All in the Community: Using Community Solar Gardens to Bring the Benefits of Renewable Energy to Low-Income Communities

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ABSTRACT

The goal of this Note is to analyze a possible solution to make distributed generation ("DG") solar energy more affordable and available to low-income customers. The growth of renewable energy, in the form of DG solar, in the United States can be attributed to the benefits that DG solar has on mitigating the effects of climate change and helping to reduce customers' reliance on traditional utility energy, thereby reducing the costs of their energy bills. The growth of DG solar in the United States can also be attributed to the declining costs of installing DG solar coupled with federal and state policies that promote the use of renewable energy.

Net-metering is a state policy that encourages the use of DG solar. Specifically, net-metering is a policy that allows DG solar customers to buy electricity from utility companies when needed and to sell any excess electricity from their DG solar back to the grid. However, because of the utility company's duty to serve, net-metering creates stranded costs as a result of the change in demand for traditional utility energy. To try and recoup these stranded costs, utility companies must seek to increase their rates, causing the bills paid by traditional utility customers to increase and in effect subsidize the DG solar customers.

The cost shifts of net-metering have a disproportionate impact on low-income customers because low-income customers face several barriers in trying to switch to DG solar, making DG solar inaccessible to them. The two main barriers facing low-income customers when trying to switch to DG solar are the costs of installing DG solar and that many low-income customers live in multi-family apartments where they are renters. Renting an apartment means that low-income customers do not have control over the roofs of their buildings. So, even if they had the financial ability to switch to DG solar, they do not have the physical capacity to make the switch.

This Note analyzes the possible solutions to provide low-income customers with the ability to switch to DG solar. Many of the available solutions only

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reduce the costs of low-income customers' energy bills but do not reduce their reliance on traditional utility energy nor provide them with the ability to switch to DG solar. Therefore, the best solution is to have utility-financed community solar gardens because this not only reduces the costs of low-income consumers' energy bills but reduces their reliance on utility energy, thus helping to mitigate the effects of climate change.

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INTRODUCTION

Until recently, solar energy was always considered too expensive to be a viable method for combating climate change. However, recent price decreases in the cost of installing solar energy has led to an increase in its popularity.[1] This price

1. BENTHAM PAULOS, SUSTAINABLE SOLAR EDUCATION PROJECT, BRINGING THE BENEFITS OF SOLAR ENERGY TO LOW-INCOME CONSUMERS 5 (May 2017) [hereinafter BRINGING THE BENEFITS].

reduction in the costs of installing solar energy, although increasing the popularity of solar energy in wealthy communities, has still not provided low-income communities much access to solar energy.[2] Providing access to solar energy to low-income communities will not only help the communities combat climate change by reducing their reliance on fossil fuels, but also will help them save on their utility bills and allow them to spend money on other necessities. Although the financial costs of solar installation are a major barrier precluding low-income communities from participating in solar energy, there are other barriers that are unique to low-income customers that further prevent their access to solar installation.[3] Further, being denied the opportunity to participate in the solar phenomenon has created a financial burden on low-income customers because of cost-shifting.[4]

This Note analyzes the best way to provide low-income communities access to solar energy by overcoming the obstacles in their path. Part I of this Note provides an overview of the benefits of using solar energy and the growth of solar energy in the United States. Part II presents the problem that the growth of solar energy has created for low-income customers through the use of net-metering, which has resulted in cost-shifting from solar energy customers to traditional utility customers. Part III analyzes the unique barriers that low-income customers face when trying to gain access to solar energy. Finally, Part IV provides some solutions at the federal and state level to provide low-income communities access to solar energy and discusses the problems with each option. Ultimately, this Note will recommend community solar gardens owned by the utility companies as the preferred method to provide low-income customers with access to solar energy, which will reduce their energy costs and reduce the harmful effects of climate change.

I. BACKGROUND

The effects of climate change will impact the lives of all people living in the United States, but these effects will not impact every person equally. Low-income communities, often referred to as environmental justice communities, have fewer resources available to try and adapt to the effects of climate change.[5] Numerous studies have demonstrated that low-income communities, often

2. Bentham Paulos, *6 Recommendations for Bringing Solar Power to Low-Income Households*, FUTURESTRUCTURE (July 18, 2017), http://www.govtech.com/fs/perspectives/6-Recommendations-for-Bringing-Solar-Power-to-Low-Income-Households.html [hereinafter *6 Recommendations*]; *30+ Facts and Resources for Low Income Solar Power*, SOLAR RES. GUIDE, https://bill-solar.squarespace.com/30-facts-and-resources-for-low-income-solar-power/ (last visited Jan. 20, 2019).

