Research Review on Residential Solar Access:

Barriers and Solutions for Low and Moderate Income Communities

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EXECUTIVE SUMMARY

Demand for rooftop solar power has grown rapidly in the last decade. In 10 years, the sector has grown from 23,000 homes in 2006 to 40 times that – over 920,000 – by the end of 2015 (Barbose and Darghouth, 2016). Yet, as this number continues to rise, numerous barriers limit the opportunities for low and moderate-income (LMI) households to acquire these systems. Though rooftop solar systems are becoming more and more affordable as demand rises and manufacturers and installers develop new ways to eliminate system costs, persistent barriers to greater access by LMI homeowners remain.

Through Yale, our research team is examining the constraints that LMI households face in obtaining solar power. This paper provides a review of reports and research on solar deployment to LMI populations, revealing an array of barriers and solutions to their ability to procure solar power. We categorize the specific barriers and solutions and analyze the strength of the current evidence for each barrier and solution. Understanding how to overcome barriers to LMI solar access can help ensure that the benefits of solar power can be realized by all income levels.

Barriers can be categorized as customer issues, business issues, and government issues. Customer concerns fall under: (a) budget barriers, (b) specific preferences, and (c) home design complications. Businesses (or coordinating entities, as in the case of community solar) have challenges in (a) customer outreach and (b) cost concerns. Lastly, a few sources identified governmental issues consisting of (a) political, (b) regulatory, and (c) public administration hurdles.

Solutions are organized into the following categories: (a) reducing upfront costs (b) financing and spreading costs over time (c) improving customer awareness (d) community solar business model components and (e) other “anchor” institution or business model approaches.

BARRIERS

CUSTOMER	• Budget barriers • Preferences • Home design complications
BUSINESS	• Customer outreach • Cost concerns
GOVERNMENT	• Political • Regulatory • Public administration

SOLUTIONS

- Reducing upfront costs
- Financing to spread costs over time
- Improving customer awareness
- Community solar business model components
- Other "anchor" institution or business model approaches

Many barriers overlap with each other. The budget barriers faced by a customer are affected by the cost considerations of a business via the final price of installation. And some solutions address many barriers at once: community solar, for example, can lower the cost per watt of an installation and overcome home design barriers. We will now discuss the evidence found for each barrier.

BARRIERS TO LMI SOLAR DEMAND

CUSTOMER SPECIFIC BARRIERS

Many of the barriers impeding wider consumption of solar products by LMI customers stem from financial limitations, physical constraints, or communications impediments between potential customers and residential solar providers. These barriers primarily take the form of high project costs, physical limitations associated with customer residences, or customer engagement tactics that may clash with customer preferences. Within these categories, we identify a variety of barriers that individually or collectively undermine efforts to increase solar power deployment among LMI customers. Although these barriers may be substantial in some cases, the benefits of solar access for LMI households can also be significant, as many LMI households have greater energy burdens than households in higher income brackets. Residential solar power could help alleviate this burden.

Barriers Associated with Customer Costs

In LMI households, where annual incomes and available savings are often constrained, the cost of affording solar under standard contracts can be a significant limitation to residential solar.

For LMI homeowners, the cost of purchase and installation for rooftop solar power can represent a significant impediment to access. (Browning, Harris, & Mackie, 2016). This is particularly acute in places with higher than average costs of rooftop solar installation, like New York State (Bulman, 2012). Though economies of scale present in community solar projects have the potential to reduce purchase and installation costs, these cost challenges are important to address to increase access. A study of the Colorado community solar market and a survey of consumers by the Solar Electric Power Association found that, just as high rooftop solar costs can deter LMI customers, high upfront community solar costs can limit the reach to subscribers (SEPA, 2016; Artale & Dobos, 2015a).

In addition to the upfront costs, low-income households can't benefit from tax credits designed to reduce the cost of rooftop solar: LMI households with low income tax burdens are unable to take advantage of ITC and other tax credits designed to stimulate increased solar adoption (Borenstein & Davis, 2016; Browning et al. 2016; EcoMotion, 2012; Interstate Renewable Energy Council [IREC] 2016; Jospé et al. 2014).

Many LMI households also rent their homes. This creates a split-incentive problem in which renters who pay utility bills and would thus benefit from reductions from rooftop solar power do not own the rooftops or hold siting authority necessary for installation. Meanwhile the landlord who holds the property rights to the roof has no incentive to invest in a solar system that won't save the property money (Browning et al. 2016; EcoMotion, 2012; IREC 2016).

