

Civic Power: A Primer on PACE-Secured Solar Power Purchase Agreements

*Building the Market for Small Commercial Solar Projects to Serve
Nonprofit and Community-Based Organizations Using PACE-Secured PPAs*

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Disclaimer

This material is based upon work supported by the Department of Energy Office of Energy Efficiency and Renewable Energy (EERE), under Award Number DE-EE0007319, Nationally Administered by The Solar Foundation.

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About CivicPACE

CivicPACE is a U.S. Department of Energy (DOE) effort under the Solar Market Pathways program designed to make commercial Property Assessed Clean Energy (PACE) financing a reality for tax-exempt organizations and non-profits. More information is at www.civicpace.org.

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The U.S. Department of Energy Solar Energy Technologies Office supports early-stage research and development to improve the flexibility and performance of solar technologies that support the reliability, resilience, and security of the U.S. electric grid. The office invests in innovative research efforts that securely integrate more solar energy into the grid, enhance the use and storage of solar energy, and lower solar electricity costs.

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Overview

For community-based nonprofit organizations like affordable housing developers, faith-based institutions, and others, financing solar projects can be a challenge. Nonprofit organizations face unique obstacles to solar energy development compared to institutions in the private sector. To a large extent, these difficulties have hampered solar energy growth among nonprofits – preventing these organizations from realizing the substantial economic and environmental benefits of solar energy.

To address this challenge, we explore in depth how securing solar Power Purchase Agreements (PPAs) with Property Assessed Clean Energy (PACE) financing may offer a particularly useful tool for nonprofit organizations.

In recent years, PPAs have emerged as a popular tool allowing consumers to enjoy the benefits of solar energy with little or no upfront payment, by transferring ownership to a developer that finances and operates the solar array. Meanwhile, 20 states have active PACE programs, allowing property owners to pay for clean energy projects through a special tax assessment, which is often easier than obtaining a loan.

A hybrid approach, known as a PACE-secured PPA, combines the efficiency of solar PPAs with the transparency and security of PACE. It is a powerful approach for scaling solar energy deployment within this large and publicly beneficial segment of the real estate market. In so doing, nonprofit community-based organizations can lead the way in bringing solar energy to small and mid-sized commercial buildings. The benefits include lower energy bills, increased environmental sustainability, and better energy reliability and resilience for vulnerable communities.

Toward a More Inclusive Solar Energy Market

The number of solar photovoltaic (PV) installations in the United States has been growing rapidly. Yearly, solar PV installations have grown more than eight-fold in recent years, climbing from around 850 megawatts (MW) in 2010 to more than 14,000 MW in 2016.¹ This growth is driven by declining costs for solar modules, with the price of solar panels falling from \$4.00 per watt in 2008 to just \$0.65 per watt by 2016. Increased efficiency in structuring and financing solar transactions has also contributed to reducing costs.²

While innovations in the industry have caused a dramatic reduction in the average price faced by consumers, the benefits of declining costs are not evenly distributed across the solar market. For residential customers, solar developers have overcome small project size and market fragmentation by building standardized products that offer streamlined financial solutions and standardized contract structures, including PPAs and solar leases. These financing approaches offer long-term contracts wherein a third-party owner and operator finances and maintains the PV system. In return, the customer pays a monthly lease payment (in the case of a lease) or

¹ Solar Energy Industries Association and GTM Research, “Solar Market Insight Report 2016 Year In Review,” <https://www.seia.org/research-resources/solar-market-insight-report-2016-year-review>

² Matt Weiser, “Here comes the sun: US solar power market hits all-time high,” *The Guardian*, June 28, 2016, <https://www.theguardian.com/sustainable-business/2016/jun/28/solar-power-energy-us-utilities-environment-climate-change>

payment for solar-produced power (in the case of a PPA) to the third-party owner for the use of the panels. Both of these structures require no upfront investment by homeowners and provide immediate access to solar energy at moderate cost over time. In each case, a financially sophisticated third-party owner is able to monetize the substantial tax benefits that come with solar project ownership, using these incentives to reduce the total project cost for the customer.

Likewise, utility-scale and large commercial and industrial (C&I) installations benefit from economies of scale. These markets have an even simpler path to scale, as demonstrated by the 75% growth rate within the utility-scale sector over the past five years. These projects have excellent access to capital and serve high credit-quality off-takers. They can monetize federal, state, and local incentives or secure investors that have the tax appetite to do so. High-profile, blue chip corporate customers – from large retailers like Walmart and Target, to technology customers like Apple and Google, to major manufacturing firms like Ford and GM – are adding more solar capacity every day, driven by the strong economic returns.

However, despite the solar industry’s overall growth, the industry still struggles to meet the needs of small and medium-sized commercial property owners. Commercial building owners in this “middle market” benefit neither from the efficiency of standardized transactions nor from economies of scale, keeping costs higher than average. These barriers are further compounded for nonprofit civic organizations, such as affordable housing developers and places of worship. These organizations often have non-traditional income sources, non-conforming credit profiles, and complex project ownership structures. As a result, nonprofits that could stand to realize great benefits from solar energy remain systematically underserved. If this difficulty persists over the long term, it could significantly slow solar market growth.