3. *6 Recommendations*, *supra* note 2.

4. Adrienne L. Thompson, *Protecting Low-Income Ratepayers as the Electricity System Evolves*, 37 ENERGY L.J. 265, 282 (2016).

5. Deborah Behles, *From Dirty to Green: Increasing Energy Efficiency and Renewable Energy in Environmental Justice Communities*, 58 VILL. L. REV. 25, 25 (2013).

located in urban areas, bear more of the cumulative burden of pollution as opposed to wealthier communities.[6] The cumulative burden of pollution has a stronger effect on low-income communities because fossil-fuel-burning plants that emit greenhouse gases and other harmful air pollutants are disproportionally located next to these communities.[7] The deterioration of air quality from being located next to these greenhouse gas emitting factories can lead to adverse respiratory health effects.[8] Because of the deterioration in air quality, several studies have demonstrated that low-income communities experience higher incidences of respiratory health problems than wealthier communities.[9]

Renewable energy is widely recognized as one of the most promising alternatives for reducing fossil fuel consumption and mitigating the effects of climate change.[10] Using renewable energy avoids the harmful effects of fossil fuels and will displace the sources of pollution that negatively and disproportionally impact low-income communities.[11] One type of renewable energy—solar energy—is expected to play a substantial role in reducing greenhouse gas emissions.[12] One study asserts that solar energy could provide as much as a seventh of the emissions reductions required globally to prevent the worst impacts of climate change.[13]

Switching to renewable energy sources, like solar energy, can mitigate the harmful effects of climate change. The following sections provides some background on (A) the benefits associated with solar energy and (B) the growth of solar energy in the United States.

A. THE BENEFITS OF DISTRIBUTED GENERATION SOLAR ENERGY

Scientists have determined that significant reductions of greenhouse gases are necessary to avoid the harmful impacts of climate change.[14] Federal and state governments have been evaluating different options to reduce greenhouse gases, and, recently, their focus has been on the electric industry.[15] The electric industry provides electricity to their customers by burning fossil fuels. This is a problem because research shows that approximately 40% of carbon dioxide emissions in

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6. *Id*. at 40–41; *see* BRINGING THE BENEFITS, *supra* note 1, at 9 (citing NAACP, COAL BLOODED: PUTTING PROFITS BEFORE PEOPLE (2012)).

7. Behles, *supra* note 5, at 41–42.

8. *Id*.

9. *Id*. (citing studies that found children living in low-income communities have a higher risk of acquiring asthma than children living in higher-income communities).

10. Uma Outka, *Environmental Justice Issues in Sustainable Development: Environmental Justice in the Renewable Energy Transition*, 19 J. ENVTL. & SUSTAINABILITY L. 60, 62 (2012).

11. *Id*. at 70.

12. Jackson Salovaara, *Just and Reasonable Rooftop Solar: A Proposal for Net Metering Reform*, 7 ARIZ. J. ENVTL. L. & POL'Y 56, 59 (2017).

13. *Id*.

14. Behles, *supra* note 5, at 38.

15. *Id*. at 39.

the United States are created from burning fossil fuels.[16] To reduce the levels of greenhouse gases produced by the electric industry, federal and state governments have focused on using renewable energy to reduce customers' reliance on electric utility companies, ultimately reducing the amount of fossil fuels burned by those utility companies.[17] One study asserts that solar energy could provide as much as a seventh of the emissions reductions required globally to prevent the worst impacts of climate change.[18] Solar energy can take the form of distributed generation ("DG") solar and utility scale solar.[19] This Note will focus primarily on the use of DG solar energy as an alternative to traditional utility energy.

DG is defined as small-scale electricity generation resources located near load requirements.[20] DG can also refer to community-scale renewable energy projects that serve neighborhoods via a microgrid which may or may not be connected to the large utility grid.[21] Solar energy is the most common form of DG because it can be easily placed on the roofs of buildings.[22] DG solar energy is produced by photovoltaic ("PV") cells, known as solar panels, which can be placed on rooftops or mounted on the ground.[23] DG solar accounts for one-third of installed solar capacity (complementing utility-scale solar) and is one of the fastest growing segments.[24]

The switch to renewable energy in the form of DG solar can have other beneficial impacts aside from reducing climate change, such as operational and productivity benefits. DG solar can provide benefits for the resiliency of the grid by providing a more diversified portfolio of energy sources than schemes that rely exclusively on electricity produced by large power plants.[25] DG systems in general have beneficial effects on land use because they reduce the need for rights-of-way for electric transmission and distribution.[26] Further, because DG solar is primarily generated and consumed on the same property, this reduces congestion of transmission and distribution lines.[27] According to a study by the Federal Energy Regulatory Commission, the reduction in congestion of the transmission lines creates benefits at the local level, such as allowing utilities to make capital investments in transmission and distribution, creating opportunities to provide

