



Expanding Solar Access: Pathways for Multifamily Housing



Credit: GRID Alternatives (top) and Center for Sustainable Energy (bottom)

The Gap: Multifamily housing is a vastly underserved market for solar and other clean energy technologies

Across the United States, solar installations have soared, averaging a 59 percent annual growth rate for the last 10 years.¹ The environmental and economic benefits of this growth are substantial, as solar installations generate clean renewable energy, reduce fossil fuel use, provide financial savings to consumers, and create local jobs. However, while a historic number of Americans are benefiting from solar energy, many households and communities are still unable to access solar due to policy gaps. Many of the federal, state and local policies that have helped to accelerate solar energy's growth are targeted toward homeowners and taxable enterprises, and not available to a large and growing subset of the U.S. population, namely renters and/or those who live in multi-unit residential housing. Additionally, renters and residents living in affordable multifamily housing who qualify as low- to moderate-income (LMI) are further restricted from accessing clean energy options due to additional financial, educational and other barriers.

In the U.S., nearly 40 percent of households live in rental housing, which includes single family, multi-unit and other structures.² Of those households, more than 60 percent live in multifamily housing.³ Given the large percentage of renters nationwide, policymakers need to ensure that policies and programs allow renters to take advantage of the benefits of solar and other applicable clean energy technologies, such as energy storage and energy efficiency.

Shared solar programs can enable multiple customers, including renters in multifamily housing, to share the economic benefits of a single solar power system and to receive credits on their utility bills for the electricity generated by that common system. There are 14 active state shared solar programs spread across 11 states and Washington, D.C., and there are five other state programs that are in the process of being implemented.⁴ Beyond these state programs, there are dozens of utility programs across the country – both active and under development – that are designed to reach more customers with shared solar projects. As states and utilities begin to add new programs, expanding solar access for all customers, regardless of housing type or income level, must be a priority consideration.

This document outlines two potential pathways to enable greater solar access for renters and multifamily residents, including LMI customers and communities:

- (1) on-site shared solar, and
- (2) off-site (i.e., remotely located) shared solar.

What is Shared Solar?

Shared solar (aka community solar) enables multiple people to share the economic and other benefits of a single solar energy system via their individual utility bills. These systems can be located on a multifamily building (on-site) or remotely located from the building (off-site).



NextEra™ Energy Resources (DG AMP Solar Project, Marshallville, OH)

Pathways to Solar: On-Site vs. Off-Site



Credit: Center for Sustainable Energy

⚙️ Pathway 1: On-Site Shared Solar

With on-site shared solar, the generation from a single solar installation on the roof of a multifamily building is allocated across multiple electric meters, including individually metered tenant loads, in the same building.



Credit: US Department of Energy



Credit: Center for Sustainable Energy

Primary Enabling Policy Mechanism: Virtual Net Metering

- **Net Metering (NEM)** is a flexible policy tool that has successfully encouraged the growth of distributed renewable energy systems across the country. NEM allows a customer who has installed a solar system on their property to recoup their investment by receiving credits on their utility bill for the electricity their system produces.
- **Virtual Net Metering (VNM)** extends NEM to allow multiple customers to receive utility bill credits for the energy produced from a single facility located on-site.⁵ One common arrangement is the installation of a system on top of a multi-unit apartment building, as pictured. Customers' bill credits are typically valued at retail rates, or at least incorporate most components of that rate, which makes participation simple to understand and more attractive to customers.
- On-site shared solar policies can be voluntary or mandatory for utilities, depending on the decision of the state legislature, city council, or public utility commission.



✓ What's Needed?

Utility Billing Software

Utilities simplify the administration of on-site shared solar programs using billing software that electronically credits customers for the energy produced by systems.

Bill Crediting Mechanism

On-site shared solar policies typically require the revision of the existing utility tariff, or the creation of a new tariff, to delineate how utilities will compensate customers for the energy produced by their solar subscriptions.

Clear Procedures & Requirements

On-site shared solar policies succeed when there are clear procedures and requirements for both installing metered systems, connecting customers' systems to the grid, and allocating credits across multiple meters.