Market data bears out this structural observation. The solar industry’s exponential growth has been driven by the residential and utility sectors, reporting average annual growth of 60% and 75%, respectively, between 2010 and 2016.³ At the same time, growth in the ‘middle-market’ of smaller C&I installations stalled, and has even occasionally declined since 2012.⁴

Within the C&I sector, the nonprofit segment has been particularly underserved. A major factor is a lack of access to capital for solar project finance. For example, affordable housing developers routinely face gaps in project capital budgets, leading to “value engineering” which reduces up-front capital costs at the expense of green building options.

The net result is that capital markets fail to meet solar demand within a major part of the C&I sector. This problem is heightened in low-income communities where disinvestment, failing infrastructure, and vulnerability to energy prices could be addressed through local clean energy investment.

³ Solar Energy Industries Association and GTM Research, “Solar Market Insight Report 2016 Year In Review,” <https://www.seia.org/research-resources/solar-market-insight-report-2016-year-review>

⁴ “Expanding Solar Deployment Opportunities in the C&I Sector: An Introduction to Property Assessed Clean Energy (PACE),” Members of the SEIA Finance Initiative, Commercial Real Estate Working Group, https://www.seia.org/sites/default/files/resources/SEIA-CPACE_Expanding_Solar_Deployment_CI_Sector_April2017.pdf

With the multi-year extension of the solar Investment Tax Credit (ITC) in 2015, which continued this critically important federal tax incentive through 2023, the thriving residential and utility-scale solar markets are forecast to continue driving aggressive growth in the industry, as they have in the last half decade.⁵ The extension of the ITC is projected to spur over \$132 billion in new investment between 2016 and 2020.⁶ At the same time, expected federal policy changes over the next four years – including declining corporate tax rates, reduced funding for affordable housing subsidies, and regulatory rollbacks of clean energy policies – could all exacerbate the market failures for small and medium-sized commercial property owners, and nonprofits in particular. Given this context, it is important to examine in greater detail those barriers that currently prevent the solar market from serving this “civic” sector, and to propose solutions.

In the sections that follow, we outline key market barriers to solar energy growth in community-based nonprofits. We conclude that using PACE financing as a credit enhancement could be extremely beneficial for the entire middle-market C&I sector, and to nonprofit organizations in particular.

Barriers to Unlocking the “Middle Market”

Opening the market for solar projects at community-based nonprofits will require a clear understanding of the unique barriers that stand in the way of serving them. These obstacles can be broken out into two categories: those that create disincentives for third-party owners from working with nonprofits, and those that discourage nonprofits from seeking out solar PPAs and leases.

On the investor side, worthy projects must compete for limited pools of institutional tax equity. In this seller’s market, nonprofit projects face several disadvantages:

- **Credit Quality** – Underwriting an investment risk relies on a clear understanding of the credit quality of potential off-takers, the organizations that use the power. While this is simple for residential customers (via standard credit scores) or for large corporations, it can be difficult for nonprofits such as affordable housing units or houses of worship. This “off-taker risk” too often becomes an insurmountable barrier to project approval. Even for underwritten projects, this risk can add significant transaction costs. A common solution is to require corporate guarantees or contributions of owner’s equity; however, these solutions can create further barriers and tie up capital.
- **Project Size** – Institutional investors are looking for the economic efficiency that comes from scale. They typically target aggregated pools of 1 MW, with most favoring significantly larger pools of projects. Small commercial projects, especially for community-based organizations, are by their nature smaller, more local, and more decentralized. The typical solar project for a public charter school, church, or affordable housing development often can’t meet minimum threshold size requirements for tax equity investors to consider as a

⁵ “Solar Investment Tax Credit” (ITC), Solar Energy Industries Association, accessed December 2017, <http://www.seia.org/policy/finance-tax/solar-investment-tax-credit>

⁶ “Impacts of Solar Investment Tax Credit Decision,” Solar Energy Industries Association, accessed December 2017, <http://www.seia.org/research-resources/impacts-solar-investment-tax-credit-extension>

stand-alone investment. And unlike large corporations, many small nonprofits do not own multiple large buildings.

- **Ownership Structure** – Many investors are reluctant to aggregate smaller civic projects into investment pools. Assets with disparate owners or those overseen by multiple property managers pose unwelcome risks. Further, even when pooled, the transaction costs of accounting and IRS compliance for portfolios of smaller projects with disparate and complex ownership structures and decision-making processes are often deemed prohibitive. Even where a single owner holds a portfolio of properties, as with many nonprofit affordable housing developments, complex ownership structures can present challenges. With affordable housing, each project is often owned by a Special Purpose Entity (SPE) to allow for private investment by a Low Income Housing Investment Tax Credit (LIHTC) investor. New, more streamlined, mechanisms for aggregating and de-risking these projects are needed.