16. *Id*.
17. *Id*. at 40.
18. *Id*. at 38.
19. *Id*.
20. *Id*. at 34.
21. Outka, *supra* note 10, at 118–19; Richard L. Revesz & Burcin Unel, *Managing the Future of the Electricity Grid: Distributed Generation and Net Metering*, 41 HARV. ENVTL. L. REV. 43, 45 (2017).
22. Behles, *supra* note 5, at 34.
23. Revesz & Unel, *supra* note 21, at 44.
24. Salovaara, *supra* note 12.
25. Revesz & Unel, *supra* note 21, at 45.
26. Megan McLean, *Throwing Shade: The Case Against Judicial Interference with Solar Net Metering Policies*, 46 ENVTL. L. REP. NEWS & ANALYSIS 10873, 10875 (2016).
27. *Id*.

reactive power and voltage support, and improving power quality and reliability.[28] Because the transmission system operated today is outdated, it is prone to blackouts and shortages, especially during peak demand.[29] The peak demand period is typically in the afternoon, and the demand can be so high that transmission lines may lack adequate capacity to handle it, forcing grid managers to curtail electricity deliveries to certain sources.[30] Because DG solar gets most of its energy during mid-day when the sun is at its height, this reduces peak demand, which in turn decreases transmission line congestion, increases efficiency, and prevents the need for curtailment.[31]

The final benefit of switching to DG solar, unlike the benefits previously mentioned, directly effects the individual consumer in the form of utility bill savings. Electricity provided by DG solar systems gives consumers more control over their utility bill.[32] Consumers can choose to carry out energy intensive activities during periods when their solar panels are the most productive, thus reducing their reliance on electricity produced by their local utility and lowering their bill.[33]

B. THE GROWTH OF DISTRIBUTED GENERATION SOLAR ENERGY

The growth of DG solar can be attributed to the decrease in the price of installing DG solar. This price reduction results from state and federal policies along with advances in technology. Overall, DG solar installation costs have dropped 63% since 2011, 18% between 2015 and 2016, and 70% from 2009.[34] As a result of these price decreases, DG solar has been growing in the United States at over 50% per year from 2011 to 2016.[35] In 2015, "solar accounted for 29.4% of new electric generating capacity installed in the U.S.," and in the first quarter of 2016, it accounted for 64%.[36] In 2016, the one-millionth rooftop solar array was installed in the United States, completing the "Million Rooftop Initiative" which was announced by the federal government in 1997.[37] The two-millionth rooftop solar array is predicted to be installed by 2018.[38]

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28. *Id*.

29. Ryann White, *Three Steps to a Greener Tomorrow: Encouraging Solar Energy Development in the Sunshine State*, 31 J. LAND USE & ENVTL. L. 263, 268 (2016).

30. *Id*.

31. *Id*. at 268–69.

32. *Id*. at 269.

33. *Id*.

34. Mark James, Ashleigh H. Krick, & Kelsey R. Bain, *Planning for the Sun to Come Up: How Nevada and California Explain the Future of Net Metering*, 8 SAN DIEGO J. CLIMATE & ENERGY L. 1, 4 (2017).

35. BRINGING THE BENEFITS, *supra* note 1, at 9.

36. Shannon Elizabeth Bell, *Environmental Injustice and the Pursuit of a Post-Carbon World: The Unintended Consequences of the Clean Air Act as a Cautionary Tale for Solar Energy Development*, 82 BROOK. L. REV. 529, 551–52 (2017).

37. James, Krick, & Bain, *supra* note 34, at 4–5.

38. *Id*. at 5.

Aside from the decreasing cost of DG solar, federal and state policies promoting the use of renewable energy also have contributed to the growth of DG solar. The federal Energy Policy Act of 2005 ("EPACT") requires state regulatory commissions and electric utilities to consider making net-metering services available to retail electricity customers upon request.[39] As a result, forty-four states and the District of Columbia now have some form of net-metering policy.[40]

A second policy driver of DG solar has been state polices concerning renewable portfolio standards ("RPS"). RPS require or encourage load serving entities and utilities to source a certain amount of their electricity from renewable sources.[41] By 2015, twenty-nine states and the District of Columbia had RPS programs, and eight additional states had a non-binding renewable portfolio goal.[42] However, these policies and the growth of DG solar have had some un-intended consequences for low-income customers.

