order to at least partially offset the state's anticipated $16 billion in transmission expenditures by 2020, substantial distributed solar must be deployed in high-avoided cost areas as soon as possible in order to assuage the need for new transmission. A delay could cause utility companies to initiate expensive new transmission projects that they will be unlikely to abandon after having invested substantial resources. If these proposed transmission projects come to fruition, the millions in estimated annual savings from 2012 to 2020 will be irretrievably lost.[211] As this Article suggests, California regulatory agencies and California's utility companies have already engaged in significant research regarding the past, present, and future costs of electricity generation and transmission infrastructure. Therefore, California's future community solar scheme should insist that the CPUC utilize this data and require utilities to immediately recognize avoided costs in bill credit calculations for community solar participants.

2. Adopting the Least-Net-Cost Approach in California: The Declining Multiplier Tiers Method

Reliance on least-net-cost methodology should *not*, however, compel the CPUC to conduct a project-by-project evaluation in order to determine each venture's specific avoided cost, as opponents claim SB 843's latest version would have required.[212] Such a system would not only oblige the CPUC to expend monumental financial and personnel resources, but would also burden community participants by requiring expensive and lengthy project review processes[213]; such high transaction costs would stunt, or even altogether thwart, much community solar development. Additionally, a single community solar project is likely insufficient to offset the entire aggregate demand necessitating a new power line. Thus, such a narrow focus could fail to translate into actual avoided costs. To address these concerns, California should determine the value of, for example, two GW of new community solar capacity (as was called for under SB 843)[214] by calculating the total statewide avoided costs that would flow from the resultant reduction in aggregate statewide demand. This calculation would assume that the majority of initial community solar deployment would occur in the highest avoided-cost areas, due to the incentive structure set forth below. The total avoided cost calculation should then be broken down and distributed on a per-kW-installed-capacity basis until the program's total two-GW capacity has been achieved. The state would conduct a similar calculation each time it released additional allowances for community solar capacity under future state programs.

In order to avoid developers constructing new projects in least-cost areas while taking advantage of least-net-cost energy prices, however, the CPUC should assign declining multipliers, or tiers of declining multipliers if necessary, for projects built in certain areas that the CPUC identifies ex ante as high-avoided cost areas. A utility company generally establishes a base price that it will pay for each unit of energy it purchases from a certain category of generation sources. A multiplier is simply a factor by which that base price is multiplied in order to encourage certain characteristics associated with the source of generation. A multiplier is declining if it decreases in value over time; declining multipliers thus reward early development. Tiers of multipliers exist where the utility offers a range of multipliers that correspond to a variety of characteristics. Therefore, an incentive scheme based on tiers of declining multipliers would break down and rank localities, at minimum, as high, medium, or low-avoided cost regions. Such a scheme would then seek to incentivize an influx of development proportionate to each regions' predetermined need by paying community solar projects in target areas higher prices per kWh produced. Incentives would also decline each year to encourage early development.

207. Nonetheless, utilities resist this arrangement as discussed in Part III.B.C.
208. CPUC Technical Potential, *supra* note 205, at 15.
209. *Id.* at 21.
210. S.B. 843, *supra* note 185, §2834(a)(4)(C).
211. *See* CPUC Technical Potential, *supra* note 205 and accompanying text, for a discussion of annual savings created by the least-net-cost method over least-cost procurement.
212. *See* Sadler Memorandum, *supra* note 194.
213. Compare to the LADWP's limited oversight for residential solar projects, which resulted in such a backlog of project proposals that the LADWP had to temporarily suspend its program. *See* Press Release, L.A. Dep't of Water & Power, *infra* note 219.
214. *See* S.B. 843, *supra* note 185. Although, notably, opponents advocate for a reduction of total community solar capacity to only 500 MW under SB 843. *See* Sadler Memorandum, *supra* note 194.