At the same time, several factors contribute to nonprofits being wary of seeking out solar financing:

- **Misaligned Incentives** – The value proposition of a standard PPA may not be appealing for many nonprofit owners, especially when the nonprofit building owner leases to an occupant. If the tenant is paying the utility costs (which is increasingly common in affordable housing), the tenant incurs savings for solar development, yet the property owner paid for it. PPA structures can be opaque and intimidating for non-experts. This is especially true for property owners who have no experience with a third party owning the solar array on their building. They might see third party ownership, such as a PPA, as a loss of control.
- **Lack of Standardization** – Lack of standardization deters both developers and property owners. While some solar developers or intermediaries like “Green Banks” are actively working on new solutions to serve middle-market and non-profit customers (from modified PPA structures, to credit enhancements, to crowd-funded finance), there is not yet an industry standard approach for structuring PPAs for nonprofits. Thus, even highly motivated developers have found themselves hampered in securing investment since each transaction requires customized documents, resulting in high legal fees. The resulting loss in efficiencies creates market confusion that also deters interested property owners.

Until there is an easy, streamlined way for solar developers to underwrite and structure financial agreements for nonprofits, tax equity will continue to shy away from these deals in favor of easier large commercial properties. With the decrease in corporate tax rates, demand for tax credits is expected to decline and this problem could become more acute.

Better Tools for Financing Community-based Solar Projects

Given the size of the nonprofit sector, there are abundant opportunities for market ingenuity and collaboration to address these obstacles. In 2015, the Pew Charitable Trusts estimated that there were more than 1.5 million nonprofits in the United States, owning more than \$5 trillion in

assets.⁷ In major cities – where many of these organizations are concentrated – nonprofit institutions own anywhere from 2% to 11% of total property value, even before accounting for mixed finance affordable housing under nonprofit management.⁸ By developing more creative ways to structure transactions, it will be possible to unlock a very substantial amount of new investment to meet the needs of smaller nonprofit building owners.

To be effective in overcoming challenges that slow solar market growth in this sector, solar developers, nonprofit property owners, and PACE administrators must address the following concerns:

Building new pooling and aggregation vehicles – Developers need to aggregate multiple small transactions using standardized structures to help streamline execution, minimize transaction costs, and create scaled investment opportunities that are large enough to attract a wider pool of more efficiently priced institutional tax equity investment. This can be accomplished if the risks and transaction costs that come with smaller project sizes are managed systematically for third-party owners.

Developing streamlined contractual and legal structures – Standardized contractual vehicles and streamlined legal structures will help to reduce transaction costs. In addition, it is especially important to develop financing structures that work efficiently with affordable housing transactions, which often involve complex legal and ownership structures.

Deploying targeted credit enhancement to reduce risk – Perceived credit risk remains a key barrier preventing many civic organizations from accessing solar. Therefore, any scalable solution for unlocking nonprofit solar must mitigate the “off-taker risk” that long term energy contracts could be unpaid.

Assembling well-designed pools of capital – The solar industry is increasingly served by mature and efficient capital markets drawing on tax equity, traditional debt, and other financial resources to invest in PPAs and leases for residential customers, large commercial portfolios, and utility installations. However, these investors are accustomed to templates and standards developed to meet the needs of these customers, organized around the risk and return profiles of their distinct market segments. To unlock the market to serve “civic” customers, solar developers need to manage risk across pooled mid-sized transactions with diverse ownership.

Aligning with key property-owner investment decisions – Many nonprofits and small business owners are motivated to make clean energy investments; however, they are also budget constrained. Cash-flow considerations often trump long-term returns when deciding where and how to invest. Therefore, scalable solar solutions must allow property owners to extend their

⁷ Elaine S. Povich, “Should Nonprofits Have to Pay Taxes?”, Pew Charitable Trusts, March 5, 2015, <http://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2015/3/05/should-nonprofits-have-to-pay-taxes>

⁸ Daphne A. Kenyon and Adam H. Langley, “The Property Tax Exemption For Nonprofits And Revenue Implications For Cities,” Lincoln Institute for Land Policy, November 2011, <http://www.urban.org/sites/default/files/alfresco/publication-pdfs/412460-The-Property-Tax-Exemption-for-Nonprofits-and-Revenue-Implications-for-Cities.PDF>

limited resources. Such solutions will allow owners to install solar with minimal owner's equity, and reduce demands on debt capacity or personal guarantee requirements often asked for by PPA providers. Further, these financial resources should be tailored to integrate seamlessly with low income housing tax credit (LIHTC) investments.

Taken together, these five elements offer coherent targets which, when achieved, can open the market of small commercial solar projects, especially for nonprofit organizations. If these challenges are met by solar developers and PACE administrators, it will be possible to rapidly transform this struggling market into a multi-billion dollar investment opportunity.

A Path Forward: PACE-Secured PPAs

To address these challenges, PACE-secured PPAs offer an important mechanism for making solar projects more readily accessible both to nonprofit property owners and tax equity investors. By addressing the challenges mentioned above, PACE-secured PPAs are an important tool that can make it easier for community-based nonprofits to benefit from solar.

