



Applying the PAYS[®] System to On-Site Solar to Expand Access for All

LIFT Solar



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- **Part 2** – pages 70-113: *Precedents for the Regulatory Treatment of PAYS[®] for On-site Solar* authored by Nancy Brockway
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List of Acronyms

ARRA	American Recovery and Reinvestment Act
DER	Distributed energy resources
DG	Distributed generation
DNP	Disconnection for non-payment
DOE	U.S. Department of Energy
DSM	Demand side management
EE	Energy efficiency
EECLP	USDA's Energy Efficiency Conservation Loan Program
EEI	Energy Efficiency Institute, Inc.
EIA	U.S. Energy Information Administration
FASB	Financial Accounting Standards Board
FERC	Federal Energy Regulatory Commission
FICO	A type of credit score created by the Fair Isaac Corporation
FMV	Fair market value
GAAP	Generally Accepted Accounting Principles
GMP	Green Mountain Power
GW	Gigawatt
GWdc	Gigawatts direct current
HELOC	Home equity line of credit
IOU	Investor owned utility
IRC	Internal Revenue Code
IRS	Internal Revenue Service
ITC	Investment Tax Credit
kW	Kilowatt
LMI	Low- and moderate-income
LPT	Lease Pass-through
MACRS	Modified Accelerated Cost Recovery System
NARUC	National Association of Regulatory Utility Commissions
NASUCA	National Association of State Utility Consumer Advocates
NRRI	National Regulatory Research Institute
OBF	On-bill financing
OBLR	On-bill loan repayment
PACE	Property assessed clean energy
PAYS [®]	Pay As You Save [®]
PF	Partnership flip
PPA	Power purchase agreement
PSC/PUC	Public Service Commission, Public Utility Commission (state utility regulatory body)
PV	Photovoltaic
REC	Renewable energy certificate
RESP	Rural Energy Savings Program
RFP	Request for proposal
ROI	Return on Investment

RPS	Renewable Portfolio Standard
RUS	Rural Utility Service
SBIR	Small Business Innovation Research
SLB	Sale Leaseback
SPE	Special purpose entity
SUN	Solar United Neighbors
T&D	Transmission and distribution
TDUs	Transmission and distribution utilities
TILA	Truth in Lending Act
TPO	Third party ownership
TVA	Tennessee Valley Authority
USDA	U.S. Department of Agriculture
USoA	Uniform System of Accounts
WAP	Weatherization Assistance Program

Executive Summary

The purpose of this three-part paper is to determine whether and how the PAYS[®] system for tariffed on-bill investment could make on-site solar systems available to low- and moderate-income customers and renters. The PAYS system is designed to facilitate site-specific utility investment in a cost-effective energy upgrade under terms for site specific cost recovery that are defined in a tariff. Solar PAYS is a program design based on the PAYS system that can capitalize an on-site solar installation that generates positive cash flow for a household starting in the first year. Solar PAYS is feasible for low-income households when the transaction involves no upfront copayment requirement from the participating customer.

This research is supported by the LIFT Solar Everywhere research project and provides a distinct potential financing solution increasing clean energy access for low- and moderate-income households.

The initial phase of research in the LIFT Solar project resulted in the following findings:

Attributes of the PAYS system provide unique consumer protections that assign risk to the parties best positioned to bear it, opening pathways to broad participation and benefit. In the field of energy efficiency, utilities with PAYS experience have reported high offer acceptance rates (i.e. as high as 80%) regardless of income, credit score, or renter status when little to no upfront cost component is required from participants. With those field observations in mind, elimination of an upfront copayment is a key threshold for financial feasibility for low- and moderate-income customers to be able to benefit from the PAYS system applied to on-site solar power.

Multiple precedents for regulatory approval of a PAYS tariff suggest potential for expanding application to on-site solar power. Research into regulatory precedents for approval of a Solar PAYS investment program found that utility regulators and oversight boards have used multiple rationales to reach approval for tariffed on-bill programs based on the PAYS system, with most focused on energy efficiency upgrades. The attributes of the PAYS system make tariffed on-bill investments in on-site solar more accessible to low-income households than operating leases or power purchase agreements, which have fewer consumer protections and depend critically on qualifying criteria such as credit-worthy counterparties with property ownership.

Solar PAYS would be feasible for more customers in contexts with a lower cost of on-site solar - OR - higher value of on-site solar. Examples of no regrets options to improve the value proposition of on-site solar include research and development to improve technology cost and performance metrics as well as pursuit of business innovations like bulk procurement to reduce the soft cost of installation. In addition, net metering policies that compensate surplus solar production at retail rates have produced the best market environments in the U.S. for on-site solar installations.

The federal investment tax credit is a major policy determinant of the value of solar power in the United States, and the value of this policy is not accessible to low-income households. The

federal tax credit is challenging for most low-income households to monetize without elaborate transaction structures that add cost and affect the path to ownership of the solar assets. The same observation holds for tax-exempt utilities that rely on a combination of tax equity investors and blocker entities to monetize the federal tax credit. Unless the tax credit policy is reformed to offer cash in lieu of credit, this disadvantage to low-income households and tax-exempt utilities will persist as long as a tax credit is structured in this way.¹ Without a pathway through a transaction structure to monetize the credit, low-income households would effectively need to pay more for on-site solar than more affluent homeowners with good credit, who can use other financial instruments, like leases, loans, and power purchase agreements. In addition, federal tax policy has an accelerated schedule of depreciation for solar assets, a policy that generates an additional value stream for taxable entities that can monetize the deduction. This advantages commercial entities and affects the pathway to ownership for low-income households.

Two types of transaction structures are the most promising for monetizing the tax credit and developing Solar PAYS as a tariffed on-bill investment program. The first type of transaction is a tax efficient structure for a for-profit utility, and the second is a sale-leaseback transaction, which would be suitable for either utilities that are not tax efficient or those that are tax-exempt, such as electric cooperatives. These transaction structures also help capture the value of accelerated depreciation and the related matter of assuring a pathway to ownership for the site owner.

One key to monetizing the federal tax credit is accessing financial equity from a business with sufficiently large tax liability (i.e. tax equity) to absorb the value of the credit as well as the cost of arranging the transaction. To attract tax equity at that scale, very large solar installations are needed. In the context of distributed residential solar, this potentially means hundreds to thousands of on-site solar systems installed contemporaneously, depending on the transaction structure. With scale as a critical factor, the first phase of research found that either of the two most promising transaction structures for initial application of PAYS to on-site solar could work, and the best choice for which to pursue first depends on which can obtain the lowest level of scale required to complete an initial transaction.

The research team concluded that both of the two transaction structures above should be further refined and vetted for the potential to support on-site solar installations in specific utility and market contexts.

Recommendations for next steps include:

Analyze the financial cash flows for Solar PAYS transaction structures in market conditions applicable to potential early adopters. Each of the prior recommendations involve financial analysis that describes the cash flows between parties over time. The results are essential to being able to test which scenarios can achieve a Solar PAYS offer that is free from a customer copayment for a given set of market conditions. The financial models that produce such results are also useful tools for exploring the sensitivity of key inputs (e.g. initial scale of number of

¹ The commercial solar tax credit that can be used to aggregate on-site solar installations is currently set to be 10% permanently.

installations) in order to prioritize attention to inputs that could have the largest effect on the outcomes.

Explore the potential impact of a direct payment option for the federal investment tax credit to remove barriers that low- and moderate-income households face to on-site solar with a path to ownership. The challenge of monetizing the solar tax credit could be largely resolved if Congress chooses to authorize the investment tax credit for solar assets to be converted to a cash grant similar to Section 1603 of the American Recovery and Reinvestment Act (ARRA) of 2009.² This would also vastly simplify the path to ownership for participating customers, especially low- and moderate-income households. Congress is currently debating a return to such a policy as part of economic recovery packages that could be passed in response to the recession precipitated by the COVID-19 pandemic.³ Analyzing the cash flows associated with these scenarios could also illuminate the opportunity cost of the federal tax credit policy for solar power in terms of capital either blocked or absorbed in specific types of transaction structures developed to monetize the tax credit.

Because market and policy conditions will continue to change over time and across geographies, the development of a tool to facilitate exploratory financial analysis has more value than the production of results for a fixed set of scenarios.

Clarify and quantify options for assuring a pathway to ownership for Solar PAYS customers. The path to ownership for low-income households is complicated by the current need to monetize the federal investment tax credit. NextResource Advisors, a research partner for Clean Energy Works in this study, has identified at least two potential options for facilitating a path to ownership for a customer in the context of Solar PAYS coupled with a sale-leaseback option to monetize the tax credit. Further investigation is needed to identify which of these options would be most viable from the vantage points of both a customer and a utility.

Vet and refine the legal and accounting aspects of transaction structures for Solar PAYS through which solar tax credits can be monetized. As noted above, these include (1) the Tax Efficient Structure for for-profit utilities with tax capacity and (2) the Sale Leaseback Structure for either for-profit utilities that are not tax efficient or for tax-exempt electric cooperatives that would require a blocker entity as discussed in Part 3. Financial analysis and further vetting with subject matter experts in law and accounting is needed to assure that transaction structures would be acceptable to prospective parties seeking to offer Solar PAYS. This due diligence is a prerequisite for interested parties that would want to develop the set of agreements that would be needed to execute the transaction.

The recommended next steps and recommendations for future research are well aligned, and they are consistent with the purposes of the LIFT Solar research project. This includes the development of resources for a toolkit that would enable a broad field of interested stakeholders

² American Recovery and Reinvestment Act of 2009, H.R.1, 111th Cong. (2009)
<https://www.congress.gov/bill/111th-congress/house-bill/1>

³ HR 2. The Moving Forward Act, passed by the House of Representatives, July 1, 2020.
<https://transportation.house.gov/imo/media/doc/BILLS-116HR2-RCP116-54.pdf>

to access and build upon the gains made toward an inclusive solution for on-site solar with Solar PAYS.

1 Introduction

1.1 Facing an imperative for inclusion in the clean energy economy

Pathways to acquire solar power assets are marked by a gauntlet of qualifying financial tests intended to protect both financial institutions from risk and consumers from predatory practices. Altogether these filters produce a picture of participation in the clean energy economy that reflects growing disparities in wealth and income in the United States, where economic opportunity is also stratified by race. Over the past three decades, lower income households have seen their total wealth decline 7% from \$12,300 to \$11,400,⁴ and even before the coronavirus pandemic, 40% of adults attested to the Federal Reserve that in their current financial standing, they could not meet an emergency expenditure of \$400.⁵

In this context, the benefits of on-site solar power – including a pathway to ownership that supports wealth building – have been largely inaccessible to lower income households without steep subsidies.⁶ Most financial institutions that underwrite companies marketing on-site solar find they are restricted from serving lower income households due to low credit scores, renter status, poor building quality, and a lack of sufficient income to monetize a federal income tax credit for solar power. These powerful filters have the effect of systematically excluding low-income households from the economic opportunity to benefit from the very same type of on-site solar systems benefiting wealthier households. Income and wealth are determinants that affect which households are able to acquire solar assets. Despite all households paying taxes that flow into the associated government energy subsidies, only wealthy households are able to take advantage of those subsidies. Plus, only households with sufficient wealth can invest in an asset such as solar power, with long term life cycle savings but immediate financial outlays. The impacts of these economic disparities create an imperative for finding solutions to assure inclusion in the clean energy economy.

1.2 Exploring the potential for Pay As You Save® (PAYS®) for on-site solar power

Similar barriers have affected for decades the development of energy efficiency resources, effectively stranding the utility industry's most lucrative investment opportunities – especially in the Southeast region where the majority of persistent poverty counties are found.⁷ Lessons

⁴ Horowicz, R. et al. *Trends in Income and Wealth Inequality*. 2020. Pew Research Center. <https://www.pewsocialtrends.org/2020/01/09/trends-in-income-and-wealth-inequality/>

⁵ U.S. Federal Reserve. *Report on the Economic Well-Being of U.S. Households in 2018 - May 2019* <https://www.federalreserve.gov/publications/2019-economic-well-being-of-us-households-in-2018-dealing-with-unexpected-expenses.htm>

⁶ Paulos, Bentham. *Bringing the Benefits of Solar Energy to Low-Income Consumers A Guide for States & Municipalities*. May 2017. Clean Energy States Alliance (CESA). <https://www.cesa.org/wp-content/uploads/Bringing-the-Benefits-of-Solar-to-Low-Income-Consumers.pdf>

⁷ Brown, Marilyn A. et al. *Energy Efficiency in the South*. 2010. Southeast Energy Efficiency Alliance. <https://www.scribd.com/document/29932567/Full-Report-Efficiency-in-the-South>

learned in overcoming these barriers for energy efficiency investments may illuminate similar solutions to increase LMI access to on-site solar power.

Over the past two decades, 18 utilities in 8 states have applied the PAYS system to help customers overcome financial barriers to cost effective energy efficiency upgrades – regardless of their income, credit score or renter status.⁸ In short, these utilities have offered to capitalize site-specific investments in energy upgrades on conditions for site-specific cost recovery that are defined in a utility tariff. A more detailed explanation of the PAYS system is presented in Part 1 of this report.

Altogether, the features of the PAYS system are designed to assure net positive cash flow from the start for each participant, and they also provide a pathway to ownership of the upgrades once the utility's cost recovery is complete. The programs have demonstrated that tariffed on-bill investment based on the PAYS system can produce a larger addressable market, higher rate of acceptance among customers considering whether to proceed with an upgrade, and a deeper level of investment at sites where customers do proceed. These indicators have remained positive even in areas of persistent poverty, suggesting that the PAYS system could potentially deliver similar benefits if used to capitalize on-site solar power for households with lower income.

1.3 Introduction to the LIFT Solar project

Supported by funding from the U.S. Department of Energy, the Accelerating Low-Income Financing and Transactions for Solar Access Everywhere project (LIFT Solar) seeks to advance low- and moderate-income (LMI) clean energy and resource efficiency delivery and financing models through research and the development of tools and resources for program administrators and stakeholders. LIFT Solar has conducted benchmarking research of existing LMI clean energy and resource efficiency programs to assess customer experience and financial performance at the program or project level. This benchmarking research will inform and guide primary research in the latter stages of the LIFT Solar project through customer experience survey and program or project financial performance research of participating programs across the country, culminating in the delivery of the LIFT Solar Toolkit.

With this toolkit, the LIFT Solar project team seeks to enable rapid scaling and adoption of solar power, both distributed generation (on-site) and community solar, for LMI customers nationwide. LIFT's research may also provide insights and recommendations that will help clean energy and resource efficiency program administrators who serve LMI households to design and measure meaningful customer experiences that will enhance the programs and financial products being offered.

McKinsey&Company. *Unlocking Energy Efficiency in the U.S. Economy*. 2009.

https://www.mckinsey.com/client_service/electric_power_and_natural_gas/latest_thinking/~media/204463A4D27A419BA8D05A6C280A97DC.ashx

Economic Research Service. United States Department of Agriculture. *County Policy Types, 2015 Edition*.

<https://www.ers.usda.gov/data-products/county-typology-codes/descriptions-and-maps/#ppov>

⁸ Hummel, H., Harlan Lachman. *What is inclusive financing for energy efficiency, and why are some of the largest states in the country calling for it now?* ACEEE Summer Study on Energy Efficiency in Buildings. August 2018.

https://www.aceee.org/files/proceedings/2018/assets/attachments/0194_0286_000158.pdf

LIFT Solar research may encompass multiple solar services, including community solar, residential rooftop solar, and bundled energy efficiency/solar programming. It will assess the financial performance of participating delivery programs, including innovative financial customer delivery models. Where possible, LIFT's research will also consider diverse state regulatory environments, housing status (renters and homeowners in multifamily and single-family housing), and utility business models (investor-owned, municipally owned, and rural cooperative).

1.4 LIFT Solar research team for Solar PAYS®

The purpose of this three-part paper is to determine whether and how the PAYS system could make on-site solar systems available to LMI customers and renters. To pursue this line of inquiry, Clean Energy Works turned first to the creators of the PAYS system, Energy Efficiency Institute, Inc., to explore whether it would be possible to apply the PAYS system to on-site solar power as a site-specific energy upgrade. This investigation also required further research into the regulatory context in which utility tariffs are considered and approved. Nancy Brockway, one of the first utility regulators in the country to order approval of a program that meets the criteria of the PAYS system, joined the project to research the regulatory precedents that could illuminate a path forward for on-site solar.

Based on their findings, it became clear that, at least in the short term, before other recommendations in Part 1 could be effected, monetizing the value of the federal investment tax credit for solar power would be vital, yet it was not clear which transaction structures could best facilitate both the monetization of the tax credit and provide a pathway to ownership of the solar installation for LMI customers or renters. For this third line of inquiry, the research team sought analysis from NextResource Advisors, which has expertise in transaction types used to monetize tax credits in the solar industry.

The authors of each of the three parts of this paper have contributed new insight to the LIFT Solar project by exploring and documenting lines of inquiry designed to test whether PAYS could be applied successfully to on-site solar.

1.5 Overview of the report structure

This complete report consists of this preamble overview prepared by LIFT Solar partners - Clean Energy Works and Southface Institute; and then three distinct chapters:

- **Part 1** – *The Potential for the PAYS® System to Make On-Site Solar Photovoltaic Systems Accessible to Low- and Moderate-Income Customers and Renters* authored by Energy Efficiency Institute, Inc.
- **Part 2** – *Precedents for the Regulatory Treatment of PAYS® for On-site Solar* authored by Nancy Brockway
- **Part 3** – *Limited Technical Review of Tax Structuring for PAYS® for On-site Solar* authored by NextResource Advisors

2 Framing Context

2.1 How PAYS® Works:

An example of a tariffed on-bill investment in energy efficiency based on the PAYS® system

The Smiths are struggling with high electricity bills that average \$200 per month. Their utility has identified that the load profile of their home indicates that improvements to their building envelope – like insulation and air sealing – and their heating and cooling system should yield cost-effective savings. The Smiths agree to an on-site assessment of the home to identify cost-effective energy upgrades.

As a result of the assessment, the program operator running the program for the utility presents the Smiths with a PAYS offer for the utility to pay for \$5,783 in efficiency upgrades. The Smiths do not need to pay anything upfront for the upgrades and are not required to share credit scores, take out a loan, accept a lien on their home, or increase their debt to participate in the program.

In order to recover its costs for installing upgrades at the Smith’s home, the utility requires the Smiths to agree to a fixed charge to be added to their monthly bill. Under the terms of the PAYS program for efficiency upgrades, the estimated annual savings must equal or exceed the annual charges by 25 percent. In this example, the Smiths are estimated to save \$50 per month on average, have a fixed charge of \$40 per month, and realize cash savings of \$120 every year during the cost-recovery period compared to their previous utility bills. The Smith’s net savings increase anytime the utility raises its rates, causing the value of the energy savings to grow without increasing their monthly cost-recovery charge.

If the Smiths move during the term of utility cost recovery and have fulfilled their obligations to that point, their obligations end. The next customer who occupies their home will benefit from the upgrades and assumes the obligation to pay the charges left in the cost-recovery period.

The utility is assured that its costs will be recovered while also benefiting from lower demand during periods of extreme weather, when the utility incurs its highest costs for delivering service. If the upgrades stop working at any point during the period of cost recovery, the utility will suspend the monthly charges until it can determine the cause of the problem and arrange for replacement, repair, or other remedy.

At the end of the 12-year cost-recovery period, the homeowner at that time will own the upgrades, and the monthly charge on their utility bill will end.

Table 1:
Example PAYS
transaction for the
Smiths

Data for this example comes from a PAYS program as evaluated by LibertyHomes.

	During Cost Recovery Period	After Cost Recovery Period
Avg Monthly Bill without Upgrades	\$200	\$200
Avg Monthly Energy Savings	\$50	\$50
Monthly Cost Recovery Charge	\$40	\$0
Monthly Bill after Upgrades	\$190	\$150
Net Monthly Savings	\$10	\$50
% of Savings Staying with Customer	20%	100%

2.2 Policies affecting market conditions vary by jurisdiction

To deliver immediate benefits to the customer, the PAYS system depends on the value stream produced by the upgrades, whether the upgrades are energy efficiency or on-site solar or another cost-effective improvement. The size and duration of these value streams for the same upgrades vary across different utility service areas due to the varying policy contexts in each jurisdiction. For that reason, the value proposition for Solar PAYS will also vary by geography, and as with the pace of solar sales to households who already have access to capital, it will be stronger in some places sooner than others.

2.3 Low-income households require options without upfront copayments

The feasibility of expanding access to low-income households through a Solar PAYS program depends on finding a transaction path that can eliminate the upfront cost barrier entirely. This high bar for the definition of financial feasibility is anchored to the mission of LIFT Solar.

Utilities with an existing tariffed on-bill program based on the PAYS system may already include both energy efficiency and renewable energy in the eligible upgrades. Although the warranty on solar panels and the estimated useful life of an on-site solar system may be 20 years or more, the terms of these tariffs may cap the cost recovery period at 16 years or less as a consumer protection. Using these conditions, a utility's offer to capitalize an investment in the cost-effective portion of an on-site solar power system (i.e. at the customer's home) would reduce the upfront cost of that installation, but in the near term, it would not likely eliminate all upfront costs. Because the cost recovery period for the solar investment takes longer, the investment would require a upfront copayment from the customer. Therefore, applying existing tariffed on-bill terms for energy efficiency to on-site solar with a cost recovery period of 12 years or less would likely require high upfront copayments that are not compatible with participation by low-income households.

Applying existing tariffed on-bill terms for energy efficiency to on-site solar with a cost recovery period of 12 years or less would likely require high upfront copayments that are not compatible with participation by low-income households

2.4 Copayments in a PAYS® program depend on factors affecting project cost effectiveness

For a utility to capitalize a site-specific energy upgrade (e.g. installing insulation or a new boiler) under the terms of a tariff for essential utility services, the upgrade measures must be cost effective - even after assuring a portion of the estimated savings from the efficiency improvement will be reserved to benefit each program participant right from the start. Cost effectiveness depends on the:

- cost of the upgrade, including both hardware and soft costs (e.g. customer acquisition, installation labor, wiring and connection to the grid, etc.);
- value streams that the upgrade can generate, including estimated savings based on current energy rates and market conditions over the estimated useful life of the upgrade; and

- a tariff that defines the minimum portion of estimated savings generated by the upgrade that must benefit the participant during the utility's cost recovery period.

Market conditions are powerfully framed by policies, and that is especially true in the markets for on-site solar power. Examples include federal and state tax credits, net metering or virtual net metering, interconnection policies, and renewable portfolio standards, state or local available subsidies, and associated markets for renewable energy credits. Changes to any of these policies in any jurisdiction can affect the value proposition for on-site solar, which would affect whether it would be possible to capitalize the upgrade through a Solar PAYS without a customer copayment.

2.3 Federal tax credits for solar are difficult to monetize for low-income households

The federal tax credit for solar power systems is most valuable to taxable entities that have a substantial tax liability. As a policy, it favors customers whose taxable income is high enough to create a tax liability that is larger than the value of the credit. Because low-income households rarely have thousands of dollars in savings sitting around to cover upfront costs, and the cash flow to wait months or years to recoup tax credits, the federal investment tax credit does not convey value to them unless a commercial partner is involved in the transaction.

In some arrangements with a commercial partner, a third party can provide capital upfront to pay for a new solar power system through a transaction structure that conveys to that third party the right to claim the value of the federal tax credit. Because these tax equity arrangements are costly to make at a small scale, financiers require larger projects, or many smaller projects aggregated together to reach the financially attractive economies of scale. Individual households could never reach this scale alone. In fact, even commercial-scale solar installations are usually too small to justify the costs of the professional services required to arrange the aggregation and monetization of tax credits, because the financial servicing costs reduce the net value of the tax credit to the seller so dramatically.

Tax exempt utilities, such as rural cooperatives, are similarly disadvantaged because they have no tax liabilities to which the tax credits can be applied. Electric cooperatives are 501(c)12 organizations that have excelled in the use of tariffed on-bill investment programs for building energy upgrades, yet the cost to those utilities of arranging tax equity to monetize the value of solar investment tax credits could add prohibitive transaction costs to their investment portfolio.

2.4 Financial benefits of accelerated depreciation favor commercial interests

In the United States, the tax depreciation system is called Modified Accelerated Cost Recovery System (MACRS), which allows an asset owner to make annual deductions for depreciation of the asset over a period of time defined broadly in federal policy as its useful life. The useful life of a solar power system is typically 20 years or more. However, federal policy allows solar power asset owners to apply the tax deduction on an accelerated schedule that exhausts its value after six years. This accelerated depreciation schedule is a form of financial support for owners of solar assets that is paid for by the federal government in the form of foregone tax revenues, and in effect, it conveys value to solar asset owners from all federal taxpayers who share in the cost of carrying the national debt.

The tax benefits of depreciating assets are primarily realized by businesses or landlords with rental properties. Holding all other actors equal, the financial value of a given solar power system in a given set of market conditions is higher for a profitable commercial entity than a residential customer, and the difference would be the value of the MACRS tax deduction. While that statement is a simplification of the wide range of circumstances and conditions in the field, it underscores that, due to the additional benefit of the federal subsidy in the accelerated depreciation policy, the participation of a commercial entity in the capitalization of an on-site solar system may actually improve the cost-effectiveness of the system for residents where the system is installed.

Because taxable commercial entities that own on-site solar assets are advantaged by the accelerated depreciation policy, residential customers may benefit from allowing commercial entities to capitalize their system (usually as part of a pool of aggregated residential systems) and own it for at least the first six years. The taxable commercial entity would also be in a position to collect the value of the commercial solar tax credit. The commercial tax credit for solar power is currently set to be 10% permanently after 2022, whereas the residential tax credit is currently set to fall to zero. The combination of the accelerated depreciation and the commercial tax credit have the effect of advantaging taxable commercial entities financially in the development and initial ownership of solar power assets.

3 Summary of Findings and Recommendations

Taking into account framing considerations in the prior section, LIFT Solar investigated the applicability of the PAYS system to on-site solar by exploring:

- Ways to improve the cost effectiveness of on-site solar to improve the value proposition a utility PAYS program could offer
- Conditions under which PAYS could apply to on-site solar
- Legal and regulatory precedents for use of the PAYS system
- Exploration of transaction structures for PAYS through which the federal tax credit for solar could be monetized

3.1 Recommendations to improve the cost-effectiveness of on-site solar for a PAYS offer

The creators of the PAYS system found that the cost effectiveness of on-site solar power affects whether a utility would be able to make an offer of investment to a customer that is free from an upfront payment requirement. The elimination of a customer copayment requirement is an essential characteristic a value proposition that can work for LMI income households and yield high acceptance rates from households at all income levels. Energy Efficiency Institute, Inc., identified four recommendations that could improve the cost effectiveness of on-site solar for all customers, thus also improving the prospects that a PAYS offer for on-site solar without a customer co-payment requirement would be feasible. (See also: Part 1.)

*Changing a tax credit ... to an instant rebate or an advance on a refundable tax credit that would benefit LMI customers and renters would be the **single biggest policy initiative** our country could take to make on-site solar accessible to these customers before the residential ITC policy expires in 2022*

- **Reforming the investment tax credit to be a grant or direct payment would enable lower upfront capital requirements for on-site solar.** Extending the residential and commercial solar tax credits and reforming the terms to include cash in lieu of credit would remove one significant barrier to capitalizing on-site solar systems, especially in places recognized by the federal government for persistent poverty. More than 90% of counties recognized for “persistent poverty” are served by tax-exempt electric cooperatives⁹, which incur additional transaction costs to monetize the solar tax credit.

Section 1603 of the American Recovery and Reinvestment Act (ARRA) of 2009 provided a cash grant in lieu of a tax credit for solar power installations, including on-site solar power systems.¹⁰ Reinstatement of this policy would resolve the most complex aspects of the Solar PAYS transaction structure for utilities that are either not tax efficient or exempt from taxes entirely. Leading firms in the solar industry have called for

the reinstatement of the ARRA Section 1603 policy in response to the 2020 recession.¹¹ If implemented, this policy alone could spark a surge in deployment of on-site solar.

- **Policies that accelerate reduction in hardware costs and soft costs for installation will expand the areas in which a PAYS investment in on-site solar could be made with no copayment required.** The value proposition for on-site solar power is affected by local and state policies as well as the cost to procure and deliver hardware and components. Utility investments in on-site solar using the PAYS system will reach the threshold of no customer copayment faster when there are policies in place that promote research and development in equipment and business solutions that reduce the upfront capital requirement. Further reduction in soft costs for on-site solar, including the cost of customer acquisition, can also improve the cost effectiveness of an on-site solar investment.
- **Similarly, economies of scale can reduce the capital requirements for on-site solar systems, further reducing potential customer copayments.** The cost differences between on-site solar systems and utility-scale solar systems in the same vicinity provides a glimpse of the potential to improve affordability by harnessing the benefits of aggregation and bulk procurement in association with a utility investment program.
- **Ensure net metering rates and utility subsidies reflect the real value of solar to the grid.** The role of Public Utility Commissions is to develop rate schedules and policies that produce sufficient energy at rates that are fair, just and reasonable for all customers. Utilities of any type (e.g. investor-owned, cooperative, or municipal utilities) may face regulatory frameworks that give them an incentive to promote low net-metering rates and reduce incentives for customers to

⁹ National Rural Electric Cooperative Association (NRECA). *Electric Cooperatives Serving Persistent Poverty Counties*. <https://www.cooperative.com/content/public/maps/persistent-poverty/index.html>

¹⁰ American Recovery and Reinvestment Act of 2009, H.R.1, 111th Cong. (2009) <https://www.congress.gov/bill/111th-congress/house-bill/1>

¹¹ Cypress Creek Renewables, First Solar, et al. *Letter to U.S. Department of Treasury*. Tax Notes. *Energy Companies Call for Solar Incentives in Future COVID-19 Legislation*. June 1, 2020. <https://www.taxnotes.com/tax-notes-today-federal/credits/energy-companies-call-solar-incentives-future-covid-19-legislation/2020/06/24/2cn8b>

deploy on-site solar systems. Commissions and oversight boards should approve regulatory frameworks that assure utility grid operators are able to realize the full value of on-site solar and offer commensurate incentives to develop it.

3.2 Findings and recommendations related to PAYS for on-site solar power

The creators of the PAYS system also found that PAYS has characteristics that are promising for developing a value proposition for on-site solar that would be free from an upfront payment requirement. That condition is an essential characteristic of a value proposition that can work for LMI households and yield high acceptance rates from households at all income levels.

- **Compared to financial instruments like loans, operating leases, or power purchase agreements, the PAYS system has more inclusive eligibility criteria.** Because the PAYS system allows participation from all customers regardless of income, credit score, or renter status, the addressable market that could be reached with a utility investment program based on the PAYS system would be larger than loans, leases, lien-backed loans, and power purchase agreements. The difference in the size of the addressable market is significant, especially in lower income market segments where the difference could span from nearly 0% for a loan instrument to 100% for a tariffed on-bill investment. This feature is particularly important for being able to reach underserved market segments, which include low- and moderate-income households.

Engagement with commercial tax equity markets is necessary to monetize the federal investment tax credit (ITC) for on-site solar systems at locations with low-income households. The ITC cannot be used by renters or most LMI customers directly. As stated by Energy Efficiency Institute, Inc. in Part 1 of this paper:

“Changing a tax credit that disproportionately benefits upper income citizens to an instant rebate or an advance on a refundable tax credit that would benefit LMI customers and renters would be the single biggest policy initiative our country could take to make on-site solar accessible to these customers before the residential ITC policy expires in 2022.”

- **For utilities that are not tax efficient, PAYS should be introduced in conjunction with a commercial operating lease between a utility and a third-party capital provider in order to capitalize the federal investment tax credit.** At current rates, the federal tax credit is too valuable to ignore, and persistent proposals to extend the tax credit add to the imperative to find a path to monetizing its benefits. The solar tax credit for commercial development is set to be 10% permanently after 2022, at which point the federal government’s policy will systematically advantage commercial solar over residential solar. Therefore, utility aggregation of investment in residential solar via the PAYS system could yield a commercial portfolio of on-site solar that is systematically advantaged over residential solar. Next Resource Advisors concluded that the use of a sale-leaseback provision, using a commercial operating lease between a utility and tax advantaged investor, could attain the goal of monetizing the federal investment tax credit at a lower minimum threshold of aggregation than other options considered. LIFT will further explore this research during 2020-2021.
- **The Initial cost recovery for on-site solar through the PAYS system should be 20 years based on an expected useful life of 25 years.** Investments made with the PAYS system typically cap the cost recovery period at 80% of the estimated useful life of the equipment. For some energy

efficiency programs, the maximum cost recovery period is 12 years, which is 80% of 15 years. By contrast, a Solar PAYS program could have a 20 year cost recovery period, which would leave a sufficient amount of time (5 years) for the utility to recover unexpected costs requiring extension of the term such as repair costs, missed billing cycles due to extended vacancies, and costs for a utility to acquire a leased system at a fair market value at the end of the lease period. Cost recovery for PAYS programs should always be as short as possible while requiring no copayments. Shorter cost recovery terms reduce risks for implementing utilities and reduce total costs for participants.

