

OWNING THE BENEFITS OF SOLAR+STORAGE

New Ownership and Investment Models for
Affordable Housing and Community Facilities

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ABOUT CLEAN ENERGY GROUP

Clean Energy Group is a leading national, nonprofit advocacy organization working on innovative technology, finance, and policy programs in the areas of clean energy and climate change. Clean Energy Group, in partnership with Meridian Institute, founded the Resilient Power Project to help states and municipalities with program and policy information, analysis, financial tools, technical assistance, and best practices to speed the deployment of clean, resilient power systems in their communities. For more information, visit www.cleangroup.org and www.resilient-power.org.

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Contents

3 Introduction

5 The Financing Need and Alternative Ownership Models

6 Model No. 1:
Immediate Direct
Ownership

8 Model No. 2:
Third-Party
Ownership Flip

9 Model No. 3:
Third-Party Ownership
Flip Using an Affiliated
Entity

12 Model No. 4:
C-PACE Financing with
Third-Party Ownership

13 Model No. 5:
Utility Ownership or
Third-Party Ownership
under a Utility Contracted
Payment-for-Services
Agreement

14 Conclusions and Next Steps

14 Endnotes

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Introduction

NOW THAT THE MARKET FOR solar PV coupled with battery storage (solar+storage) is taking off in mainstream markets, it is important that low-income communities are not left behind. One of the reasons for this lag in market uptake of clean energy in low- and moderate-income (LMI) communities is a persistent financing gap.

Current models of financing clean energy systems do not sufficiently serve low-income communities, if they serve them at all. There is a lack of capital to invest in these systems in LMI markets. One primary reason is that most nonprofit property owners are viewed by lenders as having limited borrowing capacity for energy-related projects. They also have difficulty accessing tax equity markets, which are so important to funding solar+storage projects.

As a result, these solar+storage projects are vastly underrepresented in affordable housing and community facilities across the country.¹ The sad irony is that this lack of financing prevents the types of solar+storage projects that could reduce utility bills and create more resilient power systems for people who need the benefits the most.²

What is needed to overcome this financing gap and to deliver the benefits of resilient power to LMI markets? A focus for many community advocates has been to create new ways for low-income residents and their organizations to own these systems and to get the benefits through asset ownership, such as with community solar models.³

That position makes a lot of sense and is understandable from several perspectives. Climate change has disproportionately impacted people with limited economic resources. Clearly, underrepresented communities and people with low incomes need to share in the economic and environmental benefits of clean, resilient power. The historical lack of ownership of community assets by communities of color makes a compelling case to ensure that future control and ownership remains in the LMI communities, so they can directly benefit from and participate in the



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clean energy economy. Suspicion of outside control and ownership of community assets remains a powerful concern for those creating locally based environmental justice and energy equity programs.

With clean energy systems especially, there is little doubt that direct ownership can provide property owners with the greatest level of control over a solar+storage system's various value streams, ranging from utility bill savings, to potential revenue from grid services, to

4 OWNING THE BENEFITS OF SOLAR+STORAGE

back-up power during grid disruptions. For good reason, ownership is a key equity issue for LMI advocates to pursue.

However, with these views and goals in mind, it is also wise to explore the range of options for ways that local communities can share in the equitable benefits of the clean energy economy. Toward that end, and in recognition of some potential obstacles facing the direct ownership approach, this paper suggests additional ownership models worth consideration, which may represent good alternative approaches for some communities.

Much of this paper is premised on a somewhat counter-intuitive assumption—that to achieve social equity benefits, LMI communities may want to consider additional non-ownership options for solar+storage technologies to achieve the best “ownership benefits.” In other words, we start with the immediate direct ownership model as a baseline and then offer for consideration for other ownership and financing alternatives for solar+storage assets, to reach equity goals in LMI markets.

This is a point worth emphasizing: although direct, immediate ownership of clean energy assets may have a special significance for low-income communities, it is not the only option. There are other ownership and financing avenues, for both LMI and non-LMI markets, worth considering that could produce significant benefits, with less risk in terms of project development, system performance, and financial risk for property owners.

To those ends, we explore some financing strategies for LMI markets that are generally only available to the commercial and industrial customers with substantial balance sheets and sound credit. In this brief paper, we take the current financing mechanisms that commercial customers use and apply them to LMI communities—strategies that housing and community development entities and LMI advocates are already beginning to pursue in communities across the country.⁴

The paper is designed to introduce to a wider audience some of these emerging new financing models to address the energy equity challenge and to level the financing playing field.