II. UTILITY REGULATION AND THE GROWTH OF DISTRIBUTED GENERATION SOLAR ENERGY HAVE RESULTED IN THE STRANDED COSTS OF NET-METERING

The switch to DG solar promoted by the federal and state policies previously mentioned has caused some harmful effects to low-income customers, especially through the use of net-metering policies. The following sections provide some (A) background on the utility industry in the United States and (B) uses this background to explain the issues caused by net-metering.

A. FEATURES OF REGULATED UTILITIES

There are some fundamental features of utility regulation that are important to understanding the utility's role—in this case the electric utility—in the switch to renewable energy. The energy market of the United States was built on the principles of monopolism, meaning that vertically integrated utility companies controlled all stages of energy production: generation, transmission, and distribution.[43] In exchange for this control, the electric companies were subject to extensive regulation turning them into highly regulated public utility companies.[44] To understand this development, the next two sections focus on (1) the history of this regulation and (2) how it imposed several important duties on the electric utilities: the duty to serve, the duty of non-discrimination, and the ability to pay principle.

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39. Steven Ferrey, *Net Legal Power*, 53 SAN DIEGO L. REV. 221, 230 (2016).
40. *Id.*
41. Revesz & Unel, *supra* note 21, at 57.
42. *Id.*
43. Christina Alam, *It's Not Always Sunny in Philadelphia: The Problem with the Pennsylvania Solar Initiatives*, 16 U. PITT. J. TECH. L. & POL'Y 208, 210 (2016).
44. *Id.*

1. A Brief History of Utility Regulation

The Public Utility Regulatory Policies Act ("PURPA"), which is part of the National Energy Act of 1978, required electric utilities to procure a portion of their electricity from "qualified facilities," which were basically small generation sources of alternative energy.[45] The Federal Energy Regulatory Commission ("FERC") was put in charge of PURPA implementation, and FERC promulgated regulations setting a minimum price for the energy procurement from such generation sources.[46] Under these rules, electric utilities had to buy energy at the price charged to the utilities' own customers, which was a significant step toward encouraging the use of renewable energy.[47]

In the 1990s, because of the Energy Policy Act of 1992 and FERC Order No. 888, the vertically integrated monopolies were unbundled, meaning that there were separate charges for generation, transmission, and distribution, creating competition in the wholesale transmission market.[48] However, the federal government only has power to regulate the wholesale and not the retail sale of electric service under PURPA. This ended up not being an issue because the state legislatures and utility commissions followed suit and introduced competition into the retail market.[49] Under this new regime, customers were allowed to choose the type of generation source they wanted, opening the door to renewable energy use.[50]

2. Duties Imposed on a Regulated Utility Company

The duty to serve is an obligation on the utility to provide service to any member of the public in the utility's service area who has applied and is willing to pay for service, including both profitable and unprofitable customers.[51]

Along with this duty to serve is the duty of non-discrimination. This duty requires that a utility provide service without undue discrimination, meaning "to [the] extent of its capacity, serve all who apply, on equal terms, as far as they are in [the] same class and similarly situated."[52] Low-income customers have been given rate discounts by utility companies, but these discounts have withstood the common law duty because the discrimination is not undue.[53] Finally, the ability to pay principle states that, because electricity is a necessity, it should not be

45. *Id*. at 211.
46. *Id*.
47. *Id*.
48. *Id*. at 211–12.
49. *See id*. at 212.
50. *Id*.
51. Thompson, *supra* note 4, at 274.
52. *Id*. at 275 (citations omitted).
53. *Id*.

denied to low-income customers purely because they cannot pay the full cost of the service.[54]

B. THE UNINTENDED EFFECTS OF NET-METERING

Net-metering is a policy governing how utility customers are compensated for the electricity they provide to the grid.[55] Net-metering regulations allow DG solar customers to buy electricity from utility companies when needed and to sell any excess electricity from their DG solar to the grid.[56] At the end of the billing period, customers only pay for the net amount of electricity used, meaning their consumption minus their generation.[57] Although net-metering is helpful to those who can afford it, net-metering also has the negative effects of (1) stranded costs and (2) cost-shifting.