- ***Outreach to LMI households should be prioritized, and it should be conducted by vicinity and not by household income verification.*** Investments made using the PAYS system are based on the cost effectiveness of the upgrade rather than the creditworthiness of an individual in a household. For that reason, outreach should prioritize attention to locations with a high concentration of lower income households where the opportunity to reach underserved customers would be higher than the general population. Based on field experience with energy efficiency investment programs based on the PAYS system, adequate funds would need to be available to address structural deficiencies found in some homes – especially repairs to the roof or the electrical system – prior to installation.

3.3 Findings of a review of legal precedents for applying PAYS® to on-site solar power

The PAYS system has been used successfully for two decades by utilities in expanding the access of residential customers to energy efficiency and solar water heating upgrades. A review of precedents set by regulatory decisions approving the application of PAYS to energy efficiency upgrades provides insights into the applicability of the PAYS system to on-site solar power.

A review of legal and regulatory precedents conducted in Part 2 of this three-part paper produced the following findings:

- Regulators have used a variety of sources of regulatory authority to approve PAYS tariffs.
- Loan programs offered by utilities as On-Bill Financing and On-Bill Loan Repayment are distinctly different from PAYS, which facilitates site-specific utility investments in upgrades with cost recovery on the bill for services at that location. PAYS does not create consumer debt. For this reason, PAYS transactions are not covered by the Truth in Lending Act and other statutes that apply to transactions that create indebtedness.
- The PAYS system has unique features that were developed specifically to enable customers to overcome market barriers that remain despite incentives and processes available in traditional utility programs. Because these features are necessary to overcome those market barriers, they must be present in systems for capitalizing residential solar in order to achieve the same results as PAYS energy efficiency programs. Financing systems such as on-bill-financing with loans, operating leases, and purchased power agreements lack a number of these features. As a result, they cannot be adapted to serve as vehicles for PAYS transactions applied directly to residential customers seeking on-site solar systems.
- Utility investment programs based on the PAYS system have been offered by investor-owned, municipal, and cooperative utilities. The legal bases and precedents for implementing a tariffed on-bill program based on the PAYS system are different depending on the ownership structure of

the utility and the particular aspect of service they provide. Utility accounting treatment for assets capitalized using the PAYS system has varied based on the source of capital (e.g. ratepayer capital or shareholder capital).

- A Program Operator is a vital component of the system, and the utility can either perform those functions internally or hire a third-party entity to run the program as the Program Operator. In a state with retail choice, one way that PAYS could be offered to all residential customers would be through a statewide program operator, though this would need to be explored further in the context of a specific restructured market.

3.4 Findings & recommendations regarding transaction structures for Solar PAYS

In an exploration led by tax equity experts at Next Resource Advisors, the authors arrived at three broad conclusions related to the application of PAYS to on-site solar and the quest for a Solar PAYS transaction structure to introduce in the field.

- **To minimize upfront copayments by participating Solar PAYS customers, it is essential to monetize the solar tax benefits through an outlet that is not the customer.** Most customers are unable to monetize residential solar tax credits in a timeframe that would allow them to apply such benefits to offset a Solar PAYS copayment. Additionally, residential solar tax credits for individual taxpayers will be eliminated entirely after 2021, but investment tax credits for businesses will remain at 10%.¹² Furthermore, while the residential customer would not be able to utilize any benefits associated with accelerated depreciation, its use would be possible by other parties.

There are at least four prospective financing structures for Solar PAYS that would allow parties other than the customer to benefit from solar tax credit benefits, thereby reducing the amount of customer copayment required. (LIFT will explore this in more detail in 2020-'21)

- **Utilities using Solar PAYS must be able to monetize the associated tax benefits either internally or externally.** For-profit utilities with sufficient tax capacity participating in Solar PAYS structures should be able to internally monetize the tax benefits from portfolios of on-site residential solar. Tax-exempt electric cooperatives or for-profit utilities without sufficient tax capacity should be able to externally monetize these tax benefits through addition of existing commercial tax-equity structures broadly employed across the U.S. solar financing markets (e.g. Sale Leaseback, Partnership Flip, and Lease Pass-through structures), provided that such arrangements follow existing tax guidance and are structured such that Tax Investors are motivated to participate.
- **For Solar PAYS transactions that require externally sourced Tax Investors, considerations of project scale and transaction efficiency should drive structuring decisions.** Closing transactions for new products is challenging, and the pool and appetite of Tax Investors is limited. As a result, deference should be given to investors based on their constraints and preferences. While the Sale Leaseback structure has advantages over other structure options (e.g. Partnership-Flip, Lease Pass-through) due to lower minimum scale requirements and simplicity, the structure selection should ultimately depend on the preference of available Tax Investors. This is most

¹² Under IRC Section 25D, the solar tax credit available to individuals is scheduled to drop from 22% to zero after December 31, 2021, while under IRC Section 48, solar tax credits for businesses will reduce from 22% down to 10% after December 31, 2021, would allow businesses such as Tax Investors or Utilities to continue claiming tax credits for residential systems owned by these third-party businesses.

likely to result in an initial preference for Sale Leaseback structures, but all structures should be considered if willing counterparties preferring other structures present themselves. Even more importantly, finding scale partners with their own tax capacity or existing tax-equity relationships would obviate the need to separately structure tax credit transactions and allow for faster implementation.

4 Additional Considerations

4.1 *Could a utility offer Solar PAYS even if the market conditions are not favorable?*

Where market conditions are not favorable, Solar PAYS may still be offered, though customer copayments would be likely. In these circumstances, the program may facilitate deployment of capital for on-site solar upgrades, but the upfront copayment may effectively preclude participation by low-income households without some form of supplemental support. In Kansas, half of the participants in the PAYS program for energy efficiency upgrades have faced copayments and have chosen to make them. The utility, Midwest Energy, has reported that for those locations where a copayment is needed in the utility's energy efficiency program, the average customer copayment is near \$1,000.¹³ This payment brings down the cost of the upgrades to a level that would meet the threshold for cost effectiveness in the utility tariff. Midwest Energy has reported that the copayment unlocks utility investment that averages \$5,500 per location.¹⁴

4.2 *Could the barrier of an upfront copayment be reduced or eliminated?*

Although the initial phase of research did not identify complementary policies that could be used to reduce copayments, future research will explore options to combine multiple value streams. For example, it is possible that some income-eligible energy assistance programs could sponsor copayments, which are a fraction of the cost of the whole system installation costs. For example, the federal Weatherization Assistance Program (WAP) allows states to approve the use of funds for solar power installations provided that they can show the cost effectiveness of using WAP funds for an expenditure that results in net savings for the program participant.¹⁵

4.3 *Could changes to policy adversely affect the value proposition of Solar PAYS?*

In the context of the PAYS system, a utility offer of investment in site-specific upgrades is always framed by market conditions that affect the cost of the upgrades as well as the estimated savings they will produce. For example, as a consumer protection measure, a utility using the PAYS system calculates estimated savings with an assumption that the current rates will remain constant over the cost recovery period. This assumption typically produces surplus benefits from energy efficiency upgrades when electricity rates rise over time, as they typically do.

¹³ This data is presented in Part 1 – Appendix A: 2019 PAYS® Status Update.

¹⁴ This data is presented in Part 1 – Appendix A: 2019 PAYS® Status Update.

¹⁵ Clean Energy States Alliance (CESA). *Using Weatherization Assistance Program (WAP) Funds for Low-Income Solar*.

2018. <https://www.cesa.org/event/using-weatherization-assistance-program-wap-funds-for-low-income-solar/>

The value proposition for solar power is predicated on similar assumptions about future prices as well as policies such as the:

- availability of *state and federal investment tax credits* for solar power
- value of solar power based on current *net metering* policies and whether they will persist
- level of ambition in *renewable portfolio standards* that produce additional value in the renewable energy credit market
- cost of solar power equipment and *U.S. trade policies* that affect imported products

Market conditions for on-site solar vary across the country in part due to variation in the underlying state and local policies that create fragmented, location-specific solar power markets.¹⁶ For example, when North Carolina and Louisiana awarded state tax credits for solar power, those policies created very different market conditions between them and their neighboring states, and those market conditions changed again after the state tax credits expired.

In another example, net metering rules across the country vary by state or by utility service area, and they determine the value of solar electricity produced at a customer’s site in excess of the amount of electricity service needed at that site. In 2020, net metering as a policy was recently challenged before the Federal Energy Regulatory Commission, which voted unanimously to deny the challenge.¹⁷ The sweeping implications of this challenge to long-accepted “net metering” policies could have devastated all grid-connected solar customers without on-site storage that currently enjoy net metering at retail rates, and it would have substantially diminished the value proposition of on-site solar for prospective customers in markets that currently have net metering at retail rates.

In Washington, D.C., residents are currently experiencing highly favorable conditions for on-site solar due to an ambitious renewable energy standard that causes utilities to pay local owners of solar power assets for renewable energy credits if they are not able to meet the standard required on their own.¹⁸ The value stream of renewable energy credits can improve the value proposition of a Solar PAYS investment for both a utility and a customer seeking a path to ownership without facing a steep upfront cost obligation.

While policy changes are continuously shifting the map of market opportunity, the value proposition for on-site solar is likely to remain attractive even if some policy changes adversely affect market conditions overall. As a case in point, wildfire risk in California is expected to pose risks to energy security due to seasonal public safety outages every summer for the next decade. The result is a surge of interest in on-site solar power with storage because the value of energy assurance is extremely high in a context where the power can be cut off for weeks at a time. For property owners with taxable income, the acquisition of on-site solar and storage systems is

¹⁶ Database of State Incentives for Renewables & Efficiency® (DSIRE®). <https://www.dsireusa.org/>

¹⁷ United States Of America Before The Federal Energy Regulatory Commission, Docket No. EL20-42. *Petition For Declaratory Order Of New England Ratepayers Association Concerning Unlawful Pricing Of Certain Wholesale Sales*. April 14, 2020. https://elibrary.ferc.gov/idmws/file_list.asp?document_id=14851599

¹⁸ Clean Energy Omnibus Amendment Act of 2018 (the CEDC Act). D.C. Act 22-583, January 18, 2019. <https://doee.dc.gov/service/clean-energy-dc-act>

attainable, but this surge is also accompanied by a rising apprehension about exacerbated burden on households for whom obtaining on-site generation with storage is financially out of reach.

Even assuming that the value proposition for on-site solar will continue to improve with prevailing reductions in installed costs, it is possible that changes to policies that affect the value of on-site power could change dramatically. These changes could undermine the value streams estimated to be produced from an investment based on the PAYS system unless participants are able to also obtain cost effective on-site storage through a similar tariffed on-bill program. On the other hand, a deep economic recession precipitated by the coronavirus pandemic could be met with a federal policy prescription for countercyclical spending on deployment of clean energy solutions or authorization by utility regulators for a surge of investment by utilities accelerating their existing plans for clean energy deployment.¹⁹

4.4 *Could non-utility entities offer Solar PAYS?*

The simple answer is ‘no.’ PAYS is a system for implementing a tariffed on-bill investment program that by definition requires a tariff for delivery of essential utility services. Tariffs are distinctly different financial instruments from loans and leases, and they are subject to economic regulation by utility regulators and oversight boards in every utility service area in the United States. For this reason, non-utility entities cannot offer a tariffed on-bill investment program, and therefore, Solar PAYS cannot be implemented without a utility that has an approved tariff for site specific investment and cost recovery for cost effective energy upgrades.

5 Recommended Next Steps

The biggest barrier to a Solar PAYS investment program that produces offers to customers with no upfront copayment is monetization of the federal investment tax credit. The tax credit provides a value to commercial investors or affluent residential owners that is otherwise inaccessible to low-income households. Unless the tax credit policy is reformed to offer cash in lieu of credit, this disadvantage to low-income households will persist as long as a residential tax credit is available. Availability of a commercial tax credit on better terms than a residential tax credit would continue to advantage households that can qualify as customers for commercial aggregators that only do business with qualified counterparties based on income and credit score among other factors.²⁰ Without a pathway through a transaction structure to monetize the credit, low-income households would effectively need to pay more for on-site solar than homeowners with good credit who can use other financial instruments, like leases, loans, and power purchase agreements.

5.1 *Recommendations*

¹⁹ The Moving Forward Act, H.R.2, RULES COMMITTEE PRINT 116–54 , 116th Cong. (JUNE 22, 2020). <https://transportation.house.gov/imo/media/doc/BILLS-116HR2-RCP116-54.pdf>

²⁰ The federal tax credit policy in effect in 2020 is structured in a way that eliminates the residential solar tax credit in the future but allows a commercial tax credit of 10% to permanently persist, which permanently advantages households eligible to do business with commercial entities that can monetize the tax credit.

Building on findings by expert authors of the three parts of this report, the following recommendations would advance research to characterize feasible transaction paths for Solar PAYS with no customer copayment needed. This would be the threshold at which Solar PAYS would be more likely to achieve inclusive participation in on-site solar for households at any income level, especially low- and moderate-income households.

1. Analyze the financial cash flows for Solar PAYS transaction structures in market conditions applicable to potential early adopters.

Each of the prior recommendations involve financial analysis that describes the cash flows between parties over time. Based on the findings of the initial research, the most likely transaction structures that can address these two challenges for early adopters of Solar PAYS are (1) the Tax Efficient Structure for for-profit utilities with tax capacity and (2) the Sale Leaseback Structure for either for-profit utilities that are not tax efficient or tax exempt electric cooperatives that would require a blocker entity as discussed in Part 3. Financial analysis is essential to being able to test which scenarios could produce a Solar PAYS offer that is free from a customer copayment for a given set of market conditions. The financial models that produce such results are also useful tools for exploring the sensitivity of key inputs (e.g. initial scale of number of installations) in order to prioritize attention to those that could have the largest impact and benefit consumers and the climate most.

2. Describe and quantify cash flows for a Solar PAYS transaction structure that integrates direct payments in lieu of tax credits.

Reform of the solar tax credit to assure a direct payment option would obviate the need for Solar PAYS transaction structures that are solely serving the purpose of monetizing the federal tax credit. To explore the significant implications of this scenario, the next phase of research should produce financial analysis for a simplified transaction structure using an instructive proxy: the American Recovery & Reinvestment Act of 2009 (Section 1603).²¹ The results of that financial analysis for the market conditions of potential early adopters would determine whether a transaction structure free from the distortions of the tax credit policy would also yield a value proposition for on-site solar that would be free of a customer copayment. These results would provide a contrast with further research on transaction structures that facilitate monetization of the tax credit, and the differences between them would also illuminate the value of resolving the powerful effects of the tax credit on determining who can access a pathway to ownership for on-site solar.

Members of Congress are currently considering economic recovery policy proposals that include whether to offer direct payments in lieu of investment tax credits for solar power developments.²² Of note, the bill passed in the house excludes electric cooperatives from eligibility for the direct payment option. This exclusion is significant because more than 90% of the counties recognized by the federal government for persistent poverty are served by electric

²¹ American Recovery and Reinvestment Act of 2009, H.R.1, 111th Cong. (2009)
<https://www.congress.gov/bill/111th-congress/house-bill/1>

²² The Moving Forward Act, H.R.2, RULES COMMITTEE PRINT 116-54 , 116th Cong. (JUNE 22, 2020).
<https://transportation.house.gov/imo/media/doc/BILLS-116HR2-RCP116-54.pdf>

cooperatives. On the path to passage there are at least two points at which this omission could be remedied, first during deliberation in the Senate and second during a conference of the comparable bills passed by the two chambers. Without attention to this issue, the tax credit reform would exacerbate equity concerns about economic inclusion in renewable energy policies.

3. Explore two options for assuring a pathway to ownership for Solar PAYS customers.

The path to ownership for low-income households is complicated by the pathways for monetizing the federal investment tax credit. For example, one of the two most promising options for monetizing the federal investment tax credit in a Solar PAYS program is a sale-leaseback structure, and the path to ownership can be described as follows. After the term of the operating lease through which the federal investment tax credit for solar would be monetized, the utility (lessee) will incur costs to acquire the system from the tax investor (lessor) at either a pre-determined price or at fair market value at that time. The utility must then recover these acquisition costs from the Solar PAYS participant for the utility's costs to be fully recovered, at which point ownership of the system can be conveyed from the utility to the property owner at the location where it is installed. Next Resource Advisors has identified at least two options for facilitating a path to ownership for a customer in the context of Solar PAYS coupled with a sale-leaseback option to monetize the tax credit. Further investigation is needed to identify which of these options would be best from the vantage points of both a customer and a utility.

4. Vet transaction structures for PAYS through which solar tax credits can be monetized.

Attention from domain experts in law and accounting is needed to vet and refine the transaction terms and agreements for both of the most promising transaction structures identified in the initial phase of research. These include the Tax Efficient Structure for for-profit utilities with tax capacity and (2) the Sale Leaseback Structure for either for-profit utilities that are not tax efficient or tax-exempt electric cooperatives, which would require a blocker entity as discussed in Part 3. Both should be further refined and vetted for the potential to aggregate the financial terms for on-site solar installations, possibly reaching hundreds or thousands of households within a specific window of time (e.g. 6 months).

Taking these recommendations into account, future research should include the following activities:

- Conduct financial modeling to characterize the value streams and cash flows for the two most promising transaction structure options in the policy context of specific markets.
 - Development of an accessible, adaptable financial model that can vary inputs to create scenarios and explore summary financial metrics for a sample portfolio of Solar PAYS investments as well as average metrics for a single participant within such a portfolio.

- Applying input assumptions for two different types of utilities in two different markets (e.g. electric cooperative and for-profit utility)
- Using the two most promising transaction structures as appropriate (i.e. Tax Efficient Structure, and Sale-Leaseback with and without a blocker entity)
- Exploring the solar tax credit policy - both with an extension, and with a direct pay option; or with solar tax credit policy unchanged from current terms as of June 2020.
- Exploring two potential pathways to ownership for site owners at the end of a utility's operating lease as discussed in Part 3.²³
- Documentation of the model and results from an illustrative set of defined scenarios along with a glossary and a list of the transaction agreements required for each transaction structure.

This analytic work above would provide qualified responses to a host of questions that remain threshold issues in the structure of a Solar PAYS transaction. Some of these include:

- Is a cap on the monthly cost recovery payments made by participants (based on 87% of the estimated 20-year production of the solar system) sufficient to complete cost recovery for the utility without a customer copayment?
- How much would a non-profit utility (or for-profit yet tax inefficient utility) need to pay a tax advantaged investor to gain ownership of on-site solar assets?
- In the sequence of ownership, what are the risk mitigation practices for managing the cost of future acquisition for the utility and ultimately for the customer?
- In the absence of solar tax credit reform, can non-taxable electric cooperatives engage blocker entities (see Part 3) in order to make a Solar PAYS investment?
- Might concurrent investments such as energy efficiency upgrades improve the value proposition for an on-site solar system?
- Vet and refine the two most promising transaction structures with entities that could be key actors in such a transaction:
 - Identify potentially interested utilities and financial participants to vet the transaction structures and associated stages of scaling up a Solar PAYS investment program;
 - Vet the transaction structures with potential tax investors, especially sale lease-back providers with experience in distributed generation solar or working with electric cooperatives.
 - Refine transaction structures in consultation with prospective scaling partners, including solar aggregators, generation & transmission cooperatives, and others

²³ In short, the two options include (1) reserving a portion of each cost recovery charge during operating lease, or (2) continuing cost recovery after operating lease to cover the fair market value of the system.

able to efficiently offer Solar PAYS programs within a single utility service area, across a state, or nationally.

- For regulated utilities, engage with Commissions to evaluate their interest in approving the PAYS system to effect site-specific investment and cost recovery for on-site solar systems, including at the homes of low- and moderate-income customers and renters.
- Confirm the appropriate Solar PAYS structure(s) to pursue based on willing participants and the likely stages for scale and further vet the structures
 - Conduct detailed transaction structure review with accountants or legal counsel
 - Engage with legal counsel to draft contracts required to pilot, including any required structure documents, the Participant Agreement, and the Installer Agreement (or amendments to existing Participant and Installer Agreements); and,
 - As a pilot becomes viable, engage with appraisers, independent engineers, and others, as may be required by tax investors or other parties to conduct due diligence on the transaction.

This line of inquiry for future research is designed to illuminate critical threshold decision points for the key actors that would be participants in a Solar PAYS transaction. In any aspect of the transaction where a party's financial position would be worse as a result of participation, the transaction structure would fail. Pressure testing prospective solutions in a research environment is prudent and necessary for the next phase of research, and any scenarios that indicate promising results should help inform and accelerate the development of initial approaches to implementation in the field.

The recommended next steps and recommendations for future research are well aligned, and they are consistent with the purposes of the LIFT Solar research project. This includes the development of resources for the LIFT toolkit that would enable a broad field of interested stakeholders to access and build upon the gains made toward an inclusive solution for on-site solar with Solar PAYS.

***Applying the PAYS[®] System to On-Site Solar
to Expand Access for All***

Part 1

The Potential for the PAYS[®] System to Make On-Site Solar Photovoltaic Systems Accessible to Low- and Moderate- Income Customers and Renters

Ancillary Research supported by the US Department of Energy
EERE grant DE-EE0008567/0000, Accelerating Low Income Financing and Transactions
("LIFT") for Solar Access Everywhere

Submitted to Clean Energy Works
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**Prepared by Paul A. Cillo & Harlan Lachman
Energy Efficiency Institute, Inc.**

Purpose of this report

The Pay As You Save[®] (PAYS[®]) system has proven its ability to overcome the barriers preventing utility customers from installing resource efficiency upgrades that provide significant near- and long-term savings.¹ Investor-owned utilities, municipal utilities, and electric cooperatives have all demonstrated the effectiveness of the PAYS system. Customers of all types accept PAYS offers. Participants include low- and moderate-income (LMI) customers, renters who pay for their energy use, multifamily building owners, businesses, schools, and municipalities. The 2019 PAYS status report (see Appendix A) shows that for the ten utilities reporting offer acceptance rates, all but one reported rates of 70 to 90 percent.

The PAYS system enables utilities to invest in cost effective resource efficiency and renewables on the customer side of the meter and recover all of their costs. Participating customers have money-saving, resource-efficient upgrades installed with no up-front payment and no debt obligation. Those who benefit from the savings pay a tariffed charge on their utility bill, but only for as long as they occupy the location where the upgrades are installed. The monthly charge is always lower than the estimated savings and it remains on the bill for that location until the utility recovers its costs. While PAYS allows for payment over time, it does not involve any consumer loan obligation.

LMI customers (i.e., customers whose income is less than half of the mean income) represent half of most utilities' customers. Some additional customers are renters. Utility ratepayers at all income levels have participated in PAYS programs—an indication that even low-income households are able to access benefits from energy efficiency upgrades through programs based on the PAYS system. If on-site solar photovoltaic systems could qualify as PAYS upgrades without any customer out-of-pocket expense, PAYS might facilitate the widespread installation of on-site solar photovoltaic (PV) systems for all types of customers.

In one early example of applying the PAYS system to on-site solar, Ouachita Electric Cooperative Corporation in Arkansas installed on-site solar PV systems for 28 of its customers including 21 residential customers.² In this case, the high costs for these systems relative to their savings over a period of 10 years, as required in their existing tariff and chosen source of capital, leaves participants to pay upfront copayments to their solar vendor of just over 50 percent of the total cost for their on-site solar installations. With upfront out-of-pocket costs ranging from a \$6,646 to nearly \$37,000, such copays would prevent most, if not all, LMI customers and all renters from accepting PAYS offers to install on-site solar systems. This field experience underscores the importance of state and federal policy changes, technological advancements, and utility tariffs, such as the *PAYS Model On-site Solar Tariff* attached to this paper, that make these installations more accessible to all.

¹ Pay As You Save[®] and its acronym, PAYS[®], are trademarks awarded by the US Patent and Trademark Office in 2005 and 2007 respectively for a resource efficiency system defined by specific essential elements and minimum program requirements. The trademarks ensure that “Pay As You Save” and “PAYS” may only be used to refer to programs with these essential elements and program requirements. EEI has never charged a utility for use of the trademark, providing its program meets all of these elements and program requirements. EEI uses the trademarks in titles, section headings, and their first use in a report or document

² Ouachita already uses a PAYS tariff successfully to provide energy efficiency upgrades to its members. It received informal permission from the Arkansas Public Utility Commission to test solar installations within its PAYS tariff structure. Appendix B shows the data available for 21 Ouachita Solar PAYS residential customers.

Ten years ago, EEI began inquiring about whether it would be possible to apply some combination of solar tax credits, accelerated depreciation, bulk purchasing, utility subsidies, and other program enhancements to eliminate the need for customer copays for PAYS solar PV installations. This report summarizes EEI’s research, findings, and recommendations about the viability of using these and other possible program enhancements to make on-site solar PV systems accessible to residential customers, especially hard-to-reach customers.

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Executive summary

All types of utility residential customers install PAYS resource efficiency upgrades because these upgrades provide customers with significant near- and long-term savings. However, on-site solar PV installations have not yet qualified as PAYS upgrades without large customer copayments. This puts these installations out of reach for low- and moderate-income (LMI) customers and renters. LMI customers (i.e., customers whose income is less than half of the mean income) represent half of most utilities' customers and cannot afford to pay large sums upfront to install these systems. If on-site solar photovoltaic systems could qualify as PAYS upgrades without any out-of-pocket customer copayment, PAYS might facilitate the widespread installation of on-site solar systems for all types of customers including renters.

EEl's research has explored whether some combination of solar tax credits, accelerated depreciation, bulk purchasing, utility subsidies, and other program enhancements could be packaged to eliminate the need for customer copays for PAYS on-site solar PV installations. This report summarizes EEI's research, findings, and recommendations about the viability of using these and other possible program enhancements to make on-site solar PV systems accessible to residential customers, especially hard-to-reach customers.

While the PAYS system has many benefits that have resulted in 70-90 percent customer acceptance rates for the most cost-effective resource efficiency upgrades, the system has inherent limitations that create challenges to expanding its use to on-site solar installations. Meeting the PAYS requirements to provide significant net savings to customers, to assign utility cost recovery charges to a location not an individual customer, and to ensure that the customer is not required to pay when they are not saving, make the system incompatible with traditional financing mechanisms, including consumer loans, residential leases, and power purchase agreements. This means that finding a way to qualify on-site solar installations as PAYS upgrades requires using other financing mechanisms as well as advancing state and federal policies and program operation practices that eliminate the customer's upfront cost for a solar installation and increase the system's kWh output.

This research has led to the following recommendations:

1. Reform the federal solar investment tax credit so it can be an instant rebate or accessed as an advance on a refundable tax credit to lower the upfront cost of on-site solar.
2. Promote development of new technologies that lower equipment costs and or increase their output and help bring them to market.
3. Harness bulk purchasing to lower installation costs.
4. Expand the deployment of low-cost capital by allowing all utilities to access federal financing on terms similar to those utilized in the U.S. Department of Agriculture's (USDA's) Energy Efficiency Conservation Loan Program (EECLP)³ and providing technical assistance.
5. Use 20-year cost-recovery terms to qualify more on-site solar systems without a copay and leave a sufficient amount of the 25-year expected system life to allow the utility to recover unexpected costs requiring extension of the term.
6. Ensure net metering rates and utility subsidies reflect the real value of solar to the grid.
7. Target/mandate installations of on-site solar power on LMI customers' and renters' homes.

³ See <https://www.rd.usda.gov/programs-services/energy-efficiency-and-conservation-loan-program>

8. Test the combination of a commercial operating lease or other type of tax-credit transaction and PAYS to make on-site solar installations qualify as PAYS upgrades without customer copays.

The PAYS® System—Benefits, Limitations, Challenges

The Pay As You Save (PAYS) system enables utilities to invest in cost-effective resource efficiency and renewables on the customer side of the meter and recover all of their costs.⁴ Participating customers have money-saving, resource-efficient upgrades installed with no up-front payment and no debt obligation. Those who benefit from the savings pay a tariffed charge on their utility bill, but only for as long as they occupy the location where the upgrades are installed. The monthly charge is always significantly lower than the estimated savings, and monthly charges only remain on the bill for that location until the utility recovers its costs. While PAYS allows for payment over time, it does not involve any consumer loan obligation.

1.1 PAYS® ESSENTIAL ELEMENTS & MINIMUM PROGRAM REQUIREMENTS⁵

A. A program based on PAYS® has these essential elements:

1. A tariffed charge assigned to a location, not to an individual customer;
2. Billing and payment on the utility bill with disconnection for non-payment; and
3. Independent certification that products are appropriate and savings estimates exceed payments in both the near and long terms.

B. A program based on PAYS® has these minimum program requirements:

1. The offer to the customer will not be burdened with customer risk, which undermines the offer’s attractiveness, results in fewer projects being completed, and reduces the program’s effectiveness in achieving its goals.
2. The utility doing billing and collection of PAYS charges agrees to pay the capital provider(s) each month the amount billed to PAYS customers that month, regardless of the utility’s collections, and to treat any bad debt for PAYS measures the same way that it treats all other bad debt.
3. PAYS offers will not be forced to compete with other rebate options. Any utility offering rebates and implementing a program using the PAYS system will offer the same rebates to all participants. Utilities can reduce the costs for rebates if rebates available to all customers are limited to the amount required to qualify an upgrade for the PAYS tariff.

Key design tips to ensure PAYS® programs meet these essential elements and minimum requirements

- **Upgrades**
 - PAYS upgrades use proven technologies to ensure reliable savings.
 - Upgrades do not entail new debt obligation for participating customers.
 - At the conclusion of utility cost recovery, upgrades belong to building owner.

⁴ <http://www.eeivt.com>.

⁵ This information may be found on EEI’s website at <https://www.eeivt.com/pays-essential-elements-minimum-program-requirements-2/>

- Upgrades do not have end-of-lease charges or transfer-of-ownership financial obligations.
- **On-bill charges**
 - Participants receive immediate net annual savings of at least 25 percent above program services charges (80 percent rule).
 - Duration of payments is not more than 80 percent of the estimated life of the shortest-life component or a full parts and labor warranty/insurance policy.
 - The program services charge is a fixed amount that may not be increased mid-payment-term.
 - Pre-payment of unbilled charges is not permitted (i.e., no payment without savings).
 - Utilities may disconnect customers for non-payment (DNP) in accordance with current policies, but upgrades may not be repossessed.
- **Repairs**
 - Charges stop if upgrades stop working until they are repaired and working again. Charges are also suspended for vacancy if meter is shut off.
 - Repairs or vacancy may extend the duration of charges but not increase the monthly payment amount.
- **Cost-effectiveness analysis**
 - Savings analysis is onsite and building specific, and it includes no energy inflation or adders. It uses the amount of savings expected at the end of cost recovery for upgrades whose savings degrade over time, and it should be reported in units of energy not dollars.
 - Savings estimates used in a cost-effectiveness analysis may be for monthly, bi-monthly, or annual periods.
 - The exact cost of installed upgrades must be known at the time of assessment to avoid the cost and customer hassle of a second assessment because a vendor's installation price is different from the one used for the original assessment.
 - Programs that set contractors' prices based on negotiated or bid averages reduce the assessment cost and simplify program marketing and communications.
 - Utility subsidies and state and federal credits may only be included in cost-effectiveness analyses if they can be used to lower the upgrades' cost used in the assessment (no post-installation rebates paid to participants).

1.2 PAYS system benefits

Qualifying upgrades provide significant net customer savings and PAYS includes sufficient consumer assurances so that most customers accept program offers. Participants agree to pay 100 percent of the cost for the most cost-effective upgrades, and rebates for these upgrades are often unnecessary. Customers can have confidence in the upgrades installed in their homes and businesses because they are independently certified as appropriate and estimated to provide net savings in the short and long terms.

Additionally, customers have:

- No upfront payment
- No credit checks, liens or hassles (e.g., bank applications or approvals)
- No new debt obligation (the obligation to pay is assigned to the location not an individual)

- No obligation to pay if they don't benefit (e.g., if a customer relocates, their payment obligation stops; if an upgrade fails or breaks down, it is repaired or the payment obligation stops; if repaired, the payment amount stays the same, only the term is extended)
- No split incentives between owners and renters. (Renters pay lower utility bills while they occupy the premises. Landlords who don't pay for renters' utilities pay nothing.)

The risk-free offer is the reason programs based on the PAYS system have enjoyed unprecedented customer acceptance in states across the country. And since the PAYS system allows utilities to recover all of their investment in the most cost-effective upgrades from participants, reduces the need for rebates as an incentive, promotes upgrades remaining in place for the duration of utility cost recovery, and makes upgrades accessible to all utility customers, it is also attractive for the implementing utilities.

1.3 PAYS system limitations

Despite the benefits of PAYS, the system has a number of limitations as described below.

- Not all upgrades that are in society's or a utility's interest will qualify for PAYS.