The Role of PACE in Clean Energy Projects

PACE is a powerful tool for financing energy efficiency, solar projects, and other clean energy projects for middle-market C&I customers. In a 2017 white paper on the topic, the Solar Energy Industries Association (SEIA) honed in on PACE as a way to overcome market barriers to solar deployment in the C&I sector.⁹ PACE is a project finance mechanism that enables long-term funding for energy efficiency, renewable energy, and water conservation projects. Financing is typically provided by private capital and repaid as a special tax assessment, similar to other public benefit assessments (like those used to fund sidewalks, water mains, or sewers). Such special tax assessment financing vehicles have been in use in the U.S. since at least the late 18th century, but PACE is novel in allowing owners to voluntarily assume this special assessment to fund clean energy projects. PACE-enabling legislation has been passed in 33 states plus Washington, D.C., and active PACE programs are now operating in 20 cities, counties, or regions in those states.

PACE can serve as an important credit enhancement tool for energy projects. Because PACE offers the same underlying security to debt as real estate taxes, it provides an exceptionally stable investment with minimal default risk. PACE is secured by the property, not the credit of the borrower. The assessment is entered in the land record, and typically stays with the property in the event of sale. As a result, PACE can offer an off-balance sheet solution that does not encumber the credit of the borrower with a traditional mortgage obligation. It provides 100% upfront, long-term financing for solar, energy efficiency, and other clean energy projects, solving many of the key barriers that discourage community-based nonprofits from installing solar.

Importantly, because it is secured by the property, PACE eliminates the need for a traditional credit underwriting, because it is not attached to the credit of the borrower. From the perspective

⁹ "Expanding Solar Deployment Opportunities in the C&I Sector: An Introduction to Property Assessed Clean Energy (PACE)," Solar Energy Industries Association, accessed December 2017, <https://www.seia.org/research-resources/expanding-solar-deployment-opportunities-ci-sector>

of a financier, when backed by PACE, the underwriting question is no longer about whether the counterparty is likely to make monthly energy payments on time. Instead, investors must assess whether the property owners are likely to pay their real estate taxes (which have a very low default rate, given the strong remedies available in cases of default). This significantly reduces “off-taker risk,” increasing the pool of candidates who can qualify for financing to include many civic customers who may not be deemed creditworthy by typical underwriting standards. In many cases, the benefits of PACE security serve as a credit enhancement that ultimately can flow through to the property owner in lower financing costs and improved return on the solar investment.

PACE combines many of the advantages of solar ownership with the advantages of PPAs and leases. PACE allows owners to start realizing the benefits of solar without any out-of-pocket payments to fund installation. At the same time, PACE allows building owners to purchase solar systems outright and realize the economic benefits of ownership, instead of passing these benefits on to a third party. Property owners retain the tax benefits and incentives, and repay the system installation costs through long-term, low-cost PACE financing. Thus, for small businesses, many affordable housing developers, homeowners, and others with a tax appetite, PACE-enabled ownership is an elegant solution to the challenges of financing solar projects.

While PACE may mitigate credit quality barriers to solar, it isn’t always enough to make solar economics work for nonprofits. Because nonprofits cannot monetize the tax benefits of solar, they end up leaving a significant portion of the financial benefits of solar ownership on the table. Often, the savings on utility bills alone are not enough to repay the full cost of installation, even if financed over a long term. Nonprofits are unable to realize the additional savings that come from tax benefits, including the federal ITC and accelerated depreciation through the modified accelerated cost recovery system (MACRS). The table below illustrates the relative (undiscounted) value of the energy produced by a sample 100 kW system, compared to the various tax incentives.

System Size	100 kW
Installed Cost (\$2.50 / watt)	\$250,000
ITC Value (Year 1)*	\$75,000
MACRS Value (Years 1 – 5)**	\$44,625
20-Year Energy Value (at \$0.08 / kWh savings initially)***	\$270,000

*ITC value currently at 30% of the eligible installed costs. The credit is reduced to 26% in 2020.

**MACRS may be monetized over five or six years, depending on the time of year the system is placed in service. MACRS, or accelerated depreciation, offsets tax liability, and so its value is dependent on the system owner’s tax rate. This analysis assumes a corporate tax rate of 21%.

***Assumes 3% annual utility escalation and production levels for the Mid-Atlantic region.

As this very simple table demonstrates (without considering financing or discount rates), tax benefits make up a large part of the value streams for solar installation – almost a third in this example. If a discount rate were applied, the tax benefits (which are front-loaded) would make up an even higher proportion of the benefits. In markets where energy prices are high or other subsidies are available, solar projects may pencil out even when the tax benefits are not monetized. However, in others, they simply don’t.

Interestingly, the inability to monetize tax benefits is not restricted to nonprofits. CleanFund, a PACE-secured PPA provider, cited golf courses and certain real estate companies as PACE-secured PPA candidates along with nonprofits due to their shared lack of tax appetite.¹⁰

PACE-Secured PPA Benefits

How, then, can community-based nonprofits finance a solar project if neither PACE nor a PPA alone are financially feasible? The solution is a “PACE-secured PPA” or “PACE-lease,” a structure that combines the third-party ownership of a typical PPA or solar lease (to monetize tax benefits) with the security, simplified underwriting, and long-term financing provided by PACE.