1. Stranded Costs

The problem with net-metering and why utility companies oppose these policies is stranded costs.[58] Stranded costs are prudent investments that are unrecoverable because of changes in regulatory policy, technology, or demand.[59] Utilities point to three main types of stranded costs in the net-metering context: "(1) obligations incurred to carry or abandon redundant or obsolete energy generation plants; (2) added transition expenditures not recoverable under net metering policies; and (3) contractual obligations to purchase electricity from DG customers at above market prices."[60]

2. Cost-Shifting

Cost-shifting refers to cross-subsidization of DG solar users. Cost-shifting features prominently in the fairness argument, which is one other common argument made by utility companies concerning the use of net-metering. Utilities argue that net-metering allows DG solar customers to free-ride off of other customers who do not have PV solar panels because they are allowed to make use of the electric grid as a back-up power source without paying their "fair share" of the costs of building and maintaining it.[61] This effectively creates a cross-subsidization for DG solar users.[62] When a utility customer enrolls in DG solar, the quantity of grid-sourced electricity that they consume shrinks to a fraction of their former

54. *Id*. at 276.
55. Salovaara, *supra* note 12, at 63.
56. *Id*.
57. *Id*.
58. McLean, *supra* note 26, at 10874.
59. *Id*.
60. *Id*.
61. Troy A. Rule, *Solar Energy, Utilities, and Fairness*, 6 SAN DIEGO J. CLIMATE & ENERGY L. 115, 129 (2015).
62. *Id*. at 131.

amount, causing utilities to seek increases in their rates to maintain the same basic grid infrastructure while selling less power.[63] This causes the bills paid by traditional utility customers to increase, thus subsidizing the DG solar costumers.[64]

Because of the many barriers that prevent low-income customers from participating in DG solar, these customers have no choice but to pay the higher utility rates, creating wealth transfers from low-income customers who cannot obtain DG solar to high-income customers who have access to DG solar.[65] The concerns of cost-shifting come from two sources: DG solar customers take service under usage-based rates, and they receive retail rate reimbursements for the excess energy they export back to the grid.[66] Usage-based rates combine infrastructure costs with energy costs, but DG solar costumers can avoid these infrastructure costs.[67] The California Public Utility Commission conducted an expansive study of the economic impacts of net-metering and found that, by 2020, this policy will cost California's traditional utility customers $1.1 billion.[68] If DG solar remains out of reach for low-income customers, then they will be less able to manage spikes in their loads that occur during periods of high demand, causing increased bill volatility and higher prices.[69]

Many state utility commissions have been trying to change their net-metering policies to avoid their unintended effects.[70] However, reforming net-metering is not the subject of this Note because simply reforming the policies does not cure the problem of reducing the barriers faced by low-income customers trying to gain access to DG solar.

III. LOW-INCOME CUSTOMERS FACE NUMEROUS BARRIERS WHEN TRYING TO SWITCH TO DISTRIBUTED GENERATION SOLAR ENERGY

The effects of climate change tend to have a disproportionate effect on low-income communities; low-income customers feel the economic effects not only from net-metering, as described in Section II.B, but from regular energy bills as well. Low-income customers pay a much higher portion of their income for energy than middle and high-income customers.[71]

In a recent study of the 48 largest U.S. cities, the American Council for an Energy Efficient Economy ("ACEEE") found that households with income below

63. *Id.* at 130.
64. *Id.*
65. *Id.* at 135.
66. John V. Barraco, *Distributed Energy and Net Metering: Adopting Rules to Promote a Bright Future*, 29 J. LAND USE & ENVTL. L. 365, 380 (2014).
67. *Id.*
68. *Id.* at 381.
69. Shelley Welton, *Clean Electrification*, 88 U. COLO. L. REV. 571, 600 (2017).
70. Revesz & Unel, *supra* note 21, at 64.
71. BRINGING THE BENEFITS, *supra* note 1, at 1.

80% of the median income in that area experienced higher energy burdens than the average household in the city.[72] The median energy burden across all of the cities in the study was 3.5%, while the median low-income household's energy burden was more than twice as high, at 7.2%.[73] The federal Energy Information Administration found that, depending on the state, the energy burden on middle to high income ratepayers is 1–5%, whereas low-income customers face burdens from 6–30% or more.[74] Studies have further shown that energy bills can be up to 30% of a low-income family's monthly income, and low-income households are estimated to represent over 95% of those households that are considered to have a high energy burden.[75] These studies, along with the effects of net-metering, demonstrate that those who would benefit the most from a reduction in energy bills are the ones who are denied access to DG solar.[76]

Although cost is a major factor that prohibits low-income customers from participating in DG solar, there are several other barriers that foreclose this option to these customers. Low-income customers do not have enough savings to pay cash or down payments for solar energy systems.[77] Further, many low-income customers do not have enough income tax to take full advantage of federal tax credits for solar power.[78] Low-income customers also cannot take advantage of third-party leasing of solar energy systems because they may have insufficient lending activity to generate a credit score, which automatically bars them from solar offerings.[79] Finally, low-income customers may lack home ownership, and many of them live in multifamily housing as renters with no control over their roof space.[80]