Many utilities qualify program measures using a standard that requires the estimated customer savings to be equal to or greater than their costs for the measures, and use of this standard is expected to make the program "bill neutral" for the customer.⁶ Programs using the bill-neutral standard count 100 percent of the savings for 100 percent of their estimated useful life and often include projections for energy-cost inflation. The bill-neutral standard ensures that almost all upgrades that are in society's interests are included as eligible upgrades in these programs. Such calculations also mean that participants will worsen their financial situation in the early years following installation but will eventually come out even, assuming the customer remains at the location for the duration of the upgrades' useful lives, the upgrades function as expected, and the expected energy rate increases occur as predicted.

In order to ensure PAYS participants receive immediate net savings and to ensure upgrades will continue to function and save through the cost recovery term (i.e., including any extension of the term for the cost recovery period due to necessary repairs or extended vacancies or foreclosures), most PAYS programs use the 80 percent rule. The 80 percent rule stipulates that the PAYS monthly program services charge is set so that the participant receives net annual savings equal to at least 25 percent of the annual program services charges (i.e., the program services charge cannot be more than 80 percent of the gross savings; $20 \div 80 = 25$ percent) and the duration of payments does not exceed 80 percent of the estimated life of the shortest-lived component of the upgrade package or of the term of a full-warranty insurance policy.

The PAYS assumption is that customers, especially LMI customers, need significant and immediate savings to participate and a generous safety margin to ensure that assessment errors don't worsen their financial condition. Additionally, the upgrades should be expected to function for the full term of utility cost recovery, including any extended term to cover repairs, foreclosures, or long vacancies. Installations that do not benefit participants in both the short and long term do not qualify as PAYS upgrades, even though they may be in society's interest.

⁶ http://www.puc.state.pa.us/Electric/pdf/Act129/OBF-ACEEE_OBF_Exploring_EE_Opps-Approaches.pdf

- PAYS obligations for utility cost recovery must be assigned to a location, not an individual.

Capitalization of an energy upgrade at a customer's location under the terms of a utility tariff does not constitute a loan to the individual customer. Therefore, a PAYS investment by a utility does not create a debt for an individual. Because consumer credit is not involved in the transaction, credit scores are not considered as a factor for eligibility, vastly expanding the addressable market for solution providers. Assigning program obligations to a location and not an individual also makes these obligations binding on successor customers upon their taking occupancy at a location, with or without their permission. Whoever benefits from the resulting savings at a location is required to pay for them until utility cost recovery is complete.

Three features of PAYS include (1) no new debt for consumers, (2) payment obligations automatically transfer to successor customers, and (3) no liens on property. Part 2 addresses legal considerations associated with the PAYS system. Some of these considerations effectively rule out the use of traditional financing tools (e.g., power purchase agreements, loans, leases) as not compatible with assigning obligations to a location.

- PAYS charges must stop if an upgrade fails and is not repaired. The name Pay As You Save implies one of the key attractions of this system: Participants at an upgraded location pay for an improvement only while they benefit from it. If they leave a location, their payments end. If an upgrade fails during cost recovery, it is repaired, or payments end. The theory behind this PAYS rule is that few upgrades will fail during the period after the warranty ends and before 80 percent of their estimated measure lives. During the warranty period, the contractor bears the risk of repairs or replacements. After the warranty period until the point at which the utility's costs are recovered, the utility bears this minimal risk. Experience with resource efficiency programs has shown that few utilities have reported repair costs as an issue or even that they have had any repair costs. This report suggests a maximum PAYS cost recovery term of 20 years for on-site solar systems, which is 80 percent of a 25-year useful life, except when term extension is required to pay for needed repairs or cover extended vacancies. In no case can cost recovery continue if the system is no longer functioning.

1.4 PAYS system challenges

These limitations create challenges for those seeking to adapt PAYS for some societally beneficial investments:

- 1) Need to provide immediate net savings. People with financial means are able to use their resources to pay more than they save in the short term in order to reap substantial benefits over time. Many customers, especially LMI customers and renters, do not have the financial resources to do this or have other more compelling uses for their resources. Excluding fuel inflation in the PAYS cost effectiveness analyses makes qualifying on-site solar installations with the PAYS system more challenging than using a bill-neutral standard.
- 2) Inability to harness delayed incentives which cannot be used to lower installation costs. The solar tax credit (Investment Tax Credit or ITC) is available only to people who have a high enough income to be able to use the credit to reduce their taxes and only to those who can also afford to pay upfront and wait for four to 16 months (or even a few years) to receive the benefits of the ITC. These are significant barriers to making on-site solar installations accessible to LMI customers and renters.

As shown in Appendix D, “Examples of On-site Solar Installations,” if the ITC were available to lower the upfront costs of installing an on-site solar installation, the offer would be much more attractive for all customers. This would especially be true for those with low credit scores or those without available capital (or renters), who cannot advance the funds while waiting to receive the credit. Two of the standard installations (i.e., at Roanoke Electric Cooperative and Green Mountain Power) in Appendix D show that using the ITC in this way would qualify the installations without a copay. Unfortunately, Ouachita Electric Cooperative Corporation (OECC) has a low net-metering rate; Roanoke’s net-metering rate is 15 percent higher. Ouachita’s participants would have a copay of \$2,150 even with the tax credit and a 20-year cost recovery term under the assumptions in the Appendix D analysis.

Many solar installers work with developers who offer operating leases and power purchase agreements (PPAs) that enable the developer to claim an ITC and incorporate it into their competitive pricing for the lease or PPA. Those developers with sufficient profits can harness additional value using the Modified Accelerated Cost Recovery Systems (MACRS). However, since they are assuming the risk of the delay of these benefits and the uncertainty of realizing the annual profits needed to claim them, few if any developers channel these benefits into an upfront rebate to customers who install their systems. And, even if someone wanted to use a residential lease or PPA to share ITC or MACRS benefits directly with participants, as shown in Figure 3 in Part 2, the analysis presented there indicates these instruments are not compatible with PAYS.

- 3) No loans or liens. PAYS does not involve loans or liens. The most common current financing mechanisms available to residential customers are varying types of loans, leases, and PPAs. Most residential loan and lease mechanisms require building ownership and high credit scores (or very expensive credit enhancements that would increase program costs). The advantage of PAYS is that credit scores are not a factor for a residential customer to qualify for an upgrade. However, excluding all of these financing mechanisms, which are used for most residential solar installations, will require new, less familiar mechanisms that may make obtaining capital for periods of 20 years or longer more challenging.
- 4) PAYS charges must be suspended for repairs. If a customer who uses PAYS to upgrade their home reports an upgrade failure, the program operator must investigate. If the program operator determines that the customer, building owner, if different, or any occupant did not remove or damage the upgrade, then on-bill charges must be suspended until the upgrade is repaired. A utility or a vendor might be able to secure warranties to cover suspending payments for repairs, but depending on the duration of cost recovery and the on-site solar system’s costs, they might determine that the cost outweighs the benefit of doing so.
- 5) No prepayment of future utility service charges. While not an essential element or minimum program requirement of PAYS, EEI recommends that all utilities adopt tariffs that prohibit prepayment of unbilled cost recovery charges (i.e., treat them the same as other unbilled utility charges). EEI’s intellectual property (IP) now includes this feature in all PAYS agreements. The reason a policy of allowing pre-payment is strongly discouraged is to ensure that someone selling their home or a renter leaving their home cannot be forced by a purchaser (or a purchaser’s financing institution or landlord) to pay off all the remaining charges to make the home easier to sell or rent. Forcing a customer leaving their home to pay off unbilled charges

while they receive no savings breaks the promise of Pay As You Save. The customer could be pressed to make a large lump-sum payment without receiving the commensurate savings, and meanwhile successor customers who receive the savings get a free ride. A challenge of implementing PAYS for utilities is explaining to realtors and financial institutions that participants cannot pay the utility's cost recovery charges before they receive the benefits the service delivers.

- 6) Fixed monthly payments. The PAYS system effects cost recovery through tariffed on-bill charges that are significantly less than the estimated savings. These on-bill charges must be fixed payments and cannot be increased to recover repair costs or other uncertainties. For energy efficiency upgrades, based on the uncertainty of site specific cost effectiveness analyses, EEI recommends the 80 percent rule discussed above. For solar, where the ability to predict panel output is more precise (i.e., based on the orientation to true south and obstruction to insolation), EEI is recommending an 87 percent rule (based on the savings of the last year of cost recovery) so that the fixed charge is set to leave at least 13 percent of the estimated savings for the participant. In this way, participants are assured their savings will exceed their costs by at least 15 percent (i.e., $13 \div 87 = 15$ percent). While none of the solar vendors that EEI contacted insisted on variable payments, many were surprised PAYS charges were fixed, making cost recovery less flexible.
- 7) No repossession. Repossession of a loaned or leased upgrade is one of the many features that ensure loaners and lessors will be protected in the event of non-payment. With PAYS, the threat of disconnection of an essential service, albeit in accordance with a Public Utilities Commission or State policy, is the only protection against non-payment. Utilities or capital providers may not repossess PAYS upgrades, which may make PAYS a less attractive option for them and may limit the upgrades that a utility is willing to include in a PAYS program.
- 8) Customers leaving the grid. Utilities recover their PAYS investments through fixed on-bill charges. A customer installing on-site solar and an energy storage system (e.g., batteries) might completely disconnect from the grid, making utility cost recovery through tariffed charges impossible. This creates a challenge for a utility wanting to offer a PAYS on-site solar program that can be addressed in the PAYS tariff for on-site solar. Possible options include requiring anyone occupying the location to be a utility customer until all PAYS tariff charges have been paid or requiring a customer exit payment to the utility for all remaining on-bill charges and repayment of any utility subsidies that facilitated the installation. It may also be possible at some point for the utility to require installation of a SIM-card switch on each installed solar system to allow the utility to remotely shut off power to the home in the case of non-payment.⁷

Scope of this report: On-site solar PV

There are myriad applications of on-site solar systems that one could install (e.g., solar hot water, photovoltaic systems dedicated to heating hot water, passive solar systems, etc.). This report focuses solely on rooftop and ground-mounted PV systems, with or without motors to adjust the panels' horizontal or vertical axes to maximize production, that produce electricity for a home.

⁷ http://solar.m-kopa.com/wp-content/uploads/sites/4/2016/04/M-KOPA-Light-Bulb-Series-5_Financial-Inclusion.pdf, p.6

In order to explore the potential for PAYS to apply to on-site solar and provide immediate net cost savings to customers, we focused on PV without integrating the additional cost of storage batteries. Therefore, the costs cited in this report for on-site solar PV installations and the cost-effectiveness analyses do not include the cost of batteries, nor any potential benefits.⁸

This analysis excluded solar water heaters, which were successfully demonstrated as PAYS upgrades in Hawaii Electric Companies' SolarSaver program.⁹ This investigation also excluded community solar systems because, unlike all other PAYS upgrades, they are installed on the utility's side of the meter.

PAYS[®] variables

There are a number of variables that impact the cost effectiveness of all PAYS upgrades and, therefore, the comprehensiveness and marketability of a PAYS offer to a customer. Utilities implementing PAYS programs need to monitor and manage these variables for energy efficiency upgrades as well as for on-site solar upgrades to produce the most robust PAYS offers possible for their customers. There are some additional variables that come into play just for on-site solar upgrades that also require this kind of attention.

Key variables that impact the cost effectiveness of both energy efficiency and on-site solar upgrades are current utility rates, cost of capital, and costs for upgrades and installation. These are discussed below, followed by additional variables that apply especially to on-site solar installations.

3.1 Utility rates

PAYS uses the customer's retail utility rate in effect at the time of an upgrade installation to calculate estimated savings over the entire span of the cost recovery period. This ensures that individual customers will have the benefit of additional savings if electricity rates rise in the future, but the estimated savings do not depend on an assumption of either the timing or magnitude of any rate increase. Average rates or rates that are adjusted for projected inflation or other factors do not work for PAYS cost-effectiveness analyses because they put the customer at risk if the assumptions turn out to be faulty. By making an assumption that the current retail rate will remain fixed over the span of cost recovery, any benefit of increased savings as a result of future rate increases are implicitly assigned to the customer.

Electric rates vary throughout the country by utility. The U.S. Energy Information Administration (EIA) lists 2018 retail rates as low as 7.71¢ per kWh in Louisiana and as high as 29.18¢ in Hawaii.¹⁰ PAYS energy efficiency upgrades in a state with lower average residential electricity

⁸ While evaluating the financial value proposition for solar plus storage systems is not within the scope of this paper, it may warrant future investigation. Batteries may create some value for some customers and utilities (e.g., emergency back-up electricity, moving demand to lower-cost periods in case of time-of-use rates or demand control) sufficient to warrant utilities or states sufficiently subsidizing their installation to make them cost effective for LMI customers.

⁹ With the increased efficiency and reduced costs of PV systems over the past 15 years, many experts propose that customers should simply install PV systems to provide electricity for the home including for an electric heat pump water heater. This reduces the cost of plumbing and freeze prevention for a solar water heating system while providing a system that can also meet a customer's other electricity needs.

¹⁰ EIA, State Electricity Profiles, 2018 <https://www.eia.gov/electricity/state/>

prices like North Carolina (9.25¢/kWh), for example, do not generate as much value in avoided costs—and therefore, will not be as cost effective—as they do in a state with higher average electricity rates, like Vermont (15.13¢/kWh). The same is true for the value of avoided electricity costs achieved through the production of an on-site solar system. The rates in the EIA table do not include all volumetric rates such as fuel adjustment charges, which vary widely from state to state.

Utility rates are the basis for calculating avoided costs for electricity purchased from the grid, but when the solar system produces more electricity than is needed by the energy uses in the house, the value of that surplus solar is determined by a utility's or state's net metering policy. When considering a residential solar power system, the net-metering rate is key in calculating on-site solar upgrade cost effectiveness.¹¹

PAYS assumes that for on-site solar, the net-metering rate will not decline more than the 13 percent safety margin provided by the 87 percent rule. If a Commission or unregulated utility lowers the net metering rate for customers who already installed on-site solar systems expecting net system savings, these customers will be at risk of paying more for than their on-site solar system than they save. The PAYS model tariffs for on-site solar in Appendix B include language committing the utility to not lower the net metering rate for PAYS customers who are currently being charged for on-site solar systems.

3.2 Capital costs

Any utility that obtains approval of the Model PAYS Tariff is assured that charges unpaid by customers participating in its PAYS program are treated like charges unpaid by customers for its other essential services. This also assures that the utility will be in a position to meet its obligations to capital providers regardless of the performance of the PAYS investment portfolio. For that reason, the cost of capital for a PAYS program is based on underwriting of risk to the utility's balance sheet rather than risk to any one individual or even a subset of individuals served by the utility. The cost of capital available on these terms varies by source, and multiple sources are available depending on the type of utility (i.e. electric cooperative, municipal utility, or investor-owned utility). This section presents several examples of potential capital sources and the prevailing cost of each for utilities in sound financial standing.

The Rural Energy Savings Program (RESP) is a competitive zero-interest loan program from the Rural Utilities Service at USDA, and it has limited funding authorized annually by Congress. The RESP interest subsidies are available to electric cooperatives and non-profit organizations for a loan with a 20-year term, but the law authorizing the program requires that the borrower limit the term of deployment to 10 years. States that set up efficiency utilities, such as Efficiency Vermont, that serve areas that meet the RUS definition of rural may also apply to receive these funds.¹²

The Cooperative Finance Corporation is owned by electric cooperatives and makes loans only to its member-borrowers. CFC borrows capital from RUS and or buyers of its corporate bonds. It marks up the cost of capital but offers discounts for utilities that agree to borrow exclusively from CFC.

¹¹ The net metering rate is the price per kWh that a utility pays its customers for the excess electricity they generate at their locations with solar PV installations and supply back to the grid. Each state regulatory commission sets net metering rules for how utilities must pay solar generators within their service territories. Currently 41 states require net metering for utility customers with solar installations.

¹² <https://www.rd.usda.gov/files/RDRuralDefinitionReportFeb2013.pdf>

However, it has made an exception for exclusive borrowers that win subsidized RESP loans on the condition that these borrowers pay CFC 0.5 percent in interest for capital received from the federal government with zero interest.¹³ EEI could not verify whether CFC's exclusive borrowers are also allowed to borrow from RUS' EECLP program and still maintain their discount as exclusive borrowers.

Municipalities may have access to tax-exempt municipal bonds to capitalize a PAYS program with rates comparable to the Treasury-rate loans available through EECLP for the higher-rated municipalities.¹⁴ As an alternative to tax-exempt bonds, municipal utilities may also be able to access pension funds at relatively low interest rates while also providing pension fund managers with a low-risk return option with multiple benefits to the municipality.

Financially healthy investor-owned utilities (IOUs) and other utilities that obtain approval of a Model PAYS Tariff and comply with the PAYS requirement of guaranteeing payment to capital providers regardless of collections from ratepayers may, at the time of this paper's publication, be able to source capital in the range of 4.25 - 5.5 percent.

Among all of these options, the advantage of RESP loans and EECLP loans is that they are similar to a line of credit, so there are no carrying costs for using these sources of capital in the time period between approval of the loan and deployment of the capital. Utilities seeking other sources of capital may also be able to structure them similar to lines of credit where interest costs only begin to accrue when the line of credit is drawn upon to pay for approved installations.

3.3 Upgrade costs

The costs for upgrades can vary dramatically by contractor, based on the contractor's need for work among other factors. Aggregating system purchases can drive down the cost.¹⁵ EEI recommends using requests for proposals (RFPs) with contractors and suppliers to harness the purchasing power created from a utility program that can significantly expand the number of installations in a service territory. Aggregating procurement using RFPs can obtain prices for upgrades that are lower than for individual installations. Having prices for bulk procurement to inform the cost-effectiveness analyses also simplifies the process of qualifying projects and creates consumer confidence in the prices used for the analyses. Most utilities do not use RFPs to obtain fixed prices for upgrades for their rebate and on-bill financing loan programs because the customer is responsible for procurement of the upgrade and installation services.

EEtility, Inc., currently the only program operator licensed to use the PAYS system in more than one state, uses a negotiation approach. EEtility sources prices for volume business by negotiating with individual PAYS contractors.¹⁶ While their prices are not as low as the prices obtained from offering all retrofits to the lowest-priced contractor willing to meet quality standards, they are below market prices for individual retail purchases because of the avoided cost of customer acquisition.

¹³ Harlan Lachman's October 21, 2019 conversation with Mark Cayce; General Manager, Ouachita Electric Cooperative.

¹⁴ <https://www.fmsbonds.com/market-yields/>

¹⁵ Solar United Neighbors, interview with Corey Ramsden about their procurement aggregation program, March 2020.

¹⁶ EEtility determined the market of contractors is too thin to conduct an RFP with a competitive pool of contractors certified to perform services in a program based on the PAYS system where it is currently operating programs.

This also allows EETility to determine upgrade costs for a particular job in advance simply by knowing the contractor the customer selected or that is next on a rotating list.

Regardless of how upgrades are priced, if program purchasing power is not used to reduce prices, fewer upgrades will qualify for a PAYS tariff without a customer copay.

3.4 Additional variables for on-site solar systems

In addition to the variables already discussed, adoption of on-site solar upgrades is challenged by other specific variables discussed below including the usefulness of the investment tax credit and MACRS (i.e., accelerated depreciation), net metering rates, varying state and utility incentives, system orientation, obstructions, and system performance.

Investment tax credit (ITC): The investment tax credit, also known as the federal solar tax credit, allows a homeowner installing on-site solar in 2020 to credit 26 percent of the cost against their federal income taxes. The ITC applies to both residential and commercial systems, and there is no cap on its value.¹⁷ The credit is scheduled to drop to 22 percent in 2021. For solar PV systems owned by residential customers, the ITC will expire in 2022 without federal legislation, and the ITC will become permanent at 10 percent for commercial businesses.

The ITC is the largest incentive available to lower the cost of on-site solar systems. However, since the federal tax credit is of little or no value to owners of solar PV who have little federal income tax liability, and since it cannot be used by homeowners to lower the upfront cost of their system (i.e., its value is received in the year following installation), it does not offer much help to LMI customers facing an upfront cost barrier to acquiring the upgrades by buying and owning the system directly. To date, EEI has not found any service provider willing to share a sufficient portion of the ITC to eliminate the need for a copay for LMI customers.

Modified Accelerated Cost Recovery System (MACRS): MACRS is the method of depreciation that allows a business to recover the depreciation of an asset through a tax deduction to allow for its eventual replacement. Using MACRS, a significant portion of the value of qualifying solar energy equipment can be depreciated over 5 years. The total cost less one half of the claimed ITC credit—13 percent in 2020 and 11 percent in 2021—may be deducted over 5 years.¹⁸ While residential customers cannot claim accelerated depreciation, businesses that offer power purchase agreements or operating leases to homeowners can benefit from them, which can almost double the value of the solar tax credit, providing they have sufficient income for the MACRS to offset.

As with the ITC, EEI has not found investors or service providers who share the value of MACRS with LMI customers installing on-site solar systems.

Net metering rates: Net metering is the term used to describe the policy of utilities crediting customers for the production of electricity from an on-site solar system that flows through the customer’s meter and onto the grid. Net-metering policies vary from state to state.¹⁹ In Arkansas, for its residential customers, Ouachita Electric Cooperative Corporation’s net-metering rate must be the

¹⁷ <https://www.energysage.com/solar/cost-benefit/solar-investment-tax-credit/>

¹⁸ <https://www.seia.org/initiatives/depreciation-solar-energy-property-macrs>

¹⁹ https://web.archive.org/web/20140703061348/http://dsireusa.org/documents/summarymaps/net_metering_map.pdf

same as its residential rate.²⁰ In Vermont, net metering is limited to offsetting the annual kWh use of the participant. At the Vermont utility, Green Mountain Power (GMP), cited in Appendix D, the net metering rate is 17.893¢ per kWh if the customer lets GMP claim available Renewable Energy Certificates to comply with a complementary policy, the state Renewable Portfolio Standard.²¹ Net metering rates, which in the small number of examples used in this report vary by more than 55 percent, are another large determiner of whether on-site solar systems qualify as PAYS upgrades without a copay at the homes of LMI customers and renters.

Utility value streams: Some utilities benefit when customers install on-site solar systems. Utilities could facilitate installation of more on-site solar systems if they shared with the installing participant some or all of the value an installation provides to the utility. The examples in Appendix D show the amount of utility incentive that would be required to make an installation of an on-site solar system qualify for a PAYS tariff without a copay.

There are multiple types of value streams that a utility can manage for the benefit of both the utility and its customers. For example, if a utility has not fulfilled a state policy requiring a minimum portion of the portfolio of electricity sources be solar generation, solar power installations at customer locations may reduce the financial cost of utility compliance.

Massachusetts and Washington, DC, are two jurisdictions with Renewable Portfolio Standards that have produced a demand for Solar Renewable Energy Credits (Solar RECs), generating value streams of up to \$400 per MWh (40¢ per kWh paid by a utility and ultimately incorporated as a cost of meeting the policy requirement that is included in the rate base.²²

If a utility has high peak demand charges and on-site solar production occurs during the utility's traditional system peak demand, the utility could realize the value of avoided costs.

Avoiding the need for transmission and distribution (T&D) upgrades might be another source of value if the on-site solar installations are targeted to a T&D-constrained section of the utility's service territory. Similarly, avoiding line losses in a utility's distribution system is another potential value stream for utilities that have long distribution circuits, like most electric cooperatives in rural service areas. The average line losses reported by rural electric cooperatives from 2007 to 2012 were above 5 percent for all electricity delivered.²³ Because the losses are proportional to distance, losses on longer distribution circuits are above average. Therefore, targeting long distribution circuits for deployment of on-site solar can produce higher value streams.

Customer rebates are a way that utilities share the value of an installed upgrade with the participant responsible for its installation. Traditionally, rebate programs have almost exclusively benefitted those customers with the financial means to pay upfront for the full cost of the upgrade. However, using rebates to lower the upfront cost of an on-site solar installation to allow it to qualify as a

²⁰ <https://www.arkansasonline.com/news/2019/dec/06/psc-asked-to-quickly-clarify-solar-powe/> and confirmed in a March 27, 2020 conversation with Mark Cayce

²¹ February 28, 2020 email from GMP's Kristin Kelly; Director of Communications.

²² <https://www.sretrade.com/markets/rps/srec/>

²³ NRECA, 2014. Electric Distribution System Losses. Figure 1.2. <http://www.cooperative.com/programs-services/bts/Pages/BTS-Reports/Electric-Distribution-System-Losses.aspx>

PAYS upgrade with either no copay or a reduced copay is a way to allow LMI customers and renters to access these benefits.

State Incentives: Some states provide incentives to customers who install on-site solar systems. These vary significantly from state to state and can change over time. A current listing of state incentives may be found online.²⁴

As with ITC and MACRS, incentives often are not in the form of immediate cash credits to lower the upfront costs for customers, a policy design choice that affects the accessibility of those benefits to LMI customers. Advocates and policy makers interested in making on-site solar accessible for LMI customers and renters should work to promote equity by making incentives available to all customers through policies or business models that result in upfront reduction of the system costs.

Orientation and solar exposure: Assessing orientation and solar exposure for each site is a critical step in determining whether an on-site solar upgrade will deliver optimal energy generation, lowering potential requirements for a customer copay. All of the examples in Appendix D assume the solar panel orientation will be true south and have unobstructed exposures. If the on-site solar system has a different orientation or is shaded at some periods of the day at certain times of the year, then it will produce less electricity than the system characteristics assumed in the analysis for this project. Most homes are not oriented or landscaped for future installation of on-site solar systems facing true south with exposure that is unobstructed by trees, other buildings, or geologic features. One of the systems used as an example in Appendix D is designed to optimize orientation to the sun throughout each day with electric motors on both horizontal and vertical axes of the panels (e.g., dual-tilt axis system).

System Performance: In Appendix D, the two different systems analyzed illustrate the type of differences in cost and performance that are associated with different brands of systems. The same procurement mechanisms that may be used to lower upgrade costs (i.e., RFPs and negotiations) may also be used to help customers get more efficient technologies installed at their homes.

Findings

4.1 Investment Tax Credit

The amount of the credit, currently 26 percent, is large enough that if allowed to lower the upfront on-site solar upgrade cost, it would make the upgrades accessible to LMI customers. While the ITC effectively reduces the cost of the installation for a customer with sufficient federal income tax liability to be offset by the credit, the owner needs to front the funds to purchase the system and wait four to 16 months to receive the credit. If the ITC were a refundable tax credit (as it was during the Recovery Act era), it would approximate a rebate program worth one quarter of the project cost (26 percent in 2020), and it would be available to all regardless of income or related federal income tax liability. If it were possible to also change the ITC to provide an instant rebate or an advance on a refundable tax credit available to everyone regardless of their income, then on-site solar systems could be more affordable to many customers, including LMI customers and renters. As shown in Appendix D, if such a refundable tax credit were available upfront as an instant rebate or advance, then the costs for installation of a standard on-site solar system in a PAYS program at two of the

²⁴ <https://www.energysage.com/solar/cost-benefit/solar-incentives-and-rebates/>

three of the selected utilities (i.e., Roanoke, and Green Mountain Power), would be sufficiently low to allow installations to qualify as PAYS upgrades without copays.

For other customers who can afford to make an upfront payment knowing they can benefit from the ITC in the next tax year, the examples in Attachment C show that, with the modeled standard system at all three utilities, the ITC more than covers the customer copay with a 20 year cost recovery term at the two utilities with net metering rates over 13¢ per kWh (Roanoke and GMP). However, since the current credit cannot be used for four to 16 months after an on-site solar upgrade installation has been placed into service, participants would have to pay a copay and then be reimbursed in the future. For customers with sufficient financial resources to advance the cost of the ITC, this analysis shows that installing on-site solar with a PAYS tariff and a 20-year cost recovery duration is a compelling offer.

4.2 *Technological and business innovation improvements*

There are many technological improvements and business innovations that could drive down the cost of on-site solar. For example, Helical Solar Solutions has combined multiple technological innovations for deployment of ground-mounted systems with dual axis tracking for more solar power generation. These advancements initially targeting the agricultural sector may have a significant impact on the viability of ground-mounted on-site solar installed as residential PAYS upgrades in rural areas where shade-free yards provide available space. As shown in Appendix D, for all three of the selected utilities, if the developmental system by Helical Solar Solutions were available at the designed output and cost, this new technology would substantially improve the cost effectiveness of on-site solar. The developmental system is designed to produce enough energy at its estimated price (if ordered in bulk) that at all three test utilities, the systems could be installed with no copayment.

The economics of this potential technological development are so promising that a 15-year or more cost recovery term does not require a copay at two of the utilities (Roanoke and Green Mountain Power) and the third (Ouachita) did not require a copay with a 20-year term. With continued policy support for research and business development like the US Department of Energy's Small Business Innovation Research program and other Department of Energy grants that support innovative solar start-up companies that might be able to serve LMI customer's interests, one or more technological breakthroughs like this one provide one path to making on-site solar upgrades available to LMI customers and renters using the PAYS system without the need to modify the ITC.

4.3 *Bulk procurement to lower upgrade costs*

A successful utility investment program based on the PAYS system would be likely to significantly expand the number of on-site solar installations in a service territory. Utilities seeking to qualify installations of on-site solar systems as PAYS upgrades without copays for LMI customers and renters can use this expansion to lower the cost of the upgrades through bulk procurement. The standard system used in the examples in Appendix D take advantage of the experience of Solar United Neighbors and its proven ability to use buying cooperatives to aggregate demand and issue competitive solicitations to obtain lower-cost and higher-performance systems. Helical Solar's developmental ground-mounted on-site solar system costs are based on the company's projected price if shipping 140 completed systems at one time to a utility.²⁵

²⁵ Conversation with James McKinion, founder of Helical Solar Solutions, LLC, on February 27, 2020

4.4 Duration of utility cost recovery

At this time, a 20-year cost-recovery term is optimal for qualifying on-site solar installations as PAYS upgrades as shown in the three market examples researched for this project. In Appendix D (page 1), using the example of a standard on-site solar system at Ouachita, even with a cost of capital that is 2.5 percentage points higher than the rate used for the 10-year cost recovery option, the copay is significantly lower with each longer cost-recovery duration. The copay drops from 55 percent of the standard system's cost with a 10-year cost recovery term to 34 percent of system cost with a 20-year term. This results in an upfront savings to participants of \$5,533. In all of the other examples in Appendix D, there are similar copay reductions with longer cost recovery terms.

Another reason is that a 20-year cost-recovery term leaves at least five years remaining in the 25-year useful life of an on-site solar upgrade as a hedge for the utility to manage specific risks. In particular, the utility may extend the cost recovery period to recover the cost of any needed repairs to the upgrade or missed billing cycles when vacancy periods cause a meter to become inactive. In addition, this remaining span of time could include cost recovery for any commercial operating lease buyout cost (if a commercial lease is used) by extending the term but staying within the useful life of the upgrade (see *Combining PAYS with a Commercial Operating Lease to a Utility* below).

It is also true that participants with longer cost recovery terms pay more in the end since the cumulative cost of capital over 20 years is added to the portion of the system cost that otherwise would have been an upfront payment. But for LMI and rental customers, the upfront copay is a key barrier to participation, and even for higher income customers, financing is preferable to paying in full upfront if they have other economic opportunities with higher returns.

4.5 Combining PAYS with a Commercial Operating Lease to a Utility

Swell Energy has proposed an innovative approach involving commercial operating leases from a service provider to a utility with an approved PAYS model to qualify residential on-site solar installations as PAYS upgrades. EEI has not received sufficient information to assess the viability of this approach. Nevertheless, EEI has included the available information from Swell Energy in this report because if the preliminary analysis is validated, this approach would provide an opportunity to make on-site solar qualify as PAYS upgrades for many more LMI customers. [See Part 3 prepared by Next Resource Advisors.]

Swell is a California company that markets battery storage to mitigate fire risk and expand the value of residential solar systems, especially in areas affected by extended power outages. Batteries charged by renewable energy systems are eligible for investment tax credits, so the options for financing a solar PV system are familiar to the company.

They believe a commercial operating lease between a lessor and a utility can be combined with a residential PAYS tariff, allowing capture of the ITC and MACRS that effectively would lower the on-site solar upgrade cost and eliminate the need for customer copays. Swell Energy's preliminary analysis of this approach showed that it could be promising. If validated, the standard on-site solar system with the standard installation cost installed at utilities with a net metering rate of 13¢ per

kWh or higher would qualify for a PAYS tariff without the need for a customer copay, except when the system cannot be installed facing true south and or has obstructions to insolation.²⁶

Swell Energy informed EEI that they have completed an additional analysis using their own estimate for installing the same system at a lower cost. Using their discounted cost for a system with the same rated output, they found all installations at these utilities would qualify as PAYS upgrades without a copay with a net metering rate of 13¢ per kWh or higher. Further, they indicated that some installations oriented to true south with few or no obstructions might qualify without a copay at utilities with an 11¢ per kWh net metering rate.