Multipliers have already been successfully used in comparable contexts. For example, in requiring utilities to purchase generation from qualified renewable projects, Washington State mandates a generous base rate, which is adjusted by multiplying it by various factors corresponding to certain project characteristics.[215] For example, a project's base rate is multiplied by 2.4 if its solar modules were manufactured in Washington State, and would qualify for an additional multiplier of 1.2 if its inverters were also manufactured in-state.[216] Moreover, certain Washington communities offer additional per-kW incentives to encourage targeted local development.[217]

The use of declining incentives has also successfully encouraged early interest in targeted development as prospective beneficiaries rush to take advantage of higher, time-sensitive incentives. For example, the Los Angeles Department of Water and Power's (LADWP) "Solar Incentive Program" (SIP) sets forth a 10-step incentive structure in which per-kW subsidies diminish as the program "matures" and "becomes more popular."[218] The overwhelming popularity of the SIP forced the LADWP to temporarily suspend the program from April to September 2011, as customer demand was outpacing the LADWP's ability to grant incentives by three-to-one.[219]

Similarly, implementation of declining multiplier tiers in California would incentivize early development in high-avoided cost areas. Localities representing would-be beneficiaries of proposed new transmission projects are quintessential high-avoided-cost regions. Returning to our hypothetical regions, assume that Brownville and Smog County were poised to become main beneficiaries of the proposed Treehacker Transmission Line, but the implementation of 100 MW of distributed solar in each area would nullify any present need for new transmission projects. Suppose further that rising demand in Coal County will also require a new transmission line to Desert Power Plant or, alternatively, 400 MW of community solar. In order to ensure early development in these areas, the state would allocate a greater proportion of the total anticipated avoided costs at a rate the state projects will be sufficient to stimulate prompt development of 100, 100, and 400 MW of community solar, respectively, distributed proportionately to demand. For example, the state could require utilities in high-avoided-cost areas to pay an additional 30% per kWh, equivalent to a multiplier of 1.3, when calculating bill credits to community members who invest in projects in targeted areas.As long as the disparities in avoided costs are roughly similar among targeted high-avoided-cost localities throughout the state, the state should sacrifice absolute accuracy for administrability and apply a uniform multiplier rate. Where avoided costs per kW are substantially greater for a particular region or regions, the CPUC could implement additional multiplier tiers as necessary, effectively shifting an even greater proportion of aggregate avoided costs to a predetermined capacity of community solar in the highest avoided-cost areas. Returning to our hypothetical facts, if Coal County's projected avoided costs per kW were substantially higher than those for both other regions, the state could assign a declining multiplier of 1.8 to Coal County community solar projects, as one tier, and a declining multiplier of 1.3 to Brownville and Smog County projects. As certain preestablished milestones of aggregate capacity are met for each targeted region, the multiplier available to subsequent projects would be incrementally decreased. Notably, the use of declining multipliers and multiplier tiers to target high-avoided-cost areas would not alter the aggregate incentives paid in recognition of avoided costs, but rather would merely shift the distribution of these incentives.

The ex ante determination of target regions and the establishment of eligibility caps on multiplier benefits are essential to ensuring the fiscal success of the proposed program. Although the precise market response to such incentives would not be entirely predictable, the incentive structure described above would ensure that the actual bill credits paid over the life of the program would roughly equate the aggregate avoided costs of deploying two GW of community solar in California. Moreover, placing a cap on eligibility for multiplier benefits would greatly incentivize early development in areas where community solar would most effectively mitigate demand for expensive and environmentally detrimental transmission lines—all while maintaining a free market. Because of the flexibility of community solar siting, this would also allow nearby communities to invest in targeted areas in order to more rapidly assuage the need for new transmission projects. Notably, this benefit would be slightly limited, in that community investors should not be allowed to purchase an interest in a community solar project outside of their utility company's service area. Administrability considerations require that only one utility company purchase all generation and distribute all bill credits flowing from any single community solar project. Nevertheless, while awareness of time-sensitive multiplier opportunities would drive capital into areas with currently low distributed solar penetration levels, *all* communities would still receive recognition for at least some avoided costs.

Finally, because community solar in the highest avoided-cost areas would proportionally decrease demand for new transmission and distribution infrastructure, the avoided-cost multiplier-tiers method would also fulfill

215. *See Renewable Energy Cost Recovery Incentive Payment Program*, Database of St. Incentives for Renewables & Efficiency (July 31, 2012), http://www.dsireusa.org/incentives/incentive.cfm? Incentive_Code=WA27F (last visited June 3, 2013) [hereinafter *Washington Incentives*].

216. *Id*.