IV. COMMUNITY SOLAR IS A BETTER SOLUTION TO PROVIDE LOW-INCOME CUSTOMERS WITH THE OPPORTUNITY TO SWITCH TO DISTRIBUTED GENERATION SOLAR ENERGY THAN TRADITIONAL FINANCE SOLUTIONS

The traditional focus on lowering the energy costs of low-income customers was to provide subsidies and rate decreases from utilities and commissions. Some states have tried to implement these same methods to reduce the stranded cost problem and to reduce the cross-subsidization issue. However, the focus should not be on just alleviating the cost-shifts because then low-income individuals will still bear the health risks of climate change, instead of just the economic burdens

72. *Id*. at 9.
73. *Id*.
74. Thompson, *supra* note 4, at 269.
75. Behles, *supra* note 5, at 43–44.
76. Welton, *supra* note 69, at 632–33.
77. BRINGING THE BENEFITS, *supra* note 1, at 11.
78. *Id*.
79. *Id*.
80. *Solar for All: What Utilities Can Do Right Now to Bring Solar Within Reach for Everyday Folks*, S. ENVTL. L. CTR. 1 (2017), https://www.southernenvironment.org/uploads/words_docs/SolarForAll_InlineDoc_061716_Final.pdf [hereinafter *Solar for All*].

imposed by wealthier individuals switching to DG solar. Instead, the focus should be on providing low-income customers with the ability to participate in the DG solar movement and give them access to DG solar. Not only will this help combat the issues associated with climate change, but this also will reduce the energy needs of these customers. Increasing access to DG solar to low-income customers will require participation from policy makers, regulators, agencies, and utilities from both the federal and state levels.

The following sections (A) outline possible financial solutions to bring DG solar to low-income customers along with the flaws of each solution, (B) recommend as the best solution a community solar garden system, and (C) recommend that the system be owned and funded by the electric utility companies.

A. TRADITIONAL FINANCE SOLUTIONS AND WHY THEY ARE INSUFFICIENT

Traditionally, financial solutions in the form of (1) government assistance programs and (2) third-party ownership models have been the main method used to solve the problem of providing low-income customers access to DG solar.

1. Government Assistance Programs

One solution to help reduce the cross-subsidization effects of net-metering is to continue to offer utility discounts to low-income customers along with federal and state subsidies. Federal programs such as the Low-Income Home Energy Assistance Program ("LIHEAP") and the Weatherization Assistance Program ("WAP") focus on giving direct subsidies to the consumer to lower current energy bills.[81] These programs are beneficial and should continue to be used to help reduce low-income customers' energy costs, but only a small portion of these programs are used to try to prevent low-income customers from continuing to face the same energy burdens in the future.[82] Furthermore, the funding for these programs is usually subject to budget cuts.[83]

Several states have programs similar to the federal programs just mentioned, but as with the federal programs, they face the same funding issues.[84] In some states there is a straight discount program available to help low-income customers reduce the amount of their bill.[85] The last financing option that is being explored by states is virtual net-metering ("VNM"). VNM as contemplated in Massachusetts would allow a DG solar customer to allocate any of their credits from their DG solar energy system to be given to anyone in the same community.[86]

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81. Behles, *supra* note 5, at 27.
82. *Id*. at 30–31.
83. *Id*. at 31.
84. *Id*. at 31–33.
85. Thompson, *supra* note 4, at 277.
86. Hannah Flint, *State Market Assessment: Solar in Massachusetts*, GEO. ENVTL. L. REV. BLOG (Jan. 14, 2015), https://gelr.org/2015/01/14/state-market-assessment-solar-in-massachusetts/; BRINGING THE BENEFITS, *supra* note 1, at 31.

The issue with all of these financing models is that they just help low-income customers pay for their current energy bill but do not help to reduce their energy intake and do not help to solve the environmental problems that would be cured with providing access to DG solar.

2. Third-Party Ownership Models

One option to actually provide low-income customers with access to DG solar is through third-party ownership models. Many states allow third-parties to own rooftop solar systems and provide solar energy to a customer through a lease, a power purchase agreement ("PPA"), or an energy service agreement.[87] The most common models are PPAs and leases, which are implemented when a developer installs a solar energy system on the customer's property, maintains the system for them, and leases the power to the customer.[88] Although this option would break down many of the barriers that preclude low-income customers from accessing DG solar, the problem is that third-party providers rarely serve low-income customers because credit score is an important factor in determining the financial risk of taking on a customer, and, as previously stated, one of the other barriers facing low-income customers is either having a poor credit score or no credit score at all.[89] Therefore, this is not a great option to provide low-income customers access to DG solar.