There are two prevailing approaches to structuring PACE-secured PPAs and leases in the market today. In both approaches, the third party builds, owns, and maintains the system during the term of the agreement. However, a PACE payment replaces the traditional monthly PPA energy bill, thus providing added security and credit enhancement for the third-party investor. There are two variants for how a PACE-secured PPA could work. One variation is much like a traditional PPA, but the property owner makes PACE payments that are then transferred to the third-party owner. In a second variation, the property owner pre-pays an energy payment upfront to bring more capital into the transaction.

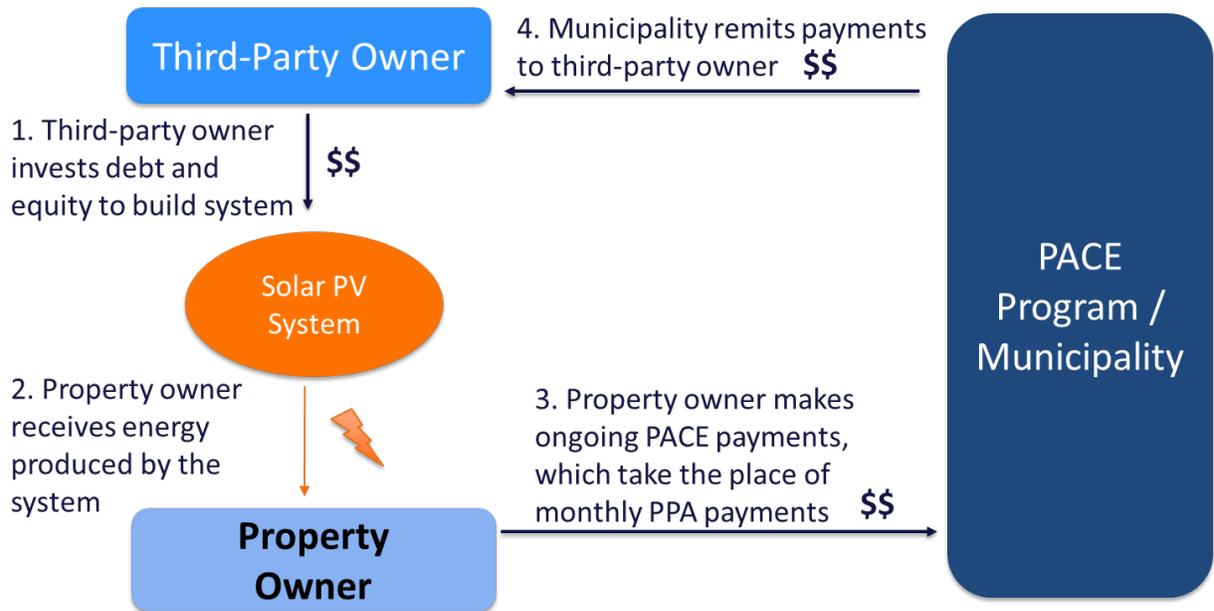
Standard PACE-Secured PPA or Lease

Under this framework, a third-party owner secures debt and equity to develop a solar installation. The property owner makes PACE payments (annually or semi-annually, depending on the local tax collection processes) to the municipality, which are then remitted to the third-party owner. This structure has been employed by the Connecticut Green Bank, as well as De-Meter, a distributed energy platform and solutions provider. A case study on a project completed by the Connecticut Green Bank using this approach is listed under *Further Resources* at the end of this report.

Figure 1 depicts a standard PACE-secured PPA in which PACE payments replace standard monthly PPA payments to the third-party owner. A PACE-secured lease would be similarly structured.

¹⁰ Josh Smith (CleanFund), email to Upasana Kaku (Urban Ingenuity), November 11, 2017