If their proposed approach to combine an operating lease to a utility with a utility's Commission-approved PAYS[®] Model On-Site Solar Tariff works as described, then a utility with favorable market conditions could install on-site solar systems at many homes, including those of LMI customers. Swell Energy has not provided an analysis of how this approach might work for renters. Whether an operating lease or another transaction design for monetizing a solar tax credit would work best would need to be thoroughly assessed and documented before it can be recommended. A thorough assessment would need:

- a clear explanation of how the transaction would work and each party's role in a system designed to make residential on-site solar accessible to LMI customers and assure utility cost recovery;
- a review by an expert with knowledge of solar operating leases to trace the assignment of tax credits and value streams and to seek views from accounting experts as needed;
- a legal review of a modified PAYS Model On-site Solar Tariff (e.g. Appendix C2) to detect any aspects that may be flagged by a Commission if submitted by a utility; and
- a service provider that is able to source capital as required to make the proposal work.

Recommendations

The purpose of this paper is to determine whether and how the PAYS system could make on-site solar systems available to LMI customers and renters. At the time of completion of this paper, it is not currently possible to remove the upfront cost barrier for on-site solar to make it available to these hard-to-reach customers. None of the states that have approved PAYS tariffs for resource-efficiency programs have net-metering rates sufficient to qualify residential on-site solar systems without a copay. The ITC cannot be used by renters or most LMI customers directly.

However, in this section, EEI outlines actions that, if successful, could make on-site solar systems accessible to LMI customers and renters. These actions are listed in order of importance but not in order of feasibility. EEI offers the following recommendations to policy makers and resource efficiency advocates interested in making access to on-site solar equitable by helping LMI customers and renters install systems at their homes:

²⁶ Based on phone conversations between Harlan Lachman and Swell Energy's Sean Early on March 4 and 11, 2020 and emails from March 4 – 16, 2020.

1. Reform the ITC.

Advocates and policy makers should work to keep the ITC at current levels and to make all incentives available to lower the upfront costs for LMI customers and renters. Changing a tax credit that disproportionately benefits upper income citizens to an instant rebate or an advance on a refundable tax credit that would benefit LMI customers and renters would be the single biggest policy initiative our country could take to make on-site solar accessible to these customers before the residential ITC policy expires in 2022.

2. Promote research and development to accelerate technology.

DOE should continue its efforts to identify promising new technologies and help bring them to market. The developmental system used as an example in this report is part of a Department of Energy (DOE) Small Business Innovation Research (SBIR) Phase 1 grant. The magnitude of the cost reductions that can be gained through innovation is on par with the current value of the ITC, so investments that accelerate innovation could eliminate reliance on a tax credit that is currently vital but also limits market participation.

3. Harness bulk purchasing to lower installation costs.

EEI recommends that utilities implementing PAYS programs purchase upgrades by using the scale of its program (i.e., through competitive RFP solicitations to suppliers or negotiations) to obtain lower costs for more cost-effective upgrades. This will qualify more energy efficiency upgrades and more on-site solar systems as PAYS upgrades without customer copays.

4. Expand the deployment of low-cost capital through utility investments accessible to LMI households.

EECLP capital provided by USDA from a facility with \$5 billion per year does not involve significant risk of carrying costs since it operates as a line of credit. It currently has an interest rate less than 1.5 percent and allows for a 15-year cost recovery term that may be expanded for longer-lived upgrades. Any electric cooperative in the country can access this capital. Because few electric cooperatives have adopted tariffs to deploy capital on the customer's side of the meter, EECLP financing has seldom been sought. More technical assistance to deploy the capital already available could be effective.

Advocates and policy makers should work to have USDA (or other federal entity) make low-cost long-term financing with EECLP's regulations available to all utilities including IOUs and municipal utilities. These funds should be reserved for and targeted to LMI customers. As noted elsewhere in this paper, to avoid unnecessary administrative effort and expense, LMI customers should be targeted based on neighborhoods, not individual income verification.

5. Use 20-year cost-recovery terms.

Cost recovery for both the existing PAYS model and the combination of a PAYS tariff with a concurrent utility commitment to a commercial operating lease should both use a 20-year term unless a shorter cost recovery duration can qualify on-site solar systems without a copay. Cost recovery for PAYS programs should always be as short as possible while requiring no copays. Shorter cost recovery terms reduce risks for implementing utilities and reduce total costs for participants.

However, as the examples of a standard on-site solar system in Appendix D show, limiting cost

recovery to 80 percent of the useful life of an upgrade (i.e., 25-years for on-site solar systems) reduces the need for copays yet offers sufficient extra expected life to cover repair costs, missed billing cycles due to extended vacancies, and costs for a utility to pay off the fair market cost of a leased system.

6. Ensure net-metering rates and utility incentives reflect the real value of solar to the grid.

The role of Public Utility Commissions is to develop rate schedules and policies that produce sufficient energy at rates that are fair, just and reasonable for all customers. Utilities, especially IOUs, as noted above, may face regulatory frameworks that give them an incentive to promote low net-metering rates and reduce incentives for customers to deploy on-site solar systems.

Commissions should approve regulatory frameworks that assure utility grid operators are able to realize the full value of on-site solar and offer commensurate incentives to develop it.

7. Target/mandate installations of solar power at LMI customers' and renters' homes.

Although not discussed earlier in this paper, EEI has found that if market forces are allowed to determine where upgrades are installed, most upgrades will not be installed in the homes of LMI customers. California's SB535 policy attempts to address this issue by allocating a share of public spending to geographically bound areas recognized as Disadvantaged Communities. However, since money serving other areas may be spent first, there is no assurance this mandate actually will achieve its desired effect. EEI recommends that advocates and policy-makers shape mandates for utilities to direct that their initial program investment be targeted to neighborhoods primarily occupied by LMI customers and to rental housing where customers pay for their energy costs, before the balance of funding is made available to other customers. Based on field experience with energy efficiency investment programs based on the PAYS system, to reach all LMI customers solar upgrades adequate funds will be needed to address structural repairs in some homes prior to installing the upgrades.

8. Test the combination of PAYS with a commercial operating lease or other type of transaction able to monetize tax credits.

As explained above, further work will be required to determine whether the idea of combining a commercial operating lease with PAYS can create on-site solar offers without copays for LMI customers at least in some states (i.e., those with sufficient net metering rates and or incentives). Part 3 attempts to provide a more detailed analysis of the potential for commercial operating leases or other transaction type to integrate financing so that LMI households can access on-site solar systems as PAYS upgrades. If an interested utility is willing to pursue this approach with a service provider, and the utility's regulator approves a tariff similar to the PAYS Model On-site Solar Tariff in Combination with Commercial Operating Lease (Appendix C2), then this approach may be the most immediate way to make on-site solar installations possible in the homes of LMI customers.

Methodology

There were two parts to this research project. One part involved exploring the technical and financial issues related to on-site solar installations and how they might be structured to qualify as PAYS upgrades. The other part, seen in Part 2, explored the legal issues involved in implementing an on-site solar PAYS program.

There were two legal issues. First, what legal questions and concerns have surfaced during the approvals of the current PAYS programs; and what are the proven ways Commissions and utilities

interested in implementing PAYS programs addressed them to facilitate approval of PAYS tariffs? Second, could the most common financial structures (loans, operating leases, and purchase power agreements) for capturing the ITC and MACRS be adopted and made compatible with the PAYS system?

To address the legal issues, the project team was fortunate to have the services of Nancy Brockway. Ms. Brockway is an expert in utility regulation, with over 40 years in the field. She served as a Commissioner on the New Hampshire Public Utilities Commission and was a senior staff member for two other New England regulatory commissions. As a Commissioner, she was instrumental in bringing PAYS to New Hampshire electric utilities. She began her career as a legal services lawyer. After her tenure as a state commissioner, she has provided consulting services, including expert witness testimony, in 26 states and provinces, and 70 dockets, on subjects ranging from low-income energy efficiency programming to smart metering. She is a graduate of Smith College and Yale University Law School.

Her memo, included as Part 2, informs this paper and provides clear answers and guidance to organizations, utilities, and others interested in implementing programs based on the PAYS system to effect installation of resource efficiency and on-site solar upgrades on the customer side of the meter.

To address the technical and financial issues, EEI contacted identified leaders in the solar industry. Some were referred by the project's ad hoc advisory committee. Others were referred by Clean Energy Works.

There are many different on-site solar products and services in the country as well as varying solar policies from state to state such as net-metering rates and utility and state incentives and tax credits. To make the project manageable, two different on-site solar systems were studied to illustrate the issues of qualifying them for PAYS treatment.

One system was suggested by Solar United Neighbors (SUN), an organization committed to "...a clean, equitable energy system that directs control and benefits back to local communities, with solar on every roof and money in every pocket."²⁷ This organization establishes localized buying cooperatives for residential rooftop solar projects around the country. SUN aggregates demand and uses competitive solicitations with better economies of scale to help individuals access better pricing for higher-quality installation of on-site solar systems. Mr. Corey Ramsden, Vice President of their Go Solar Programs, worked with EEI to develop a representative premium output, reliable system with reduced cost from bulk buying.

The other is an innovative on-site solar system developed by the start-up Helical Solar Solutions, LLC, under a Department of Energy FY2019 Small Business Innovative Research (SBIR) grant. While the innovations are described in the company's publicly available SBIR abstract, Helical Solar is at a critical stage in the commercialization process and not wanting to disclose too much proprietary information about the combination of ground-mounted systems with dual-axis tracking and solar modules with double-sided panels. Suffice it to say, the system is designed to offer a lower cost per watt and higher level of production than its competition.

²⁷ <https://www.solarunitedneighbors.org/about-us/vision-mission/>

Their system has a modular design so it can be installed by utilities, potentially using their existing capital equipment and personnel. This technology when combined with a business-to-business approach allows municipal and cooperative utilities to acquire and install systems at volume pricing. If Helical Solar gains market traction, it may deliver the type of innovative technological advancement that significantly improves the ability of on-site solar systems to qualify as PAYS upgrades, even for LMI customers and renters.

The modeled results of both systems in Appendix D assume they will be purchased in bulk to take advantage of economies of scale that can be achieved when a utility aggregates demand.

Appendix D presents analyses of how the performance of these two systems would play out at each of three utilities with different net metering rates and different utility ownership structures: two cooperatives that have approved PAYS tariffs, Ouachita Electric Cooperative Corporation and Roanoke Electric Cooperative, and one IOU, Vermont's Green Mountain Power, which has not expressed interest in a PAYS tariff but offers significantly higher net metering rates.

Potential solution to high PAYS on-site solar up-grade costs for LMI customers

As discussed earlier in this report, Swell Energy has proposed using a commercial operating lease between a lessor and a utility that it believes can be combined with a residential PAYS tariff, allowing capture by the lessor of the ITC and MACRS that effectively would lower the on-site solar upgrade cost to eliminate the need for customer copays in some markets. Ms. Brockway's work (Part 2) did not focus on solar operating leases between businesses, but rather solar operating leases between a service provider and homeowners, so it is possible that such an arrangement can be put into place under current law. Other experts, Next Resource Advisors, are pursuing similar transaction structures that may enable on-site solar PV to qualify as PAYS upgrades without a copay (i.e., available to LMI customers). Their preliminary analysis is presented in more detail in Part 3.

Acknowledgments for the development of the PAYS system

Twenty years ago, the Energy Efficiency Institute, Inc. (EEI) presented its paper, Pay-As-You-Save Energy Efficiency Products: Restructuring Energy Efficiency, in December 1999 at the winter meeting of the National Association of Regulatory Utility Commissioners. Since then, 18 utilities in eight states have implemented programs based on the Pay As You Save system. It is appropriate to acknowledge some of the people who contributed to the development of the PAYS system, which has spun off programs across the country that have invested more than \$40 million in resource-saving upgrades at more than 5,000 customer locations.

- **Thomas Buckley**, former Manager of Energy Services at the Burlington Electric Department (Vermont) was instrumental in helping to develop the precursor of PAYS.
- **Nancy Brockway**, utility regulation expert; her memorandum in Part 2 addresses many key legal issues associated with PAYS, including whether it can be adapted to more flexible financial terms.
- **Steven Nadel**, Executive Director of ACEEE sponsored the short-lived, non-profit PAYS America that tried to jump start additional PAYS programs.
- **Michael Volker** at Midwest Gas & Electric was the first utility manager to push for adoption of a PAYS program (2007).

- **Tammy Agard** is CEO of EEtility, Inc. (Little Rock, AR), the only multi-state PAYS Program Operator. Her commitment to the PAYS system has resulted in customized assessment tools, data systems, and innovative approaches to residential weatherization that has set the standard for what PAYS can accomplish.

EEI's Harlan Lachman also would like to acknowledge the extensive financial generosity of his father, Gerard Lachman, without which Harlan's foray into the energy efficiency field and the PAYS system would never have happened.

Acknowledgments for this research

It is not possible to list all of the solar professionals who freely gave of their time and expertise to help us in our research. In no particular order and knowing we have left generous experts out, our thanks to the professionals at SunCommon, Swell Energy, Solar United Neighbors, Vermont Electric Cooperative, James McKinion at Helios Solar Solutions, LLC, and Ouachita Electric Cooperative's Mark Cayce. We are also grateful to Nancy Brockway, whose memorandum in Part 2 addresses many key legal issues associated with PAYS, including whether it can be adapted to more flexible financial terms.

Appendices

- A. 2019 Status Update on Programs Based on the PAYS system
- B. Data from PAYS Net Metering Pilot in Arkansas
- C. PAYS Model On-site Solar Tariffs
 - C1: PAYS Model On-site Solar Tariffs
 - C2: PAYS Model On-site Solar Tariff in Combination with Commercial Operating Lease
- D. Examples of Standard and Development On-site Solar Installations
 - Ouachita Electric Cooperative Corporation (9AR)
 - Roanoke Electric Cooperative (NC)
 - Green Mountain Power (VT)
- E. June 25, 2020 Addendum upon review of Part 3 of this report

Appendix A

2019 PAYS® Status Update

Program	Utility	State	Number of Customers	Inception (yr)	Active (Y/N)	Source of Capital	Program Operator	Project Type	Projects Completed	Percent of Customers	Investment Total (\$)	Adoption Rate (%)	Avg. Project Size (\$)	Project Term (yr)	Uncollectables (%)	Progress Through		
HELP PAYS®	Ouachita Electric	AR	6,916	2016	Y	CFC RUS	EEUtility	Total:	354		\$2,840,784							
								MF	81	5%	\$472,798	90%	\$5,746	12	NA	6/30/2019		
								SF	262		\$1,437,942		\$4,639	12				
								Commercial	11		\$930,044		\$130,353	7				
Upgrade to Save	Roanoke Electric	NC	14,262	2015	Y	USDA EECLP	EEUtility	Residential	638	4.5%	Utility Fees \$762K ≅\$3,303,000 Copays ≅ \$84K	75%	\$7,232	Varied (4-12)	<.1%	6/30/2019		
HowSmart® KY	Big Sandy RECC	KY	23,730	2011	Y	Various	MACED	SF		0.22%	\$2,478,068			Varied				
								Grayson Electric Co-op	15,000			Recovered from Tariff	\$1,651,562			During Pilot	2%	
								Fleming-Mason Energy	51,000					78%	\$7,743	Post Pilot	0..36%	6/30/2019
								Jackson Energy Co-op	20,000							10-15 Max		
								Farmers RECC	17,000									
Licking Valley RECC																		
HowSmart®	Midwest Energy	KS	≅ 50,000	2008	Y	Various	Utility	Residential	2,139	4.4% Recovered from Tariff	≅ \$16,437,006 \$12,257,670	≅ 70%	\$7,684 \$5,730	10-15	<0.1%	6/30/2019		
Windsor Efficiency PAYS®	Town of Windsor Water Utility	CA	7,846 SF 615 MF	2012	Suspended for Redesign	Utility Operations	Sonoma Cnty Energy Independence	SF, MF	242 SF 233 MF	3% SF 38% MF	\$561,704	NA	\$460 SF \$19,220 MF	10-15	<0.1%	SF 2014 MF 2016	Suspended	
Green Hayward PAYS®	City of Hayward	CA	13,439 MF	2015	Y	Utility Operations	Frontier Energy	MF	162 MF	1.20%	\$173,115	23%	\$28,852	3-10	NA	3/9/2018	Suspended	
EBMUD WaterSmart Pilot	East Bay Municipal Utility District	CA				Utility Operations	Utility	MF	53 MF	<1%	\$22,634	NA	\$7,545	3-5	NA	11/2/2017		
Smart Start	Eversource	NH	236 Municipalities	2002	Y	Conservation Budget & Repayments	Utility	Municipal	274	NA	≅ \$10,950,000	NA	NA	≅ 8	<0.0%	10/2/2019		
Solar Saver Pilot	Hawaiian Electric	HI	304,261	2007	N	Conservation Budget	Utility	SF	484	NA	≅ \$2,900,000	NA		≅10	<0.1%	12/31/2008	Ended	
	Hawai'i Electric Light		85,029															
	Maui Electric		70,872															
PAYS Pilot	New Hampshire Electric Co-op	NH	84,000	2002	N	Conservation Budget & NRECA	Utility	SF, Commercial, Retail	21 (does not include retail CFLs)	NA	\$157,000	NA	NA	5-10	<0.1%	12/31/2004	Ended	
U-Save Advantage	Appalachian Electric Co-op	TN	40,233	2019	Y	USDA RESP	EEUtility	SF	30 under contract	NA	\$179,380	86%	\$8,153	12	NA	6/30/2019	Began 2019	

Source: Energy Efficiency Institute, Inc. as of October 2019

4,950 \$40,561,935

Appendix B

Data from PAYS Net Metering Pilot in Arkansas

Appendix A										
NET METERING MEMBERS as of December 31, 2019										
Cooperative Name:Ouachita Electric Cooperative Corporation										
	Name	kW	Total Project Cost	Copay	Available Tax Credit	Type	Price P/Watt	HELP PAYS [®] Cost	Monthly PAYS Charge	Estimated Monthly Savings
	MM	n/a	n/a			Roof	n/a	n/a	n/a	
	MC	n/a	n/a			Roof	n/a	n/a	n/a	
	JR	n/a	n/a			Roof	n/a	n/a	n/a	
	JS	n/a	n/a			Roof	n/a	n/a	n/a	
	GS	n/a	n/a			Roof	n/a	n/a	n/a	
1	LM	9.60	\$ 25,232.00	\$ 14,182.09	\$7,569.60	Roof	\$2.57	\$11,049.91	\$94.42	\$118.34
2	TD	9.20	\$ 24,706.29	\$ 13,268.34	\$7,411.89	Roof	\$2.69	\$11,437.95	\$97.74	\$124.76
3	CP	16.20	\$ 44,388.00	\$ 25,896.45	\$13,316.40	Roof	\$2.74	\$18,491.55	\$158.01	\$201.68
4	RS	16.80	\$ 44,172.00	\$ 23,207.12	\$23,227.47	Roof	\$2.63	\$20,964.88	\$150.63	\$228.66
5	JM	11.10	\$ 31,802.50	\$ 18,948.21	\$9,540.75	Roof	\$2.87	\$12,854.29	\$109.84	\$140.20
6	SF	21.90	\$ 57,345.00	\$ 33,188.07	\$17,203.50	Roof	\$2.62	\$24,156.93	\$206.42	\$263.90
7	TN	13.69	\$ 35,419.23	\$ 17,257.16	\$10,625.77	Roof	\$2.72	\$18,162.07	\$155.20	\$198.10
8	WJ	23.10	\$ 51,513.00	\$ 25,889.70	\$15,453.90	Roof	\$2.23	\$25,623.30	\$218.95	\$271.00
9	S+BR	13.50	\$ 35,560.00	\$ 19,736.83	\$10,668.00	Roof	\$2.63	\$15,823.17	\$135.21	\$172.59
10	RR	17.70	\$ 53,130.29	\$ 33,449.96	\$15,939.09	Roof	\$3.00	\$19,680.33	\$168.17	\$214.66
11	N+MP	10.20	\$ 35,451.50	\$ 23,045.31	\$10,635.45	Roof	\$2.98	\$12,406.19	\$106.01	\$135.32
12	WF	10.80	\$ 27,528.00	\$ 13,926.88	\$8,258.40	Roof	\$2.55	\$13,601.12	\$116.22	\$148.35
13	JTB	11.84	\$ 38,227.60	\$ 22,227.60	\$11,468.28	GND	\$3.29	\$16,000.00	\$136.72	\$174.52
14	DED	10.36	\$ 28,782.80	\$ 14,859.42	\$8,634.84	Roof	\$2.84	\$13,923.38	\$118.98	\$151.87
15	WA	21.46	\$ 65,571.60	\$ 36,881.36	\$19,671.48	Roof	\$3.06	\$28,690.24	\$245.16	\$312.92
16	SK	10.36	\$ 30,508.00	\$ 18,973.40	\$9,152.40	Roof	\$3.00	\$11,534.60	\$98.56	\$125.81
17	PW	20.00	\$ 40,279.00	\$ 6,646.10	\$12,084.00	Roof	\$1.61	\$33,632.90	\$287.40	\$366.84
18	DJ	11.84	\$ 35,524.59	\$ 20,281.32	\$10,657.38	Roof	\$3.06	\$15,243.27	\$130.25	\$166.26
19	BA	12.95	\$ 42,731.00	\$ 25,213.00	\$12,819.30	Roof	\$3.30	\$17,518.00	\$149.69	\$191.07
20	MJ	12.95	\$ 46,168.95	\$ 28,920.69	\$13,850.68	GND	\$3.57	\$17,248.26	\$147.39	\$188.13
21	ZR	12.95	\$ 36,013.00	\$ 18,385.14	\$9,363.38	Roof	\$2.78	\$17,627.86	\$150.63	\$192.27
		298.50	\$ 830,054.35	\$ 454,384.15	\$257,551.96	\$0.00	\$58.74	\$375,670.20	\$3,181.60	\$4,087.23

Appendix C

PAYS® Model On-site Solar Tariffs

APPENDIX C1: PAY AS YOU SAVE® MODEL ON-SITE SOLAR TARIFF

- 1 **Eligibility:** Eligible on an optional and voluntary basis to any customer who takes service under any rate schedule where the utility provides electric service to the structure for installation of a roof- or ground-mounted on-site solar photovoltaic system (System). It shall not be a requirement that the structure be all electric.

- 2 **Participation:** To participate in the Program, a customer must: 1) request from the utility an analysis of System installation at a specific location, 2) agree to the terms of the cost-effectiveness analysis fee as described in Section 3.4, and 3) sign the On-site Solar Agreement, which defines customer benefits and obligations, and implement any project that does not require an upfront payment from the customer as described in Section 3.3.
 - 2.1 **Ownership:** If the customer is not the building owner, the building owner must sign an Owner Agreement, agreeing to not remove or damage the System, to maintain it, and to provide notice of the benefits and obligations associated with the System at the location to the next owner or customer before the sale or rental of the property.
 - 2.2 **Notice:** The owner must agree as part of the On-site Solar Agreement (if the owner is the customer) or Owners Agreement (if the owner is not the customer) to have a Notice of the benefit and obligations described in 2.1 attached to their property records. Failure to obtain the signature on the Notice Form of a successor customer who is renting the premises or a purchaser, in jurisdictions in which the utility cannot attach the Notice to the property records, indicating that the successor customer received notice will constitute the owner's acceptance of consequential damages and permission for a tenant or purchaser to break their lease or sales agreement without penalty.

- 3 **Solar PV Plans:** The utility will have its Program Operator perform a cost-effectiveness analysis and prepare a Solar PV Plan (Plan) identifying a recommended System that is estimated to lower utility bill costs at that location as described in section 3.2, Net Savings and section 7, Program Services Charge.
 - 3.1 **Incentive Payment:** The utility may reduce the cost for the System with an incentive payment for program participation that is less than or equal to the value of the System to the utility or a rebate that is available to any customer who installs a similar System.
 - 3.2 **Net Savings:** Recommended Systems shall be limited to those where the annual Program Service Charges (Service Charges) described in section 7, including any program fees and the utility's charges for capital, are no greater than 87% of the estimated annual savings to a participating customer based on a projection of the system's performance during the final year of the utility cost recovery term and the current net metering rate and rules governing net metering or the current retail rates for electricity if the utility or its

Program Operator can verify the customer can reasonably be expected to benefit from each kWh produced without net metering .

- 3.3 **Copay Option:** In order to qualify a project that is not cost effective for the Program, customers may agree to pay the portion of a project's cost that prevents it from qualifying for the Program as an upfront payment to the contractor. The utility will assume no responsibility for such upfront payments to the contractor.
- 3.4 **Cost-Effectiveness Analysis Fee:** If the cost of the cost-effectiveness analysis exceeds the value to the utility of System accepted by customers for installation based on the Utility Cost test, the utility will recover from participants the portion of the cost for the analysis that is greater than the value of the System to the utility. The utility will not recover costs for the analysis if the Solar PV Plan concludes that proposed System is cost effective only with a copay. The utility will recover all of its costs for the analysis at a location from a customer who declines to install System identified in a Solar PV Plan that does not require a copayment. Customer costs for analyses, if any, will be recovered from participants by rolling them into Service Charges as described in Section 7.
- 3.5 **Existing Buildings:** Projects that involve installation of a System for existing buildings deemed unlikely to be habitable or to serve their intended purpose for the duration of utility cost recovery will not be approved unless other funding can effect necessary repairs. If a building is a manufactured home, it must be built on a permanent foundation and fabricated after 1982 to be eligible.
- 4 **Approved Program Operator:** Utility may operate the program directly with its own staff resources or hire an experienced Program Operator to implement the program.
- 5 **Approved Contractor:** Should the customer decide to proceed with implementing the Plan, the utility shall determine the appropriate monthly Service Charge as described in section 7. The customer shall sign the Agreement and select a contractor from the utility's list of approved contractors.
- 6 **Quality Assurance:** When installation of the System is completed, the contractor shall be paid by the utility, following a successful on-site or telephone inspection and approval by the utility or its Program Operator. Monthly, after installation, the utility or its agent will review bills and or metered data showing system performance to identify any anomalies with the Solar PV Plan and arrange for corrective action if the system's performance is less than 87% of the estimated performance during the last year of cost recovery.
- 7 **Program Services Charge:** The utility will recover the costs for its investments including any fees as allowed in this tariff through a fixed monthly Service Charge assigned to the location where the System is installed and paid by customers occupying that location until all utility costs have been recovered. Service Charges will also be set for a term not to exceed 80% of estimated life of the system or the length of a full parts and labor warranty, whichever is greater and in no case longer than twenty years. The Service Charges and term of payments will be included in the On-site Solar Agreement.

- 7.1 **Cost Recovery:** No sooner than 45 days after approval by the utility or its Program Operator, the customer shall be billed the monthly Service Charge as determined by the utility. The utility will bill and collect Service Charges until cost recovery is complete except in cases discussed in Section 8. Prepayment of unbilled charges will not be permitted. This ensures that each installed System remains and continues to function at the location for at least the duration of cost recovery.
- 7.2 **Eligible Systems:** The utility will seek to negotiate with contractors or PV system suppliers for bulk installation prices and extended warranties to qualify more installations without a copy and to minimize the risk of System failures on behalf of all customers.
- 7.3 **Ownership of Systems:** During the period of time when Service Charges are billed to customers at locations where systems have been installed, the utility will retain ownership of the Systems. Upon termination of the Service Charge, ownership will be transferred to the building owner.
- 7.4 **Maintenance of Systems:** Participating customers and building owners (if the customer is not the building owner) must agree, when signing the On-site Solar Agreement or the Owner Agreement, to keep the System in place for the duration of Service Charges, to maintain the System per manufacturers' instructions, and report any failure of the System to the Program Operator or utility as soon as possible. If a System fails, the utility is responsible for determining its cause and for repairing the equipment in a timely manner as long as the owner, customer, or occupants did not damage the System, in which case they will reimburse the utility as described in Section 8.
- 7.5 **Termination of Service Charge:** Once the utility's costs for a System at a location have been recovered, including its cost of capital, the cost paid to the contractor to perform the work, costs for any repairs made to the System as described in Section 8, the monthly Service Charge shall no longer be billed, except as described in Sections 7.7 and 8.
- 7.6 **Vacancy:** If a location at which a System has been installed becomes vacant for any reason and electric service is disconnected, Service Charges will be suspended until a successor customer takes occupancy. If a building owner maintains electric service at the location, the building owner will be billed Service Charges as part of any charges it incurs while electric service is turned on.
- 7.7 **Extension of Program Charge:** If the monthly Service Charge is suspended for any reason, once the System has been repaired or service reconnected, the number of total monthly payments shall be extended until the Service Charges collected equal the utility's cost for installation as described in Section 7, including costs associated with repairs, deferred payments, and missed payments as long as the current occupant is still benefitting from the System.
- 7.8 **Tied to the Location:** Until cost recovery for a System at a location is complete or the System fails as described in Section 8, the terms of this tariff shall be binding on the location or facility and any future customer who shall receive service at that location. Any resident at this location must maintain an account with the utility until all charges

under this tariff have been billed and paid or the customer has paid the utility for any outstanding billed charges and all remaining unbilled charges associated with installation of the on-site solar system and any utility subsidies that facilitated its installation.

- 7.9 **Disconnection for Non-Payment:** Without regard to any other Commission or utility rules or policies, the Service Charges shall be considered as an essential part of the customer's bill for electric service, and the utility may disconnect the location for non-payment of Service Charges under the same provisions as for any other electric service. If service is disconnected for customers on pre-paid payment plans, Service Charges will be pro-rated by the day.
- 8 **Repairs:** Should, at any future time during the billing of Service Charges, the utility determine that the installed System is no longer functioning as intended and that the customer, building owner, if different, or occupants did not damage or fail to maintain the System in place, the utility shall suspend the Service Charges until such time as the utility and/or its contractor can repair the System. If the System cannot be repaired or replaced cost effectively, the utility will waive remaining charges.

If the utility determines the occupant, or building owner if different, did damage or fail to maintain the system in place as described in Section 7.4, it will seek to recover all costs associated with the installation, including any fees, incentives paid to lower project costs, and legal fees from the responsible party(ies).

If replacement inverters or optimizers are not covered by a parts and labor warranty for the duration of cost recovery, the cost for their replacement will be treated as repairs.

The Service Charges will continue until utility cost recovery is complete as long as the System continues to function.

- 9 **Expectation of Savings:** Any customer installing an on-site solar system under this tariff does so with the expectation of net savings for the duration of Service Charges at their location. The Utility will not lower the net metering rate for that location for the duration of the Service Charges.
- 10 **Monitoring and Evaluation:** The utility or its Program Operator will compare each participant's post-installation actual annual savings to estimated annual savings at least once for each location. If any instances are identified where actual savings are below 87% of the location's estimated savings, the utility or its Program Operator will investigate to identify the cause and take appropriate action including those described in Section 8 above or enforcing agreements with contractors or participating customers.

APPENDIX C2: PAY AS YOU SAVE[®] MODEL ON-SITE SOLAR TARIFF IN COMBINATION WITH COMMERCIAL OPERATING LEASE

- 1 **Eligibility:** Eligible on an optional and voluntary basis to any customer who takes service under any rate schedule where the utility provides electric service to the structure for installation of a roof- or ground-mounted on-site solar photovoltaic system (System). It shall not be a requirement that the structure be all electric.
- 2 **Participation:** To participate in the Program, a customer must: 1) request from the utility an analysis of the System installation at a specific location, 2) agree to the terms of the cost-effectiveness analysis fee as described in Section 3.4, and 3) sign the On-site Solar Agreement, which defines customer benefits and obligations, and implement any project that does not require an upfront payment from the customer as described in Section 3.3.
 - 2.1 **Ownership:** If the customer is not the building owner, the building owner must sign an Owner Agreement, agreeing to not remove or damage the System, to maintain it, and to provide notice of the benefits and obligations associated with the System at the location to the next owner or customer before the sale or rental of the property.
 - 2.2 **Notice:** The owner must agree as part of the On-site Solar Agreement (if the owner is the customer) or Owners Agreement (if the owner is not the customer) to have a Notice of the benefits and obligations described in 2.1 attached to their property records. Failure to obtain the signature on the Notice Form of a successor customer who is renting the premises or a purchaser, in jurisdictions in which the utility cannot attach the Notice to the property records, indicating that the successor customer received notice will constitute the owner's acceptance of consequential damages and permission for a tenant or purchaser to break their lease or sales agreement without penalty.
- 3 **Solar PV Plans:** The utility will have its Program Operator perform a cost-effectiveness analysis and prepare a Solar PV Plan (Plan) identifying a recommended System that is estimated to lower utility bill costs at that location as described in section 3.2, Net Savings and section 7, Program Services Charge.
 - 3.1 **Incentive Payment:** The utility may reduce the cost for the System with an incentive payment for program participation that is less than or equal to the value of the System to the utility or a rebate that is available to any customer who installs a similar System.
 - 3.2 **Net Savings:** Recommended Systems shall be limited to those where the annual Program Service Charges (Service Charges) described in section 7, including any program fees and the utility's charges for capital, are no greater than 87% of the estimated annual savings to a participating customer based on a projection of the system savings during the last year of the utility's operating lease for the system and the current net metering rate and rules governing net metering or the current retail rates for electricity if the utility or its Program Operator can verify the customer can reasonably be expected to benefit from each kWh produced without net metering.