Researchers at the Interstate Renewable Electricity Council (IREC) published a report that reasoned that ratepayer assistance programs reduce the benefit of switching to solar. Ratepayer assistance programs provide a discount on utility bills. However, when consumers' electricity is effectively cheaper, the savings from switching to solar are smaller than they would be without the ratepayer assistance. Ratepayer assistance "convolutes the price signal," as the paper puts it, though it provides no data as to whether this dynamic truly occurs (IREC 2016).

The IREC whitepaper also hypothesizes that public housing residents may not always see a financial benefit from switching to solar because the public housing agency (PHA) may raise tenants' rents a "proportionate amount." The paper describes how the public housing utility allowance structure "requires rent plus utilities to be less than 30% of the tenant's monthly income." Any amount over 30% is subsidized by the PHA. Therefore, if the monthly cost of utilities goes down, the PHA has room to raise the rent, in which case the tenant would see no net change in their bills. The paper does not show whether this has happened, or whether tenants are aware of the possibility and alter their decision when purchasing solar (IREC 2016).

Finally, low-income individuals often have low FICO Scores, which inhibits their ability to qualify for solar system contracts such as Power Purchase Agreements, solar leases, or solar loans (Browning et al. 2016; IREC 2016; Jospé et al. 2014; Artale & Dobos, 2015a).

Barriers Associated with Customer Preferences

A failure to appreciate customer preferences may also limit the success of efforts to promote residential solar for LMI customers.

In crafting community solar contracts that will appeal to LMI customers, solar providers can encounter hurdles associated with contract structures that are unappealing to LMI customers. Case studies and interviews suggest that customers are uninterested in subscribing to long-term community solar

contracts, even if longer-term contracts might provide greater savings. Grand Valley Power (GVP) found that while seeking customers for a Low-Income Community Solar Program the program experienced greater success after its contracts were restructured from an $800/panel, 22-year lease subscription with a $50/year upfront cost through 2036 to a zero-interest, 5-year on-bill financing subscription at $15/month. GVP was compelled to modify their program offerings after experiencing slow initial demand for contract subscriptions that resulted in a minimal 47% subscription rate through 2012 ("Grand Valley Power," 2015; Chwastyk & Sterling, 2016).

One paper stated that there could be disagreement between residents within a multifamily structure about whether roof space should be used for solar installations (IREC 2016). LMI populations households may also have been subject to scams in the past—anything that seems too good to be true has often turned out to be, leading to potential distrust. The entity marketing their solar offering may need to interact repeatedly with a potential customer to develop sufficient trust for a successful sale (IREC 2016; Artale & Dobos, 2015a).

A report prepared for the Colorado Energy Office on community solar noted that there can be a time delay between sign-up and receiving the benefits of cheaper electricity, which can also cause distrust. There can also be confusion for the resident around which entity they are talking to when joining in a community solar project, such as the housing authority or the project developer. The authors heard in interviews with individuals in the industry that the paperwork involved in a community solar project can be "intimidating, unapproachable, and burdensome." Plus, legal jargon can discourage customers, and the process can see delays when forms are not completed correctly (Artale & Dobos, 2015a).

Engineering/Physical Barriers

Another impediment to residential solar access stems from physical limitations of an individual's property. These barriers can be due to a range of factors including roofs improperly suited to hosting solar panels or a potential customer renting their property rather than owning it.

Many LMI individuals live in multifamily housing or other residential properties that are not designed to support rooftop solar (Browning et al., 2016; EcoMotion, 2012; Heavner et al., 2015).

Other LMI households may occupy manufactured homes with inefficient systems or insulation, which exposes them to high energy costs. For these households, investments in energy efficiency may carry more value than investments in solar power (Browning et al., 2016).

In addition, LMI individuals who do own their property may not reside in homes with roofs that are sufficiently equipped to host rooftop solar systems (Browning et al., 2016; IREC 2016).

BUSINESS SPECIFIC BARRIERS

Though many barriers to increasing residential solar access for LMI customers stem from customer-specific challenges, we have identified more systemic impediments to wider solar access on the business side. Though some companies like GRID Alternatives and Posigen specifically target low-income customers interested in installing rooftop solar systems, there remains a lack of companies specifically structured to engage LMI customers. Customer engagement strategies employed by other residential solar providers may also fail to properly consider customer constraints, and providers may encounter high financial costs in seeking to engage LMI customers.