217. *Washington State Solar Power Rebates, Tax Credits, and Incentives*, SolarPowerRocks.com, http://solarpowerrocks.com/washington/ (last visited May 27, 2013).

218. *Program Status and Incentive Levels*, L.A. Dep't of Water & Power, https://www.ladwp.com/ladwp/faces/ladwp/residential/r-gogreen/r-gg-installsolar/r-gg-is-progstusincetlvl?_adf.ctrl-state=ztytgjak1_4&_afrLoop=46103451737000 (last visited May 27, 2013).

219. Press Release, L.A. Dep't of Water & Power, LADWP to Relaunch Solar Incentive Program With Revised Incentive Levels and Streamlined Customer Service (Aug. 2, 2011), *available at* http://www.ladwpnews.com/go/doc/1475/1153343/.

PURPA's ratepayer indifference requirement, and should hypothetically make utilities indifferent as well. Any minor rate increases or decreases that might occur as a result of a uniform avoided-cost metric would be de minimis, especially when distributed amongst thousands or millions of ratepayers, and the reduced administrative expense would benefit taxpayers statewide. Additionally, the predetermined assignment of uniform avoided-cost measures to certain regions would inform utilities of the total avoided costs that they would be required to pay over the entire life of the program.

Opponents contend that a pricing system based on avoided costs would result in wide variation in the rates paid to community solar projects and claim that such variation is "arbitrary."[220] However, this criticism fallaciously ignores the fact that greater avoided costs imposed on certain utilities would accurately approximate the utilities' savings in addition to a portion of the state's overall annual savings. Furthermore, the aforementioned proposals for California avoided-cost calculations would result in considerably less price variation[221] than currently occurs under Washington's multiplier-incentive scheme, under which prices paid to distributed renewable energy projects range from $0.12 to $0.54 per kWh.[222] In fact, requiring bill credits to reflect the administering utility's actual costs and rates is quite the opposite of "arbitrary." On the contrary, the inclusion of avoided-cost calculations furthers the goal of ratepayer indifference by ensuring that nonparticipating ratepayers pay the same rates they would otherwise pay in the absence of community solar's cost-mitigating benefits.

Another likely criticism of this Article's declining avoided-cost multiplier-tiers proposal is that such a system would impose disparate purchasing requirements on each utility, in terms of both the price paid per kWh and the quantity of energy to be purchased. The utilities may cite fairness concerns if a greater portion of the highest avoided-cost areas fall within one or a few utilities' jurisdictions. However, this criticism is misguided, because California's numerous utility companies already charge their respective customers different rates and contract for various pricing options when purchasing electricity from myriad generators.

In conclusion, the California Legislature's adoption of a least-net-cost payment scheme for energy produced by community solar projects would confer numerous additional benefits over its current least-cost approach. The recognition of aggregate avoided costs would allow community solar bill credits to more accurately reflect economic reality. Such recognition would also help to level the financial playing field between community solar projects and industrial-scale generation. By distributing aggregate avoided costs amongst several multiplier tiers, California could incentivize early development in the areas with the greatest energy demand, while simultaneously translating such growth into real cost-savings for the state. Finally, the use of declining multipliers would encourage early development as projects compete to secure the highest possible financial incentives.

B. *Purchase Mechanisms: Virtual Net Metering and Alternative Arrangements*

The previous discussion of pricing for community solar energy generation presupposes expansion of California's virtual net metering (VNM) program, under which multiple customers can receive individual bill credits for shared generation.[223] Without VNM, a customer investing in off-site community solar would recognize separate revenue from the project's energy sales while still paying his or her energy bill in full. While the last version of SB 843 implicitly confirmed the use of VNM by requiring utilities to issue bill credits for the energy produced,[224] it also required project administrators to allocate ratepayer ownership interests in terms of kWh.[225] KWh, a measurement of system output, will fluctuate monthly as well as decline over the life of the system. Therefore, a community solar developer must inform the utility company of each investor's predetermined ownership interest on the basis of a metric that cannot be precisely forecasted and which will vary from month-to-month. In short, kWh are an imprecise indicator of system ownership. Because SB 843's language would produce an illogical system based on conjecture, the California Legislature's future community solar bill should call for ownership interests to be allocated on the basis of ratepayer's percentage interest in the project.[226] The number of kWh credited against each ratepayer's bill would fluctuate monthly in direct proportion to the ratepayer's percentage ownership and the project's output. A utility could easily determine the number of kWh allocable to each community solar participant by dividing the total system output by each party's predetermined percentage interest.