This report looks at five ownership and investment models that promise to extend the benefits of solar+storage to affordable housing owners and residents—as well as community facilities.⁵ These options enable nonprofit

property owners and low-income residents to retain economic benefits that solar+storage can provide, while at the same time improving the economic feasibility of an LMI project by attracting tax equity investment and long-term financing that might not otherwise be available to nonprofit property owners.

These five models can be summarized as follows:

1. **Immediate direct ownership:** The solar+storage system is purchased and owned outright by the property owner.
2. **Third-party ownership flip:** A third-party entity initially owns the solar+storage assets until the tax equity investor’s tax incentives have been fully used, at which point ownership of the project assets flips to the property owner.
3. **Third-party ownership flip using an affiliated entity:** Instead of the assets being transferred to the property owner/housing developer once the tax benefits have been fully utilized, they are transferred to an affiliated public purpose entity.
4. **C-PACE financing with third-party ownership:** PACE financing secures the loan payments through a priority lien assessment on real estate property, providing third-party owners/tax equity investors with additional security and long-term debt sources for solar+storage projects.
5. **Utility ownership or third-party ownership under a utility contracted payment-for-services agreement:** As long as energy demand congestion is relieved in key grid circuits, the utility is indifferent to whether the project is located adjacent to an LMI community property. When the grid is down, the solar+storage system is available to provide resilient back-up power for adjacent critical energy loads and public services.

This paper briefly describes these ownership and financing models for solar+storage in affordable housing and community facilities. Much more work is needed to put some of the new models into practice, including a review and reaction from the environmental justice community and others to ensure that these models expand rather than narrow the options for achieving the equitable benefits of these new technologies.

The Financing Need and Alternative Ownership Models

MOST AGREE THAT MORE EMPHASIS needs to be placed on expanding the access to and delivering the benefits from solar+storage technologies to affordable housing owners and the residents they serve.

For environmental justice organizations, the view is that a new energy system is needed—one that places energy decisions in the hands of the community, that is environmentally and economically more equitable, and that integrates more clean energy generation.⁶

But the questions of how to finance that just transition—and what are the appropriate business and ownership models for systems in LMI markets—are complex to answer. They raise some profound questions of how we adapt current financing mechanisms to meet this important energy equity challenge.

Some major obstacles stand in the way of financing these systems.

Though direct ownership of solar+storage systems allows owners to retain all of the utility bill savings and revenue generated from these systems, purchasing solar+storage systems outright with cash and loans is not always a feasible option for many property owners that serve low- and moderate-income (LMI) markets. Many LMI property owners are viewed by lenders as having limited cash flow to service additional debt, making it difficult to access financing for energy upgrades.

Additionally, nonprofit owners of affordable housing or community facilities are not well served by solar+storage tax equity markets. Most nonprofit affordable housing owners have little if any tax appetite, and many tax equity



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investors have little experience or interest in the relatively small-sized solar+storage tax credit transactions that affordable housing typically offers, particularly when they do not coincide with a LIHTC (low-income housing tax credit) capitalization event.

What's more, lease financing and power purchase agreements (PPAs) for solar PV, and now solar+storage installations, have not always been transparent; and the pricing and deal structures are traditionally designed to benefit the investor and developer rather than maximizing the financial benefits for a nonprofit housing owner or critical community facility to advance its mission.

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6 OWNING THE BENEFITS OF SOLAR+STORAGE

In the case of stand-alone solar systems, third-party ownership and lease financing models have greatly expanded the market for solar photovoltaics (PV) by providing no down payment, 100 percent financing. But in many instances, it has also obligated property owners to long-term leases with recurring payment escalators and unclear bundled operating, management, and financing costs—which present an especially tricky problem for LMI customers or property owners who may have little ability to absorb increasing costs. For these and other reasons, residential direct ownership of PV systems overtook solar leasing in the United States in the last quarter of 2016.⁷

These financing challenges come amidst the backdrop of major changes in the clean energy market.

The deployment of stand-alone solar PV systems on affordable housing has been increasing rapidly in recent years. As the costs of PV modules have declined, more financing tools have been created and become widely available, and more policy efforts at the state level are being focused on expanding the benefits of clean energy and to address environmental justice concerns.⁸

Still, many low-income communities have not had sufficient access to solar technologies, and recent analysis suggests that the value of standalone solar systems may be at risk as states consider changes to net metering policies and utilities adjust electricity rate structures.⁹

Due to the flexibility of battery storage, solar+storage systems can provide greater cost savings than solar alone, in many cases. This is because the addition of battery storage to solar allows the customers to control how and when they use electricity, whether generated from solar panels or from the grid.