Finally, as outlined in Part III, aside from cost, one of the biggest barriers for low-income customers to overcome when contemplating DG solar is that many such customers rent the buildings that they live in and do not own their own roofs.[90] The problem with installing solar on multi-family dwellings is that landlords may not approve of the idea because landlords do not benefit directly.[91] Multi-family buildings have a single "master" electric meter for the common areas in the building, which is billed to the building owner and sub-meters for individual apartments, which is billed to the tenant.[92] This can result in split incentives where the costs and benefits of making building improvements like DG solar can have differing impacts on who makes the investments and who benefits from them.[93] A landlord who does not pay the utility bills on a multifamily housing property will not see the full bill savings from an investment in solar power.[94] Landlords, however, may benefit from tax credits, energy savings, and

87. BRINGING THE BENEFITS, *supra* note 1, at 45.
88. *Id*. at 46.
89. *Id*.
90. *6 Recommendations*, *supra* note 2; *see also* BRINGING THE BENEFITS, *supra* note 1, at 14; *Solar for All*, *supra* note 80, at 1.
91. Richard L. Ottinger & John Bowie, *Innovative Financing for Renewable Energy*, 32 PACE ENVTL. L. REV. 701, 704 (2015).
92. BRINGING THE BENEFITS, *supra* note 1, at 14.
93. *Id*.
94. *Id*.

increases in property value from going solar but may be unwilling to share those savings with tenants.[95] Because of these issues, it is unlikely that landlords will invest in DG solar, and it is unclear as to whether low-income customers would actually see the benefits if DG solar was actually installed.

B. THE SOLUTION OF COMMUNITY SOLAR GARDENS

Community solar projects allow for broad community participation and also reduce the cost barriers to DG solar.[96] The general definition of a community solar garden ("community solar") is a solar project owned, developed, and controlled by either residents or an entity of the community in which the project is located.[97] Community solar works by allowing customers to subscribe or to buy a portion of an offsite solar installation and receive utility bill credit from its output.[98] In addition, the community solar model reduces the high upfront installation costs associated with DG solar by spreading the costs among a group of customers.[99] The following sections outline the (1) many benefits of community solar gardens and (2) how some states are already trying to implement community solar gardens.

1. The Benefits of Community Solar Gardens

Community solar gives multiple users who may lack the ability or desire to install rooftop DG solar panels the chance to purchase a portion of their electricity from a solar facility located off-site.[100] Members of the community who purchase energy from these community-owned solar panels receive the same net-metering benefits as if the panels were located on their own property.[101] Because of these characteristics, community solar is a viable option for homeowners or renters who either do not have a roof that could support solar panels or who rent and do not own their own roofs.[102] Community solar is one of the best options to bring solar energy to low-income communities because this type of solar energy enables a wider range of customers such as renters, apartment dwellers, and people in homes that are ill-suited for rooftop solar panels to gain access to DG solar.[103]

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95. *Id*. at 8.

96. LOW-INCOME SOLAR POLICY GUIDE 45 (2016), http://www.lowincomesolar.org/wp-content/uploads/2016/03/Low-Income-Solar-Policy-Guide_3.11.16.pdf.

97. Behles, *supra* note 5, at 45.

98. BRINGING THE BENEFITS, *supra* note 1, at 10.

99. Kristen 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, 124 (2012).

100. *Id*. at 129.

101. Behles, *supra* note 5, at 46.

102. BRINGING THE BENEFITS, *supra* note 1, at 10.

103. *Id*.

2. The Implementation of Community Solar Gardens

The model of community solar is still relatively new, but many states are testing new possibilities.[104] In some states, community solar is designed to save customers money by relying on virtual net-metering to allow customers to capture the value while others pay a premium to participate in community solar owned by a utility.[105] Colorado became the first state to pass statewide shared renewable legislation when, in 2015, it passed the Community Solar Gardens Act.[106] The California and Colorado community solar laws even require utilities to reserve a percentage of their projects for low-income customers.[107] At least fourteen states and the District of Columbia have some form of community solar policy in place.[108] The National Renewable Energy Laboratory ("NREL") calculates that community solar could represent between a third and a half of the distributed PV market in 2020.[109]

C. FINANCING UTILITY OWNED COMMUNITY SOLAR GARDENS

One of the issues with community solar is deciding who will own and operate the DG solar systems. Government entities, utilities, nonprofits, or other administrative programs all have the ability to run and finance community solar.[110] Utilities would be good candidates to own community solar because they would be able to communicate directly with low-income customers and would be able to help these customers pay for the community solar.[111] Utilities would be able to help low-income customers pay for the community solar gardens through either (1) on-bill repayment or (2) pay as you save.