- 3.3 **Copay Option:** In order to qualify a project that is not cost effective for the Program, customers may agree to pay the portion of a project's cost that prevents it from qualifying for the Program as an upfront payment to the contractor. The utility will assume no responsibility for such upfront payments to the contractor.
- 3.4 **Cost-Effectiveness Analysis Fee:** If the cost of the cost-effectiveness analysis exceeds the value to the utility of the System accepted by customers for installation based on the Utility Cost test, the utility will recover from participants the portion of the cost for the analysis that is greater than the value of the System to the utility. The utility will not recover costs for the analysis if the Solar PV Plan concludes that proposed System is cost effective only with a copay. The utility will recover all of its costs for the analysis at a location from a customer who declines to install System identified in a Solar PV Plan that does not require a copayment. Customer costs for analyses, if any, will be recovered from participants by rolling them into Service Charges as described in Section 7.
- 3.5 **Existing Buildings:** Projects that involve installation of a System for existing buildings deemed unlikely to be habitable or to serve their intended purpose for the duration of utility cost recovery will not be approved unless other funding can effect necessary repairs. If a building is a manufactured home, it must be built on a permanent foundation and fabricated after 1982 to be eligible.
- 4 **Approved Program Operator:** Utility may operate the program directly with its own staff resources or hire an experienced Program Operator to implement the program.
- 5 **Approved Contractor:** Should the customer decide to proceed with implementing the Plan, the utility shall determine the appropriate monthly Service Charge as described in section 7. The customer shall sign the Agreement and select a contractor from the utility's list of approved contractors.
- 6 **Quality Assurance:** When installation of the System is completed, the contractor shall be paid by the utility, following a successful on-site or telephone inspection and approval by the utility or its Program Operator. Monthly, after installation, the utility or its agent will review bills and or metered data showing system performance to identify any anomalies with the Solar PV Plan and arrange for corrective action if the system's performance is less than 87% of the estimated performance during the last year of the utility's operating lease for the system.
- 7 **Program Services Charge:** The utility will recover the costs for its investments including any fees as allowed in this tariff through a fixed monthly Service Charge assigned to the location where the System is installed and paid by customers occupying that location until all utility costs have been recovered. Service Charges will also be set for a term not to exceed 80% of estimated life of the system or the length of a full parts and labor warranty, whichever is greater and in no case longer than twenty years. The Service Charges and term of payments will be included in the On-site Solar Agreement.
- 7.1 **Cost Recovery:** No sooner than 45 days after approval by the utility or its Program Operator, the customer shall be billed the monthly Service Charge as determined by the

- utility. The utility will bill and collect Service Charges until cost recovery is complete except in cases discussed in Section 8. Prepayment of unbilled charges will not be permitted. This ensures that each installed System remains and continues to function at the location for at least the duration of cost recovery.
- 7.2 **Eligible Systems:** The utility will seek to negotiate with contractors or PV system suppliers for bulk installation prices and extended warranties to qualify more installations without a copay and to minimize the risk of System failures on behalf of all customers.
- 7.3 **Ownership of Systems:** During the period of time when Service Charges are billed to customers at locations where systems have been installed, the utility's lessor will retain ownership of the Systems. At the conclusion of the utility's lease, the utility may either require the lessor to remove the system and restore the home to its condition prior to installation or may purchase the system in accordance with the terms in its lease. Upon termination of the Service Charge, if the system is still in place, ownership will be transferred to the building owner.
- 7.4 **Maintenance of Systems:** Participating customers and building owners (if the customer is not the building owner) must agree, when signing the On-site Solar Agreement or the Owner Agreement, to keep the System in place for the duration of Service Charges, to maintain the System per manufacturers' instructions, and report any failure of the System to the Program Operator or utility as soon as possible. If a System fails, the utility is responsible for determining its cause and for repairing the equipment in a timely manner as long as the owner, customer, or occupants did not damage the System, in which case they will reimburse the utility as described in Section 8.
- 7.5 **Termination of Service Charge:** Once the utility's costs for a System at a location have been recovered, including its cost of capital, the cost paid to the contractor to perform the work, costs for any repairs made to the System as described in Section 8, and, if the utility purchases the system from the lessor, the amount of that payment, the monthly Service Charge shall no longer be billed, except as described in Sections 7.7 and 8.
- 7.6 **Vacancy:** If a location at which a System has been installed becomes vacant for any reason and electric service is disconnected, Service Charges will be suspended until a successor customer takes occupancy. If a building owner maintains electric service at the location, the building owner will be billed Service Charges as part of any charges it incurs while electric service is turned on.
- 7.7 **Extension of Program Charge:** If the monthly Service Charge is suspended for any reason, once repairs have been successfully made or service reconnected, the number of total monthly payments shall be extended until the Service Charges collected equal the utility's cost for installation as described in Section 7, including costs associated with repairs, purchasing the system from the lessor, deferred payments, and missed payments as long as the current occupant is still benefitting from the System.
- 7.8 **Tied to the Location:** Until cost recovery for a System at a location is complete or the System fails as described in Section 8, the terms of this tariff shall be binding on the location or facility and any future customer who shall receive service at that location.

Any resident at this location must maintain an account with the utility until all charges under this tariff have been billed and paid or the customer has paid the utility for any outstanding billed charges and all remaining unbilled charges associated with installation of the on-site solar system and any utility subsidies that facilitated its installation.

7.9 **Disconnection for Non-Payment:** Without regard to any other Commission or utility rules or policies, the Service Charges shall be considered as an essential part of the customer's bill for electric service, and the utility may disconnect the location for non-payment of Service Charges under the same provisions as for any other electric service. If service is disconnected for customers on pre-paid payment plans, Service Charges will be pro-rated by the day.

8 **Repairs:** Should, at any future time during the billing of Service Charges, the utility determine that the installed System is no longer functioning as intended and that the customer, building owner, if different, or occupants, did not damage or fail to maintain the System in place, the utility shall suspend the Service Charges until such time as the utility and/or its contractor can repair the System. If the System cannot be repaired or replaced cost effectively, the utility will waive remaining charges and resolve its lease with its lessor.

If the utility determines the customer, building owner, if different, or occupants, did damage or fail to maintain the system in place as described in Section 7.4, it will seek to recover all costs associated with the installation, including any fees, incentives paid to lower project costs, and legal fees from the responsible party(ies).

If replacement inverters or optimizers are not covered by a parts and labor warranty for the duration of cost recovery, the cost for their replacement will be treated as repairs.

The Service Charges will continue until utility cost recovery is complete as long as the System continues to function.

9 **Expectation of Savings:** Any customer installing an on-site solar system under this tariff does so with the expectation of net savings at their location for the duration of Service Charges. The Utility will not lower the net metering rate for that location for the duration of Service Charges.

10 **Monitoring and Evaluation:** The utility or its Program Operator will compare each participant's post-installation actual annual savings to estimated annual savings at least once for each location. If any instances are identified where actual savings are below 87% of the location's estimated savings, the utility or its Program Operator will investigate to identify the cause and take appropriate action including those described in Section 8 above or enforcing agreements with contractors or participating customers.

Appendix D

Examples of Standard and Developmental On-site Solar Installation

Analysis of Standard On-site Solar PV System as PAYS[®] upgrade at Ouachita Electric

System design and performance data supplied by Solar United Neighbors				
Site specific performance data supplied by https://pwwatts.nrel.gov				
PAYS rule used	87%	(customer savings will exceed monthly charges by 15%)		
Inputs	Without tax credit			credit
Payment term (years)	10	15	20	20
Capital interest rate	0.5%	3.0%	3.0%	3.0%
Net metering rate per kWh	\$ 0.1150	\$ 0.1150	\$ 0.1150	\$ 0.1150
Total installed project cost	\$ 26,448	\$ 26,448	\$ 26,448	\$ 26,448
Project cost reduction tax credit	\$ -	\$ -	\$ -	\$ 6,876
Annual kWh savings	12,188	11,886	11,592	11,592
Outputs				
Project cost covered by PAYS	\$ 11,891	\$ 14,350	\$ 17,426	\$ 17,426
Program services on-bill charge (monthly)	\$ 101.61	\$ 99.10	\$ 96.64	\$ 96.64
Maximum program services on-bill charge	\$ 101.62	\$ 99.10	\$ 96.65	\$ 96.65
Required copay	\$ 14,557	\$ 12,098	\$ 9,022	\$ 2,146
Utility subsidy to avoid copay	\$ 14,557	\$ 12,098	\$ 9,022	\$ 2,146
Solar PV technical assumptions				
Rated kW output (DC)	9.120			
Annual kWh degradation as %	0.5%			
PV panel useful life (years)	25			
True south orientation				
Panel tilt (degrees)	22.6			
No obstructions				
No additional wiring required				
Home likely to be habitable for cost recovery duration				
System purchased in bulk via RFP or negotiations (approximately 100 installations)				
Cost of capital based on calls with Inclusive Prosperity Capital and are estimates				

Analysis of Developmental On-site Solar PV System as PAYS[®] upgrade at Ouachita Electric

System design and performance data supplied by James McKinion, Helical Solar Solutions, LLC				
Site specific performance data supplied by https://pwwatts.nrel.gov				
PAYS rule used	87%	(customer savings will exceed monthly charges by		15%
<i>Inputs</i>	Without tax credit			With tax credit
Payment term (years)	10	15	20	15
Capital interest rate	0.5%	3.0%	3.0%	3.0%
Net metering rate per kWh	\$ 0.1150	\$ 0.1150	\$ 0.1150	\$ 0.1150
Total installed project cost	\$ 11,650	\$ 11,650	\$ 11,650	\$ 11,650
Project cost reduction tax credit	\$ -	\$ -	\$ -	\$ 3,029
Annual kWh savings	9,810	9,641	9,467	9,641
<i>Outputs</i>				
Project cost covered by PAYS	\$ 9,571	\$ 11,639	\$ 11,650	\$ 8,621
Program services on-bill charge (monthly)	\$ 81.79	\$ 80.38	\$ 64.61	\$ 59.54
Maximum program services on-bill charge	\$ 81.79	\$ 80.38	\$ 78.93	\$ 80.38
Required copay	\$ 2,079	\$ 11	\$ -	\$ -
Utility subsidy to avoid copay	\$ 2,079	\$ 11	\$ -	\$ -
Solar PV technical assumptions				
Rated kW output (DC)	4.380			
Annual kWh degradation as %	0.45%			
PV panel useful life (years)	25			
True south orientation				
Panel tilt tracks sun				
No obstructions				
No additional wiring required				
Home likely to be habitable for cost recovery duration				
System purchased in bulk via RFP or negotiations (approximatey 100 installations)				
Cost of capital based on calls with Inclusive Prosperity Capital and are estimates				

Analysis of Standard Onsite Solar PV System as PAYS[®] upgrade at Roanoke Electric

System design and performance data supplied by Solar United Neighbors				
Site specific performance data supplied by https://pwwatts.nrel.gov				
PAYS rule used	87%	(customer savings will exceed monthly charges by 15%)		
Inputs	Without tax credit			With tax credit
Payment term (years)	10	15	20	20
Capital interest rate	0.0%	3.0%	3.0%	3.0%
Net metering rate per kWh	\$ 0.1327	\$ 0.1327	\$ 0.1327	\$ 0.1327
Total installed project cost	\$ 26,448	\$ 26,448	\$ 26,448	\$ 26,448
Project cost reduction tax credit	\$ -	\$ -	\$ -	\$ 6,876
Annual kWh savings	12,530	12,220	11,917	11,917
Outputs				
Project cost covered by PAYS	\$ 14,465	\$ 17,024	\$ 20,672	\$ 19,572
Program services on-bill charge (monthly)	\$ 120.54	\$ 117.56	\$ 114.65	\$ 108.55
Maximum program services on-bill charge	\$ 120.55	\$ 117.57	\$ 114.65	\$ 114.65
Required copay	\$ 11,983	\$ 9,424	\$ 5,776	\$ -
Utility subsidy to avoid copay	\$ 11,983	\$ 9,424	\$ 5,776	\$ -
Solar PV technical assumptions				
Rated kW output (DC)	9.120			
Annual kWh degradation as %	0.5%			
PV panel useful life (years)	25			
True south orientation				
Panel tilt (degrees)	22.6			
No obstructions				
No additional wiring required				
Home likely to be habitable for cost recovery duration				
System purchased in bulk via RFP or negotiations (approximatey 100 installations)				
Cost of capital based on calls with Inclusive Prosperity Capital and are estimates				

Analysis of Developmental Onsite Solar PV System as PAYS[®] upgrade at Roanoke Electric

System design and performance data supplied by James McKinion, Helical Solar Solutions, LLC				
Site specific performance data supplied by https://pvwatts.nrel.gov				
PAYS rule used	87%	(customer savings will exceed monthly charges by.		15%
<i>Inputs</i>	Without tax credit			With tax credit
Payment term (years)	10	15	20	10
Capital interest rate	0.0%	3.0%	3.0%	3.0%
Net metering rate per kWh	\$ 0.1327	\$ 0.1327	\$ 0.1327	\$ 0.1327
Total installed project cost	\$ 11,650	\$ 11,650	\$ 11,650	\$ 11,650
Project cost reduction tax credit	\$ -	\$ -	\$ -	\$ 3,029
Annual kWh savings	9,620	9,487	9,347	9,620
<i>Outputs</i>				
Project cost covered by PAYS	\$ 11,106	\$ 11,650	\$ 11,650	\$ 8,621
Program services on-bill charge (monthly)	\$ 92.55	\$ 80.45	\$ 64.61	\$ 83.25
Maximum program services on-bill charge	\$ 92.55	\$ 91.27	\$ 89.92	\$ 92.55
Required copay	\$ 544	\$ -	\$ -	\$ -
Utility subsidy to avoid copay	\$ 544	\$ -	\$ -	\$ -
Solar PV technical assumptions				
Rated kW output (DC)	4.380			
Annual kWh degradation as %	0.45%			
PV panel useful life (years)	25			
True south orientation				
Panel tilt tracks sun				
No obstructions				
No additional wiring required				
Home likely to be habitable for cost recovery duration				
System purchased in bulk via RFP or negotiations (approximatey 100 installations)				
Cost of capital based on calls with Inclusive Prosperity Capital and are estimates				

Analysis of Standard Onsite Solar PV System as PAYS® upgrade at Green Mountain Power

System design and performance data supplied by Solar United Neighbors				
Site specific performance data supplied by https://pwatts.nrel.gov				
PAYS rule used	87%	(customer savings will exceed monthly charges by 15%)		
<i>Inputs</i>	Without tax credit			With tax credit
Payment term (years)	10	15	20	20
Capital interest rate	4.5%	4.5%	4.5%	4.5%
Net metering rate per kWh	\$ 0.1789	\$ 0.1789	\$ 0.1789	\$ 0.1789
Total installed project cost	\$ 26,448	\$ 26,448	\$ 26,448	\$ 26,448
Project cost reduction tax credit	\$ -	\$ -	\$ -	\$ 6,876
Annual kWh savings	10,961	10,690	10,425	10,425
<i>Outputs</i>				
Project cost covered by PAYS	\$ 13,717	\$ 18,124	\$ 21,372	\$ 19,572
Program services on-bill charge (monthly)	\$ 142.16	\$ 138.65	\$ 135.21	\$ 123.82
Maximum program services on-bill charge	\$ 142.17	\$ 138.65	\$ 135.21	\$ 135.21
Required copay	\$ 12,731	\$ 8,324	\$ 5,076	\$ -
Utility subsidy to avoid copay	\$ 12,731	\$ 8,324	\$ 5,076	\$ -
Solar PV technical assumptions				
Rated kW output (DC)	9.120			
Annual kWh degradation as %	0.5%			
PV panel useful life (years)	25			
True south orientation				
Panel tilt (degrees)	30.3			
No obstructions				
No additional wiring required				
Home likely to be habitable for cost recovery duration				
System purchased in bulk via RFP or negotiations (approximately 100 installations)				
Cost of capital based on calls with Inclusive Prosperity Capital and are estimates				

Analysis of Developmental Onsite Solar PV System as PAYS[®] upgrade at Green Mountain Power

System design and performance data supplied by James McKinion, Helical Solar Solutions, LLC				
Site specific performance data supplied by https://pvwatts.nrel.gov				
PAYS rule used	87%	(customer savings will exceed monthly charges by...)		15%
<i>Inputs</i>	Without tax credit			With tax credit
Payment term (years)	10	15	20	10
Capital interest rate	4.5%	4.5%	4.5%	4.5%
Net metering rate per kWh	\$ 0.1789	\$ 0.1789	\$ 0.1789	\$ 0.1789
Total installed project cost	\$ 11,650	\$ 11,650	\$ 11,650	\$ 11,650
Project cost reduction tax credit	\$ -	\$ -	\$ -	\$ 3,029
Annual kWh savings	8,964	8,836	8,701	8,964
<i>Outputs</i>				
Project cost covered by PAYS	\$ 11,218	\$ 11,650	\$ 11,650	\$ 8,621
Program services on-bill charge (monthly)	\$ 116.26	\$ 89.12	\$ 73.70	\$ 89.35
Maximum program services on-bill charge	\$ 116.27	\$ 114.61	\$ 112.85	\$ 116.27
Required copay	\$ 432	\$ -	\$ -	\$ -
Utility subsidy to avoid copay	\$ 432	\$ -	\$ -	\$ -
Solar PV technical assumptions				
Rated kW output (DC)	4.380			
Annual kWh degradation as %	0.45%			
PV panel useful life (years)	25			
True south orientation				
Panel tilt tracks sun				
No obstructions				
No additional wiring required				
Home likely to be habitable for cost recovery duration				
System purchased in bulk via RFP or negotiations (approximatey 100 installations)				
Cost of capital based on calls with Inclusive Prosperity Capital and are estimates				

Assumed Annual PV Production Numbers (in kWh) – Three Case Studies

Year	OECC Standard System Production Estimates	OECC Future System Production Estimates	RECC Standard System Production Estimates	RECC Future System Production Estimates	GMP's Standard System Production Estimates	GMP's Future System Production Estimates
1	12,750.00	10,100.00	13,108.00	9,843.56	11,467.00	9,178.43
2	12,686.25	10,068.70	13,042.46	9,819.58	11,409.67	9,155.52
3	12,622.82	10,037.20	12,977.25	9,795.43	11,352.62	9,132.41
4	12,559.70	10,005.40	12,912.36	9,771.01	11,295.85	9,109.03
5	12,496.91	9,973.27	12,847.80	9,746.34	11,239.37	9,085.41
6	12,434.42	9,940.92	12,783.56	9,721.46	11,183.18	9,061.59
7	12,372.25	9,908.43	12,719.64	9,696.40	11,127.26	9,037.55
8	12,310.39	9,875.70	12,656.04	9,671.16	11,071.63	9,013.30
9	12,248.84	9,842.82	12,592.76	9,645.75	11,016.27	8,988.84
10	12,187.59	9,809.76	12,529.80	9,620.13	10,961.19	8,964.03
11	12,126.65	9,776.49	12,467.15	9,594.23	10,906.38	8,938.97
12	12,066.02	9,742.93	12,404.82	9,567.97	10,851.85	8,913.69
13	12,005.69	9,709.15	12,342.79	9,541.38	10,797.59	8,888.09
14	11,945.66	9,675.20	12,281.08	9,514.50	10,743.60	8,862.25
15	11,885.93	9,641.10	12,219.67	9,487.38	10,689.88	8,836.11
16	11,826.50	9,606.77	12,158.57	9,459.97	10,636.43	8,809.70
17	11,767.37	9,572.19	12,097.78	9,432.27	10,583.25	8,782.99
18	11,708.53	9,537.23	12,037.29	9,404.09	10,530.33	8,756.02
19	11,649.99	9,501.98	11,977.11	9,375.55	10,477.68	8,728.59
20	11,591.74	9,466.63	11,917.22	9,346.69	10,425.29	8,700.67
21	11,533.78	9,431.02	11,857.63	9,317.58	10,373.17	8,672.44
22	11,476.11	9,395.26	11,798.35	9,288.22	10,321.30	8,643.93
23	11,418.73	9,359.33	11,739.35	9,258.51	10,269.70	8,615.12
24	11,361.64	9,323.26	11,680.66	9,228.46	10,218.35	8,586.00
25	11,304.83	9,287.03	11,622.25	9,197.99	10,167.26	8,556.51

Sources:

1. Performance data for the Standard System estimates noted in the table were supplied by Solar United Neighbors
2. Performance data for Future System estimates noted in the table were supplied by James McKinion, Helical Solar Solutions, LLC

Site specific performance data was supplied by <https://pvwatts.nrel.gov>

Appendix E

June 25, 2020 Addendum

On June 19, 2020, EEI received the final draft of Part 3 of this LIFT report, a memorandum by Next Resource Advisors regarding “Limited Technical Review of Tax Structuring for PAYS[®] for On-site Solar”. On page 16 of this memorandum in footnote 19, Next Resource Advisors write, “*For-profit, tax-efficient utilities could claim investment tax credits under IRC Section 48 (instead of the residential credits under IRC Section 25D) and MACRS depreciation on the solar systems.*”

EEI has not seen a written opinion from a utility tax lawyer or other tax expert verifying that tax-advantaged utilities can make investments in on-site solar systems at homeowners’ residential properties, without the structure of a PPA or operating lease, and claim the commercial solar credit under IRC Section 48 or MACRS depreciation.

However, if a tax-advantaged utility could claim these tax benefits, this could be a game changer. If such a utility faced mandates to increase its on-site solar portfolio or to provide equitable solar services to underserved LMI customers and could collect the value of approximately 40% of the cost of the system in the first 5 or 6 years,²⁸ not including their solar tariffed charges collections from program participants, it might be motivated to operate a PAYS[®] solar program. Such a utility might be persuaded to seek partial cost recovery from participants and successor customers at the upgraded locations, especially LMI customers and renters, sharing some of its tax benefits with customers to secure their participation.

On page 11 of its report, EEI wrote, “*To date, EEI has not found any service provider willing to share a sufficient portion of the ITC to eliminate the need for a copay for LMI customers.*” While a successful tax-advantaged solar vendor might not want to change its business model and reduce its after-tax profits to share its tax benefits with utility-program participants, a tax-advantaged utility needing to serve LMI customers or renters or simply wanting to meet its mandates, might have a different perspective.

EEI recommends that Next Resource Advisors’ statement be verified. If it is indeed the case that tax-advantaged utilities’ can claim commercial solar credits under IRC Section 48 and MACRS depreciation benefits for systems installed on residential properties without a PPA or operating lease, using what Next Resource Advisors label Option 1 on page 16 of their memo may be the most promising approach to making on-site solar systems accessible to LMI customers and renters. For example, unlike the other financial options they list that require a minimum installation of 700 to 7,000 systems, there is no minimum number of installations for a tax-advantaged utility wanting to use PAYS[®] to increase its solar installations in the homes of LMI customers.²⁹ Also, unlike the financial options they list that have “*...significant legal structuring, commercial underwriting and due diligence costs required to close tax equity portfolio; [and] third-party transaction costs of \$500,000 are not uncommon...*,”³⁰ Option 1 would not require such costs.

²⁸ Part 3 of this report: “In 2020, the value of the monetized tax credits and depreciation benefits in this scenario could exceed 40% of the total investment...,” 28.

²⁹ Ibid., Table 1: Minimum Residential Project Aggregation Requirements by Structure.

³⁰ Ibid., 27.

***Applying the PAYS[®] System to On-Site Solar
to Expand Access for All***

Part 2

Precedents for the Regulatory Treatment of PAYS[®] for On-site Solar

Ancillary Research supported by the US Department of Energy
EERE grant DE-EE0008567/0000, Accelerating Low Income Financing and Transactions
("LIFT") for Solar Access Everywhere

Prepared by Nancy Brockway

MEMORANDUM

FROM: Nancy Brockway
TO: Harlan Lachman & Paul A. Cillo, Energy Efficiency Institute, Inc.
RE: Precedents for the Regulatory Treatment of PAYS[®] for On-site Solar
DATE: March 23, 2020

This memorandum surveys the legal and regulatory bases for Pay As You Save[®] (PAYS[®]), an innovative means of making distributed resources available to customers who cannot make use of traditional utility incentive programs. PAYS has been implemented in 8 states, primarily to support energy efficiency upgrades. PAYS tariffs have been approved for a variety of reasons and PAYS programs have experienced few difficulties. PAYS does not involve consumer debt or consumer credit, and for this reason the transaction is not subject to the Truth in Lending Act (TILA). PAYS has been used to obtain distributed solar hot water, and in principle it should be possible to expand uptake of distributed solar using PAYS. The memo describes ways in which PAYS is different from other solar finance mechanisms used by utilities and developers. This memo does not constitute legal advice. Rather, readers should find resources here to help determine if PAYS can be implemented from a legal and regulatory point of view in their states.

ACKNOWLEDGEMENTS

This memo could not have been prepared without the wisdom and comments of Harlan Lachman, Paul Cillo, Serine Steakley and Holmes Hummel. Errors, of which there are undoubtedly many, are my own.

Nancy Brockway

Nancy Brockway is an expert in utility regulation, with over 40 years in the field. She served as a Commissioner on the New Hampshire Public Utilities Commission and was a senior staff member for two other New England regulatory commissions. As a Commissioner, she was instrumental in bringing Pay As You Save[®] to New Hampshire electric utilities. She began her career as a legal services lawyer. After her tenure as a state commissioner, she has provided consulting services, including expert witness testimony, in 26 states and provinces, and 70 dockets, on subjects ranging from low-income energy efficiency programming to smart metering. She is a graduate of Smith College and Yale University Law School.

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INTRODUCTION

This memo reviews the authority of the utility and/or its regulator to approve a PAYS® tariff for residential solar installations. Other issues arise depending on the structure of the PAYS transaction, as discussed further below.

PAYS is a system whereby a utility customer receives upgrades that foster efficiency and sustainability, and the costs of the upgrades are recovered through on-bill utility charges. According to the creators of PAYS, the system works as follows:

The Pay As You Save (PAYS) system enables utilities to invest in cost effective resource efficiency and renewables on the customer side of the meter and recover all of their costs. Participating customers have money-saving, resource-efficient upgrades installed with no up-front payment and no debt obligation. Those who benefit from the savings pay a tariffed charge on their utility bill, but only for as long as they occupy the location where the upgrades are installed. The monthly charge is always lower than the estimated savings and it remains on the bill for that location until the utility recovers its costs. While PAYS allows for payment over time, it does not involve any consumer loan obligation.¹

In the 20 years of field experience with PAYS implementation, the system has been used primarily for energy efficiency (EE) upgrades, such as weatherization, lighting and high-efficiency appliances. In Hawaii, PAYS was used to expand residential access to solar hot water. In principle, PAYS can be used for any type of cost-effective energy upgrade on the customer's side of the meter, and in some places, it has been applied for water efficiency upgrades as well. This memo examines whether PAYS can be used to support consumer access to residential solar. The memo also considers whether other financing mechanisms now in use by some utilities, vendors and customers can provide the benefits of PAYS. The memo is part of an effort to explore alternative financing mechanisms to expand consumer access to distributed solar technology.

Barriers to PAYS adoption are not primarily legal

As discussed below, the jurisdictions with PAYS have used a variety of legal formulas to support its implementation. **This memorandum suggests that any one of the legal precedents, and even some others not yet employed, could provide the legal and regulatory basis for PAYS.**

Other utility mechanisms have been used by utilities and regulators to foster consumer take-up of efficiency, and in some cases distributed energy resources (DER) such as solar. On-Bill Finance (OBF) and On-Bill Loan Recovery (OBLR), which allow homeowners the convenience of paying back a loan through their utility bill, aim to make access to credit easier and reduce risk of default to lenders. Some contain some of the components pioneered by PAYS, such as using disconnection for non-payment of a debt to the utility or a third party as a payment motivator. However, they are not useful to renters, and contain all the drawbacks of a loan such as qualification of individuals and transfers of personal debts between individuals.

¹ <http://www.eeivt.com/>

Because OBF and OBLR programs involve loans, they may require compliance with a variety of credit and consumer financial protection regulations. As PAYS is not a loan, and contains other consumer protections, it should not be subject to the complications of these provisions.

The memo explores the idea of having an entity other than the utility or a contractor to the utility designated as the Program Operator. The Program Operator is the “gatekeeper” for access to the PAYS transaction. The Program Operator determines the suitability of a customer’s premises for a PAYS tariff, identifies the qualifying upgrades, calculates the monthly program charges, and on behalf of the utility enters into a PAYS agreement with the customer (and landlord if necessary). Given a variety of complications, the memo suggests that the most successful way to bring in a gatekeeper other than a utility or a utility hired contractor would be a statewide Program Operator.

The memo looks at the applicability of PAYS to third-party owner solar finance systems, including finance leases, solar operation leases, and Power Purchase Agreements. Solar vendors have used these arrangements to enable customers to finance solar installations with little or no money down, making lease payments for the use of the equipment, or electricity usage payments for the output of the upgrade. This memo explores whether they can be adapted as a vehicle for the PAYS offer to customers. Each of these has a number of features that are incompatible with the PAYS offer. The memo findings suggest that they not be pursued as a vehicle for PAYS.²

The utility remains the entity that offers PAYS upgrades to customers. The memo notes that the utility owns the upgrade during the pendency of the PAYS charges.³ Utilities will account for their expenditures and receipts in a PAYS transaction according to accounting rules specified by their state regulator (or governing board, if unregulated). Utility accounting rules are typically based on the Uniform System of Accounts (USoA) promulgated by the Federal Energy Regulatory Commission. In turn, the USoA is similar to the Generally Accepted Accounting Principles developed by the Financial Accounting Standards Board and promulgated by the Securities and Exchange Commission for use by publicly-traded companies.

Background on the PAYS system

PAYS is a system of agreements that include a set of elements and related program requirements, some of which have been copied in other models since PAYS was first created, and some of which remain unique to PAYS. PAYS was developed by the Energy Efficiency Institute, Inc. The PAYS creators recognized that many customers were unable to participate in and benefit directly from utility energy efficiency programs.

Utility demand-side management programs aim to overcome barriers in the markets that prevent customers from choosing energy resources that would be to their benefit. These barriers include high upfront costs, and lack of confidence in the value of the measures, among other problems. Traditional utility efficiency programs have relied heavily on dollar incentives, such as rebates or

² The analysis in the report is of lease and PPA transactions between the solar developer and the end-user. It may be possible to use a commercial operating lease between the solar developer and a utility, and a separate PAYS transaction between the customer and the utility.

³ Similarly, the lessor or PPA vendor owns the upgrade during the lease or PPA.

low-rate financing, to gain customer participation in the program, and installation of upgrades. Loan programs have concentrated on expanding access to loans, reducing the cost of loans, and making loan repayment more convenient. However, these program designs have left many customers facing barriers that incentives and loan offerings do not address.

Lack of money (or competing demands for available funds), lack of technical expertise, and uncertainty about one's continued occupancy at a particular location all combine to prevent customers from choosing to invest in energy efficiency in their homes and businesses. The so-called split incentive, when energy using equipment is purchased by someone other than the end user, also inhibits the selection of energy efficient equipment. Builders, developers and landlords profit by purchasing the least expensive equipment, even though the end user's life cycle cost for energy inefficient equipment may be much higher. Another significant barrier is the one least understood: rational, well-informed consumers with access to capital and an understanding of the life-cycle value of efficiency investments often do not make such investments because the up-front cost is more real to them than the theoretical future savings.⁴

The PAYS offer to a customer is designed to overcome the market barriers facing those who are not well served in loan programs or incentive programs. According to the creators of the PAYS system, the offer contains:

- No upfront payment
- No credit checks, liens or hassles (e.g., bank applications or approvals)
- No new debt obligation (the obligation to pay is assigned to the location not an individual)
- No obligation to pay if the participant does not benefit (e.g., if a customer relocates, their payment obligation stops; if an upgrade fails or breaks down, it is repaired or the payment obligation stops; if repaired, the payment amount stays the same, only the term is extended)
- No split incentives between owners and renters (Renters pay lower utility bills while they occupy the premises. Landlords who don't pay for renters' utilities pay nothing)⁵

Figure 1 sets out the essential elements of a PAYS program as well as minimum program requirements and other elements.⁶

⁴ Harlan Lachman and Paul Cillo, Pay-As-You-Save Energy Efficiency Products: Restructuring Energy Efficiency, 1999, at pp. 1-2. Available at http://www.eeivt.com/EEI_Pays_1st_paper.pdf, last viewed March 8, 2020.

⁵ <http://www.eeivt.com/how-pays-works/> last viewed March 8, 2020.

⁶ <http://www.eeivt.com/pays-essential-elements-minimum-program-requirements-2/#> Last viewed March 8, 2020.

Figure 1: PAYS® Essential Elements & Minimum Program Requirements

A program based on PAYS® has these essential elements:

- A tariffed charge assigned to a location, not to an individual customer;
- Billing and payment on the utility bill with disconnection for non-payment; and
- Independent certification that products are appropriate and savings estimates exceed payments in both the near and long terms.