Efforts to increase distributed solar power access to LMI individuals is currently inhibited by the lack of companies that specifically seek to engage LMI individuals and address their unique circumstances (Browning et al., 2016).

Customer Outreach

Companies selling solar to LMI residents may face language barriers, limited communication channels, and insufficient time for customer engagement. Specifically, some LMI households may not be fluent in English, may lack access to the Internet or email, and have significant time constraints, which can make it difficult to take the time to learn about the process and benefits of purchasing solar (IREC 2016; Artale & Dobos, 2015a). Other problems facing customer engagement in LMI communities include poor understanding of the benefits by target consumers receive, or simply a lack of clarity around energy terms like “kilowatts” that are used in marketing materials (SEPA, 2016; Chwastyk et al., 2016).

Moreover, the demographic designation “LMI” encompasses a range of incomes and households with a wide range of credit scores. Effective programs for LMI outreach may be best structured with flexible strategies to reach different segments within LMI populations (IREC 2016).

Financial Barriers

Recruiting and serving LMI customers can prove costly for utilities and third-party solar companies. It is important to understand the financial challenges that may disincentivize companies from operating in this space or recruiting LMI customers.

Community solar projects present a challenge for utilities, which often have stringent securities compliance requirements. Special Purpose Entities (SPEs) can provide appealing corporate structures for community solar projects, but SPEs may struggle to collect tax incentives if financed by passive investors who are ineligible to receive the incentives or cannot adequately limit the project risk to investors. Community solar projects can also be challenging for non-profit organizations to finance due to these organizations’ low tax burdens (Coughlin et al., 2011).

Financially, marketing solar to lots of individual households is more expensive than working with a few larger buyers. As a specific example, when a carve-out designates that a certain percentage of a community solar development must go to LMI customers, the developer may need to offset the added costs of working with individual residents by then "enrolling larger commercial and industrial subscribers" (Artale & Dobos, 2015a). This dynamic was revealed in Minnesota as developers submitted proposals for large community solar installations to which the regulator responded with a cap on the size, so that they would be geared toward individual subscribers (Hoffman & High-Pippert, 2015).

From the perspective of financiers, LMI customers want flexible terms for joining a community solar project, which adds risk that customers might leave and pushes financiers to raise rates. But LMI customers also do not want to pay higher rates. The misalignment of these interests constricts the market (IREC 2016). An analysis of the low-income carve-out in Colorado's Community Solar Gardens program found that LMI community solar subscribers who lived in apartments tended to move "every few years," and failed to notify developers that they were discontinuing their service. This caused community solar projects to fail compliance with the state's regulations, and placed a strain on project developers who had to account for customer departures (Artale & Dobos, 2015a).

PUBLIC SECTOR BARRIERS

In addition to customer recruitment challenges and other impediments to LMI engagement, there are political barriers that can limit successful outreach by to LMI customers. Many states lack community solar-enabling legislation, which can inhibit development of affordable solar projects, while other states may have regulatory barriers that restrict where or how an LMI individual can invest in residential solar. In addition, states or municipalities may have permitting restrictions that impede the ability of individuals to acquire rooftop solar.

Political Barriers

In Virginia, political forces and special interests blocked state legislation that would have helped stimulate community solar markets (Michaud, 2016). Given that community solar has the potential to lower costs for subscribers and allows families without ideal rooftops to use solar power, this political issue makes solar access more difficult for LMI customers.

Regulatory Barriers

In another jurisdiction, community solar carve-outs to LMI residents were only applicable to investor-owned utilities (IOUs), leading to shared solar projects with "limited low-income subscribers" within non-IOU service territories. Additionally, multifamily buildings with single meters did not qualify for community solar because individual subscribers needed to have their own meters (Artale & Dobos, 2015a).

Administrative Barriers

Permitting for rooftop requires resources and local expertise in navigating the permitting process. However, this was not listed specifically as a barrier for LMI but for solar in general (Passer, 2015). Presumably, LMI families may have less time capacity to handle permitting requirements, but none of the papers we examined addressed this issue directly for LMI customers.

SOLUTIONS TO BOLSTER LMI SOLAR DEMAND

We have identified solutions to many of the barriers discussed above that, if implemented, could support wider availability of solar power to LMI customers. These include measures to reduce the perceived costs of contracts and strategies to promote more successful customer engagement. In addition, we will highlight specific business models that have been analyzed or piloted for increasing LMI customer access to residential solar contracts and public policy solutions for states and municipalities interested in promoting wider adoption of solar within LMI communities.