Adding that control can increase electric bill savings and, in some instances, create opportunities for revenue generation by providing valuable grid service, thereby increasing a project owner's capacity to take on project financing.¹⁰

All of which leads to the discussion of financing options in this paper. This is intended to start a discussion of the broad range of options for owning and financing solar+storage systems. It is designed to open up the conversation to explore a variety of models that could attract more capital and provide equitable benefits in LMI communities.

MODEL NO. 1

Immediate Direct Ownership

WHAT IT IS

A property owner, whether a for-profit affordable housing owner or other nonprofit entity, can choose to purchase and own outright a solar+storage system.

In this model, a solar+storage developer designs and builds a turnkey system to be purchased by the property owner, and the owner retains the greatest flexibility and control over the economic and use benefits of the solar+storage system. All of the net metering, solar renewable energy certificates (SRECs), and utility bill savings from the solar and energy storage system are retained by the owner.

By owning the solar+storage system, the property owner can retain the maximum flexibility in adjusting how the system is configured to access different cost savings and revenue streams as policies and market rules evolve in the years ahead.

However, tax-exempt organizations such as government agencies and nonprofit entities are unable to take the tax incentives associated with solar+storage systems. Only for-profit entities with sufficient earnings to take advantage of tax incentives, or third-party owned entities funded by tax equity investors, can take the tax benefits associated with solar+storage. These tax benefits include investment tax credits (ITCs) and accelerated depreciation (i.e., Modified Accelerated Cost Recovery System or MACRS).

If the owner is unable to take advantage of these tax incentives, additional invested capital, debt and/or project subsidy will be needed to complete the financing for the solar+storage project.

In the immediate direct ownership model, a solar + storage developer designs and builds a turnkey system to be purchased by the property owner, and the owner retains the greatest flexibility and control over the economic and use benefits of the solar + storage system. All of the net metering, SRECs, and utility bill savings from the solar and energy storage system are retained by the owner.

HOW IT'S FINANCED

The great majority of multifamily affordable housing being developed today is financed with low-income housing tax credits (LIHTC). Solar + storage can be included in the project budget at the time of new construction or substantial rehab, which provides the opportunity to finance integrated energy measures with tax equity investment.

However, financing real estate improvements, including solar + storage projects, between capitalization events is difficult for property owners who want immediate ownership of the project assets. All of the financing parties in the original capital “stack” will need to underwrite the additional financing and provide consent. It can also be difficult to find tax equity investors and debt financing for solar + storage retrofits between LIHTC capitalization events because of the relatively small amount of capital required relative to the complexity and unrated credit of the transaction

HOW LMI COMMUNITIES BENEFIT

As an alternative to direct ownership, third-party entities can provide solar + storage services to property owners through lease financing arrangements. However, these agreements can also commit the property owner to lengthy terms with cost escalators (and termination fees) that may soon become uncompetitive with rapidly evolving market technologies and product offerings. Also, the actual financing, operating, and maintenance costs and profit margins are not transparent in these agreements.

Immediate direct ownership allows the property owner to retain all of the economic benefits of the solar + storage system without any cost escalators or termination fees. The property owner can competitively negotiate favorable service and maintenance agreements with a variety of vendors. This also maximizes the potential benefits that can be shared with tenants. In jurisdictions where virtual net metering is available, or for master-metered properties, the economic benefits of solar + storage systems can be

shared with tenants through individual utility bill credits or adjustments to the utility portion of the rent payment.

Additional bill savings created by a battery storage system’s ability to reduce demand charges for common areas could also be shared with tenants, assuming the consent of the property owner and utility. The ability to maximize and share with tenants the economic benefits of clean distributed power generation like solar + storage is an issue of growing importance for community advocates and those concerned with environmental justice.



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MODEL NO. 2

Third-Party Ownership Flip

WHAT IT IS

The third-party ownership flip model uses a third-party entity to initially own the solar+storage assets until the tax equity investor's tax incentives have been fully utilized, and the tax equity investor's required return on investment has been achieved. At that point, ownership of the project assets is flipped to the property owner.

This model allows a nonprofit property owner to ultimately own the solar+storage system and enables the project to raise tax equity investment and to take advantage of the ITCs and MACRS benefits. This model is valuable to for-profit property owners as well.

HOW IT WORKS

The third-party entity (either a special purpose entity created for the specific project or a third-party project development entity) raises tax equity investment to supplement the grants and incentives that have been awarded to the project. Solar+storage equipment can be installed without any upfront capital cost to the property owner. The property owner then pays for the electricity from the system under a power purchase agreement (PPA). PPAs are contracts where the customer pays only for the power supplied by the system.

The third-party ownership of solar+storage assets does not interfere with the existing capital stack for the real estate property, so no additional consents are required by existing mortgage lenders, and the project does not need to coincide with a capitalization event.