A program based on PAYS® has these minimum program requirements:

- The offer to the customer will not be burdened with customer risk, which undermines the offer’s attractiveness, results in fewer projects being completed, and reduces the program’s effectiveness in achieving its goals.
- The utility doing billing and collection of PAYS charges agrees to pay the capital provider(s) each month the amount billed to PAYS customers that month, regardless of the utility’s collections, and to treat any bad debt for PAYS measures the same way that it treats all other bad debt.
- PAYS offers will not be forced to compete with other rebate options. Any utility offering rebates and implementing a program using the PAYS system will offer the same rebates to all participants. Utilities can reduce the costs for rebates if rebates available to all customers are limited to the amount required to qualify an upgrade for the PAYS tariff.

Key design tips to ensure PAYS® programs meet these essential elements and minimum requirements

- **Upgrades**
 - PAYS upgrades use proven technologies to ensure reliable savings.
 - Upgrades do not entail new debt obligation for participating customers.
 - At conclusion of utility cost recovery, upgrades belong to building owner.
 - Upgrades do not have end-of-lease charge or transfer of ownership financial obligation.
- **On-bill charges**
 - Participants receive immediate net annual savings of at least 25% above program services charges (80% rule).
 - Duration of payments are is not more than 80% of the estimated life of shortest-life component or a full parts and labor warranty/insurance policy.
 - The program services charge is a fixed amount that may not be increased mid-payment-term.
 - Pre-payment of unbilled charges is not permitted (i.e., no payment without savings).
 - Utilities may disconnect customers for non-payment (DNP) in accordance with current policies, but upgrades may not be repossessed.
- **Repairs**
 - Charges stop if upgrades stop working until they are repaired and working again. Charges are also suspended for vacancy if meter is shut off.
 - Repairs or vacancy may extend the duration of charges, but not increase the monthly payment amount.
- **Cost-effectiveness analysis**
 - Savings analysis is onsite and building specific, and include no energy inflation or adders, use the amount of savings expected at the end of cost recovery for upgrades whose savings degrade over time, and be reported in units of energy not dollars.

- Savings estimates used in a cost-effectiveness analysis may be for monthly, bi-monthly, or annual periods.
- The exact cost of installed upgrades must be known at the time of assessment to avoid the cost and customer hassle of a second assessment because a vendor’s installation price is different from the one used for the original assessment.
- Programs that set contractors’ prices based on negotiated or bid averages reduces the assessment cost, and simplifies program marketing and communications.
- Utility subsidies and state and federal credits may only be included in cost-effectiveness analyses if they can be used to lower the upgrades’ cost used in the assessment (no post installation rebates paid to participants).

As noted, the provisions of the PAYS program listed in Figure 1 are designed to overcome customer risks and participation impediments. Figure 2 associates PAYS features with the customer risks they are intended to address.

Figure 2 :
How PAYS® overcomes customer risks

PAYS® feature	How it overcomes customer risks
Tariffed charge assigned to location	Tenant can participate without taking on debt
Independent certification of upgrades	Reassures customers that upgrades will work
Immediate savings/no upfront cost	Immediate savings/no need for cash or credit
Upgrades must be comfortably cost-effective	Reassures customers that savings will appear
Program Service Charge must be fixed amount	Reassures no escalation of cost over time
Upgrades may not entail new debt	Opens PAYS to those who cannot take on debt
Payments suspended for vacancy	Customer can leave without debt
Payments suspended for repairs	Customer will not pay if equipment does not work
Upgrades may not be repossessed for nonpayment	Reassures customers of stability of upgrades
Exact cost must be known at beginning	No need for second audit
No end-of-lease or ownership transfer payments	Customer can decide on occupancy without burden
No post-installation rebates/tax benefits	Customer not at risk for non-receipt
Savings analysis onsite, no adders	Confidence in contents of offer
The analysis uses the savings after system degrading	Reasonable anticipation of future conditions

PAYS creates a unique transaction between customer and program operator. The importance of some of its elements may not be immediately recognized. EEI trademarked the program, so that the name they have developed would not be applied to other programs that have some of these elements, but not all.⁷

⁷ “Use of the Pay As You Save® and PAYS® trademarks are available at no cost to utilities and state regulators who wish to implement programs that meet the essential elements and minimum program requirements of the PAYS system.” <http://www.eeivt.com/implementing-pays-in-your-state-or-at-your-utility/> Last viewed March 8, 2020.

What are the legal bases and precedents for implementing PAYS®?

A variety of sources have provided the legal bases for implementing PAYS

Utilities and state regulators have relied on a variety of sources of authority to implement a PAYS program. They range from the general supervisory power of Commissions over regulated utilities to specific legislation mandating PAYS implementation.

So far, PAYS has been approved and initiated in eight jurisdictions.⁸ In most states, the method has been used to promote energy efficiency measures installed in customer premises. In Hawaii, the legislature specifically authorized a PAYS program for solar hot water systems. In California, municipalities, water districts, and joint powers authorities have used PAYS to promote water usage efficiency.

The attached Table of Authorities summarizes the legal bases for the programs that have been implemented to date. The authority is described in general terms, and in the endnotes the specific chain of approvals is set out.

Except for completely self-regulating cooperatives and governmental entities such as many municipal utilities, the same commission that regulates utility rates and services has provided legal authority to institute a PAYS program. The bases can be separated into a number of approaches. A state may use a combination of such legal bases for approval of a PAYS program. In at least two cases, the Commission authorized a PAYS program on its own authority, and the legislature later gave more authority to the Commission. The bases used so far include the following:

1. Commission approval of proposal by cooperative, without citing specific statutory authority (Kentucky).
2. General supervisory authority of the regulator (Kansas)
3. Powers of self-regulating municipal or cooperative utility (North Carolina, and Kansas after initial reliance on general supervisory authority)
4. Statute declaring energy conservation as a utility function (Arkansas)
5. PAYS- or OBF-specific legislation (Hawaii)
6. A combination of grants of authority to municipal utilities and agencies to promote water conservation (California)
7. A regulatory contract with a wholesale provider permitting PAYS program (Tennessee)
8. States legislative policies in favor of utility support for EE and DER as utility functions:
 - a. General legislative support for utility demand-side investments (Kansas)
 - b. Restructuring requirements (New Hampshire)
 - c. Utility efficiency program-approval-authority in statutes (New Hampshire)
 - d. Legislative mandate to implement PAYS for solar hot water (Hawaii)

⁸ The Virginia State Senate has recently passed a bill authorizing cooperatives to provide PAYS-like offers to customers. <https://lis.virginia.gov/cgi-bin/legp604.exe?201+sum+SB754>. Last viewed March 22, 2020.

No commission is currently approving a PAYS program⁹ based solely on the general supervisory power of the Commission. When state regulation was broadly introduced in the early part of the 20th century, legislatures typically granted the Commission what appeared on paper to be plenary oversight authority. These statutory grants of authority remain in place. For example, the Kansas Commission cited these provisions in its approval of Midwest Energy’s PAYS program in 2007:

“...The Commission is granted broad authority to supervise and control the electric and natural gas public utilities under its jurisdiction. K.S.A. 66-101; K.S.A. 66-1,201. It is also empowered ‘to do all things necessary and convenient for the exercise of such power, authority and jurisdiction.’ K.S.A. 66-101g and K.S.A. 66-1,207. Further, grants of power, authority, and jurisdiction made to the Commission are to be liberally construed and confer on the Commission all incidental powers necessary to effectuate provisions of Kansas public utility law. K.S.A. 66-101g and K.S.A. 66-1,207.¹⁰

Commission reliance on these general supervisory powers today is unusual, however. Over the course of traditional regulation, the scope of such blanket authority was successfully narrowed by utility challenges. The doctrine of “managerial prerogative” emerged to carve out areas of utility decision-making where the Commissions could not overturn the decision except in extraordinary situations.

Some courts have limited commissions’ authority to challenge or prescribe utility activities, citing the “managerial prerogative.” (See the NRRI paper [Are Utility Workforces Prepared for New Demands? Recommendations for State Commission Inquiries](#), pp. 28-38.) At their most confining, these judicial statements cause regulators to forsake standard setting in favor of cost disallowing—an action regulators hesitate to take for fear of weakening the utility.¹¹

There is reason to expect that most Commissions can use a variety of modern sustainability powers to approve PAYS. Beginning in the 1960s, and ever since then, the utility industry and regulation have been under considerable stress, as the result of the exhaustion of generating plant economies of scale, new understanding of the environmental impacts of electric generation, and realization of the limitations of vertically integrated regulated utilities as well as private markets to provide individual customers with tools they can use to reduce their environmental footprint. Stakeholders have proposed various forms of industry restructuring to achieve public policy goals they enunciate.¹²

⁹ The Kansas Commission used this basis when it approved the PAYS proposal of Midwest, but Midwest is now able to offer the PAYS tariff on its own initiative, as a self-regulating cooperative.

¹⁰ In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Natural Gas Service, In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Electric Service, Kansas State Corporation Commission, Docket Nos. 07-MDWG-784-TAR, 07-MDWE-788-TA. Order Adopting Stipulation, 2007 at 6.

¹¹ Scott Hempling, *Utility Performance: Will We Know It When We See It?* (July 2010). Available at <https://www.scotthemplinglaw.com/essays/utility-performance> Last viewed January 21, 2020.

¹² For a useful summary of the changing nature of public utility regulation, and an introduction to recent policies giving utilities responsibilities for efficiency and renewable resources behind the meter, see: William Boyd “Public Utility and the Low-Carbon Future,” 61 *UCLA L. REV.* 1614 (2014). Available at <https://www.uclalawreview.org/boyd> Last viewed March 2, 2020.

By the 1980s, the idea of a Commission ordering a utility to assist customers in installing energy efficiency measures behind the meter as a utility obligation to develop least cost resources, as required under the 1978 Public Utilities Regulatory Policies Act and state initiatives, was introduced and became popular over time. Utility opposition succeeded in stalling such initiatives in many states, and during the movement towards retail choice, some states let their efficiency programming be reduced:

As a result of restructuring, funding for demand-side management (DSM) programs across the country is being significantly reduced. David Nemptow, president of the Washington, D.C.-based Alliance to Save Energy, estimates that in the past five years, total utility spending for conservation in the United States has dropped from a peak of roughly \$3 billion per year to less than \$1.5 billion.¹³

The author of the above quote on DSM budgets affected by restructuring went on to say, however, that “statutes and regulations setting out norms for utility-sponsored distributed energy resources have become commonplace.”¹⁴ Statutes mandating sustainability and least cost resources have taken various forms (including the provisions that have been relied on to date to authorize implementation of PAYS). By 2019, utilities in all but six states had fielded behind-the-meter energy efficiency programs to help customers reduce wasted energy.¹⁵

Additional sustainability and least cost planning provisions that could support the authorization of a PAYS project include the following: Integrated Resource Planning (sometimes called Least Cost Planning); requirements for preapproval of new utility-side plant investment; assignment of responsibility to expand efficiency and distributed energy resources; and efficiency and renewable portfolio standards.

In New Hampshire, the legislation opening retail sales of electricity to competition expressly provided that the Commission should encourage demand-side management. The Legislature instructed the Commission to design the restructuring of the state's electric industry so as to "reduce market barriers to investments in energy efficiency and provide incentives for appropriate demand-side management and not reduce cost-effective customer conservation." RSA 374-F:3, X.¹⁶

The New Hampshire statute further authorized the Commission "to order such charges and other service provisions and to take such other actions that are necessary to implement restructuring and that are substantially consistent with the principles established in [the Restructuring Act]". RSA 374-F:4, VIII. Cognizant of this mandate, the Commission stated in Order No. 23,574 that "[a] properly designed Pay As You Save (PAYS) program ... could potentially unleash pent-up consumer demand for efficiency measures." Order No. 23,574, slip op. at 18.

¹³ Juliane Poirier "Public-Benefits Programs Adapt Under Restructuring," Home Energy Magazine Online July/August 1999. Available at <https://homeenergy.org/show/article/id/1488> Last viewed January 21, 2020.

¹⁴ Id.

¹⁵ The ACEEE 2019 State Energy Efficiency Scorecard, October 2019, Report U1908, Table 2.

¹⁶ See National Conference of State Legislators, State Renewable Portfolio Standards and Goals, available at <https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx> Early on, demand-side management largely referred to energy efficiency, but as solar and other behind-the-meter technologies became increasingly cost-effective and technologically practical, the term expanded to include managing the demand by self-generation. Eventually the term Distributed Energy Resources (DER) came to replace DSM as the umbrella term including behind-the-meter utility investments.

Another mandate for a utility and state to meet sustainability goals is the Renewable Portfolio Standard (RPS). An RPS requires a utility to implement a certain level of renewable generation as a condition of the franchise.¹⁷ Customer-side solar has been counted towards the portfolio standard in a number of states. The National Conference of State Legislatures reports that renewable portfolio standard polices vary widely, based on:

...several elements including RPS targets, the entities they include, the resources eligible to meet requirements and cost caps. In many states, standards are measured by the percentage of retail electric sales. Iowa and Texas, however, require specific amounts of renewable energy capacity rather than percentages and Kansas requires a percentage of peak demand. While most state targets are between 10% and 45%, 13 states—California, Colorado, Hawaii, Maine, Maryland, Massachusetts, Nevada, New Mexico, New Jersey, New York, Oregon, Vermont, Washington, as well as Washington, D.C. Puerto Rico and the Virgin Islands—have requirements of 50% or greater.¹⁸

Another basis for asserting Commission authority to mandate PAYS in particular is the general rule against discrimination in rates and services, part of the organic statute of regulatory commissions set up early in last century. PAYS has attributes that enable utilities to reach the many types of customers who do not or cannot respond to traditional incentive programs. The Hawaii Commission highlighted this point in its approval of the PAYS concept for solar water heating:

As the Consumer Advocate indicated, "most of the past and current programs have not been designed to encourage renters and low-income customers in adopting energy efficiency or renewable energy infrastructure, yet these very same customers have been required to subsidize programs that benefit other customers".¹⁹

There have been different paths for promotion of solar

With respect to public support for distributed solar power, the history has been somewhat different from the history of energy efficiency. The primary drivers of behind-the-meter solar installations have been the solar vendors, aided by three cost-lowering policies. One cost-lowering policy has been the tax credit for solar investments. Another has been tradeable solar credits, funded with a variety of sources, including utility DER funds, proceeds from RGGI²⁰

¹⁷ For example, in Texas the legislature passed a law requiring electric transmission & distribution utilities (TDUs) to meet certain energy efficiency goals. Public Utility Commission of Texas Substantive Rule §25.181 (Energy Efficiency Rule) establishes procedures for meeting these goals. To comply with the Energy Efficiency Rule, the TDUs offer energy efficiency programs to customers within their respective service territories. Texas Energy Efficiency Program Basics, available at <http://www.texasefficiency.com/index.php/utility-programs/program-basics>

¹⁸ National Conference of State Legislatures, State Renewable Portfolio Standards and Goals, December 31, 2019. Available at <https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx>

¹⁹ In the Matter of Public Utilities Commission Instituting a Proceeding to Investigate the Implementation of On-Bill Financing. Docket No. 2011-0186, Decision and Order No. 30974 (February 1, 2013) pp. 26-27 [footnotes omitted].

²⁰ RGGI is the Regional Greenhouse Gas Initiative in New England:

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont to cap and reduce power sector CO2 emissions. RGGI is composed of individual CO2 Budget Trading Programs in each participating state. Through independent regulations, based on the RGGI Model Rule, each state's CO2 Budget Trading Program limits emissions of CO2 from electric power plants, issues CO2 allowances and establishes participation in regional CO2 allowance auctions.... Within the RGGI states, fossil-

transactions, and others. The third has been net energy metering (NEM), a tariff with the utility that allows a homeowner to sell excess power back into the grid at the retail rate, netting the cost of purchases of power from the utility and sales of power to the utility.²¹

Commissions and legislators have used renewable portfolio standards to require utility investments in distributed solar. So far these have not been used to provide a basis for implementing PAYS for solar. There have been, however, some utility incentive programs to assist consumers in installing solar, and thereby assist the utility in meeting its portfolio requirements. It may be possible in some states to require utilities to offer PAYS on-site solar tariffs and incentives.

As can be seen from this discussion, there is a wide range of legislation and policy that could, in theory, support a utility's decision to implement PAYS and a regulator's decision to approve a PAYS tariff.

Do the legal bases and precedents differ depending on the ownership structure of the utility, and by the particular aspect of service it provides?

PAYS justifications change depending on type of utility ownership and services

Yes, the legal bases and precedents are different depending on the ownership structure of the utility. Investor-owned utilities are regulated by state commissions. Cooperatives and municipal electric utilities may be regulated, but many states do not regulate them.

In the case of regulated utilities, the state regulatory commission would receive a petition to approve a PAYS tariff in a process similar to other tariffed terms of service.²² In the case of non-regulated utilities, the governing body of the entity presumably determines whether to offer PAYS as a tariffed service.

By statute, states could establish a statewide Program Operator to run demand-side programming for all distribution utilities. One possible model for housing a statewide Program Operator is Efficiency Vermont:

In 1999, the Public Service Board ("Board") approved a settlement among all Vermont electric utilities, the Vermont Department of Public Service ("DPS"), and other interested parties, that provided for the creation of a new statewide Energy Efficiency Utility ("EEU") that would deliver energy efficiency services to Vermonters throughout the

fuel-fired electric power generators with a capacity of 25 megawatts (MW) or greater ("regulated sources") are required to hold allowances equal to their CO₂ emissions over a three-year control period.

<https://www.rggi.org/program-overview-and-design/elements>

²¹ As the utility cost avoided by the customer's self-generation is typically lower than the retail rate, NEM rates have often provided NEM customers a greater compensation than they would otherwise have received as suppliers.

²² Note that typically a utility rate filing goes into effect by operation of law if a Commission does not suspend its implementation for hearings. Thus, it is theoretically conceivable that a utility could develop and field a PAYS program without specific approval of the regulator.

state.²³

See also *New Jersey's Clean Energy Program*. This is a statewide program that offers financial incentives, programs and services for New Jersey residents, business owners and local governments to help them save energy, money and the environment.²⁴ Wisconsin similarly has a statewide program, for energy efficiency, Focus on Energy:

A program within the Office of Energy Innovation, Focus on Energy is Wisconsin utilities' statewide energy efficiency and renewable resource program. Since 2001 the program has worked with eligible Wisconsin residents and businesses to install cost-effective energy efficiency and renewable energy projects.²⁵

Focus on Energy is funded by the state's investor-owned energy utilities, as required under Wis. Stat. § 196.374(2)(a) and participating municipal and electric cooperative utilities. To participate in Focus on Energy programs, residents or business owners must be customers of a participating utility. See also Mass Save, in Massachusetts,²⁶ and New Hampshire Saves.²⁷ These programs would have to be adapted to perform the Program Operator role, but they represent statewide efforts at implementing consistent programming among multiple utilities.

²³Board order approving settlement, <http://psb.vermont.gov/utilityindustries/eu/generalinfo/creationandstructure> Last viewed February 5, 2020.

²⁴ <https://njcleanenergy.com/> Last viewed February 5, 2020.

²⁵ <https://psc.wi.gov/Pages/Programs/OEI.aspx> Last viewed February 5, 2020.

²⁶ [https://www.masssave.com/en/saving/energy-assessments/homeowners?utm_source=bing&utm_campaign=MA%20Residential_RCD%2020&utm_medium=cpc&utm_term=energy%20efficiency%20programs&utm_content=Energy%20Efficiency:%20Programs%20\(Phrase\)&mclid=982fbd4fa1b617cd2fb7e3748c624a99](https://www.masssave.com/en/saving/energy-assessments/homeowners?utm_source=bing&utm_campaign=MA%20Residential_RCD%2020&utm_medium=cpc&utm_term=energy%20efficiency%20programs&utm_content=Energy%20Efficiency:%20Programs%20(Phrase)&mclid=982fbd4fa1b617cd2fb7e3748c624a99), last viewed February 5, 2020.

²⁷ <https://www.nhsaves.com>

Are the legal bases and precedents for PAYS® programs substantially different from On Bill Financing (OBF) and On Bill Loan Recovery (OBLR) programs?

PAYS legal bases and precedents differ from OBF and OBLR

On-Bill Financing (OBF) and On-Bill-Loan Recovery (OBLR) have emerged among regulators and advocates as financing options for utility energy efficiency and renewable energy projects. By 2013 at least 20 states offered some form of a line-item billing program.²⁸ More recently, the Energy & Environment Study Institute tallied more than a hundred on-bill programs, the vast majority of which are OBF and OBLR programs involving loans to consumers.²⁹

On-bill loans have been offered by some utilities since the 1970s to fund a range of energy efficiency and renewable energy improvements. At least 45 programs are active, serving all customer market segments. The majority of programs focus on the residential sector while the majority of loans, by dollar volume, have been made to non-residential customers (due to larger loan size).³⁰

The OBF and OBLR programs have so far been offered in aid of extending loans to customers who are able to meet the required underwriting criteria. In general terms, these programs “allow consumers to repay loans on their utility bill.”³¹

Broadly, this involves:

- A lender providing funds for consumers and businesses to make energy improvements on their property,
- The utility adding the loan payments to the consumer’s utility bill, and
- The borrower paying their combined energy and loan bill.³²

By contrast, PAYS is not a loan program. It is a system through which a utility can capitalize upgrades and recover those costs through a tariff that lays out the terms of service approved by a utility regulator or oversight board. As can be seen in Figure 1 above, *PAYS Essential Elements & Minimum Program Requirements*, participating customers pay monthly utility charges rather than loan repayments. They do not owe a debt to the utility. The upgrades chosen to be installed at a location based on the PAYS system have monthly payments that are calculated to end before

²⁸ James Fine, Brad Copithorne, Michael Roos, Ruiwen Lee, Jessica Feingold, Elizabeth Stein, and Sandra Shorenstein, *On-Bill Repayment: Repaying Clean Energy Investments on Utility Bills*, 2013 Working Paper, Lincoln Institute of Land Policy, p. 7. Available at https://www.lincolninst.edu/sites/default/files/pubfiles/2413_1757_Fine_WP14JF1.pdf. Last viewed February 5, 2020.

²⁹ Energy Efficiency Study Institute. Interactive map of utilities with on-bill financing programs. <https://www.eesi.org/obf/map> Last viewed March 13, 2020.

³⁰ Leventis, et al, *Current Practices in Efficiency Financing: An Overview for State and Local Government*, LBNL-1006406, p. 1. Available at <https://emp.lbl.gov/sites/all/files/lbnl-1006406.pdf> Last viewed February 5, 2020.

³¹ *Id.* at p. 33.

³² *Id.*

savings end, and there is a built-in cushion in the cost recovery period in case reality does not match projections. Payments end if the upgrades fail.

On-bill programs or pilots in California, Georgia, Illinois, New York, South Carolina, and cooperative utilities in the Tennessee Valley Authority (TVA) states provide loans, so they are not PAYS transactions.³³ With respect to energy efficiency financing, OBF programs and their authorizing laws and regulations sometimes explicitly characterize the financing assistance as a loan or financing. For example, programs in the states listed above that use the terms “loan” in their title include the Georgia Environmental Finance Authority Residential Energy Efficiency On-Bill Loan Programs and the Illinois Energy Efficient Loan Program.³⁴

The use of a lending term of art (“loan” or “indebtedness,” for example) will likely result in the program being deemed to have defined the customers’ obligations more broadly than in a PAYS transaction. Merely identifying OBF or OBLR as a loan program also undercuts the basis for exclusion from application of certain lender notice obligations.³⁵

Whether the legal bases for OBF and OBLR differ from PAYS depends on the statute and regulatory language, such statutes and Commission orders to establish an OBF or OBLR program typically do not create a specific basis for PAYS. OBF and OBLR differ from PAYS because they lack crucial elements of the PAYS offer, and/or include elements inconsistent with it. Some statutory authorizations for OBF may conceivably be interpreted to allow implementation of the elements of a PAYS program, if they do not require provisions inconsistent with PAYS.³⁶

Are there principles and determinations from previous orders and statutes that are applicable to PAYS implementation?

In addition to questions of legal authority to approve and implement PAYS programs, it is useful to look at program issues that have arisen about PAYS, and how regulators have handled them.

Consumer advocates have expressed concern about programs (such as OBLR and PACE³⁷) in which consumers are asked to pay for upgrades. While these concerns are not always raised in litigation concerning approval of a PAYS program, it is useful to address three of them. They are among the essential PAYS elements, and it is valuable to be able to reassure interested persons that the concerns have been considered and alleviated:

³³ See Financing Solutions Working Group, Financing Energy Improvements on Utility Bills: Technical Appendix—Case Studies, State and Local Efficiency Action Network (SEEAN), May 2014.

³⁴ Id.

³⁵ See Section G, below. As will be discussed, PAYS has built-in consumer protections for its non-loan provisions, such as a likelihood that upgrades will do what is promised, bona fides of installers, charges stop if upgrades fail and are not repaired, and so forth. Further, installers are not protected from their liabilities as third parties if they install PAYS upgrades.

³⁶ Some OBF and OBLR programs have one or another of these features, but lack other essential features of PAYS.

³⁷ Property Assessed Clean Energy, a program authorized by local governments under which a property owner can put her indebtedness for upgrades on the tax bill. See, <https://pacenation.org/what-is-pace/> Last viewed March 23, 2020.

1. A tariffed charge assigned to a location, not to an individual customer,
2. Billing and payment on the utility bill with disconnection for non-payment, and
3. Upgrades, payment levels, contractors, and post-installation provisions chosen to ensure consumers are not at risk for paying when they don't save.

Tariffed charge assigned to a location, not to an individual customer

A fundamental feature of PAYS is that if a customer leaves a PAYS-upgraded location before the PAYS charges for cost recovery are complete, the bills for the next customer at the premises will include the monthly charges. The next customer realizes the savings from the upgrades installed at that location, and the PAYS obligation is assigned to the upgraded location, not any particular customer. The PAYS system assigns to program operators the responsibility to ensure that potential successor customers have notice that a property has a PAYS upgrades and cost recovery is still underway:

The Commission further finds that because the Program charge for participating in the Program is tied to the cooperative member's electric meter and premises, it is a charge for electric service.

Accordingly, the Commission approves Ouachita's request to allow the cooperative to disconnect the [successor] customer for non-payment of the Program Charge, subject to existing rules ...that are applicable to standard electric service. The Commission, however, in its role of ensuring the fairness and reasonableness of rates and tariffs, directs Ouachita to carefully implement the provisions of PAYS that ensure notice by the utility and by participating customers to future customers at the same premises.³⁸

This assignment of the PAYS obligation to the location and premises is a key component of the structure in that associates the cost recovery with an investment in delivery of an energy service. The utility terms of service are not a loan. The customer initiating the utility investment does not have to carry any unpaid liability after leaving the premises. It is also this feature that permits renters facing split incentives with their landlords to participate. PAYS overcomes this enormous problem.

Disconnection for Non-Payment has not been a barrier to PAYS implementation

Disconnection for nonpayment of cost recovery charges for a PAYS investment, a provision that has drawn concern from some consumer advocates, has not been a major barrier to implementation of either on-bill financing with loans or with PAYS. In New York, Vermont, and Kansas consumer representatives have raised concerns about provisions in on-bill financing programs that allow for disconnection in cases of non-payment.³⁹ However, they did not take their concerns to the point of litigation.

³⁸ In the Matter of The Application of Ouachita Electric Cooperative Corporation Requesting Implementation of a New Energy Efficiency Program Designed To Individually Customize Energy Efficiency Measures, Arkansas Public Service Commission, Docket No. 15-106-TF, Order No. 2 (February 8, 2016), at p. 11.

³⁹ In a Massachusetts on-bill financing working group, consumer advocates objected to programs that allow for disconnection for non-payment but did not make their objection a make-or-break position. On-bill Financing Working Group: Principles and Issues for On-bill Repayment, October 5, 2009. https://www.nclc.org/images/pdf/energy_utility_telecom/obf/MA-On-bill-Financing-Working-Group-2009Oct5.pdf

In Kansas, the consumer advocate objected to that feature of the proposed Midwest Energy program.⁴⁰ Midwest Energy for its part argued that disconnection for nonpayment is appropriate because the so-called How\$mart® PAYS program “may be considered an integral part of utility service.” ... Midwest also pointed out “Midwest's Board approved a PAYS®-type program, and one of the elements of such programs is that customers may be disconnected for nonpayment of the line item charge”.⁴¹

Midwest expected a lower percentage of disconnects under the program than usual, however, because the average bills would be lower.⁴² Some utilities have reported that their collections from PAYS locations (greater than 99.9%) are higher than their normal rate of collections, and that no participants have been disconnected.⁴³ Of note, Midwest Energy has reported no disconnections for non-payment at How\$mart® upgraded locations in spite of 2,139 projects since 2007 with upgrades totaling more than \$16 million.

In Kansas, the Citizens Utility Rate Board (CURB) argued that participating customers should not be at risk of disconnection if they do not pay the PAYS charge:

CURB argues that since 1979, the Commission's Billing Standards have prohibited termination of service for non-payment of special services such as the sale of merchandise, insulation, or services performed in connection therewith. Section IV. B. (1) and Section I. A. (3) of the Commission's Billing Standards. The language, in Sections I.A. (3) and IV. B. (1) of the Commission's Billing Standards, has remained virtually unchanged since it was adopted by the Commission. CURB argues the How\$mart® program involves "the sale of merchandise, insulation, and services performed in connection therewith." Thus, CURB contends, allowing termination for nonpayment of the How\$mart® obligation would reverse the longstanding Commission policy and would not be in the public interest.⁴⁴

The Commission rejected CURB’s arguments in its original Order Approving Stipulation and its Order on Reconsideration.

⁴⁰ Citations in this discussion are to two different Kansas Commission orders, one approving a stipulation supporting elements of PAYS and one reaffirming decisions disconnection and meter assignment on reconsideration. In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Natural Gas Service, and In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Electric Service, Kansas State Corporation Commission, Docket Nos. 07-MDWG-784-TAR, 07-MDWE-788-TAR, Order Approving Stipulation (August 16, 2007); In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Natural Gas Service, and In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Electric Service, Kansas State Corporation Commission, Order on Reconsideration (December 20, 2007)

⁴¹ Order on Reconsideration at p. 6 (transcript citations omitted).

⁴² *Id.*

⁴³ Hummel, H., Harlan Lachman. What is inclusive financing for energy efficiency, and why are some of the largest states in the country calling for it now? A presentation to ACEEE Summer Study on Energy Efficiency in Buildings, August 2018. Available at

https://www.aceee.org/files/proceedings/2018/assets/attachments/0194_0286_000158.pdf. Last viewed March 2, 2020.

⁴⁴ Order Adopting Stipulation, pp. 8-9.

The Commission is... persuaded that the utility's ability to disconnect for nonpayment assists the utility to fulfill the purpose of the program, which ultimately assists the public generally.⁴⁵

Noting that utility service for renters is normally in the name of the tenant, not the property owner, the Commission agreed with the utility that, without DNP for the PAYS charges, “there is no immediate or efficient method to motivate payment other than through a formal collection process which defeats the purpose of the program.”⁴⁶ The Commission also cited the fact that the program “is designed in such a way as to actually lower customer bills, which should, in some measure, assist customers in meeting their payment obligations and result in fewer disconnections for non-payment.”⁴⁷ Accordingly, the Commission found that the program should be approved as a tariffed service, and that disconnection for non-payment is appropriate.⁴⁸

The Arkansas Commission found that the Program Charge would be tied to Ouachita’s electric meter and premises, and therefore, the program provided a utility service.

Accordingly, the Commission approves Ouachita’s request to allow the cooperative to disconnect the customer for non-payment of the Program Charge, subject to existing rules covering notice, time periods, etc. that are included in the Commission’s General Service Rules and the cooperative’s terms and conditions of service that are applicable to standard electric service.⁴⁹

In Hawaii, the issue of Commission authority to approve disconnection for failure to pay PAYS charges was covered by legislation. Over the Consumer Advocate’s objection, the Commission found that:

“...the utilities are required to comply with the Act 240 provision regarding the disconnection of service for non-payment of the SWH⁵⁰ system charges. Moreover, the commission finds that under the SWH Financing Programs, this tariff provision enables the utilities to encourage the payment of the Fee. The Consumer Advocate’s position analogy to landline telephone services is distinguishable. Under the SWH Financing Programs, the participating customers are paying for the cost of their SWH systems, not for ancillary services. Indeed, by paying for the SWH system on their utility bills, the participating customers are effectively paying electricity because the SWH systems result in electricity savings. Therefore, the commission finds that the disconnection of service for non-payment of the SWH system charges results in sound public policy.”⁵¹

⁴⁵ Order Approving Stipulation, p. 11.

⁴⁶ Id., p. 5.

⁴⁷ Id., p. 6.

⁴⁸ Id., p 12.

⁴⁹ Ouachita Order No 2, February 8, 2016, at p. 11.

⁵⁰ Solar Water Heat

⁵¹ Decision and Order 23531, June 29, 2007, page 34.