Education & Outreach

Raising awareness among all involved stakeholders about the opportunity and value of on-site shared solar is critical to getting building owners to go solar. Useful resources include:

- *Multifamily Toolkits for Apartments, Condos and Contractors*
<http://energycenter.org/solar-market-pathways/toolkits>
- *EnergySage Multifamily Solar Marketplace*
<https://www.energysage.com/cse-multifamily/>
- *Fostering a Future for Multifamily Solar in Santa Monica, CA: A Market Profile* <https://irecusa.org/regulatory-reform/solar-market-pathways/>
- *Virtual Net Energy Metering (NEM-V) Solar Energy System Easement Agreement for Condominium Developments* <https://irecusa.org/regulatory-reform/solar-market-pathways/>

Financing Tools & Mechanisms

Enabling a wide array of financing tools and mechanisms can help remove many barriers to solar, such as high upfront costs, insufficient lines of credit, competing economic priorities, or participation in discounted electricity rate assistance programs. Financing options that are especially helpful for LMI customers include direct incentives, loan programs, credit enhancements, and alternative and hybrid underwriting criteria. Similarly important are financing options that target LMI facilities and LMI participant organizations, including “anchor” subscriptions, back-up guarantees, direct incentives, loan programs, credit enhancements, and low-cost public financing.

Power Purchase Agreements (PPAs) & Other Agreements

The relationships between community solar participants, providers, and utilities need to be formalized in PPAs, other agreements or utility tariffs.

Case Study

California has two complementary programs geared towards on-site shared solar—its virtual net metering program and its Multifamily Affordable Solar Housing (MASH) program—which enable both general market and affordable housing customers to share in the benefits of an on-site renewable energy facility. The state's new Solar On Multifamily Affordable Housing Program (SOMAH) will replace the MASH program, which has depleted its incentive funding.



Credit: Center for Sustainable Energy



Credit: GRID Alternatives

Who is Involved?

Multifamily Residents

The residents of multifamily buildings can receive credits on their monthly utility bills for the energy generated by on-site solar systems.

Multifamily Building Owners & Property Managers

Landlords, property managers, and homeowners' associations that generally make the decision to install on-site solar systems may be able to offset their buildings' common loads while also providing solar access to their tenants, which can be an enticing feature to attract and retain tenants. See multifamily owner toolkits available at <https://www.energysage.com/cse-multifamily/>.

Solar Installers & Providers

Companies that develop shared solar projects on multifamily buildings serve as a key liaison between residents, property owners, and/or managers, as well as project financiers, local government permitting and code officials, and the utility.

Community Groups & Advocates

Community non-profit organizations and individuals can help raise awareness about shared solar options, guide policy and program improvements, and support education and outreach efforts.

Solar Jobs Programs

A skilled workforce is necessary to serve increased demand for solar, while also ensuring quality workmanship. Job programs may be implemented as part of shared solar programs to offer training and/or apprenticeship opportunities.

Financiers

Third parties may help fund the installation of larger solar systems, especially where upfront costs can be significant.

Utilities

Utilities may administer or manage on-site shared solar projects. They also are responsible for electronically allocating credits on customers' monthly bills and processing the interconnection applications to approve grid connections.

Policymakers

The city council, state legislature, and/or public utility commission may enable and/or oversee the adoption and implementation of on-site shared solar programs, as well as the financing tools, incentives, and other policy mechanisms that support broad participation, especially among LMI customers.

Keep in Mind

Building owners and residents have different motivations for participating in on-site shared solar. Policymakers should consider how policies or programs might be designed to help building owners, who usually make the decision to install projects, recoup their investment.

For example, California's forthcoming SOMAH program offers upfront per-watt incentives for systems that offset common area load (up to \$1.10 per watt), and higher incentives for systems

that offset tenant load (up to \$3.20 per watt). In this way, direct tenant benefits are encouraged, but property owners' motivations are also recognized. SOMAH also requires that at least 51 percent of the electricity generated is used to offset electricity usage by tenants.

Pathway 2: Off-Site/Remote Shared Solar

With off-site/remote shared solar, electric generation from a remote solar installation is allocated across multiple customer meters.

Primary Enabling Policy Mechanism: Community and Shared Solar

- The terms “community solar” and “shared solar” are often used interchangeably, or even combined as “community shared solar.” For purposes of this roadmap, **community solar** is defined as a program that enables multiple customers to share the economic benefits of a renewable energy system that is off-site or remotely located from where participants live.
- Community solar participants purchase or subscribe to an interest in a common solar system—sometimes referred to as a subscription—and receive the proportionate value of the energy generated via credits on their utility bills.
- While an existing NEM or VNM program may serve to enable a community solar program’s bill credit valuation and allocation, community solar programs may rely on separate bill credit valuation and allocation mechanisms that do not have a direct tie to NEM or VNM rules.

What Else is Needed?

In addition to the key elements of on-site shared solar listed above, community solar projects entail a few other components.