Figure 1



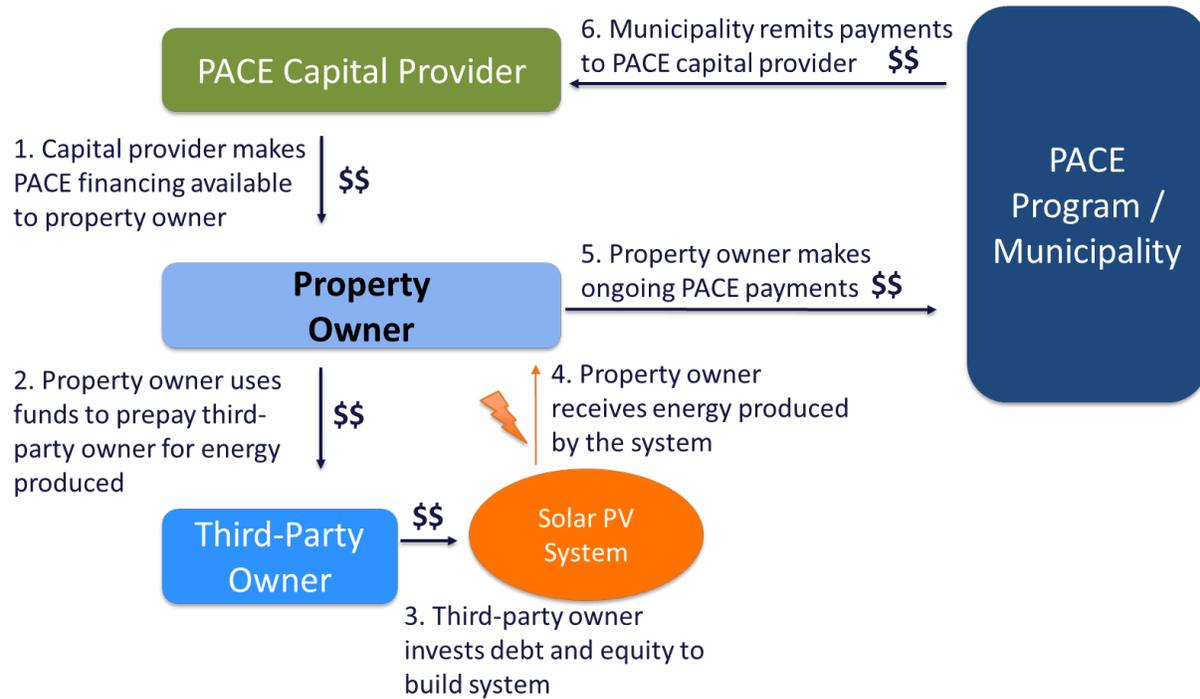
PACE-Secured Prepaid PPA

Under a PACE-secured Prepaid PPA, the property owner pre-pays for the energy that will be produced during the entire PPA term. This prepayment is provided upfront (typically either upon PPA signing or the system’s commissioning) to the third-party owner, so that on day one, the site host has paid for 15 or 20 years of electricity (depending on the term of the PPA).

While the prepayment can theoretically be made from any source (e.g. an out-of-pocket contribution or traditional loan), in reality this structure is most viable in situations where the site host can access separate long-term financing for the prepayment. Few can afford to prepay out-of-pocket (and a direct purchase might make more sense if they could afford to do so), and a traditional loan with a shorter term would result in high annual payments relative to the energy produced. Thus, prepaid PPAs are well-suited for long-term financing. Instead of making monthly PPA payments, the property owner makes PACE tax payments that repay the cost of the financed prepayment. These tax payments align with their utility bill savings, producing smooth cash flows.

Figure 2 illustrates the more complex transaction structure of a prepaid PPA using PACE financing.

Figure 2



This structure mitigates “off-taker risk” for the tax equity investor even more than a traditional PACE-secured PPA or lease, as the energy or lease payment have already been paid for in advance. Payment risk is now borne entirely by the PACE capital provider that funded the prepayment. While this structure adds an additional step to the process, it has the advantage of allowing the property owner more freedom and flexibility in sourcing their PACE financing. On the other hand, it adds complexity, as it leaves the site host with two separate financial transactions to manage.

The prepaid PPA also creates a convenient mechanism for the nonprofit host to re-purchase the system earlier, and without substantive additional out-of-pocket costs. This could be beneficial for affordable housing developers, who have expressed concerns about giving up control over the operations of the system. They want to avoid an uncertain and potentially large price tag to purchase the system at the end of the PPA. With a prepaid PPA, the property owner has also financed the system purchase price upfront.

CleanFund has deployed more than 2 MW of solar across several California projects through prepaid PACE PPAs, with transactions in other states pending.¹¹ See *Further Resources* for a case study on a pre-paid PACE-secured PPA completed by CleanFund.

One limitation of this approach, noted by Figtree Financing (a PACE capital provider), is that there is limited tax equity available for prepaid PPAs. As a result, Figtree has limited their work in this space. As of August 2017, they had completed one prepaid PPA for which they sourced

¹¹ Josh Smith(CleanFund), email to Upasana Kaku (Urban Ingenuity), November 11, 2017.

third-party equity.¹² Another limitation is the potential complexity in the tax treatment of the prepayment given the 2017 tax law change, which could require PPA providers to treat prepayments as income in the year they are received, rather than income received for electricity generated over the term of the PPA. This could have significant impacts on the viability of this model.

Advantages and Disadvantages of PACE-Secured PPAs

The primary benefit of PACE-secured PPAs or leases are that they enable customers with unusual or unrated credit to access PPAs and leases. The security structure of PACE, which effectively gives third-party owners the collections and enforcement rights associated with a tax, significantly reduces the risk premium that the tax equity might assign to a counterparty. Investors generally have greater confidence that property owners will pay their tax bills, as delinquency could result in foreclosure. When it comes to paying energy bills, remedies in the case of default are limited.

For example, the Connecticut Green Bank worked with a tax equity partner and regional banks to create a series of funds to finance solar systems, some of which were structured as PACE-secured PPAs and leases. Instead of making monthly PPA or lease payments, participating customers paid their bills through the PACE program.¹³ The Connecticut Green Bank has now deployed almost 10 MW of solar through PACE-secured leases and PPAs, primarily for nonprofits, small businesses, and multifamily affordable housing, all of which they found were excluded from typical tax equity structures.¹⁴ After several years of work in this space, the Green Bank team believes that due to their partnership with private funders, the market will increasingly step in to finance future projects.