Regardless of the respective amounts of grant and tax equity investment provided by the property owner and the tax equity investor, 100 percent of the tax benefits are allocated to the tax equity investor. Once the tax benefits have been exhausted, the tax equity investor's ownership interest in the assets is flipped to the property owner/housing developer.

An alternative to transferring ownership to the property owner (i.e., an ownership flip when tax benefits have been exhausted) is for the third-party ownership entity to retain ownership of the energy assets throughout the term of the PPA. In general, PPAs are structured to initially

This model uses a third-party entity to initially own the solar+storage assets until the tax equity investor's tax incentives have been fully utilized, and the tax equity investor's required return on investment has been achieved. At that point, ownership of the project assets is flipped to the property owner.

provide electricity at a slightly lower cost than if the customer were to pay for power from the utility; but, the PPA payments are usually structured to increase throughout the term of the agreement.

However, one California project developer has created a PPA agreement whereby PPA payments are structured to decrease over time. Organized as a Benefit Corporation (B Corp)¹¹, once the initial hardware and installation costs are paid off and tax incentives exhausted, the cost savings are reallocated to benefit the customer through lower PPA payments.¹² This model is being used to install solar+storage systems in six California schools totaling 1 MW of solar PV and 1.2 MWh of energy storage.¹³

It should be noted that the *Tax Cuts and Jobs Act of 2017* has reduced the corporate tax rate from 35 percent to 21 percent starting in 2018. The lower tax rate reduces the value of tax benefits and will likely reduce the amount of tax equity that can be raised for new solar-only and solar+storage projects. Previously, those projects qualified for an investment tax credit worth at least 30 cents per dollar of capital cost and depreciation worth 26 cents. Depreciation will be worth less at a 21 percent corporate tax rate than at 35 percent, affecting the amount of tax equity that is likely to be raised for new projects.¹⁴

HOW LMI COMMUNITIES BENEFIT

Investment tax credits available for solar+storage can raise as much as 30 percent of an eligible solar+storage system's hard and soft costs; and MACRS accelerates the amount of depreciation expense that can be deducted against taxable income, thereby sheltering more income in less time. These benefits are valuable to tax investors and can raise equity investment that nonprofit property owners could not otherwise access.

This equity investment reduces the amount of grant subsidy and/or debt financing that is needed to fund a project. By raising more equity investment that does not require debt service payments, the project economics are significantly improved, more projects in low-income communities are feasible, and property owners and tenants can realize the economic, health, and safety benefits of solar+storage.

Third-party ownership models can allow the affordable housing or community facilities property owner to retain many of the benefits of ownership while reducing some of the risks associated with ownership of the new technology

assets. By providing an exit for tax equity investors in exchange for the nonprofit's investment of grants and other project subsidies, it can create community leverage in structuring the deal and sharing project benefits more equitably.

Third-party ownership models can also relieve the property owner of development risk, the initial O&M risks, and the technical and financial performance risks associated with a new integrated technology. It allows the project to capture the considerable tax benefits available to solar+storage, which can be shared with the nonprofit owner through a favorable PPA or energy services agreement (ESA). At the same time, it secures through the ownership flip the long-term economic benefits and maximum flexibility over time that direct ownership provides as the market evolves in the years ahead.

By doing so, third-party ownership models can allow nonprofit property owners to "own the benefits" of solar+storage immediately without having to own the assets at the time of installation.

MODEL NO. 3

Third-Party Ownership Flip Using an Affiliated Entity

WHAT IT IS

As with Model #2 above, this ownership structure has tax equity investors owning the solar+storage assets until the tax benefits have been fully utilized, and then ownership of the assets flips. But instead of the assets being transferred to the housing developer/nonprofit property owner, they are transferred to an affiliated public purpose entity created by a nonprofit entity or other intermediary.

HOW IT WORKS

Under this model, an affordable housing owner/developer would establish an affiliated legal entity that can aggregate investment tax credits for multiple solar+storage project assets to create a scaled investment opportunity that attracts tax equity investors.

Initially, the affiliated legal entity would retain 1 percent ownership of the solar+storage assets, and the tax equity investor would own the remaining 99 percent. The affiliated entity would enter into PPAs with the individual affordable

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10 OWNING THE BENEFITS OF SOLAR+STORAGE

housing project owners on favorable terms that would provide greater benefits to the owners and tenants than a standard solar lease or PPA would.

In the sixth year, when the tax benefits have been fully utilized by the tax equity investor, ownership of the assets flips to the affiliated entity. The PPAs between the affiliated entity and the property owners remain in effect throughout the economic life of the project, and the project assets remain with the affiliated entity and do not revert to individual property owners at any point.