COST REDUCTION STRATEGIES

There are a variety of tools identified in the literature to expand the availability of solar power to LMI customers, including virtual net metering, community solar projects that internalize solar subsidies such as rebates or SRECs, and contracts that are structured to limit upfront contract costs.

Upfront Cost Reductions

Several approaches are available that reduce or eliminate the upfront costs for an LMI household when installing solar.

Rebates or incentive programs that provide a reimbursement per watt are one mechanism (Browning et al., 2016; IREC 2016). By constructing solar power at economies of scale, community solar projects may also achieve cost reductions and increase the affordability of projects compared with individual rooftop installations. One study notes that in 2013, installation labor accounted for $0.55/W and customer acquisition accounted for $0.19/W on regular residential systems, suggesting community solar could reduce these soft costs by operating at scale. It also suggests that permitting costs (estimated at $0.19/W at the time) could be reduced (Otto, Higbee & Tudenggongbu, 2014).

Third-party ownership schemes, where the customer either leases the system or signs a power purchase agreement (PPA), can allow LMI residents to have solar for no upfront costs, since those are borne by a different owner (Browning et al., 2016).

Community solar lease contracts with no initial investment requirements were highly valued by customers surveyed on their preferences for different contract components. One study found that customers valued contracts without initial investment over both those that could provide an 8% decrease on their bills after 5 years and those with month-to-month terms (Solar Electric Power Association [SEPA], 2016). Another study found that consumers surveyed on their interest in community solar contracts were dramatically more interested when the upfront panel price dropped from $495 to $395 per panel, and that potential customers were very cost-sensitive towards rate-premiums or sign-up fees (Shelton Group & SEPA 2016).

Financial solutions that spread and/or reduce costs over time

There are a variety of financial and policy approaches available for solar project developers to improve the affordability of distributed solar projects for LMI households. Net metering and virtual net metering allow customers to see a sizable benefit over time, as their solar installation sells electricity into the grid in times of excess (Browning et al., 2016). Virtual net metering, in particular, allows residents who cannot have solar on their building to receive benefits for the excess generation (Heavner et al., 2015). SRECs, or credits that a solar owner can earn for a unit of generation, can also help create a positive cash flow over time. In Massachusetts, in particular, SRECs earn a higher rate for LMI solar projects than non-LMI ones (Browning et al., 2016).

Credit enhancement approaches

A few solutions are available to overcome low credit scores.

Government bodies can procure solar or incentives can be provided to "anchor" institutions to provide a type of "underwriting" to low-credit LMI participants in community solar schemes (Browning et al., 2016). Loan loss reserve funds can help reduce the risk in a pool of loans to low-income customers and thus help financial entities be more willing to loan to them (IREC 2016).

There are also ways in which underwriting criteria can be amended to help make LMI customers more eligible for loans. One is to expand underwriting criteria such that there is a lower minimum credit score threshold. Another is to use alternative underwriting criteria such as a customer's utility bill payment history to gauge how likely they are to make payments. A third approach is a hybrid of the first two: hybrid underwriting criteria that combine a lower credit score minimum with an examination of utility bill history (IREC 2016).

Bill payment approaches

There are a couple of ways to move the payments for a solar project to other bills, which can reduce hassle for the customer. These approaches may also reduce the risk seen by credit providers since customers may be more willing to pay those bills, and it can make property ownership transfers easier since the new owner can simply continue paying back the costs.

On-bill recovery and on-bill financing are when the solar payments are put on a utility bill rather than as a separate bill (Browning et al., 2016; IREC 2016). For community solar in particular, a resident's monthly subscription cost can be added to the utility bill as well.

PACE or "Property Assessed Clean Energy" is when the property gets a new tax assessment that includes the value of the solar installation and the payments are rolled into the tax bill (Browning et al., 2016; IREC 2016).

CUSTOMER ENGAGEMENT OPTIONS

In addition to increasing the affordability of solar contracts or restructuring their cost burdens, companies interested in recruiting LMI customers to can implement customer engagement strategies specifically designed to respond to the barriers identified earlier in this report. These include increasing the clarity and simplicity of marketing pitches for solar and billing structures, community based recruitment strategies, and better education of solar contract options.