In Kentucky, no one objected to the disconnection provision in the PAYS program proposed by Big Sandy Rural Electric Cooperative et al.⁵² The Commission noted the disconnection provision, and commented that:

Failure to make payment could result in disconnection in accordance with [the cooperatives'] approved terms and conditions as provided in its tariff. However, the program is designed to actually lower customer bills, which should assist customers in meeting their payment obligations and result in fewer disconnections for non-payment.⁵³

Without further discussion of this issue, the Kentucky Commission found that the proposed permanent program “is reasonable and should be approved.”⁵⁴

The New Hampshire Public Utilities Commission relied on its authority to implement the sweeping restructuring statute. The Commission concluded that:

it is within the agency's statutory authority to permit or require service denials [where a successor occupant refuses to undertake the PAYS obligations], particularly in light of the energy efficiency objective contained in the Electric Industry Restructuring Act, RSA 374-F:3, X, and the Act's explicit investiture in the Commission of authority to implement its objectives, RSA 374-F:4, VII.⁵⁵

There have been varying sources of authority cited by Commissions for authorizing disconnection of service for nonpayment of PAYS service charges. Significantly, the provision has not been rejected by any Commission. In practice, this feature has not caused the kinds of problems anticipated by critics. Michael Volker (Midwest Energy's former Director of Energy and Regulatory Services) indicated to the State and Local Efficiency Action Network that “they have had very few problems” with the charge staying with the meter.⁵⁶

⁵² Case No. 2010-00089, Joint Application of Big Sandy Rural Electric Cooperative Corporation, Fleming Mason Energy Cooperative, Inc., Grayson Rural Electric Cooperative Corporation, and Jackson Energy Cooperative for an Order Approving an On-Bill Financing Pilot Program Titled the Ky Energy Retrofit Rider" (Ky. PSC Dec. 16, 2010).

⁵³ *Id.*, p. 6.

⁵⁴ Joint Application of Big Sandy Rural Electric Cooperative Corp., Fleming-Mason Energy Cooperative, Inc., and Grayson Rural Electric Cooperative Corp. For an Order Approving Ky Energy Retrofit Rider Permanent Tariff, Case No. 2012-00484, August 26, 2013, p. 8.

⁵⁵ Public Service Company of New Hampshire and New Hampshire Electric Cooperative, Inc. Pilot “Pay As You Save” (PAYS) Energy Efficiency Program, Docket DE-01-080, Order No. 23,851, approving a proposed “Pay As You Save” energy efficiency pilot program to be conducted by Public Service Company of New Hampshire (now, Eversource) and the New Hampshire Electric Cooperative (November 29, 2001), p. 4.

⁵⁶ Financing Solutions Working Group, Financing Energy Improvements on Utility Bills: Technical Appendix—Case Studies, State and Local Efficiency Action Network (SEEA), May 2014, p. 27. Of the 150 PAYS Midwest Energy properties that changed hands (16% of all treated premises), 75 or half have had “repayment taken over by a subsequent owner or tenant. The other half paid off the on-bill charge before moving.” *Id.*, p. 24. Some customers prefer to sell the property without the PAYS charge, and in Kansas they may pay make advance payments toward future energy bills at the time of transfer of property ownership in order to eliminate further cost recovery for the successor resident.

PAYS upgrades, payment levels, contractors, and post-installation provisions are chosen to ensure consumers are not at risk for paying when they don't save

There are several provisions in the recommendations for PAYS whose purpose is to ensure that participants are protected from the kinds of harms that have plagued such programs as PACE and solar financing offerings. PAYS requirements concern choice of upgrades, payment levels and post-installation provisions intended to ensure consumers are not at risk for paying when they do not save. Utility commissions and oversight boards approving tariffs for the implementation of programs based on the PAYS system, including utility commissions in Arkansas, Kentucky, and Kansas, have determined these protections to be acceptable for implementation.

By contrast, consumer advocates have noted a number of risks for consumers in loan programs that could cause them to pay more than they save or expose them to other hazards. For example, OBF and OBLR programs do not include any protection to prevent participants being forced to pay for upgrades that are no longer functioning.⁵⁷ The National Consumer Law Center, a respected legal services back-up center, commented about a number of concerns to the California Public Utilities Commission in its proceeding to explore implementing an OBLR program for loan repayment:

Fundamental issues that go to the core of an OBR product include, addressing ... contractor training and certification quality assurance standards, dispute resolution processes for the different combinations of entities involved in an OBR loan, the application of consumer protection laws, etc.⁵⁸

To ensure that participants do not pay more than they save, the tariffed terms as well as agreements in the PAYS system have built-in consumer protections for tariffed transactions, such as a likelihood that upgrades will do what is promised, certified bona fides of installers, suspension of charges if upgrades fail and are not repaired, and so forth. Further, installers are not protected from their liabilities as third parties if they install PAYS upgrades. Some OBF and OBLR programs have one or another of these features but lack other essential features of PAYS.

To fulfill these promises, PAYS uses a Program Operator to be the gatekeeper for customers and assure good work quality from contractors. A utility can serve the role of a program operator itself or contract with a third-party to perform functions such as making sure the terms of the Participant Agreement meet the requirements, and that contractors are properly vetted. The Program Operator oversees the assessment process, the development of the Participant Agreement, the choice of contractors, and post-installation issues such as consequences if an upgrade fails to work as intended. As noted above, non-payment rates are as low or lower than rates of non-payment for customers whose homes have not been treated.

⁵⁷ In Georgia, the loan program allows customers to install solar hot water heating SEEA Table A-8.

⁵⁸ National Consumer Law Center Reply Comments on the Administrative Law Judge's Ruling Regarding Energy Efficiency Financing, Order Instituting Rulemaking to Examine the Commission's Post-2008 Energy Efficiency Policies, Programs, Evaluation, Measurement, and Verification, and Related Issues, California Public Utilities Commission, Rulemaking 09-11-014, February 2012, at p. 2. Available at https://www.nclc.org/images/pdf/energy_utility_telecom/on_bill_financing/r0911014_reply_comments_nclc_29_fe_b_2012_final.pdf. Last viewed February 5, 2020.

Do PAYS® tariffed charges create consumer debt or require utilities to adhere to consumer finance protection laws such as the Truth in Lending Act?

The federal Truth in Lending Act (TILA) and the implementing regulations, Regulation Z,⁵⁹ were enacted primarily to address customer confusion about financing proposals, including how to compare one offering to another. TILA defined the “annual percentage rate” as a defined calculation of the interest that would apply to a credit transaction and required disclosure of the Annual Percentage Rate (APR)⁶⁰ in offerings. TILA applies to credit transactions. Regulation Z, the federal regulation that implements TILA, defines credit transactions, in pertinent part:⁶¹

(c) Coverage.

- (1) In general, this part applies to each ... business that offers or extends credit, ... when four conditions are met:
 - (i) The credit is offered or extended to consumers;
 - (ii) The offering or extension of credit is done regularly;
 - (iii) The credit is subject to a finance charge or is payable by a written agreement in more than four installments; *and*
 - (iv) The credit is primarily for personal, family, or household purposes.

The core questions are whether a PAYS tariff describes a credit transaction, and whether the fact that the consumer benefits turns the transaction into credit extended “for personal, family household” uses.⁶²

PAYS is not a credit transaction; consumers do not incur debt

Regulation Z defines credit as “the right to defer payment of debt or to incur debt and defer its payment.”⁶³ From this, we can see that it is important to determine if the PAYS participant owes a debt to the utility on whose bill repayment is made. In other words, is the customer indebted to the utility to pay the cost it incurred to install the measures?

Utilities making investments using the PAYS tariffed on-bill system regularly make offers to their customers. Depending on the cost and useful life of the improvements, it is likely that the PAYS charge will stay on the bill for more than four months. These elements of the transaction have characteristics similar to those required to bring it under the TILA definition. From here, however, there are significant differences between PAYS and a credit transaction that take PAYS out of the definition of a credit transaction.

⁵⁹ The Truth in Lending Act was originally Title I of the Consumer Credit Protection Act, Pub. L. 90–321, 82 Stat. 146, enacted May 29, 1968, codified at 15 U.S.C. 1601 et seq. Regulation Z available at <https://www.fdic.gov/regulations/laws/rules/6500-3200.html#fdic65001026.1>

⁶⁰ Annual Percentage Rate is an interest rate calculated on a basis required so that all borrowers have a consistent measure of the interest they will be paying on their loans, despite differences in how the loans are packaged.

⁶¹ Large sections of TILA and Regulation Z deal with home buying and mortgage transactions, which do not cover PAYS.

⁶² There is a “public utility credit” exemption, Regulation Z, § 1026.3. As PAYS is not a credit transaction, it is not necessary to determine if this exemption applies.

⁶³ Regulation Z, § 1026.2(a)(14).

Most importantly, the participant does not owe a debt to the utility. A PAYS participant owes the monthly PAYS charge to the utility for installed upgrades so long as the participant is the customer at that location and the installed upgrades continue to function. The charge is calculated to enable the utility to recover the costs it incurs to install the upgrades. Pursuant to the tariff,⁶⁴ the obligation to pay is associated with services to the premises; it is not an obligation of any particular customer. If the customer leaves the premises, even if she moves to another premise where the participant becomes a customer of the same utility, that customer does not carry with her the obligation to make any further payments regarding that PAYS installation at their prior location. No “debt” becomes due. According to the essential elements of the tariff, the utility cannot sue to recover the remaining PAYS charges if the customer leaves before all of its costs are recovered through the service charges for the upgrade at that location. See Figure 1.

As a corollary, the transaction does not contemplate an extension of credit payable in more than four installments. The customer is only obliged to pay her monthly bill when rendered. The customer is not obligated to pay PAYS charges that have not been rendered as part of regular payment for electric service. If the measures cease to provide the sustainable resources for which utility made the investment, and cannot be repaired within the parameters of the program’s calculation of incremental costs, the PAYS charge is removed from the bill. Further, being a utility customer in one month does not commit a customer to continue as such the next month. If the customer leaves the premises, even to move to another location served by the same utility, their responsibility to continue making payments to cover the PAYS charge ceases.⁶⁵

In addition, PAYS investments are not made by utilities primarily for personal, family, or household purposes. They are authorized by statute or commissions in service of societal goals for the electric and gas industries. They are approved as vehicles to expand the uptake of energy efficiency measures, distributed energy resources, or other measures that are essential to reducing greenhouse gases, ensuring least cost supply, or otherwise accomplish the goals of widespread efficiency and resource sustainability.

Courts may assert jurisdiction to protect utilities or consumers, though no known cases have involved PAYS

Defining PAYS as a tariffed service has been cited as a reason that Commission rules on protecting utility consumers should be applied to PAYS transactions, rather than consumer finance protections that apply to consumer credit transactions. As noted above, the New Hampshire Supreme Court set out the basic premise: a tariff duly approved by the Commission has “the force and effect of law.”⁶⁶

⁶⁴ See, e.g. *Haverhill Gas Co. v. Findlen*, 357 Mass. 417, 258 N.E.2d 294 (1970) (requiring gas company to charge rates established by law).

⁶⁵ The continuing cost recovery is handled by PAYS programs in ways that anticipate contingencies. If the next customer is notified that the premises are PAYS-treated and subject to a PAYS tariff, the monthly PAYS charges automatically apply to the bill for services for that location. If the premises become vacant with PAYS charges remaining and the meter is shut off, the utility must defer billing until the meter is turned back on. However, the utility may extend the cost recovery period to recover unbilled charges. Any receivables due that are uncollectable are treated the same as all other receivables that are uncollectible for other services delivered by the utility, or they are reimbursed by a reserve fund if one is available.

⁶⁶ *Appeal of Pennichuck Water Works*, 120 N.H. 562, 566 (1980).

Courts in different states have considered whether their application of otherwise-applicable consumer protection laws should take precedence over rulings of regulatory commissions. It is difficult to follow a clear thread of logic among these cases, sometimes even within a particular state.⁶⁷ The most probable application of consumer protections undertaken by courts, rather than defer to Commission rulings, is the area of unfair or deceptive acts and practices (UDAP). UDAP cases typically involve a showing of fraud in the market and sales, or fraud in the description of the contract, or other bad faith action.

There appear to have been no cases in which a utility or program operator using the PAYS system has been sued for unfair or deceptive acts and practices related to its use.

In restructured states, can an energy supplier initiate PAYS upgrades with tariffed on-bill payments binding on a distribution utility and a location, even after the energy supplier no longer provides service to that location?

Regulatory approval of PAYS in a restructured state is possible but may need legislation

This question asks if a competitive energy supplier in a restructured state can bundle energy supply and PAYS tariffed service to provide an offer to prospective customers that might be more attractive than default service or the supply-only offerings of competitors.

In order to answer this, it will be useful first to review some detail on the implementation of PAYS and which entity may perform which aspect of the transaction.

Core functions of the program are carried out by a Program Operator that acts as a gatekeeper for access to the tariff. The Program Operator vets proposed projects, makes the program offer, and executes the resulting Participant Agreement. PAYS assigns these responsibilities to a gatekeeper that is accountable to the utility in order to prevent conflicts of interest and assure fidelity to the program essentials. The Participant Agreement sets out what upgrades will be done, what the monthly on-bill charge will be, and other fundamental terms.

The transaction begins with the consumer learning about the availability of a PAYS option for accessing cost effective upgrades without an upfront cost. The customer may learn about it through marketing channels or by referral from a call with a customer service agent. If interested in signing up, the customer is referred to the Program Operator, which affirms the customer is eligible for an assessment at the site that would identify upgrades that would be cost effective even with an immediate net savings stream reserved for the customer. The Program Operator qualifies the upgrades that are cost effective in the assessment and calculates the associated tariff for cost recovery. The Program Operator arranges for a Contractor that is trained, bonded, licensed (if required), and has signed the Contractor Agreement, to install the upgrades.

⁶⁷ For a useful summary of the cases, see *Access to Utility Services*, National Consumer Law Center, Section 1.3.5 - Dispute Resolution.

Note, the Contractor cannot be the gatekeeper. This provision to separate the roles prevents self-dealing and conflicts of interest between the entity that verifies the suitability of the upgrades for PAYS treatment and the entity that is paid to install the upgrades.

Other core functions include applying a tariffed service charge for a non-bypassable bill assigned to the location. This tariffed service charge is the means by which the costs of the project and program are recovered from the Participant and successor customers. If not enforced by a distribution utility with the ability to disconnect for non-payment of cost recovery charges, regulatory complications would arise. Even in Texas, where competitive suppliers perform billing and collection functions and are designated providers of last resort for customers unable to get supply in the market, only distribution utilities have the authority to completely disconnect a customer.

Using the distribution utility as the Program Operator risks putting the success of the program in the hands of an entity that may have little incentive to develop the energy efficiency and distributed energy resources that generate value streams for both participants and energy suppliers. Even with decoupling, distribution utilities may not be positively incented to make the program work if the utility management team perceives that they would have to raise rates to cover fixed costs lost in reduced revenues associated with savings.⁶⁸

If having the distribution utility be the Program Operator is considered suboptimal, and the intention is to narrow the distribution utility's role to ministerial tasks, another entity must be chosen to be the Program Operator. One option in a restructured state is a competitive supplier, which may wish to perform this function directly. Another option may be a state-created entity operating the program for all utilities. There are pluses and minuses with each from a programmatic perspective. From a regulatory perspective, it should be possible to construct either structure to fulfill PAYS requirements. In either scenario, it is likely that legislation would be needed to clarify roles and obligations in restructured states.

Do the structures of the ownership of on-site solar upgrades and the money flows with a solar vendor change the applicability of PAYS[®] for an upgrade?

Leases and PPAs directly with residential customers are not compatible with PAYS

The structures of the ownership of the on-site solar upgrades and the money flows (i.e., utility purchase, services agreement, or third-party lease)⁶⁹ with a solar vendor do change the applicability of PAYS for the upgrade. There are two kinds of third-party ownership (TPO)

⁶⁸ Consider New Hampshire where PSNH (now Eversource) maintains the longest-lasting PAYS program by any utility. The tariff has only been marketed to municipal customers. While quite successful with this group of customers, the offer has not been extended to any other customer groups.

⁶⁹ Utility purchase has been the typical mechanism used for PAYS to date. A services agreement is sometimes called a Power Purchase Agreement (PPA) and will be referred to in that way. There are two kinds of third-party leases, operating and finance (formerly "capital"). The term "solar lease" has been used for each of the lease types, although they are quite different. The terms are defined below.

arrangements that have been commonly used by residential customers to use to acquire solar upgrades: the solar operating lease, and Power Purchase Agreements (PPAs). In both cases, for a residential on-site solar installation the contract is made with the homeowner.⁷⁰

Third Party Ownership (TPO) structures, mainly leases and power purchase agreements (PPAs) ... dominated the solar PV market since 2008. This is the result of a TPO's ability to stretch high up front cost for PV systems into affordable monthly payments; monetize the Investment Tax Credit (ITC); and access larger federal tax benefits and transfer some of those benefits to host owners.⁷¹

Another common TPO structure is the finance lease, whereby customers can obtain financing to buy their solar array from a variety of sources.⁷² A finance lease operates essentially like a sale to the homeowner that is paid off by lease payments instead of mortgage payments. As with a mortgage-financed purchase, the customer is the "owner" of the system during the lease term. Loans, including finance leases, outperformed third-party ownership in the first half of 2018.⁷³

Capital Leases ... are the most common type of agreement for leasing energy efficient equipment. Lessees in a capital lease may benefit from any tax advantages of ownership (e.g., depreciation deductions and any available tax credits)...⁷⁴

An operating lease is different from a finance lease. In a finance lease, the lessee owns the upgrade. In an operating lease, the lessor owns the upgrade. For an on-site solar project using an operating lease, the lessee/homeowner makes lease payments to the lessor to be able to use the output of the panels installed at that site. A PPA is similar to an operating lease in that the provider of the solar panels retains ownership of those assets. Under a PPA, however, the solar provider sells the power from the panels to the homeowner under terms of the contract.⁷⁵

⁷⁰ The EPA has a short comment that a customer leasing the premises and paying the electricity bill may theoretically enter into a PPA: "The host property can be either owned or leased (note that for leased properties, solar financing works best for customers that have a long-term lease)." Solar Power Purchase Agreements, Available at <https://www.epa.gov/greenpower/solar-power-purchase-agreements> last viewed March 11, 2020. However, residential PPAs are entered into with homeowners.

⁷¹ Levantis et al, Current Practices in Efficiency Financing: An Overview for State and Local Governments, BNL-1006406, November 2016, at p. 29.

⁷² In some instances, a capital lease may be referred to as a finance lease, as it is in Accounting Standards Codification Topic 842 (ASC 842) published by the Financial Accounting Standards Board and the International Financial Reporting Standard issued in January 2016 (IFRS 16) that became effective in 2019.

⁷³ Julia Pyper, Solar Loans Emerge as the Dominant Residential Financing Product, November 14, 2018. Available at <https://www.greentechmedia.com/articles/read/solar-loans-are-now-the-dominant-financing-product> Last viewed January 26, 2020.

⁷⁴ Levantis et al, Current Practices in Efficiency Financing: An Overview for State and Local Governments, BNL-1006406, November 2016, at p. 29. There are a number of potential financial benefits available to reduce the cost of solar installations. They include the federal investment tax credit for solar, state tax credits, utility cash rebates, solar renewable energy certificates (SRECs), performance-based incentives (PBIs), subsidized loans, and property tax exemptions. Aside from the federal ITC, the availability of these incentives is governed by state laws, which vary. Energy Sage, Find Out What Solar Costs in Your Area in 2020, available at <https://www.energysage.com/solar/cost-benefit/solar-incentives-and-rebates/> last viewed March 11, 2020. Net Energy Metering can be another source of income for the owner of a solar array, depending on the state. There is an ongoing debate about the proper scope of the benefit. Compare, e.g. Mark Muro and Devashree Saha, Rooftop solar: net metering is a net benefit, <https://www.brookings.edu/research/rooftop-solar-net-metering-is-a-net-benefit/> and Lisa Wood, Why Net Energy Metering Results in a Subsidy, <https://www.brookings.edu/opinions/why-net-energy-metering-results-in-a-subsidy-the-elephant-in-the-room/> last viewed March 11, 2020.

⁷⁵ PPAs are not available in all states, largely because of restrictions on competitive sales of electricity to end users. <https://www.ncsl.org/research/energy/solar-policy-toolbox.aspx>

Each of these three alternatives—PPA, operating lease, and finance lease—has elements that make it incompatible with PAYS if the terms are applied directly to residential customers. Key features of PAYS are assessed in Figure 3 and discussed in more detail later.

Figure 3:
PAYS® Essential Elements of Program Requirements

PAYS® Essential Elements or Program Requirements	Utility Ownership	PPA	Operating Lease	Finance Lease
A.1. A tariffed charge assigned to a location, not to an individual customer Upgrades may not entail new debt or require similar accounting treatment	1	3	3	3
A.1. A tariffed charge assigned to a location, not to an individual customer Charge is automatically binding on successor customers at location	1	3	3	3
B.1 The offer to the customer will not be burdened with customer risk If upgrade fails and cannot be repaired, charges end	1	3	3	3
B.1 The offer to the customer will not be burdened with customer risk Repossession not allowed for nonpayment (disconnection for nonpayment is only recourse)	1	2	2	2
A.3 ...savings estimates exceed payments in both the near and long terms Charges suspended during vacancy or repairs	1	3	3	3
A.3 ...savings estimates exceed payments in both the near and long terms Charge amount cannot be reduced assuming customer obtains ITC, rebates, or state incentives	1	3	3	3
A.3 ...savings estimates exceed payments in both the near and long terms No end-of-lease or ownership transfer payments	1	2	3	1
A.3 ...savings estimates exceed payments in both the near and long terms Significant Immediate savings/no upfront cost	1	2	2	2

LEGEND:

- 1: The structure accommodates this PAYS feature, or can be adjusted to include the feature.
- 2: The structure may theoretically be adaptable to accommodate PAYS feature, but it is not certain.
- 3: The structure applied directly to a residential on-site solar customer cannot accommodate this PAYS feature.

In the color-coded assessment of compatibility in Figure 3, each of the four TPO options considered has a blue or number 1 designation in every cell for which it is compatible with the PAYS offer. Yellow or number 2 indicates that the option could be made compatible. Orange or number 3 indicates that the option is inconsistent with PAYS. As Figure 3 shows, the utility form of ownership at the customer’s site can be consistent with each key PAYS feature,

All three structures can provide at least one of the listed PAYS features or might be adjusted to do so.⁷⁶ However, the inability to meet the other elements, or any one of them, renders the structure incompatible with PAYS when applied directly to a residential solar customer. PAYS is a system designed to address a number of different problems electric customers face in obtaining resource efficiency and solar benefits. The design has some unusual features, and all features have been crafted by its designers to work together to promote uptake of upgrades by customers unable to use traditional programs and loan programs.

A program lacking an element or substituting a different one will not be able to provide the same benefits and protections of PAYS, whatever other useful attribute it may have for some customers.

Among the options considered for a transaction directly with a residential customer seeking on-site solar, only the utility ownership structure now is able to achieve all the necessary elements of PAYS without adaptation. The lease and PPA options, when applied directly to a residential customer account, each have more than one area of incompatibility with PAYS. These arise in the following elements:

Tariffed charge assigned to location

A PAYS tariff defines the terms of service delivered to a *location* rather than a long-term financial liability undertaken by an *individual*. The distinction between the treatment of a location and an individual is important in a context in which the individual residing at a location can change over time. Under all the options considered, the period of time over which payment streams would need to span can exceed 15 years.⁷⁷

During the entire term of the finance lease, PPA or solar lease, the homeowner has a personal financial obligation to the solar provider or lessor.⁷⁸ The customer may not simply end the obligation by vacating the premises. At the end of a solar lease lenders commonly offer the option to extend the existing lease⁷⁹ or renew the existing lease terms.⁸⁰

⁷⁶ If a TPO misses one element, it is not relevant whether it can be adapted to meet other elements. Nonetheless, the chart shows elements that can theoretically be used with the TPO, even if not now incorporated. These elements are shown in yellow.

⁷⁷ Capital leases tend to be tied to the shorter time it takes the lessor to recoup its investment, as it has no continuing power or equipment obligations.

⁷⁸ According to Quicken Loans, a leading mortgage lender, whether such a transaction must be disclosed on a loan application depends on its particular terms:

If you're making a lease payment every month for your solar panels, this is generally included in your debt-to-income (DTI) ratio for mortgage qualification purposes. There are a couple of exceptions to this rule:

If the agreement guarantees a specific amount of energy over a given time frame and compensates the client if the solar panels failed to meet those goals, it can be excluded from DTI.

The lease or purchase power agreement can also be excluded from DTI if the client pays a rate based on usage of the property. This is treated like a utility.

Available at <https://www.quickenloans.com/blog/impact-solar-panels-mortgage> Last viewed March 22, 2020

⁷⁹ Id.

⁸⁰ <https://www.paradis solarenergy.com/blog/solar-financing-options-capital-leases-vs-operating-leases>

If a homeowner wishes to sell the house during the term of a PPA or lease, she must either (a) settle up with the solar vendor, (b) seek to transfer the contract to the next buyer, or (c) pay to remove the solar system and re-install it at their next house.⁸¹ Though practices may vary by company, a customer typically has the option to prepay all future payments due for the lease, presuming to recapture the value of the upgrade in proceeds from the home sale. Alternatively, most vendors allow a customer to arrange for the responsibility to be transferred to the buyer, assuming the buyer qualifies and is willing to undertake the obligation.⁸² Vendors' specific transfer terms differ, and without citing a specific firm, one article summarized terms found in the field that are particularly daunting for prospective buyers as follows:

(1) the home buyer has a FICO score of 650 or greater; (2) the home buyer is paying cash for your home; or (3) if the home buyer does not qualify under (1) or (2), if the home buyer qualifies for a mortgage to purchase your home and the home buyer pays us a \$250 credit exception fee.⁸³

In this case, the buyer must have very high credit, pay cash, or pay a fee to take over the contract. Wholesale Solar, a solar provider that advises customer to buy systems outright, cautions that a lease contract is not easily transferable if you decide to sell the house:

According to one large solar leasing company: "If you sell your home before the end of the lease, you can transfer the lease to the new owners if they qualify with excellent credit, or you can prepay the lease and add it to your home asking price." Qualifying" means a 700 or higher FICO score⁸⁴

By contrast, the tariffed terms of service apply to the billpayer at a location only during the period of time that they are taking service at that location. The tariffed terms automatically apply to the successor customer at that location. The attribute of a tariffed investment at a location facilitates participation by renters, rather than restricting eligibility to homeowners as do leases and PPAs. The feature of assigning tariffed service charges to a location enables tenants to obtain upgrades that their landlords may be interested in making but not if they are required to capitalize the equipment or take on a financial liability that is accounted for as debt, as would be a lease.

⁸¹ <http://www.freecleansolar.com/Solar-Lease-s/268.htm>

⁸² <https://www.solarunitedneighbors.org/wp-content/uploads/2018/02/Selling-a-solar-home-web-version.pdf>

⁸³ <https://www.greenbuildinglawupdate.com/2017/05/articles/solar-panel/selling-a-house-with-solar-panels-is-not-for-the-faint-of-heart/>

⁸⁴ Is A Solar Lease Worth It? Available at <https://www.wholesalesolar.com/solar-information/solar-leasing-option> last viewed February 7, 2020.

Upgrades may not entail new debt

Finance leases are also known as solar loans. PPAs and solar leases tend to be 15 years or more and can run as long as 25 years.⁸⁵ During the entire term of the PPA or solar lease, the homeowner has a financial obligation to the solar firm. PPAs and operating lease indebtedness follow the original customer.

Upgrades may not be repossessed for nonpayment

Some solar suppliers offering PPAs or leases file a form under the Uniform Commercial Code, a UCC-1 form, with the registry of deeds. This filing attaches to the property deed and acknowledges that the upgrade is the property of the supplier. As explained by Solar United Neighbors:

Properties with solar arrays owned by third parties (i.e. your PPA or lease provider) often have something called a “UCC-1 Fixture Filing” associated with them in the real estate records. The statement is a notice of the third-party owner’s rights to the system if the homeowner defaults on the contract. The third-party owner’s right to file this statement is disclosed within the terms of the lease or PPA, so it’s important to read your contract carefully.⁸⁶

Charges suspended for repairs or during vacancy

With PPAs, the customer does not pay if the system is not functioning. However, with leases, the obligation to pay the lease will continue, unless the customer makes an agreement for this purpose with the lessor. The customer’s obligation to make lease or PPA payments does not end if the residence becomes vacant with no energy services being used (i.e., inactive meter).

Program Services Charge must be fixed amount

For a finance lease, the lease payment is fixed, and the tax benefit is excluded from the calculation of the charge because that benefit is assigned to the lessee, who may or may not have sufficient income to absorb the full value of the credit.

Operating lease and PPA charges tend to have price escalators. As stated by Sunrun, “Leases and PPAs often have an annual rate increase of around three percent per year built into the agreement.”⁸⁷ While it is possible in some cases to estimate the charges for out-years, the customer does not necessarily know what the out-year charges will be, and in any case they will be different from the initial payment.

⁸⁵ Capital leases tend to be tied to the shorter time it takes the lessor to recoup its investment, as it has no continuing power or equipment obligations.

⁸⁶ Solar United Neighbors, Selling Your Solar Home. Available at <https://www.solarunitedneighbors.org/sellingsolarhomes/> Last viewed March 11, 2020.

⁸⁷ Understanding your Sunrun solar lease, PPA and solar contract agreement. Available at <https://news.energysage.com/sunrun-solar-lease-ppa-solar-contract-agreement/>. Last viewed January 27, 2020

No end-of-lease or ownership transfer payments

Under the terms of an operating lease or a PPA, a customer does not own the upgrade at any point during the lease. During the term of the lease or PPA, if the homeowner wishes to sell the house and the buyer is willing to take on the balance of the obligation, the seller or buyer may have to make a transfer payment.

At the end of the term for an operating lease or a PPA, the customer usually has the opportunity to buy the upgrade for a price that is determined by the fair market value as of that time. It is possible to estimate in advance what that is likely to be, but not certain.

For all four types of TPO financing for on-site solar in the prior question, which entity owns the upgrade during cost recovery?

Based on the terms of specific PAYS programs, the utility owns energy efficiency upgrade equipment for the duration of cost recovery after which time it is transferred to the location owner.⁸⁸

With a finance lease, the homeowner has rights of ownership similar to those of a mortgage borrower. In accounting, for a finance lease, “the lessee records the leased asset as if he or she purchased the leased asset using funding provided by the lessor.”⁸⁹

Under a PPA, the vendor owns the equipment and sells the customer the output.⁹⁰

Under an operating lease, the lessor owns the solar equipment and leases the equipment for the use of the customer.

How must PAYS® investments be booked?

There are a number of accounting requirements that utilities and others who implement PAYS must follow. For ratemaking purposes, they tend to be based on the Uniform System of Accounts (USoA), prescribed by the Federal Energy Regulatory Commission (FERC) for utilities under its jurisdiction. These accounting rules in turn are similar the Generally Accepted Accounting Principles (GAAP), developed by the Financial Accounting Standards Board, and adopted by the Securities and Exchange Commission (SEC) for publicly-traded companies.⁹¹

⁸⁸ The utility is not bound to obtain the equipment solely by purchase. It is theoretically possible that the utility could lease the upgrade from a third party and make it available to the customer via a PAYS tariff. If viable, this structure could expand the applicability solar leases.

⁸⁹ Capital Lease Accounting and Finance Lease Accounting: A Full Example. Available at <https://leasequery.com/blog/capital-lease-accounting-finance-lease-accounting-example/#finance-vs-capital> Last viewed March 10, 2020.

⁹⁰ See, <https://www.ferc.gov/enforcement/acct-matts.asp> and associated links.

⁹¹ Difference between GAAP Accounting and Tax Accounting. Available at <http://infomory.com/business/difference-gaap-accounting-tax-accounting/>. Last viewed March 12, 2020. The SEC worked for years to reconcile United States accounting standards with the International Financial Reporting

Cooperatives, which receive funding assistance from the United States Rural Utility Service (RUS), must follow the accounting rules set out in the Code of Federal Regulations at 7 CFR § 1767.41.

In a guide published for its members, the American Public Power Association⁹² explained that RUS accounting is also similar to the FERC USoA.