The affordable housing owner/developer and the affiliated entity could serve as co-developers for the solar+storage project, for which they would share in the development fee. Construction and permanent financing to leverage the tax equity investment for the project can be obtained by either the owner/developer or the affiliated entity.

It should be noted that incentives and subsidies still remain very important to financing these projects by writing down a portion of the equipment costs. At this early stage

in the market, tax equity and debt financing even on favorable terms do not replace the need for incentives and subsidies for solar+storage in affordable housing.

HOW LMI COMMUNITIES BENEFIT

One of the difficulties in making solar+storage projects work in multifamily low-income housing is the significant financing transaction costs associated with them, including the difficulty of sourcing tax equity for individual projects.

In most cases, a single multifamily solar+storage project is much too small to interest institutional investors. Without tax equity to fund the 30 percent ITC and take advantage of accelerated depreciation benefits, housing portfolio owners must find additional grants and subsidies to replace that investment, or decide instead to enter into long-term leasing agreements that may incorporate bundled development, financing, and operations and maintenance fees with costly annual lease escalators. These costs strip many of the economic benefits that could otherwise be retained by property owners and tenants.



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The creation of a third-party entity to aggregate solar+storage investment opportunities is important to investors. The affiliated entity could provide the same project development and management services to multiple affordable housing owners. It could create standardized deal and financing structures and develop pro forma documents that can be used repeatedly for subsequent rounds of financing.

Aggregating multiple small solar+storage projects that look alike and are structured properly is more likely to find investors, especially if there is a likelihood that multiple rounds of similarly structured transactions will follow. Developing pipelines of similar projects to finance

is the key to widely deploying the economic, health, and safety benefits of solar+storage in low-income communities.

By creating a public purpose entity to develop and own solar+storage assets, one that's affiliated with a strong nonprofit affordable housing portfolio owner, many of the economic benefits that would otherwise be siphoned off by traditional third-party developers and leasing entities are instead captured by the affiliate and shared with participating property owners and tenants through favorable PPAs. These retained benefits include development and annual management fees paid to the affiliated entity.

50 Strategies to Scale Resilient Power in LMI Communities

Increasingly, market players are looking to create development and finance strategies that can be scaled to implement solar+storage projects in LMI communities. These market participants include national energy service companies (ESCOs) in the multifamily affordable housing market, asset managers, life insurance companies, tax credit investment brokers, and social investment/finance entities.

But the market for resilient community solar+storage development is at an early stage; and incentives, investment, and supportive policies will play an essential role in the next few years in accelerating project deployment in LMI communities. Clean Energy Group has identified more than 50 recommended grant and investment opportunities that foundations could support to build the market for solar+storage in low income communities (see "A Resilient Power Capital Scan," www.cleanegroup.org/ceg-resources/resource/resilient-power-capital-scan).

The following interventions are drawn from this capital scan and describe ways that foundations could address barriers to financing community resilient power projects:

- **Support New Tax Credit Aggregation Strategies.** There are opportunities to support the creation of specialized solar+storage tax credit investment entities for the LMI market, as well as expanding the marketing efforts of existing LIHTC, NMTC and historic preservation tax credit investment brokers.
- **Provide Credit Enhancement for Performance Risk.** There is a need for credit enhancement for investors and building owners that reduces performance and financial risk, resulting in increased access to capital at lower cost and greater demand to develop projects.
- **Invest for LMI Expansion.** There are strong energy management consulting firms and ESCOs that are focused on affordable housing portfolios. Foundations could invest in these companies to help them aggregate hundreds of solar+storage projects by developing and deploying a solar+storage product and service offering.
- **Support a Special Fund.** A specialized financing vehicle is needed to provide investment for solar+storage projects in affordable housing and community facilities. Many social investors and financing institutions would consider investing in a fund but do not want to underwrite and finance individual projects and companies on a one-off basis. A fund-to-fund investment could be a way for foundations to make PRIs, MRIs, and to provide credit enhancement to attract institutional capital and tax equity investment to finance pipelines of affordable housing energy-related upgrades, including solar+storage.

MODEL NO. 4

C-PACE Financing with Third-Party Ownership

WHAT IT IS

Property Assessed Clean Energy (PACE) financing is an established means of securing loan payments through an assessment on real estate property that is equivalent in terms of lien priority to property taxes or other public improvement assessments. For third-party owned solar+storage projects, it can provide additional security to long-term debt sources and tax equity investors.

PACE is often used for taxable commercial properties (C-PACE), but it is beginning to be used with nonprofit-owned properties. Through PACE-secured financing, many community facilities and multifamily affordable housing properties owned by nonprofits are now able to enjoy the economic benefits of integrated clean energy solutions like solar+storage, even though they do not pay property taxes.

