

When paired with energy efficiency measures, cost effective solar energy systems can support state and local program administrators' goals to reduce low-income household energy burden. Energy burden is the share or percentage of annual household income that is used to pay annual home heating and cooling costs. In the U.S., about 25% of all low-income households (80% or less of area median income-AMI) reside in multifamily housing units (see Figure 1). This issue brief discusses some of the key considerations and related opportunities for deploying solar for low-income multifamily housing (buildings with 5 or more units). In particular, program administrators may need to consider how differences in multifamily housing financing structure and type can influence resident eligibility as well as resulting impacts on energy burden in both on-site and off-site solar installations. This issue brief will touch on these considerations and profile two multifamily housing examples that demonstrate how state and local entities have deployed solar energy (photovoltaics) on behalf of low-income residents.

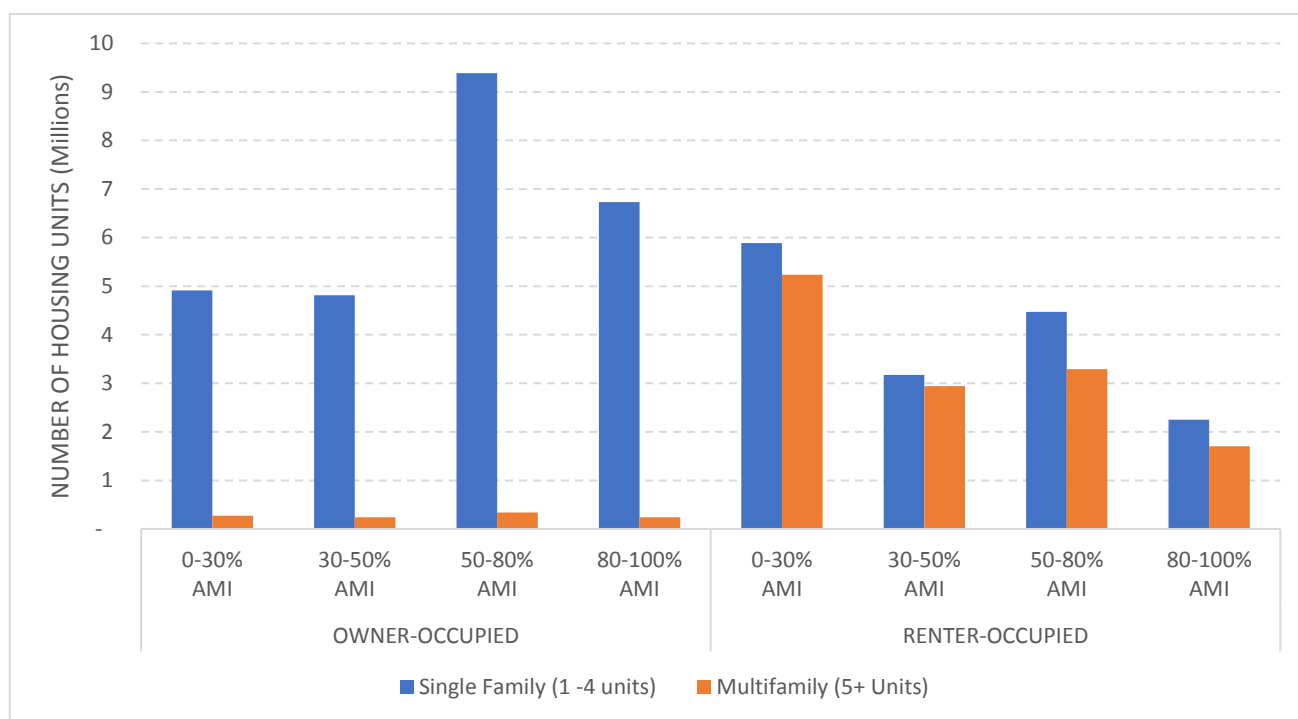


Figure 1. U.S. Housing units by ownership type, resident income, and proportion of multifamily housing (Office of Energy Efficiency and Renewable Energy's Low-income Energy Affordability Data (LEAD) Tool 2011-2015 data)