Because utilities offer a ready market and thus decrease transaction costs, VNM will likely be the primary vehicle through which community solar investors experience the benefits of system ownership. Nonetheless, power purchase agreements (PPAs) represent an alternative avenue by which to pursue community solar in California. A PPA is a private, contractual arrangement under which a "third-party developer owns, operates, and maintains the PV system, and a host customer agrees to site the system on its roof or elsewhere on its property and purchases the system's electric output from the solar services provider for a pre-

220. Sadler Memorandum, *supra* note 194.
221. *Id.* (claiming that SB 843 would have resulted in generation rates ranging from $0.02 to $0.12).
222. *Washington Incentives*, *supra* note 215.
223. Database of St. Incentives for Renewables & Efficiency, *Net Metering* (Oct. 10, 2012), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=CA02R (last visited June 3, 2013) [hereinafter *DSIRE Net Metering*].
224. S.B. 843 §(1), *supra* note 185.
225. *Id.* §2834(c)(4).
226. *Id.*

determined period."[227] Multiple companies, such as Solar City, SunRun, and Heliomu, already operate in California and offer PPAs to residential and commercial customers.[228] Moreover, a few states have successfully encouraged PPA arrangements between community members and a private purchaser, such as a school or church.[229] By cutting out the middle man, a PPA arrangement is potentially financially advantageous to both parties. Moreover, net energy metering—which allows the electricity purchaser under a PPA to sell any excess generation back to the grid or carry it forward to future billing cycles[230]—is readily accessible, having been available in California since 1995.[231] However, before community members can execute PPA arrangements, the California Legislature must guarantee that community solar projects will be exempted from regulation as a public utility, as would have occurred with the passage of SB 843.[232] In summary, in order to diversify opportunities for community solar growth, California should pass legislation allowing community solar developers to contract with other private parties through PPA arrangements or with utility companies under VNM.

C. Proposed State Financial Incentives

As discussed in Part III.A., the federal government's heavy reliance on tax policy to subsidize renewable energy gives rise to equity concerns since these benefits tend to be most valuable to, and most accessible by, wealthy investors. However, in contemplation of community solar's goal of expanding solar ownership opportunities to currently excluded populations, California could choose to mitigate these inequities by supplementing federal incentives with state subsidies that benefit all participants. For example, California could exclude all solar system materials and equipment from sales tax. Unlike depreciation, which requires the recipient to possess substantial tax appetite in order to maximize its benefit, all community solar investors would enjoy equivalent financial benefits from such an exemption. Alternatively, like Washington, California could use sales tax benefits to encourage in-state manufacturing and job growth[233] by extending this tax subsidy only to those projects that purchase panels and inverters manufactured in California. The state could also incentivize community solar development by offering low-cost lease arrangements for community solar development on government property, such as above public parking lots or on government-owned land that is already somehow disturbed.

The state could also extend eligibility for its cash rebate system, the California Solar Initiative (CSI), to community solar projects. The CSI program is currently available for traditional residential and commercial projects.[234] From 2007 to 2016, the CSI will expend $2.167 billion in cash rebates to customers within PG&E's, SCE's, and SDG&E's service territories in pursuit of CSI's goal of installing just under two GW of new residential and commercial solar capacity.[235] Customers are paid based on actual system generation or expected generation and receive a fixed amount per kWh.[236] This framework translates fluidly to the community solar context and could be implemented with ease upon location of funding.

Finally, the state could provide a state income tax credit to community solar investors. However, this supplementation would be sub-optimal. Although tax credits pose considerably less equity concerns than depreciation incentives, they nonetheless perpetuate the potential for inequity with regards to those individuals with insufficient tax liability. In sum, whether in the form of direct spending, tax cuts, or development opportunities, California possesses numerous tools to incentivize community solar within federally imposed limitations.