Though difficult to quantify, given the number of variables involved, there is some evidence that PACE-secured PPAs can result in improved pricing as compared to typical PPAs and leases. Improved pricing could result from two factors. First, for customers that would qualify for traditional PPAs or leases but were still considered risky, PACE can reduce the risk premium that a tax equity investor might assign to them. The Connecticut Green Bank's solar lease funds, for example, were able to leverage PACE as a credit enhancement to attract lower-cost capital, and pass on the benefits of this improved pricing to customers.¹⁵

Second, PACE may enable longer-term and lower-cost debt to flow into the transaction at either the project or fund level. Typical PACE financing is at 20-year terms and at interest rates of 6% to 7%. In comparison, a SEIA analysis assumed a weighted average cost of capital for third-party owners of 9.2%, based on a combination of sponsor equity and tax equity for a sale leaseback model.¹⁶ Thus, it is reasonable to expect that leveraging PACE financing as part of third-party

¹² Peter Grabell (Figtree Financing), email to Alex Winn (The Solar Foundation), August 31, 2017

¹³ Kristina Klimovich, "PACE Talk: PACE Power Purchase Agreements (PPA) Is a Game Changer for Connecticut and Beyond," PACENation, March 11, 2015, <http://pacenation.us/pace-talk-pace-power-purchase-agreements-ppa-is-a-game-changer-for-connecticut-and-beyond>

¹⁴ Ben Healey (Connecticut Green Bank) email to Upasana Kaku (Urban Ingenuity), August 25, 2017

¹⁵ Ben Healey (Connecticut Green Bank), email to Upasana Kaku (Urban Ingenuity), August 25, 2017

¹⁶ David Feldman and Travis Lowder, "Banking on Solar: An Analysis of Banking Opportunities in the U.S. Distributed Photovoltaic Market," National Renewable Energy Laboratory, November 2014, <https://www.nrel.gov/docs/fy15osti/62605.pdf>

ownership could result in savings from more efficient capital. For example, the 2017 SEIA white paper included a comparison of a traditional PPA and a PACE-secured PPA for an illustrative solar carport project for a nonprofit in Southern California. The analysis found that the PACE-secured PPA provided the host with a better cash flow until year 18 of a 20-year PPA term.¹⁷ The overall return on investment favored the PACE-secured PPA. However, these benefits are highly dependent on the financial structures employed by third-party owners and their cost of capital. For example, larger developers may access debt markets more efficiently, reducing their weighted average cost of capital.

PACE-secured PPAs offer one important additional benefit. By wrapping a PPA into PACE financing, property owners can bundle solar with energy efficiency measures, as well as related structural improvements such as roof repairs needed to support solar. This integration of solar and efficiency allows for a more holistic analysis of the energy needs of the property. Since many energy efficiency measures remain cheaper than solar for the same amount of energy savings, this integrated approach increases return on investment. A property owner can first implement energy efficiency measures, and then size solar installation to the remaining (smaller) electricity load.

One negative attribute of the PACE-secured PPA is its potential complexity. PPAs and leases, particularly in the residential sector, are designed to be simple and quick from a transaction perspective. PACE, which requires the consent of existing property lenders and would likely draw more legal scrutiny from property owners given the more serious remedies for default, can add time and cost to transactions.

Further, in a traditional PPA, payments are tied to actual energy produced, but PACE-secured PPAs or leases typically have fixed annual tax payments. This payment schedule can create potential risk for the customer if the system consistently under-produces. However, PACE-secured PPA providers have developed mechanisms to protect site hosts against performance risk. For example, a third-party owner can be required to carefully monitor actual energy production and conduct an annual “true-up” against the energy that was purchased.

Mapping the Way Forward to Serve Civic Customers

PACE-secured PPAs offer an important avenue to reduce off-taker risk and therefore expand the number of nonprofits and civic institutions that tax equity investors will accept as counter-parties to PPA agreements. However, they do not solve all of the market challenges these nonprofits face. Relatively small project size and project volume, and the lack of standardization in documents and legal requirements, remain barriers to scaled investment. Access to capital for nonprofit solar projects will remain a challenge until these broader issues are solved.

¹⁷ “Expanding Solar Deployment Opportunities in the C&I Sector: An Introduction to Property Assessed Clean Energy (PACE),” Solar Energy Industries Association, accessed December 2017, <https://www.seia.org/research-resources/expanding-solar-deployment-opportunities-ci-sector>. Importantly, the authors assumed in the traditional PPA scenario that the host was able to buy back the system at fair market value in year five, and finance that cost using competitive seven-year financing. This repurchase (instead of continued PPA payments in years 6-20) is a large factor in why the final year cash flows of the traditional PPA eventually overtake the PACE-secured PPA.

For example, SolarCity (now Tesla) launched a partnership with Renew Financial, a California PACE provider, to use PACE-secured PPAs to target small businesses in California. As SolarCity noted in their announcement of the program, “solar projects for small and medium-sized businesses have traditionally been very difficult to finance, because SMBs do not have the formal investment grade credit ratings of large corporations, and also have no commercial equivalent to the FICO scores that are often the basis of consumer financing.”¹⁸ However, as of the fall of 2017, no transactions seem to have come from this effort, demonstrating the challenges that even large industry leaders face in entering the small commercial market.¹⁹

To promote such a broad-based solution to capital access for civic solar projects, solar developers and PACE administrators should undertake several efforts.