Key Considerations and Opportunities for Solar in Multifamily Housing

Low-income residents typically live in either private unsubsidized market-rate or deed-restricted multifamily housing. Private market-rate housing accounts for about 83% of available multifamily rental units and is a naturally occurring affordable housing option that low-income individuals can pursue in competition with other renters. According to CoStar 2016 data, about 17% of multifamily rental units are in deed-restricted housing that is regulated or financed by federal, state, or local agencies and that is required to provide low-income individuals and households access to affordable housing. Three of the more common categories of deed-restricted housing for low-income families include privately-owned U.S. Department of Housing and Urban Development (HUD)-assisted housing, public housing owned and operated by local authorities and financed by HUD, and Low-income Housing Tax Credit (LIHTC) financed housing. Solar and multifamily programs targeted at affordable market-rate or deed-restricted housing should consider the following issues:

Financing Limitations

Existing multifamily buildings typically have limited operating reserves. This makes it difficult for property owners to allocate funding for direct financing of solar installations outside of already scheduled operation and maintenance investments. These operation and maintenance investments are often bundled in capital refinancing portfolios; properties pursuing refinancing or recapitalization might be interested in incorporating solar. Some states have encouraged building owners to integrate energy efficiency and renewable energy (e.g., solar)



in these portfolios as a part of their LIHTC refinancing applications. A multifamily building owner may also be able to secure an Energy Savings Performance Contract with a private third-party partner who finances the project and the energy savings may be shared between the parties. Energy Savings Performance Contracts may also be able to utilize available tax credits and incentives such as the federal Business Energy Investment Tax Credit (ITC) to further reduce installation costs.

Owner and Resident Split Incentives

In many multifamily buildings, the owner passes electricity and other utility costs to customers either based on their own consumption or as a set portion of their rent. As a result, landlords lack an incentive to pursue an on-site solar project, particularly if all the benefits accrue to residents and not the owner. Should this be the case, off-site shared solar projects may still be available to individual residents. Shared solar programs are offered in at least 35 states, and eight states have incorporated policies or targets to support low-income residents' participation in these projects.¹ Even so, access to these programs may still be contingent upon the resident paying their own electric utility bill, as opposed to a scenario where utility bills are incorporated into rent. This is because community solar eligibility may be limited to the customer named on the property's initial utility bill. If this is the case, there are still opportunities to work with property owners to participate in community solar projects as exemplified by the profile of the Denver Housing Authority that follows.

Impacts on Low-income Residents

Whether low-income residents in multifamily housing can benefit from solar projects depends on whether solar generation credits can be allocated on renter utility bills. For deed-restricted housing, it also depends on how utility allowances are set at the property. In some cases, on-site multifamily photovoltaic (PV) systems do not assign and interconnect portions of the solar array to individual units. Rather, the solar array serves common areas of the property managed by the building owner. To allow individual tenant participation, utility policy may need to allow allocating solar generation to each utility meter, as is done in

¹ The eight states with low income considerations include California, Colorado, Connecticut, Illinois, Maryland, Oregon, Rhode Island, and Virginia (Cook and Shah 2018).

virtual net metering or similar policies. Additionally, in deed-restricted properties, the method for setting utility allowances varies by housing type and can impact whether the resident sees a tangible benefit. For example, some HUD-assisted housing uses a property-specific utility allowance calculation method where utility costs are based on the building's actual consumption that may pass the credit on to HUD, state administrators, or the property owner. In other situations, properties use a "community-wide" utility allowance method where utilities are based on the average cost of utilities across similar reasonably conservative households within the same metropolitan area, such as LIHTC-assisted housing. For this type of housing, solar generation credits received may not impact tenant utility allowances as significantly. This structure allows tenants to retain the full economic value of the kilowatt hours of solar generation allocated to the tenant's meter. However, this does not apply to HUD-assisted public housing given rules requiring that utility allowances decrease when savings of 10% or more are achieved. There are other options to address this benefit allocation issue as exemplified by the profile of California that follows.