HOW IT WORKS

A for-profit special purpose entity (SPE) is established—either as a wholly owned for-profit subsidiary or by an affiliated third-party entity—to own the solar+storage project assets and to attract tax equity investment that would otherwise be unavailable to nonprofit property owners.

State and local incentives and favorable financing—including 20-year tax credit bond financing such as Qualified Energy Conservation Bonds (QECBs)—can be used to reduce the cost of financing and increase the project's economic benefits. These economic benefits are then passed on to the property owner through improved PPA pricing and terms, sometimes using a “prepaid PPA” model (an option that may no longer be financially feasible under the 2017 end-of-year US tax-cut bill).¹⁵⁻¹⁶ Once the

investment tax credits have been fully used, ownership of the solar+storage equipment can be flipped to the nonprofit property owner or affiliate.

The PACE model can be used to secure favorable PPAs for nonprofit solar projects in HUD-assisted multifamily housing in conjunction with tax-exempt bond financing and other credit enhancements.¹⁷ Initial projects are in development in the District of Columbia and New York, combining tax credit investment with 20-year debt at an interest rate of less than 4 percent.

Similarly, public purpose financial intermediaries, including green banks, are currently evaluating opportunities to finance a portfolio of solar+storage projects in multifamily and senior affordable housing, health care facilities, and community shelters.

In some instances, these efforts have been assisted with foundation grants and PRIs, with the intention of creating a financing platform that will provide access to tax equity investment for nonprofit-sponsored projects, using C-PACE secured PPAs between the property owner and a third-party entity that holds the energy assets.

HOW LMI COMMUNITIES BENEFIT

C-PACE for nonprofit property owners can provide a real estate-secured PPA that reduces risk for tax equity investors and long-term lenders. This credit enhancement, together with 20-year, tax-exempt financing and/or other public and private debt sources, results in low debt service payments that reduce operating costs and increase cash flow for affordable housing property owners. That in turn increases a project's financial resilience by freeing up cash flow and borrowing capacity for other housing needs.

Through PACE-secured financing, many community facilities and multifamily affordable housing properties owned by nonprofits are now able to enjoy the economic benefits of integrated clean energy solutions. For third-party owned solar+storage projects, it can provide additional security to long-term debt sources and tax equity investors.

Other PACE financing benefits to nonprofit portfolio owners include the following:

- 100 percent financing is available for project costs, including soft costs like energy audits, engineering, and other fees.
- Utility savings exceed monthly PPA payments and improve cash flows and net operating income from the first day of operation.
- Repayment is made through a property assessment that transfers with the property title to subsequent real estate owners, further reducing financial risk.
- The PACE model could mitigate the split incentives problem. An energy improvement that benefits owners and tenants—but the costs of which cannot be passed onto tenants—creates a disincentive for the owner to make the improvement. But tax and other property assessments can usually be passed through to tenants. These PACE payments are offset by utility savings, resulting in shared economic benefits for both owner and tenants.

MODEL NO. 5

Utility Ownership or Third-Party Ownership under a Utility-Contracted Payment-for-Services Agreement

WHAT IT IS

Utilities are looking to use solar+storage as a possible means of relieving power demand congestion and improving grid integration of renewables in key locations along the grid. Prospective solar+storage projects are beginning to be developed in low-income communities that both benefit those communities and well as electric utilities facing grid constraints.

As long as the solar+storage system provides energy demand services to relieve congestion in key grid circuits, the utility is indifferent to whether the project is located in a school, a multifamily affordable housing property, or an open field. And when the grid is down, the solar+storage system is available to provide resilient back-up power for adjacent LMI critical energy loads and public services.

HOW IT WORKS

Utilities have begun to collaborate with public school districts and colleges to install solar+storage systems to provide backup power for emergency shelters during extended power outages.¹⁸ For the utility, these partnerships provide actual experience as to how solar+storage can impact grid reliability and renewable energy integration, as well as explore additional use cases and business models for solar+storage projects.

Utilities may choose to own the solar+storage systems outright. But in many states, utilities are not permitted to own generation sources. An alternative ownership model

would be for for third-party providers to own solar+storage systems and sell energy, capacity, or ancillary services from solar PV, other distributed generation, and battery storage into wholesale markets or under payment-for-services utility contracts.¹⁹

This may involve aggregating multiple battery storage systems to create larger energy services offerings, something a single property owner or business may not otherwise be able to do.²⁰ This ownership model has been deployed in commercial markets and could be extended to multifamily affordable housing and community facilities.

HOW LMI COMMUNITIES BENEFIT

Project developers can encounter difficulty obtaining financing and investment capital when developing third-party-owned solar+storage projects sited in LMI communities and in critical community facilities. Financing would be much more readily available if the projects were structured with utility contract payment agreements for various energy storage services the system could provide.