Anchor Subscribers or Hosts

Community solar projects may enlist an “anchor” subscriber or host—such as a big box store or school where the project is sited. These parties frequently take a significant percentage of the energy produced by the project, and they may offer to buy and sell subscriptions for others as customers join or leave the project. Anchor subscribers can help facilitate greater LMI customer participation in the projects by offsetting some of the perceived or actual financial risk associated with those customers.

Suitable Project Location

Popular sites for community solar projects include rooftops of large buildings, parking structures, brownfields, and landfills. Private or public land can be used for community solar projects.



Credit: US Department of Energy



Who is Involved?

Off-site/remote shared solar projects involve many of the same stakeholders as on-site shared solar projects, but the roles and relationships of some stakeholders may vary. For example, the owners of the sites where community solar projects are installed are different—as the sites may be large commercial buildings or schools—and they will have indirect relationships with subscribers because they will not be the landlords or property managers for the buildings where subscribers live.

Program Design Considerations

- Flexibility is one of the major draws for customers participating in community solar projects. It is important that participants can move within their utility’s service territory and take their subscription with them (**portability**), or leave the program and/or service territory and transfer their subscription to someone else, or back to the project owner (**transferability**).
- Another key consideration in community solar program design is system ownership and management. It will be important to decide whether a community solar facility will be owned and managed by a utility, a non-utility, including customers and third-party providers, or some combination of the two.

Case Study

In Massachusetts, multiple, disperse customers can share the bill credits generated by a remotely located solar facility. The state’s virtual net metering program simply requires an off-site facility and its subscribers to be located in the same load zone and utility distribution territory. This is distinct from the state’s Neighborhood Net Metering program, which requires that the off-site facility and its subscribers be in the same neighborhood or geographic area.

A Quick Comparison of On-Site and Off-Site Shared Solar

↑ Opportunities

On-Site Shared Solar

Off-Site Shared Solar

All Multifamily Shared Solar

On-Site Shared Solar

Establishes direct connection between consumers and building use, creating value within the community.

Does not require finding a separate, suitable project location (lower transaction costs, optimizing urban infill opportunities).

Off-Site Shared Solar

Promotes flexibility, allowing customers to take their subscriptions with them when they move.

Does not require as much buy-in from building owners (no on-site arrangement or long-term maintenance issues, just a utility bill arrangement).

Increases consumer access & enhances energy equity.
Serves underserved markets.
Expands environmental benefits of clean energy and supports related goals.

Creates direct economic benefits (energy bill savings over time).
Is a viable solution tested elsewhere.
Creates locational/grid values for certain areas.

⚠ Challenges

On-Site Shared Solar

Requires buy-in from multiple entities (owner, tenants, financiers, utility).

May be constrained by net metering limits, core network interconnection issues.

May face barriers if there is a rent control measure in place.

Requires matchmaking with contractors and building owners. Also generally can be more expensive on roof versus ground-mounted.

Off-Site Shared Solar

Requires finding a separate, suitable project location (cost, acquisition, ownership, and potential other impacts on open space, plus permitting/zoning challenges).

Requires billing system upgrades (initial cost; more cost-effective with expanded deployment).
Can be challenging to pencil out with lower electricity rates.
Faces specific hurdles in low-income/affordable housing context (utility allowances, financial, and financing constraints).

Can be complex, and important stakeholders may lack comfort or familiarity with model (solar providers, utility, financier, customer, owner).
Requires long-term maintenance and management of solar subscriptions (administrative burden).

Mechanisms

- Virtual Net Metering
(Or other similar mechanism for on-bill credit)
- Voluntary or mandatory



What Is Needed?

- Utility billing software
- Clear procedures + requirements
- Bill crediting mechanism
- Education + outreach
- Financing tools + mechanisms
- Power purchase agreements



Who Is Involved?

- Multifamily building owners + property managers
- Community groups + advocates
- Solar installers + providers
- Solar jobs programs
- Multifamily residents
- Policymakers
- Utilities
- Financiers



How Is It Enacted?