Profile One: The Housing Authority of the City and County of Denver (DHA) Community Solar Garden

DHA provides housing to 26,000 individuals in Denver, Colorado across a portfolio of 4,800 deed-restricted housing units and up to 6,000 Housing Choice Vouchers that allow eligible low-income individuals to live in private market-rate housing. DHA is committed to providing affordable housing for Denver residents and has deployed approximately 5.5 megawatts (MW) of ground-mounted and rooftop solar on behalf of residents. This case study is based on information provided by DHA on the structure of one of DHA's innovative community solar projects, its benefits to residents, and considerations for replication.

Project Overview

In 2017, DHA deployed a 2 MW community solar installation focused on low-income properties and tenants. To complete the project, DHA partnered with multiple organizations including Xcel Energy, SolarTAC, Grid Alternatives Colorado, Namaste Solar, Monarch Private Capital, Enterprise Community Loan Fund, Ensign Energy, and the National Housing Trust. The project, located in Watkins, Colorado, just east of Denver, required a total capital investment of \$3.8 million.

DHA's partner in the project, Monarch Private Capital, was able to monetize the federal ITC as well as the Modified Accelerated Cost Recovery tax deduction, which together supported about 32% of project capital costs. The remaining costs were financed through a loan from Enterprise Community Loan Fund and DHA equity as displayed in Figure 2.

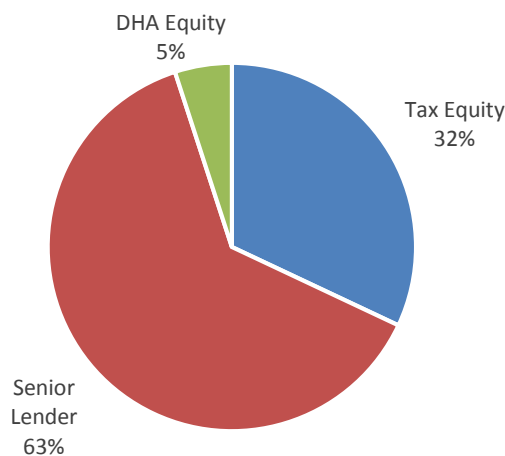


Figure 2. Sources of financing for DHA's community solar project

Resident Benefits

About 90% of all residents in DHA properties do not pay their own utility bills, limiting the pool of potential individual tenant participants. For most of the community solar capacity, DHA signed power purchase agreements for individual developments where the net impact is a savings of approximately 15%–20% on monthly electric utility bills. These savings will then be reinvested back into properties to provide about 700 homes with enhanced services, improved facilities, and sustainable operations aligned with each property's mission to support affordable housing. Any remaining capacity is subscribed by individual residents that pay their electric bills directly. For these individuals, subscriptions are offered at no cost,

which results in about \$15 – \$30 per month in household savings. DHA then acts as the subscriber manager, providing a backstop to the power purchase agreements and will cover any gaps if the project were to be temporarily undersubscribed.

Considerations for State and Local Decision Makers

The successful completion of this project offers some key considerations for decision makers interested in supporting this approach, relating to property type, electricity generation credits, and local champions. Most of the properties subscribed to the community solar project are LIHTC properties. These properties benefit from utility allowance structures that are favorable for passing solar benefits to building owners. This may not be the case for all building owners. Decision makers may wish to review their portfolio of housing types and related utility allowance structures to ensure solar benefits can be used to directly or indirectly benefit residents. DHA was also able to secure a 20-year solar renewable energy credit agreement with Xcel Energy, its service provider, which is required by state regulation to deploy low-income community solar projects in its territory. Similar favorable terms may not be available in all locations, especially to affordable housing providers, thereby limiting the potential revenue streams that can support resident electric bill savings. Finally, DHA has dedicated energy management and finance staff that served a critical role in facilitating the project from development through operation. Not all housing authorities have the same expertise or capacity and may require more support and incentives to pursue solar on behalf of residents.