Developing solar+storage projects under utility payment-for-services contracts and locating them adjacent to multifamily affordable housing and community facilities provides resilient back-up power for the property owner's critical electric loads. In addition to obtaining resilient power, the property owner could receive rent payments from the utility for siting the solar+storage system on the property. These payments could be applied to tenants' utility costs or to fund other tenant services.

Conclusion and Next Steps

IN MANY LOW-INCOME COMMUNITIES, owners of housing and community facilities may decide that they want to directly own solar+storage systems. That remains an option for those entities with the resources and financial capacity to undertake this ownership option.

But even for this group of property owners, there are many early market challenges that affect investors and lenders' willingness to provide financing for solar+storage projects. Among these are the lack of standardized deal and financing structures, the need for more performance data, and the lack of robust and predictable pipelines of conforming projects.

This paper attempts to expand the ownership and financing options for solar+storage projects and low-income communities beyond direct ownership and conventional leasing models.

It makes a simple point: there are ownership and financing strategies that can provide many of the economic and other benefits of direct ownership, while overcoming some of the risks and barriers that direct ownership may entail for many project developers.

Again, these are options that may or may not be preferable to immediate direct ownership, given the many circumstances that affect energy technology ownership and financing.

But it seems that these new avenues have not been fully tested in LMI markets with solar+storage projects. They are proposed as possibilities worth considering.

We look forward to having a more systematic conversation with all interested parties to explore these opportunities going forward. As noted in the introduction to this paper, this is intended to open, not limit, the dialogue about ways to bring new financing to LMI markets.²¹

ENDNOTES

- 1 There are many reasons for this gap, which we outline in a report titled, *A Resilient Power Capital Scan: How Foundations Could Use Grants and Investments to Advance Solar and Storage in Low-Income Communities*. The report, commissioned by The Kresge Foundation, the Surdna Foundation and The JPB Foundation, identifies market barriers to deploying solar+storage technologies in low-income markets, and proposes more than 50 grant and investment opportunities that socially minded investors can use to target those barriers.
- 2 The *Resilient Power Project* (RPP), a joint initiative of Clean Energy Group and Meridian Institute, is working to accelerate market development of solar PV plus battery storage (solar+storage) technologies for resilient power applications that also provide economic benefits to low-income communities. RPP's many reports include: *Resilience for Free: Solar+Storage 101: An Introductory Guide to Resilient Solar Power Systems*, *How Solar+Storage Could Protect Multifamily Affordable Housing from Power Outages at Little or No Net Cost*, and *Solar+Storage for Low- and Moderate-Income Communities: A Guide for States and Municipalities*.
- 3 See http://www.lowincomesolar.org/wp-content/uploads/2016/03/Low-Income-Solar-Policy-Guide_3.11.16.pdf; http://caleja.org/wp-content/uploads/2017/01/TCCReport.2016.FINAL_.2.pdf; <http://www.healthyworldforall.org/en/express-img/17081516-3570-img1.pdf>; and <http://greenlining.org/issues-impact/environmental-equity>.
- 4 Excellent work is being done to develop new financing products, underwriting terms, and development/construction risk mitigation protocols for LMI solar+storage projects, notably New York City Energy Efficiency Corporation (NYCEEC), NHT Renewable, Enterprise Community Partners, LINC Housing, Urban Ingenuity and Generate Capital.
- 5 The five models described in this report are summarized from ongoing conversations with property owners, project developers and financial intermediaries who are actively pursuing the development of solar+storage projects in low-income communities.
- 6 See <http://caleja.org/what-we-do/energyequity>.