- First, municipalities that are currently implementing or revising PACE programs should ensure their enabling legislation and program guidelines affirm the legality of PACE-secured PPAs, or at a minimum do not contain language explicitly to the contrary.
- Further, the industry needs to develop standardized PACE-secured PPA structures with common terms, conditions, and documents that can be replicated across different PACE-enabled municipalities and different classes of customers, in the same way that residential PPAs have become relatively consistent across markets nationally. This in turn would help to drive volume, reducing transaction costs and lowering the threshold size of installations required for a PACE-secured PPA project to make economic sense. It will require substantial effort to compile this emerging knowledge across what is still a relatively small and disparate market.

Recently, however, industry groups have made important strides toward creating some standardization. In January 2018, SEIA published a template ‘PACE-PPA Addendum,’ intended to modify the standard PPA template so it can work for PACE-secured PPAs. While this template was developed for the California market, and will require some adjustments to function in other states, it is an important step toward creating standardized transactions on a national level.

- All parties should seek additional credit enhancement. Credit enhancement beyond the use of PACE security will likely still prove to be extremely valuable in helping open the middle market for small commercial and nonprofit solar projects. For example, philanthropic grant capital can support initial legal work and the development of standard documents to reduce up-front costs for early movers. Mission-driven, program-related investment can create additional credit enhancement to grow available tax equity.

PACE-secured PPAs and leases will not solve all challenges faced by nonprofits, small businesses, and the rest of the medium-scale C&I sector. However, with further deployment of

¹⁸ “SolarCity Introduces Nation’s Most Affordable Solar Power Option for Small and Medium Businesses,” SolarCity press release, July 28, 2015, <http://www.solarcity.com/newsroom/press/solarcity-introduces-nation%E2%80%99s-most-affordable-solar-power-option-small-and-medium>

¹⁹ Email from deputy director for policy and electricity markets of SolarCity, to Alex Winn, The Solar Foundation, September 2017.

this tool, the solar industry has the opportunity to access a large and mostly untapped market which could become an important contributor to industry growth. This is a promising avenue for helping underserved sectors tap into the world's most abundant energy source. Using a PACE-secured PPA, these sectors can greatly reduce their energy costs, lower their carbon footprint, and provide a reliable, secure, resilient source of power to those who live and work in their facilities.

Further Resources

This primer provides one key step for moving forward on the path to resilient and low-carbon communities. Supporting case study materials and specific guidance on developing PACE-secured PPAs are presented below to facilitate further work in developing nonprofit solar energy projects.

“Expanding Solar Deployment Opportunities in the C&I Sector: An Introduction to Property Assessed Clean Energy (PACE),” Members of the SEIA Finance Initiative, Commercial Real Estate Working Group. This white paper outlines challenges to solar deployment in the C&I sector and explores PACE financing as a potential solution. Available at <https://www.seia.org/research-resources/expanding-solar-deployment-opportunities-ci-sector>.

“PACE + PPA Addendum,” Members of the SEIA Commercial and Industrial Working Group. Provides an addendum to the previously developed standard PPA contract. Developed for California. Available for SEIA members at <http://www2.seia.org/e/139231/esources-model-leases-and-ppas/271c6k/207989050>.

“Connecticut Green Bank CT Solar Lease 2 (SL2) Commercial Program,” in *State Leadership in Clean Energy Awards: New Solutions for Market Transformation*, Clean Energy States Alliance, June 2016. This paper on the Connecticut Green Bank program, conducted by the Clean Energy States Alliance, includes a case study on the Jewish Community Center of Greater New Haven, which used a PACE-secured PPA to install 775 kW of solar. <https://www.cesa.org/assets/2016-Files/SLICE/New-Solutions-for-Market-Transformation.pdf>

“CleanFund Case Study: Nonprofit / Community Center,” Clean Fund Commercial PACE Capital. This summary (below) provides an overview of a (prepaid) PACE-secured PPA project implemented for the India Community Center in Milpitas, California.

Case Study: Non-Profit / Community Center

PACE financing:	\$467,560
Term:	20 years
Projected Energy Savings:	75%
Address:	525-535 Los Coches Street Milpitas, CA
Type:	Special Purpose / Community Center
Size:	36,810 sq ft
Year Built:	1983
Year of Project:	2017

Eligible Projects:

Construction and installation of a 193kW DC roof-mounted solar system. Financing also includes a small number of water efficiency measures financed, such as hands free flush valves and electronic faucets.



Project Synopsis:

The India Community Center will utilize a PPA structure to finance the construction and installation of a 193kW DC roof-mounted solar system.

Financing also includes a small number of water efficiency measures financed, such as hands free flush valves and electronic faucets.

Installation of the solar system will be completed by First Edison and installation of the water efficiency measures by AquaTek. The estimated time frame for final completion of all measures is 60 days.