Profile Two: California Multifamily Solar Policy and Program Evolution

California has developed incentives directed at multifamily housing including the initial Multifamily Affordable Solar Homes (MASH) program, and more recently, the Solar on Multifamily Affordable Housing (SOMAH) program. Based on information provided by the State of California, this case study compares MASH and SOMAH and offers some considerations for decision makers interested in promoting similar approaches.

Program Overview: Comparison of MASH and SOMAH Program Design

Though MASH and SOMAH are both directed at deed restricted multifamily housing, there are some notable differences in program design (Table 1). For example, in the MASH program, a fixed incentive level was set for all systems, irrespective of the use of other financing options. In the SOMAH program, planned to start in 2019, incentive levels are adjusted if the project also claims tax benefits from the ITC or LIHTC.

Table 1. Comparison of Certain SOMAH and MASH Program Features

	MASH	SOMAH
Availability	2008 – 2021	2019 – 2029
Locations	Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E) territories.	All investor owned utility territories (e.g., PG&E, SCE, SDG&E, Liberty Utilities Company, and PacifiCorp).
Funding	\$162.5 million from ratepayer funds.	\$100 million annually for 10 years with funding from utility greenhouse gas allowance auction proceeds.
Eligible Properties	Deed-restricted.	Deed-restricted (Properties located outside of designated disadvantaged community must also meet a requirement that $\geq 80\%$ units have incomes $\leq 60\%$ of area median income).
Solar Incentives	Fixed incentive: \$1.10/W owner offset, \$1.80/W tenant offset if 50% or more of the bill credits are allocated to tenant accounts.	Maximum incentive level for the portion of the PV system serving tenant units set at \$3.20/watt; \$1.10/Watt for the portion of the system serving common areas. Incentives are adjusted down if project leverages ITC or LIHTC.

Tenant Benefits	No minimum tenant allocation for lower incentive rate (Systems are eligible if they only offset common area load).	At least 51% of the total solar production from the PV system must be allocated to tenant units.
Metering Restrictions	No restriction on building meter type (i.e. individual or master metered).	All PV systems must be interconnected through virtual net metering. Residential units must be individually metered.
Deployment	33.75 MW of interconnected capacity with 28 MW of additional planned capacity.	Program will begin in 2019.

Resident Benefits

In the MASH program, housing providers are eligible for the program if they either offset common area load or provided direct bill credits to low-income residents. If the building serves only common area load, it is eligible for a \$1.10/watt incentive, while those building operators that allocate at least 50% of bill credits to tenants can receive a \$1.80/watt credit. In contrast, for a property to be eligible in SOMAH, it must show that 51% or more of solar benefits are passed directly to tenants, as opposed to common area load. Federally-financed or -subsidized properties that do not allow tenants to directly benefit by retaining at least some of these credits may not participate in SOMAH. This could potentially impact HUD-assisted housing if the property reduces tenant utility allowances based on the solar credits received. If, however, the solar credits are treated as reportable household income, then the project would be eligible.

Considerations for State and Local Decision Makers

The evolution of California's multifamily housing solar policy offers some considerations for other decision makers relating to incentive structure, eligible properties, and tenant benefits. California shifted from a fixed to varied incentive structure to more effectively fill financing gaps based on the context of the project (see Table 1). In SOMAH, which will launch in 2019, California has also adopted property restrictions relating to location and resident income to serve multiple objectives including reducing energy burden and increasing/enhancing economic development. Finally, California designed SOMAH to maximize benefits for tenants. For example, SOMAH requires units be individually-metered, making it easier to directly allocate credits to tenants. Other policymakers might wish to consider how these three elements can be adopted or modified to achieve their goals.

Conclusion

Through greater understanding of different incentives and disincentives for solar in multifamily buildings, state and local agencies may design programs and form partnerships that better target and advance their goals. Building these partnerships might start by assessing multifamily housing portfolios in a given state or locality, the available financing structures for those facilities, and how benefits might be distributed to low-income residents from on- and off-site solar projects. Decision makers can further maximize their impact by tailoring program design, marketing, and outreach to the developers, existing building owners, and low-income households they serve.

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