- State policy
- City ordinance
- Voluntary utility program



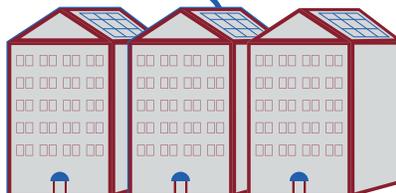
Challenges

- Requires buy-in from multiple entities
- Administrative burden
- Frequent vacancies + tenant turnover
- Requires billing system upgrades
- Roof vs ground-mounted expenses
- Economic hurdles
- Can be complex



Opportunities

- Creates value within the community
- Creates locational/grid values for certain areas
- Clean energy benefits
- Does not require separate property
- Increases consumer access + energy equity
- Energy bill savings
- Serves underserved markets
- Proven solution



Mechanisms

- Voluntary or mandatory
- Community Solar (Or other similar mechanism for on-bill credit)



What Is Needed?

- Utility billing software
- Bill crediting mechanism
- Financing tools + mechanisms
- Suitable project location
- Clear procedures + requirements
- Education + outreach
- Power purchase agreements
- Anchor subscribers or hosts



Who Is Involved?

- Community groups + advocates
- Solar installers + providers
- Multifamily residents
- Utilities
- Solar jobs programs
- Policymakers
- Financiers
- Off-site property owners



How Is It Enacted?

- State policy
- City ordinance
- Voluntary utility program



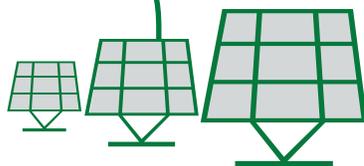
Challenges

- Identification of off-site location and associated property costs
- Lower electricity rates
- Economic hurdles
- Long-term solar maintenance
- Unfamiliarity with solar process
- Billing system upgrades



Opportunities

- Clean energy benefits
- Increase consumer access + energy equity
- Serves underserved markets
- Creates locational/grid values for certain areas
- Energy bill savings
- Proven solution
- Promotes flexibility



Endnotes

¹ Solar Energy Industries Association, “Solar Industry Data,”

<http://www.seia.org/research-resources/solar-industry-data> (accessed 12/26/2017).

² National Multifamily Housing Council, Quick Facts: Resident Demographics, “U.S. Households: How Many Rent, How Many Own?”

<http://www.nmhc.org/Content.aspx?id=4708#RentOwn> (accessed 12/26/2017).

³ Ibid.

⁴ National Shared Renewables Scorecard,

<https://irecusa.org/regulatory-reform/shared-renewables/national-shared-renewables-scorecard/> (accessed 03/01/2018).

⁵ Virtual Net Metering (VNM) is occasionally used to facilitate off-site shared solar projects;

See the Massachusetts VNM program highlighted in the case study on page 6.

Resources

Center for Sustainable Energy Virtual Net Metering Market Development Project

As part of a three-year Solar Market Pathways project funded by the U.S. Department of Energy Solar Energy Technologies Office, the Center for Sustainable Energy increased the awareness, effectiveness and use of virtual net energy metering (VNEM) in California and beyond.

<https://energycenter.org/solar-market-pathways>

IREC’s Shared Renewables web page

Highlights IREC’s work on shared renewables programs and provides links to numerous tools and resources.

<http://www.irecusa.org/regulatory-reform/shared-renewables/>

IREC’s National Shared Renewables Scorecard

Launched by IREC in May 2017, the Scorecard evaluates state shared renewables programs using objective criteria based on best practices for program design.

<https://sharedrenewablescorecard.org/>

IREC’s State Shared Renewables Energy Program Catalog

Lists all state shared renewables programs, detailing all major program rules and provisions.

<http://www.irecusa.org/regulatory-reform/shared-renewables/state-shared-renewable-energy-program-catalog/>

EnergySage

An online solar marketplace that allows homeowners to receive and compare quotes from a network of pre-screened solar installers.

<https://www.energysage.com/>

Low-Income Solar Policy Guide (GRID Alternatives, Vote Solar, Center for Social Inclusion)

Provides information on various policies and programs that are creating access to solar technology and jobs nationwide.

<http://www.lowincomesolar.org>

Bringing the Benefits of Solar Energy to Low-Income Consumers (Clean Energy States Alliance)

This guide outlines the obstacles that low-income households face in accessing solar power and provides a detailed overview of strategies that policymakers and government agencies can use to encourage low-income solar adoption.

<http://www.cesa.org/resource-library/resource/bringing-the-benefits-of-solar-energy-to-low-income-consumers>

Lights Out in the Cold (NAACP)

This report issued by the NAACP’s Environmental and Climate Justice Program (ECJP) shows lower income communities spend a greater portion of income on electricity and heating costs than high-income communities. In addition, the report outlines how utility company shut-off policies disproportionately impact low-income and African American communities.

<http://www.naacp.org/latest/utility-disconnections-leave-thousands-around-nation-cold-left-dark/>

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