V. Conclusion

Despite monumental market potential, California has failed to enact the legislation necessary to reap the myriad benefits associated with community solar. Community solar presents California with the opportunity to expand solar PV ownership to an additional 75% of ratepayers while taking advantage of rapidly declining PV pricing. At the same time, the state possesses sufficient readily available rooftop space to meet California's renewable net short through reliance on community solar alone. Moreover, effective policies facilitating community solar growth would confer myriad benefits over the states' current programs. As compared to residential solar, community solar

227. U.S. Envtl. Protection Agency, *Solar Power Purchase Agreements* (Oct. 16, 2012), http://www.epa.gov/greenpower/buygp/solarpower.htm (last visited June 3, 2013).
228. *See* Tor, *Solar Info: List of Solar Lease and Solar PPAs*, SolarRocks.com (May 18, 2009), http://solarpowerrocks.com/affordable-solar/solar-info-list-of-solar-lease-and/ (last visited June 3, 2013).
229. *See*, *e.g.*, Farrell, *supra* note 33, at 9 (explaining how Maryland's University Park Solar successfully executed a power-purchase agreement with a local church to install an on-site community-owned PV system from which the church agreed to purchase electricity directly for a fixed per kWh rate); *see also* Maks Goldenshteyn, *State's Largest Community Solar Project Goes Online in March in Poulsbo*, Kitsap Sun (Feb. 7, 2011), http://www.kitsapsun.com/news/2011/feb/07/states-largest-community-solar-project-goes-in/ (last visited June 3, 2013) (describing a financing arrangement in Washington State in which 16 community solar investors have executed a power-purchase agreement with a local middle school, under which the school will buy electricity generated by the panels to be installed on the school's roof).
230. GO Solar CALIFORNIA, *See Net Energy Metering in California*, http://www.gosolarcalifornia.ca.gov/solar_basics/net_metering.php (last visited May 27, 2013).
231. *See DSIRE Net Metering*, *supra* note 223.
232. *See* S.B. 843, *supra* note 185, §216(j) (proposing an amendment to Public Utility Code §216 to the effect that "[a] corporation or person engaged directly or indirectly in developing, producing, delivering, participating in, or selling interests in a community renewable energy facility . . . is not a public utility within the meaning of this section solely by reason of engaging in those activities").
233. The state of Washington has used other financial benefits to encourage local sourcing of solar equipment and materials. *See supra* notes 213-14 and accompanying text.
234. GO Solar CALIFORNIA, *About the California Solar Initiative (CSI)*, http://www.gosolarcalifornia.ca.gov/about/csi.php (last visited May 27, 2013).
235. *Id.*
236. *Id.*

offers a lower cost of entry, lower per-unit installation costs, superior siting flexibility, increased system reliability, reduced maintenance burdens, and other social benefits. Community solar likewise confers benefits over industrial-scale systems in the form of lower transmission costs, lower environmental externalities, superior potential for rapid deployment, and greater energy security.

On the other hand, the U.S. tax-centric incentive structure, securities laws, and PURPA's ratepayer indifference requirement present formidable challenges for the fledgling community solar industry to overcome. In addition to this complex federal minefield, California has erected additional legal and financial barriers to the realization of community solar: namely, the state's institutional preference for the legacy model, the fact the state has vested substantial power in the hands of three for-profit IOUs, and California's Re-MAT pricing mechanism that generates artificially low renewable energy pricing.

To rectify its failure, California should adopt three primary policy changes in order to encourage proliferation of the SPE LLC model. First, California should require utility companies to recognize avoided costs as soon as possible in calculating bill credits paid to community investors under an aggregate avoided-cost multiplier scheme with a declining incentive structure. Second, California should ensure that community solar developers have easy access to market opportunities in which they can sell the benefits of renewable generation. Such market mechanisms should include VNM and power-purchase agreement options. Interrelated provisions include explicit exemptions for community solar projects from state securities regulations and from special regulation as a utility. Third, any supplementary state financial incentives should foster horizontal equity by providing comparable governmental support to ratepayer-investors who acquire similar interests. Thus, California should adopt sales tax exemptions or expand cash payments to community solar under the CSI, as opposed to income tax incentives.

California already lags behind other states that have recognized the crucial role community solar will play in America's energy future. Although the sun has temporarily set on SB 843, California can nonetheless resume its position as a national leader of renewable generation in the next congressional session by making access to solar energy a reality for all.