- 7 See <https://www.greentechmedia.com/articles/read/its-official-more-residential-solar-customers-buy-than-lease?>
 - 8 See *Bringing the Benefits of Solar Energy to Low-Income Consumers* (<https://www.cesa.org/resource-library/resource/bringing-the-benefits-of-solar-energy-to-low-income-consumers>) and *Solar+Storage for Low- and Moderate-Income Communities: A Guide for States and Municipalities* (<https://www.cesa.org/resource-library/resource/solar-storage-for-low-and-moderate-income-communities-a-guide-for-states-and-municipalities>).
 - 9 See *Solar Risk: How Energy Storage Can Preserve Solar Savings in California Affordable Housing* (<http://www.cleaneenergy.org/ceg-resources/resource/california-solar-risk>)
 - 10 As detailed in previous papers by Clean Energy Group (CEG), solar+storage systems can provide multiple benefits to multifamily affordable housing building owners. These benefits include: reducing electricity bill payments (both consumption charges and demand charges); improving building resiliency and safety by delivering back-up power to critical building loads; revenue generation through providing grid services and participation in utility demand response programs; preserving and enhancing the value of standalone solar by using energy storage to shift solar electricity consumption from low-priced periods to higher-value periods under time-of-use utility rate structures; and improving public health by decreasing reliance on heavily polluting fossil-fuel peaker plants, which are often sited in low-income areas. See *Resilience for Free: How Solar+Storage Could Protect Multifamily Affordable Housing from Power Outages at Little or No Net Cost, Closing the California Clean Energy Divide: Reducing Electric Bills in Affordable Multifamily Rental Housing with Solar+Storage*, and *Solar Risk: How Energy Storage Can Preserve Solar Savings in California Affordable Housing*.
 - 11 Certified B Corps must meet standards of verified social and environmental performance, public transparency, and legal accountability, with the intention of using business practices and the power of markets to solve social and environmental problems. <https://www.bcorporation.net/what-are-b-corps/why-b-corps-matter>
 - 12 See <http://sol-ed.com/our-services/soled-financing>
 - 13 See <https://www.energy-storage.news/news/sgip-and-jigar-shahs-generate-capital-takes-sharp-smartstorage-to-six-calif>
 - 14 See *How the US Tax Changes Affect Transactions* by Keith Martin, <http://www.nortonrosefulbright.com/knowledge/publications/158248/how-the-us-tax-changes-affect-transactions>.
 - 15 The offtaker (e.g., public housing authority, utility, etc.) negotiates a long-term PPA to buy electricity from the project entity as a prepayment for some or all of the electricity generated over the term of the agreement in exchange for a discount on the electricity price. The advantage of a prepaid PPA is that in most cases an energy purchaser such as a utility, housing authority or municipality has access to cheaper capital than a solar energy developer. See https://www.chadbourne.com/PrepaidPowerContracts_Sept12_Projectfinance and <https://financere.nrel.gov/finance/content/prepay-good-way-solar>.
 - 16 See *How the US Tax Changes Affect Transactions* by Keith Martin, <http://www.nortonrosefulbright.com/knowledge/publications/158248/how-the-us-tax-changes-affect-transactions>.
 - 17 See *PACE for Nonprofit-owned Buildings: Cutting Energy Costs to Serve Communities*, <http://pacenation.us/pace-nonprofit-owned-buildings-cutting-energy-costs-serve-communities>.
 - 18 See <http://www.cleaneenergy.org/ceg-projects/resilient-power-project/featured-installations/hopewell-valley/>
 - 19 See <http://www.utilitydive.com/news/how-aggregated-der-are-becoming-the-new-demand-response/422725> and <http://www.utilitydive.com/news/how-california-is-bringing-der-aggregation-to-wholesale-markets/408958/>
 - 20 See <https://www.fool.com/investing/2016/12/21/what-business-model-will-succeed-in-energy-storage.aspx>.
 - 21 Clean Energy Group has had conversations with many parties who are interested in addressing the financing needs of resilient energy project developers in LMI communities in these creative ways. This interest has centered on possibly creating a special fund that leverages institutional capital and is deployed and managed by financial intermediaries. Foundations could play an important credit enhancement and co-investment role to reduce risk and increase return for investors.
- Clearly, for a special fund to succeed there needs to be multiple pipelines of qualifying transactions into which the funds can be readily deployed. These pipelines should be built with projects that conform to a limited number of deal structures and credit profiles.
- The next steps involve assessing the financing opportunity represented by existing pipelines of projects under development, and then exploring which new ownership and financing models are best suited to scale project financing beyond one-off transactions. This effort would be accelerated by the creation of a small working group of project developers and portfolio owners together with interested investors and financial intermediaries, who want to identify what is required to aggregate financeable projects into scalable investment opportunities.



ABOUT THE RESILIENT POWER PROJECT

The Resilient Power Project, a joint initiative of Clean Energy Group and Meridian Institute, is working to accelerate market development of solar PV plus battery storage (solar+storage) technologies for resilient power applications serving low-income communities. The Resilient Power Project works to provide new technology solutions in affordable housing and critical community facilities to address key climate and resiliency challenges facing the country:

- **Community Resiliency** — Solar+storage can provide revenue streams and reduce electricity bills, enhancing community resiliency through economic benefits and powering potentially life-saving support systems during disasters and power outages.
- **Climate Adaptation** — Solar+storage systems can provide highly reliable power resiliency as a form of climate adaptation in severe weather, allowing residents to shelter in place during power disruptions.
- **Climate Mitigation** — Battery storage is an enabling technology and emerging market driver to increase adoption of solar PV for distributed, clean energy generation and to advance climate mitigation efforts.

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