"Community Purchase Programs" like Solarize encourage large numbers of potential customers to buy solar at the same time. This not only allows for lowered cost through bulk purchases, but also acts as a recruitment strategy (Browning et al., 2016, Bollinger et al., 2016). Providing credit education to people with low credit scores or who have avoided taking out loans could help them become more comfortable with doing so to finance solar (Browning et al., 2016).

Communications tactics

The communication strategies employed by solar providers are essential to customer recruitment. One report found value in communication strategies that emphasized (in descending order of effectiveness): the eligibility of homeowners and renters; the absence of upfront costs; financial savings; cancellation opportunities; the ability to take contracts in the event of a move; and the value of a contract in hedging against increasing electric rates. These messages carried the greatest influence when delivered by a utility or a trusted non-governmental organization (SEPA, 2016).

Researchers at Lawrence Berkeley National Laboratory found people are often more attracted to programs offering improvements in comfort or community engagement, rather than reductions in home energy use; they encouraged the use of demographic insight, trusted community figures, and local contractors to support outreach and effective communication at community and household levels. In addition, connotation or accessibility of language used to market energy programs can influence the effectiveness of outreach (Fuller et al., 2010).

Using content that is linguistically and culturally sensitive while also age-appropriate and sending it over multiple channels might also improve outreach (IREC 2016). On the other hand, education programs run by cities were found in one study of 186 US cities to not be a statistically significant contributor to solar

uptake (Li & Yi, 2014). However, the authors point out that they did not account for differences between educational programs, and that solar education alone would not be enough to increase uptake given financial considerations. The study also looked at all solar deployment, not the effects of education on LMI populations.

For community solar in particular, clearly stating cost savings and minimizing legalese can reduce confusion for potential subscribers. Simplifying billing is also recommended, as is "getting them at move-in" or marketing to people moving into a house (Artale & Dobos, 2015a).

In general, it helps to make solar information easy to understand. Some evidence from programs to support energy efficiency investments suggest that explaining *straightforward* concepts in simple language leads to better understanding, but explaining *complex* concepts (like terms and conditions) in simple language does not lead to added understanding (Leon, 2016; Wong-Parodi, de Bruin & Canfield, 2013). One study recommends highlighting the energy justice attributes of purchasing solar, though the study provides no evidence for whether this increases uptake (Artale & Dobos, 2015a).

One paper proposes that marketers "present solar in an evenhanded manner." It also recommends having a robust dissemination strategy for any marketing materials, rather than just focusing on creating those materials. Consolidating all the state's information about solar policies in one place can also facilitate understanding of policy options and incentives that a customer could use (Leon, 2016).

One report on the California residential energy efficiency sector asserted that information (about technologies, their reliability, etc) and incentives are the "two most important levers for overcoming barriers." In other words, providing useful information to consumers can help them in their decision-making, as can well-structured incentives or rebates (Lutzenhiser et al., 2009).

Outreach via existing organizations or networks

Another potential pathway is to tap into contractor networks, since they are "often the only people with whom residents can discuss their energy problems face to face" (Environmental Protection Agency 2016). Solar developers can also co-brand and partner with a trusted institution in order to reach potential customers (Artale & Dobos, 2015a; Solar Outreach Partnership 2015). Potential organizations to collaborate with include affinity groups, faith communities, neighborhood organizations, environmental organizations, and business groups (Hoffman & High-Pippert, 2015).

SPECIFIC BUSINESS MODELS

We have identified specific business models that are likely to experience greater success with LMI customers at lower costs. These include community solar programs that offer flexible contract periods, zero or low upfront enrollment costs, and collaboration with utilities or mission-driven organizations. In addition, leveraging anchor institutions can reduce the business risks associated with LMI targeted projects.

Community solar business model components

Community solar is identified as a useful business model for increasing LMI customer access to solar power because it can overcome a number of barriers. Community solar projects can be structured to reduce overall costs and required credit scores; they also avoid the barriers caused by home ownership requirements or split incentives between landlords and renters, physical limitations from roof or housing conditions, or permit requirements. In addition, some projects offer subscribers shorter payback periods, have more streamlined operations and maintenance processes, more easily incorporate tax credits into the overall project financing, and provide subscribers with greater flexibility than rooftop systems (Browning et al., 2016; Artale & Dobos 2015a, Artale & Dobos 2015b).

Community solar projects that are specifically tailored to LMI customers can be structured to provide customers with greater contract flexibility, shorter-term contracts, and reduced installation and transaction costs, necessary for reducing the barriers to affordability and increasing interest (Otto, Higbee & Tudenggongbu, 2014).