1. On-Bill Repayment

If the utility ran the on-bill program, they could base qualification and participation on an individual's utility bill payment history and not their credit score history. The low-income customer could pay for their share of the community solar garden through on-bill financing.[112] On-bill repayment lets customers pay for energy improvements in installments on their utility bill.[113] On-bill financing eliminates the obstacles to renewable energy investment caused by landlord-

104. *See* LOW-INCOME SOLAR POLICY GUIDE, *supra* note 96, at 11, 15.
105. BRINGING THE BENEFITS, *supra* note 1, at 31.
106. LOW-INCOME SOLAR POLICY GUIDE, *supra* note 96.
107. Thompson, *supra* note 4, at 292.
108. LOW-INCOME SOLAR POLICY GUIDE, *supra* note 96, at 15.
109. BRINGING THE BENEFITS, *supra* note 1, at 10 (citing DAVID FELDMAN ET AL., NAT'L RENEWABLE ENERGY LABORATORY, SHARED SOLAR: CURRENT LANDSCAPE, MARKET POTENTIAL, AND THE IMPACT OF FEDERAL SECURITIES REGULATION (2015)).
110. Behles, *supra* note 5, at 65.
111. *But see id.*
112. *Solar for All*, *supra* note 80, at 2.
113. BRINGING THE BENEFITS, *supra* note 1, at 38.

tenant disincentives because the repayment obligation attaches to the utility bill or property tax, passing on the advantages of the energy savings and the obligations for repayment to successor lessees.[114]

One issue with the utilities owning community solar is that utilities may be reluctant to play such an active role in financing because lending laws can vary by state.[115] For this to work, rules must be established around whether and how utilities can disconnect service in the case of customer default and the transferability of loan obligations between customers.[116] Of the forty-five programs in thirty-two states that use on-bill financing, the cumulative default rates are low—ranging from zero to three percent financing.[117] If these rates stay low, then utilities may be more comfortable taking on this financing.

2. Pay As You Save

Another option is Pay As You Save ("PAYS"), where the utility rather than the homeowner invests in the energy upgrade.[118] The utility gets paid back through the customer's tariff because there is no loan or lien, and the repayment obligation stays with the property and not the customer.[119] It remains on the bill for that location until all costs are recovered.[120] PAYS circumvents the traditional barriers to financing solar energy by providing the upfront capital requirements.[121] PAYS does not require credit checks or liens, and all obligations attach to the meter.[122]

Community solar gardens financed by utility companies through on-bill financing or PAYS is one of the best ways to avoid almost all of the barriers to obtaining DG solar for low-income individuals. Utilities also benefit because they would be able to fulfill their RPS requirement using this program. Further, this method, unlike financing alone, actually helps low-income customers gain access to DG solar, lowers their energy burden, and helps mitigate the effects of climate change.

CONCLUSION

The effects of climate change will have a larger impact on low-income communities because of the already heightened exposure to pollution faced by these communities. Renewable energy in the form of DG solar can help limit the production of fossil fuels and lower customers' energy bills. However, low-income customers who would proportionally benefit more than higher-income customers

114. Ottinger & Bowie, *supra* note 91, at 725–26.
115. BRINGING THE BENEFITS, *supra* note 1, at 39.
116. *Id.*
117. *Id.* at 38.
118. *Id.* at 44.
119. *Id.*
120. *Id.*
121. Ottinger & Bowie, *supra* note 91, at 730.
122. *Id.*

face barriers to accessing DG solar energy in the form of financial costs and lack of roof ownership. Although there are many different solutions to help low-income customers, many of these options only help low-income customers pay for the extra costs of their utility bills that result from net-metering but do not help to reduce low-income customers' reliance on fossil fuels, thus not mitigating the effects of climate change.

Currently, the best solution to provide low-income customers with access to DG solar is through utility owned and maintained community solar. Community solar helps to distribute the costs of installing DG solar to multiple customers and does not require a low-income customer to own the roof on their house, making community solar a good solution for many low-income customers who typically are renters. The utility companies who own community solar will not only fulfill their state RPS requirements but can also help to make community solar more affordable to low-income customers by using on-bill financing and PAYS. This solution is not perfect and will not bring DG solar to all low-income customers, but it is a good start and will provide a lot more low-income communities with DG solar, thus helping to reduce their energy bills and helping to combat the harmful effects of climate change.