In Colorado, where the state passed community solar legislation in 2010 that includes a carve-out for low-income households, a review five years later identified barriers to the program's efforts to meet the customers' needs. However, the review also identified solutions, and recommended that program outreach should include co-branding with a trusted partner, highlight the low-income priorities, outline consumer protections, build long-term partnerships with mission-driven organizations, provide financing options, seek out impact investments, and offer long-term funding support (Artale & Dobos 2015a).

In New York City, where access to rooftop solar power is limited by the lack of available roofs and the high cost of rooftop solar installations, utility sponsored community solar programs and community LLC-owned community solar projects have been identified as the preferred options for providing affordable solar access to residents (Bulman, 2012).

Since the minimum term by which a customer can be enrolled will affect the financing rates for a project, which in turn affects outreach, all program elements need to be considered and designed in concert with each other (IREC 2016). Given that distributed generation is perceived to be costly to many utilities, one "middle ground" approach is to have utilities develop and administer larger community solar projects (Funkhousera et al., 2015).

Anchor Institution Approach

To consolidate various costs or act as a credit support, it can help to have an "anchor" institution take a role in developing solar projects. This approach can be one version of a community solar program, or a consolidating entity on administrative aspects for home solar.

"Anchor" institutions can consolidate subscription costs by acting as a one-stop outreach entity. They can also act as a backup when customers default. The government can encourage anchor institutions to take on this role by making higher-value RECs available to them (IREC 2016). Another way to encourage anchor institutions is through tax incentives, since individuals may not have a large enough tax bill to benefit from a tax cut as compared to a larger institution (IREC 2016).

GOVERNMENT SOLUTIONS

Finally, we have identified specific public policies available to states and municipalities to increase LMI access to residential solar projects. These policies are emerging as tools used by cities and states around the country.

Grants such as Community Development Block Grants and other public funding for technical assistance can help cities finance programs to expand LMI residential solar access and increase the number of companies working to meet these goals (Browning et al., 2016).

Community Development Financial Institutions (CDFIs) can serve as critical partners for companies seeking to increase engagement of LMI customers. CDFIs like Kentucky's Mountain Association for Community and Economic Development (MACED) can access low-cost financing, public grants, low-income specific tax credits, and technical assistance programs to support programs that reduce LMI individual's electric bills and energy efficiency investments (Browning et al., 2016).

Green banks can provide low-interest loans for project developers and other sources of subsidized capital necessary to increase the affordability of projects and make them more appealing to LMI customers. Low-cost financing from green banks can also help reduce the credit requirements for customer enrollment in residential solar contracts; in Connecticut, the Connecticut Green Bank reduced the minimum credit score for some contracts to 640, lower than many other program minimums (Browning et al., 2016).

Green bonds and revolving loan funds offer vehicles for public sources of low-cost financing for LMI solar projects. Green bonds can raise money for states to finance renewable energy projects, while revolving loan funds can leverage seed financing to capitalize specially qualifying projects that produce a return that replenishes the fund over time (IREC 2016).

In addition, Colorado implemented a mandatory carve-out within the state's Community Solar Gardens Program that required 5 percent of project subscriptions be reserved for LMI customers. Such participation requirements can ensure community solar programs reach LMI customers and expand access. However, the Colorado program has not succeeded in fostering participation of LMI customers beyond the mandatory 5 percent level (IREC 2016).

An alternative model that the Los Angeles Department of Public Works is rolling out is a series of city-financed rooftop solar installations that are sited on the roofs of low-income residences. The city will lease the rooftop space from homeowners for an annual $360 credit, distributed as monthly $30 utility bill credits after the first year (City of Los Angeles Department of Water and Power 2016; McNary 2016).

CONCLUSION

Expanding access to solar power within LMI communities has no simple solution. The barriers individuals face—from renting their homes to limited creditworthiness or likelihood of remaining in a project's service territory—present multifaceted challenges for businesses and policymakers. Mitigating the customer-specific, businesses-oriented, and public sector barriers, will likely require active engagement from LMI communities, adoption of tailored contracts, and other proactive approaches; these efforts will demand work from companies, advocacy groups, and public officials. However, solutions like community solar projects with dedicated LMI programs may offer ways to mitigate multiple barriers simultaneously. Businesses that proactively engage the LMI community may also find new consumers. Targeted approaches can help ensure that LMI individuals are afforded the opportunity to access residential solar power and are not left behind in the solar revolution.

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