Rural electric cooperatives are required to maintain their accounting records in accordance with the Rural Utility Services (RUS) Uniform System of Accounts, which is similar to that required by the FERC. In fact, except for specific instances in which RUS prescribes other accounting, any changes in the FERC Uniform System of Accounts are considered changes in the RUS system.⁹³

The FERC USoA is also the template for state commission accounting rules, which apply to utilities subject to state regulation (in some cases cooperatives and public power, and in all states but Nebraska, investor-owned utilities):

For regulated utilities, the FERC Uniform System of Accounts or the similar. National Association of Regulatory Utility Commissioners' (NARUC) Uniform System of Accounts have been adopted in virtually every state with minor exceptions necessary to *meet* particular state requirements.⁹⁴

The Internal Revenue Service (IRS) allows accounting similar to that prescribed in GAAP and the USOA, but also allows other systems. Specifically, tax accounting may use the accrual, cash basis or modified basis of accounting. For small businesses, the cost of using and developing GAAP can be very high. For this reason, the IRS allows smaller companies to use alternative methods to account for their business transactions.⁹⁵

There are some important and relevant differences between utility regulatory accounting and other accounting requirements. Regulators can and do order utilities to book certain costs or revenues in a particular way, different from that required by GAAP. The RUS describes this phenomenon as follows:

Regulatory Assets and Liabilities are assets and liabilities that result from rate actions of regulatory agencies. Regulatory assets and liabilities arise from specific revenues, expenses, gains, or losses that would have been included in net income determinations in one period under the general requirements of the Uniform System of Accounts but for it

Standards (IFRS) promulgated by the International Accounting Standards Board. In 2017, the SEC drew back from the pursuit of merged standards. [Public Statement](#)

⁹² APPA is a trade group representing publicly owned utilities, such as municipal electric departments.

⁹³ American Public Power Association, A Public Power System's Introduction to the Federal Energy Regulatory Commission Uniform System of Accounts (2012) at p. 4, Available at <https://www.publicpower.org/system/files/documents/Public%20Utility%20Accounting%20Manual%202018.pdf>. Last viewed March 5, 2020.

⁹⁴ Id. Emphasis in original.

⁹⁵ Difference between GAAP Accounting and Tax Accounting, available at <http://infomory.com/business/difference-gaap-accounting-tax-accounting/>. Emphasis in original. GAAP contains rules for how such differences are to be treated for SEC financial disclosure.

being probable: (1) That such items will be included in a different period(s) for purposes of developing the rates the utility is authorized to charge for its utility services; or (2) In the case of regulatory liabilities, that refunds to customers, not provided for in the other accounts, will be required.⁹⁶

Historically, as noted above, utilities made investments on the supply side of the meter, and not on the customer side. The USoA and related accounting systems was set up to provide transparent and comparable accounting for different activities by the utility in supplying power. With the advent of EE and DER, commissions have had to fashion means to account for spending behind the meter. Different states have used different approaches. They mostly differ in terms of the speed of cost recovery, whether the utility is allowed to recover the time value of the money, and treatments of rates of return.

There is thus an array of possible ways to treat behind-the-meter costs for ratemaking accounting. Regulators have been experimenting with different cost-recovery devices over the years, so that utility expenditures behind-the-meter have correct incentives for the utility to meet policy goals. Here are three options among the possibilities:

1. Allow a utility to put the behind-the-meter costs into the rate base on which profits (or return) are calculated. The amounts in rate base are then written off via amortization⁹⁷ over some period, usually associated with the useful life of the upgrade. To make this treatment the same as the treatment of capital investments on the utility side of the meter, these states apply the same return on investment to the unamortized balance as they do to the undepreciated balance of utility-side investments.
2. Put all the costs into a regulatory account, and specify how these amounts will be turned into expenses for ratemaking. The commission may allow the collected costs in the account to be amortized over a certain period of time. If the regulator specifies that the utility is to get a return on the unamortized balance, the effect on rates is the same as if the costs were put into rate base. Otherwise, the utility loses the time value of the money.
3. Allow utilities to expense all behind-the-meter costs in the year spent. This may accelerate cost recovery, but does not provide a return on the behind-the-meter investment. This is common treatment for energy efficiency program expenditures.

If the entity that capitalizes a PAYS transaction is not the utility, the accounting treatment will be governed by GAAP and associated tax accounting. For example, in our example, the developer in the case of a Purchased Power Agreement or operating lease retains ownership and control of the solar upgrade.

Recently, GAAP was amended so that most solar leases are characterized not as operating leases, but as finance leases:

⁹⁶ 7 CFR §1767.10.

⁹⁷ Utility behind-the-meter costs usually are not eligible for depreciation, but amortization provides the same cost recovery.

In February 2016, after working with the IASB on a joint leases project for almost a decade, the FASB finally issued its new standard on accounting for leases, ASU 2016-02.1 The leases project's primary objective was to address the off-balance-sheet financing concerns related to lessees' operating leases. Accordingly, the FASB's new standard introduces a lessee model that brings most leases onto the [lessee's] balance sheet.⁹⁸

As residential customers do not maintain balance sheets and income statements, the changes in ASU 2016-02.1 will not affect residential customers directly.⁹⁹ To the extent the lessor wishes to account for the transaction as an operating lease, the new standard sets out a list of restrictive requirements, as a result of which most leases are characterized as finance leases.

CONCLUSION

PAYS has been used successfully for two decades by utilities in expanding the access of residential customers to energy efficiency and solar water heating upgrades. Regulators have used a variety of sources of regulatory authority to approve PAYS tariffs. Occasionally intervenors have raised questions about consumer protections in the PAYS system. The system has features that have addressed these concerns to the satisfaction of regulators and governing boards in those proceedings.

Loan programs offered by utilities as On-Bill Financing and On-Bill Loan Repayment are distinctly different from PAYS, which facilitates site-specific utility investments in upgrades with cost recovery on the bill for services at that location.

PAYS does not create consumer debt. For this reason, PAYS transactions are not covered by the Truth in Lending Act and other statutes that apply to transactions that create indebtedness.

The PAYS system has unique features that were developed specifically to enable customers to overcome market barriers that remain despite incentives and processes available in traditional utility programs. Because these features are necessary to overcome those market barriers, they must be present in residential solar financing systems in order to achieve the same results as PAYS energy efficiency programs. Financing systems such as on-bill-financing with loans, operating leases, and purchased power agreements lack a number of these features. As a result, they cannot be adapted to serve as vehicles for PAYS transactions applied directly to residential customers seeking on-site solar systems.

PAYS has been offered by investor-owned, municipal, and cooperative utilities. A Program Operator is a vital component of the system, and the utility can either perform those functions internally or hire a third-party entity to run the program as the Program Operator.

⁹⁸ Deloitte Power and Utilities Accounting, Financial Reporting, and Tax Research Guide, July 2018, at p. 155. Available at <https://www2.deloitte.com/us/en/pages/energy-and-resources/articles/power-and-utilities-accounting-financial-reporting-and-tax-update.html>. Last viewed March 12, 2020.

⁹⁹ Lenders may require information about solar lease or PPA commitments in loan applications. See footnote 81 above.

One way that PAYS could be offered to all residential customers in a state with retail choice would be through a statewide program operator, though this would need to be explored further in the context of a specific restructured market.

The research questions posed for this memo led to lines of inquiry across an expansive territory of field knowledge to seek answers supported with precedents and evidence. The answers provided may lead to more areas of exploration aided by this background research.

TABLE OF AUTHORITIES FOR APPROVED PAYS[®] PROGRAMS

March 2020

Prepared by Nancy Brockway

State	Utility	Name of Program	State PSC Regulated?	Source of Legal Authority
Arkansas	Ouachita Electric Coop.	PAYS [®]	Yes	Statute declaring energy conservation as a utility function; Commission decision ⁱ
California ⁱⁱ	City of Hayward, municipal water utility	Green Hayward PAYS [®]	No but may partner with regulated utility if CPUC approves	Constitution enabling local government utilities to provide utility services, organic statutes, ⁱⁱⁱ Water Bill Savings Act and Water-Energy Nexus PUC decisions, ^{iv} miscellaneous. ^v
	East Bay Municipal Utility District.	WaterSmart Pilot		Same
	Town of Windsor Water Utility	Windsor Efficiency PAYS [®]		Same Begun 2012. Presently suspended for redesign.
	Association of Bay Area Governments, Bay Area Regional Energy Network, and municipal water utilities	Water Bill Savings Program		Water Bill Savings Act (see Note iv) Presently being designed.
Hawaii	Hawaiian Electric Co., Hawaii Electric Light Co., Maui Electric Co.	SolarSaver pilot 2006-2007	Yes	Act 240 Session Laws of Hawaii 20-06, Part IV ^{vi} Hawaii PUC approval ^{vii}
Hawaii	All IOUs	n/a	Yes	Act 204 Session Laws of Hawaii 2011.
Kentucky	Grayson Rural Electric Co-Operative Corporation, Big Sandy Rural Electric Co-Operative Corporation, and Fleming-Mason Energy Co-Operative, Inc.	How\$mart sm Kentucky	Yes	Commission decisions ^{viii}

Kansas	MidWest Energy (cooperative)	How\$mart sm	Yes (later self-regulated)	Commission decisions, ^{ix} commission organic statutes giving general supervisory authority to Commission; ^x pending session law supporting utility cost recovery. ^{xi}
New Hampshire	Public Service of New Hampshire [Eversource] New Hampshire Electric Cooperative	\$mart\$art	Yes	Legislation authorizing restructuring with conditions for efficiency services, and associated Commission orders, ^{xii} Commission PAYS Orders. ^{xiii} RGGI legislation, ^{xiv} Commission orders approving Core Programs ^{xv}
New Hampshire	New Hampshire Electric Cooperative		Yes	[see above]
North Carolina	Roanoke Electric Coop	Upgrade to \$ave	No	Vote of Board of Directors
Tennessee	Appalachian Electrical Cooperative	Tariffed On-Bill Financing for Energy Efficiency Upgrades	Yes, by TVA	Contract with TVA Vote of Board of Directors

NOTES

ⁱ In the Matter of The Application of Ouachita Electric Cooperative Corporation Requesting Implementation of a New Energy Efficiency Program Designed To Individually Customize Energy Efficiency Measures, Arkansas Public Service Commission, Docket No. 15-106-TF, Order No. 2 (February 8, 2016). States that as PAYS is a tariffed service, customers are subject to the ordinary rules for non-payment and disconnection. Cites for reference Energy Conservation Endorsement Act of 1977 (Ark. Code Ann. § 23-3-401, et seq.), from which cooperatives are exempted, and the Commission’s exemption pursuant to the statute from its Rules for Conservation and Energy Efficiency Programs, per Order No. 12 in Docket No. 06-004-R, contingent on them filing annual reports on EE activities comparable to those of the investor-owned utilities.

ⁱⁱ Some references for key resources regarding California governmental agency programs were pointed out by lawyers for BayRen, in a memo to member utility water districts kindly provided by Colantuono, Highsmith, Whatley, PC.

ⁱⁱⁱ Constitution, Article XI Local Government (a) A municipal corporation may establish, purchase, and operate public works to furnish its inhabitants with light, water, power, heat, transportation, or means of communication. It may furnish those services outside its

boundaries, except within another municipal corporation which furnishes the same service and does not consent. (b) Persons or corporations may establish and operate works for supplying those services upon conditions and under regulations that the city may prescribe under its organic law. Sec. 9 added June 2, 1970, by Prop. 2. Res.Ch. 331, 1969.)

^{iv} Water Bill Savings Act (Ca. Gov. Code § 6588.8 Added by Stats 2017 ch 430 (SB 564), s 5, eff. 1/1/2018.) (authorizes government water utilities PAYS programs) For links to CPUC action on Water-Utility Nexus, see, e.g. Order Instituting Rulemaking to Examine the Commission's Post-2008 Energy Efficiency Policies, Programs, Evaluation, Measurement, and Verification, and Related Issues, CPUC Docket R.09-11-014, Decision 12-05-015 (May 10, 2012), at pp. 306- 313.

^v Special water districts have authority under their authorizing statutes.

Under Public Utilities Code section 181001, special authorities established to mitigate climate change, such as Sonoma County Regional Climate Protection Authority, are governed by their board of directors.

Joint Exercise of Powers Act (Gov. Code §§ 6500 et seq.) allows a financing program administrator to offer a "services rendered" financing program to municipal utilities pursuant to its authority to enter into a Master Services Agreement with partner utilities and customer-specific contracts on behalf of the Partner Utilities.

^{vi} Act 240, Session Laws of 2006. Hawaii's Solar Water Heating Pay As You Save Program. The Act authorizes the Commission to implement Hawaii's Solar Water Heating Pay As You Save Program. Under Section 13, the Act provides that the program will:

- (1) Allow a residential electric utility customer to purchase a solar water heating system: With no upfront payments; and By paying the cost of the system over time on the customer's electricity bill; provided that the estimated life cycle electricity savings from the solar water heating system exceeds the cost of the system;
- (2) Provide for billing and payment of the solar water heating system on the utility bill;
- (3) Provide for disconnection of utility service for non-payment of solar water heating system pay as you save payments; and
- (4) Allow for assignment of system repayment costs attached to the meter location

HRS §269-125 directs the commission to investigate an on-bill financing program for residential electric utility customers and authorizes the commission to implement the program by decision and order or by rules if the on-bill financing program is found to be viable. HRS § 269-125 specifically refers to an on-bill program "that would allow an electric utility customer to purchase or otherwise

acquire a renewable energy system or energy efficient device. Act 204 refers to an on-bill program that allows the financing of renewable energy or energy efficiency.

vii In the Matter of Public Utilities Commission Instituting a Proceeding to Investigate the Issues Raised By and Contained in Hawaii Solar Water Heating Pay As You Save Program, Act 240, Session Laws of 2006, Docket 2006-0425, Order No. 22974 (October 24, 2006)(instituting proceeding); Order No. 23531 (June 29, 2007) (approved, with the modifications described in this Decision and Order, the HECO Companies' proposed tariffs, including specifics regarding data collection during the pilot; allowed pilot focus on customer owners; dealt with start-up costs; making no decision on suggestion that utility becomes lender under a PAYS program; approved the disconnection for non-payment of PAYS charges; addressed budget and evaluation issues; determined PAYS charges assigned to a meter continue per the installation even if pilot is terminated before they are finished; provided that the electric utilities, as a condition to program participation, require participants to consent and agree to the recordation of the SWH Financing Program agreements with program participants, or a notice of such agreements in the appropriate land and title records in the Bureau of Conveyances of the State of Hawaii.

In the Matter of Public Utilities Commission Instituting a Proceeding to Investigate the Implementation of On-Bill Financing. Docket No. 2011-0186, Decision and Order No. 30974 (February 1, 2013). Commission among other things (1) determined that an on-bill financing program for all electric utility customers in the State of Hawaii can be viable, contingent upon the details of the program design; (2) specified parameters of program components necessary for a viable on-bill financing program; and (3) established informal ongoing processes of on-bill program development, directing the on-bill financing working group to continue discussions and development of an on-bill program including the development of a tariff for such a program. The working group will identify and address potential issues in the creation and administration of an on-bill financing program, and make recommendations for detailed program design, operating procedures, program evaluation, measurement, and the integration into the Energy Efficiency Portfolio Standards Program. Program design decisions in the Order itself include: (a) limit the eligible participants to those on residential and small business tariffs, (b) all permanently installed measures that meet the requirements set forth for bill neutrality should be eligible measures for the State's on-bill financing program, (c) only permanently installed measures that cannot be removed from the property can be installed to assure measures remain on the premises between successive occupants of a property, (d) participants that wish to avail themselves of on-bill financing for the use of renewable energy generating devices must participate in available and forthcoming demand response programs and ancillary service programs, (e) any on-bill financing program should be structured as a service and tariff-based program, rather than a loan-based program, (f) measures must provide bill neutrality at most expensive for customer, (g) procedures for non-payment should follow commission-approved procedures for utility tariff non-payment including shut off and *pari passu* distribution of partial payments is appropriate; (h) as the issue of ownership will, by necessity, be unresolved until there are clear program details, particularly with the financing administrator and sources of capital, in the meantime, program development

recommendations offered by the working group should be structured to ensure that owners/tax entities are able in some way to pass through a substantial portion of the savings to customers and that tax incentives available for eligible measures are maximized. (i) requests the on-bill financing working group to focus on the development of a scalable program that starts with all of the program components in the Order and has the capability to expand to a larger market, should it be successful and cost-effective.

^{viii} In the Matter of the Joint Application of Big Sandy Rural Electric Cooperative Corporation, Fleming-Mason Electric Cooperative, Inc., Grayson Rural Electric Cooperative Corporation, and Jackson Electric Cooperative, for an Order Approving an On-Bill Financing Pilot Program Titled the “KY Energy Retrofit Rider” Case No. 2010-00089 (Ky. PSC Dec. 16, 2010) (pilot approved) (no reference to enabling legislation). In the Matter of the Joint Application of Big Sandy Rural Electric Cooperative Corporation, Fleming-Mason Electric Cooperative, Inc., and Grayson Rural Electric Cooperative Corporation, for an Order Approving KY Energy Retrofit Permanent Tariff, Case No. 2012-00484 (Ky. PSC November 19, 2012) (permanent tariff approved) (no reference to enabling legislation).

^{ix} In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Natural Gas Service, and In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Electric Service, Kansas State Corporation Commission, Docket Nos. 07-MDWG-784-TAR, 07-MDWE-788-TAR, Order Approving Stipulation (August 16, 2007); In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Natural Gas Service, and In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Electric Service, Kansas State Corporation Commission, Order on Reconsideration (December 20, 2007).

^x In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Natural Gas Service, In the Matter of Midwest Energy Seeking Commission Approval to Implement a Pay-As-You-Save Program for its Electric Service, Kansas State Corporation Commission, Docket Nos. 07-MDWG-784-TAR, 07-MDWE-788-TAR.

“...Commission's general authority permits approval of How\$martsm Program as a tariffed Service. The Commission is granted broad authority to supervise and control the electric and natural gas public utilities under its jurisdiction. K.S.A 66-101; K.S.A. 66-1,201. It is also empowered ‘to do all things necessary and convenient for the exercise of such power, authority and jurisdiction.’ K.S.A. 66-101g and K.S.A. 66-1,207. Further, grants of power, authority, and jurisdiction made to the Commission are to be liberally construed, and confer on the Commission all incidental powers necessary to effectuate provisions of Kansas public utility law. K.S.A. 66-101g and K.S.A. 66-1,207. This authority has been exercised frequently in the area of energy efficiency and conservation. An example is

the Commission's approval of Kansas City Power and Light's energy efficiency tariff docket.” Citing Dockets No. 06-KCPE-497-TAR; 06-KCPE- 1232-TAR; and 07-KCPE-683-MIS, Order Approving Stipulation at p. 6.

“The Commission has always had the authority to include energy conservation measures in tariffs and has done so on numerous occasions. In recent past, the Kansas Legislature has adopted various legislation encouraging energy efficiency and conservation. K.S.A. 66-117(e) specifically authorizes a premium on return for utility projects that promote energy efficiency or conservation.” Id., at p. 10. The Commission held that its authority to include energy efficiency approve energy efficiency programs in tariffs “also provides a basis for the Commission's decision to approve How\$martsm as a tariffed service and to approve disconnection for nonpayment.” Order on Reconsideration at p. 9.

^{xi} The Commission noted that “the 2007 Kansas Legislature adopted HB 2278. House Bill 2278 authorizes public utilities to enter into financing arrangements with customers and landlords of customers for the purchase and installation of energy conservation measures. L. 2007, ch. 58, § 1(a). Importantly, the Commission is given the authority to approve tariffs that will recover the utility's financing and program costs. Section 1(b). House Bill 2278 became effective on July 1, 2007.” Order Adopting Stipulation, at p. 10.

^{xii} RSA 374-F:3, X provides: “Restructuring should be designed to reduce market barriers to investments in energy efficiency and provide incentives for appropriate demand-side management and not reduce cost-effective customer conservation. Utility sponsored energy efficiency programs should target cost-effective opportunities that may otherwise be lost due to market barriers.”

Statewide Electric Utility Restructuring Plan pursuant to RSA 374-F.1, New Hampshire Public Utilities Commission (February 28, 1997). In the Plan, the Commission announced its intention to phase out ratepayer-subsidized conservation programs within two years of implementation of retail choice. Plan at p. 111.

Electric Utility Restructuring: Order on Requests for Rehearing, Reconsideration and Clarification, New Hampshire Public Utilities Commission, Docket No. DR 96-150, Order No. 22,875 (March 20, 1998), at p. 79:

“We recognize that the transition to market based programs may take longer than the two-year period we mandated in the Plan, though we continue to believe that such a transition period is an appropriate policy objective. We also recognize that there may be a place for utility sponsored energy efficiency programs beyond the transition period ... We believe that efforts during the transition toward market-based DSM programs should focus on creating an environment for energy efficiency programs and services that will survive without subsidies in the future.” Establishes working group to make recommendations on various related issues.

xiii Public Service Company of New Hampshire and New Hampshire Electric Cooperative, Inc. Pilot “Pay As You Save” (PAYS) Energy Efficiency Program, Docket DE-01-080, Order No. 23,851, approving a proposed “Pay As You Save” energy efficiency pilot program to be conducted by Public Service Company of New Hampshire and the New Hampshire Electric Cooperative (November 29, 2001).

Public Service Company of New Hampshire and New Hampshire Electric Cooperative, Inc. Pilot “Pay As You Save” (PAYS) Energy Efficiency Program, Docket DE-01-080, Order No. 24,064, Order of Clarification, New Hampshire Public Utilities Commission (October 11, 2002). The New Hampshire Department of Revenue Administration had advised municipalities that participation in the PAYS pilot would be inconsistent with RSA 33 unless their written PAYS agreements contained a “non-appropriation” clause, providing for the termination of the agreement in the event that adequate funds were not appropriated by the municipality in ensuing years of the agreement. The PUC approved the proposed agreement and form of clause.

Concord Electric Company, 87 NH PUC, Order No. 23,982 (2002) (authorizing implementation of CORE Programs, noting PAYS programs being run by PSNH and NHEC).

Granite State Electric Company, 88 NH PUC 624, 631, Order No. 24,248 (2003). (Noting the Commission’s goal of “synchronizing PAYS programs with the CORE Programs.)

Pay-As-You-Savetm Energy Efficiency Pilot Programs: Review of Current Programs, DE 04-052, Order Approving Continuation of the Programs, Order No. 24,417 (December 30, 2004) (Joint Utility Proposal approved with several small adjustments to SmartStart based on recommendations of program designer and other parties. Order noted with approval three key PAYSsm elements: a) a tariff that assigns repayment of permanent measure costs to the meter location; b) billing and payment through a charge on the distribution utility bill with disconnection for non-payment; and c) independent certification that products and installation are appropriate and that estimated savings will exceed payments.)

2010 Core Energy Efficiency Programs, Docket No. DE 09-170, Order Approving Revised 2010 Core Budgets, Order No. 25,099 (April 20, 2010). Utilities sought rebudgeting of their Core energy efficiency programs (called NHSaves, which included SmartStart for PSNH and NH Electric Cooperative) as a result of SB 300, effective January 14, 2014 (which transferred funds from the System Benefits Charge to the low-income Electric Assistance Program), Order Approving Revised 2010 Core Budgets, noted that PSNH’s 2010 budget for Core energy efficiency programs had declined as a result of SB 300. PSNH offset this reduction using other sources, including SmartStart (PAYSsm) transfers (\$994,487).

Re: 2018 NHSaves Energy Efficiency Programs - Docket No. DE 17-136 Eversource Smart Start Program, Docket DE 17- 136, Order 26,095 (January 2, 2018). By letter dated July 2, 2018, Eversource (successor owner of PSNH) advised the Commission that, pursuant to its Order 26,095, “Eversource intends to transfer \$300,000 from its Smart Start Program Bad Debt Reserve to the Loan Fund Balance.” Eversource stated that the SmartStart Bad Debt Reserve has not been utilized for an unpaid loan since program inception, and that in April of 2010, \$100,000 was transferred from the Bad Debt Reserve to the CORE programs.

^{xiv} RSA Chapter 125-0 set up a Energy Efficiency and Sustainable Energy Board to advise the Commission on programs and on the allocation of funds from a variety of sources, including the restructuring System Benefits Charge, sales of allowances under the Regional Greenhouse Gas Initiative, and the “energy efficiency resource standard.” The statute has been amended from time to time without eliminating the combination of funds. The most recent legislation on this issue continues the role of the Board and program funding. https://legiscan.com/NH/text/HB1496/id/2072782/New_Hampshire-2020-HB1496-Introduced.html

^{xv} See, Electric and Gas Utilities, Order No. 25,189, 95 NH PUC 677, 688 (2010) for a list of orders from 2001through 2009. See also, 2011-2012 Core Electric Energy Efficiency and Gas Efficiency Programs, Order No. 25,189, 95 NH PUC 677 (2010) and 2011-2012 Core Electric Programs and Natural Gas Energy Efficiency Programs, Order No. 25,315 (January 9, 2012).

***Applying the PAYS[®] System to On-Site Solar
to Expand Access for All***

Part 3

Limited Technical Review of Tax Structuring for PAYS[®] for On-site Solar

Ancillary Research supported by the US Department of Energy
EERE grant DE-EE0008567/0000, Accelerating Low Income Financing and Transactions
("LIFT") for Solar Access Everywhere

Submitted to Clean Energy Works

May 29, 2020

Prepared by NextResource Advisors

MEMORANDUM

FROM: NextResource Advisors
TO: Holmes Hummel, Clean Energy Works
RE: Limited Technical Review of Tax Structuring for PAYS[□] for On-site Solar
DATE: May 29, 2020

This memorandum documents the methodology and conclusions formed as part of NextResource Advisors' limited technical review of potential tax financing structures for Pay As You Save^{®1} (PAYS[®] marked herein as PAYS) with regard to residential solar electricity systems. The memo provides a background on residential solar and how systems are financed today outside the PAYS program. It introduces the PAYS program and outlines various PAYS financing structures for residential solar systems through which utility cooperatives or their third-party financiers can monetize tax credits. It then provides observations on the financing structures, raises questions for further consideration, provides initial conclusions, and proposes recommended activities to be undertaken during subsequent project phases. This memo does not constitute financial advice; it has been prepared for informational purposes only, and is not intended to provide, and should not be relied on for, tax, legal, or accounting advice.

ACKNOWLEDGEMENTS

This memo could not have been prepared without the helpful support and input of interviewees, reviewers, and key stakeholders, including Harlan Lachman from the Energy Efficiency Institute, Chris Nichols from Groundswell, Lisa Bianchi-Fossati, Andrea Pinabell, and Kevin Stam from the Southface Institute, Chris Bell and Justin McCann from Today's Power Inc, Gregory Starheim and Peter Muhoro from the National Rural Utilities Cooperative Finance Corporation, Kerry O'Neil and Chris Magalhaes from Inclusive Prosperity Capital, Stephen Tracy from Novogradac & Company, Luis Gutierrez and Doug Beebe from KeyBank Leasing, Zach Christie from Fifth Third Bank, and Dr. Holmes Hummel and Jenna Barron from Clean Energy Works.

AUTHOR QUALIFICATIONS

NextResource Advisors provides analysis and support for decision makers around renewable energy, infrastructure, and project finance challenges. Its partners bring significant relevant experience in tax-credit structuring for distributed solar energy systems.

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¹ Pay As You Save[®] and its acronym, PAYS[®], are trademarks awarded by the U.S. Patent and Trademark Office in 2005 and 2007, respectively, to the Energy Efficiency Institute (EEI) for a resource efficiency system defined by specific essential elements and minimum program requirements. EEI uses the trademarks in titles, section headings, and their first use in a report or document.

Prior to joining NextPower Capital, Ms. Chern was a Director in Tesla Energy's (formerly known as SolarCity) Financial Products and Structured Finance groups, where she was responsible for developing financial products, managing platform operations, and raising capital. She played a leading role in structuring and raising over \$1 billion in tax-equity and debt for distributed solar and battery storage installations.

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Prior to founding NextPower Capital, Mr. Cook was a Vice President in the Structured Finance & Global Markets groups at SolarCity (now Tesla Energy), where he was instrumental in creating its Structured Financing group which raised capital for over \$9 billion of its projects. Earlier in his career, Mr. Cook led the finance group at Recurrent Energy, a leading solar developer, and was a Director of Structured Finance at SunPower.

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Goals & Description of This Analysis

As part of the Solar LIFT project funded by the U.S. Department of Energy, Clean Energy Works retained NextResource Advisors to assist in its exploration of expanding the applicability of the PAYS system to include residential solar (“Solar PAYS”) for low- and moderate-income (“LMI”) utility customers and renters. Throughout the course of this engagement, the principals at NextResource Advisors (“Authors”) provided their experience and expertise with structuring tax-equity for residential solar portfolios to the PAYS system. The Authors produced this memorandum to document engagement goals, the proposed scope of work, and initial findings.

Engagement Goals

1. **Limited Technical Review:** Provide a limited technical review of the existing PAYS structure applied to residential solar. The Authors were asked to comment on the proposed PAYS structure, based on their experience with financing residential solar systems using structures involving third-party ownership by parties able to utilize tax credits and depreciation. (See *Author Qualifications* for further background on the Authors.)
2. **Recommend Next Steps:** Propose additional steps that could be useful in determining a minimum viable product for implementation. Recommendations may include:
 - a. Identification of additional stakeholders, such as industry consultants, investors, or utility participants, to solicit feedback in subsequent project phases and further refine initial findings; and
 - b. Identification of implementation hurdles and discussion around potential avenues for forward progress.

Description of Work Performed

For this study, the Authors reviewed existing PAYS materials, outlined potential transaction structures for Solar PAYS, gathered feedback from potential stakeholders and advisors, and considered next steps that could refine, test, and validate one of the options considered. Appendix C contains additional detail on work performed.

Background on Residential Solar Market and PAYS®

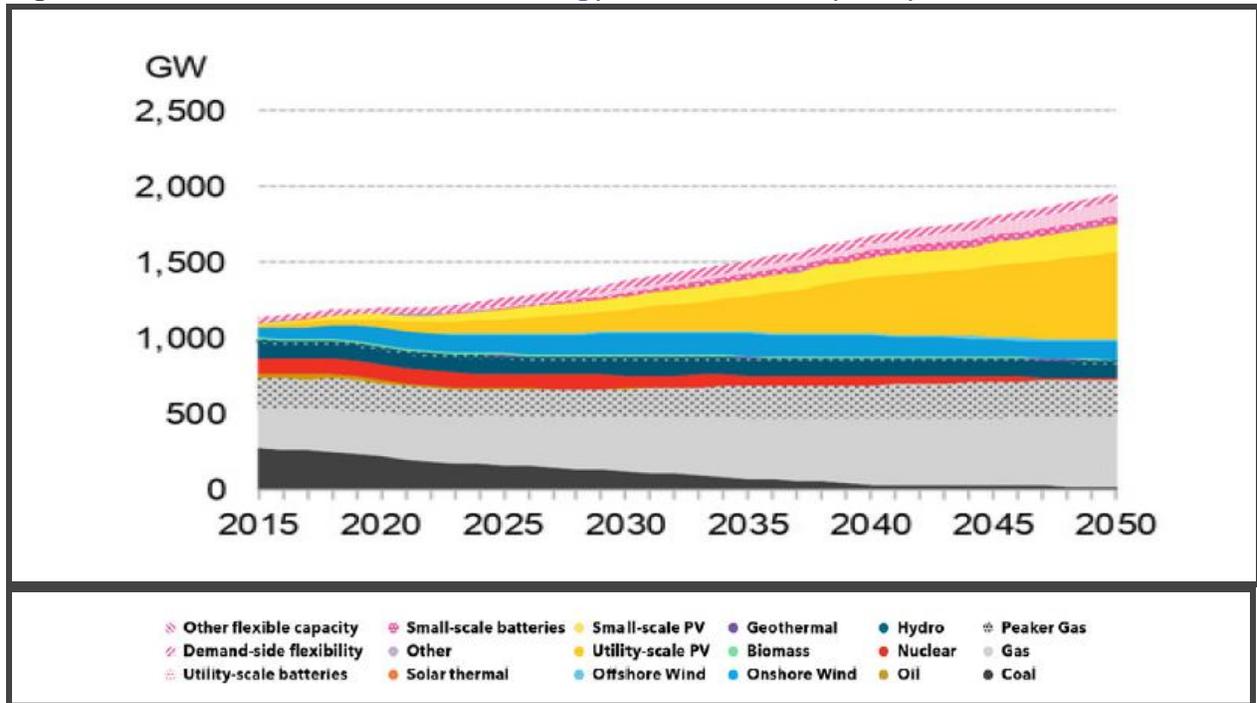
Background on U.S. Residential Solar Market

The U.S. solar market has become an important and growing part of the U.S. electricity supply base, accounting for approximately 40% of all new electricity generation capacity added in 2019. Solar installations increased by 23% last year to 13.3 gigawatts direct current (GWdc), with cumulative U.S. installations reaching 76 GWdc, up from 1 gigawatts (GW) in 2009.² Rapid growth is expected to continue; it is predicted that by 2050, solar will comprise more than 30% of the country’s installed electricity generation capacity.³

² “US Solar Market Insight”, Solar Energy Industries Association. March, 2020

³ “New Energy Outlook 2019”, Bloomberg New Energy Finance. June, 2019

Figure 1: US Cumulative Installed Energy Generation Capacity 2015-2050⁴



The U.S. residential solar market also continues to grow, hitting record installation volumes in 2019 with a 15% increase over 2018. Growth was led by decreasing installation costs, solar mandates on new-home building in California, a time-limited residential tax credit, and a growing desire for increased household energy security and resiliency.⁵ Such demand is not limited to specific states -- in 2019, there were eight states that surpassed 100 megawatt (MW) for residential solar assets.⁶

Going forward beyond the pandemic period, it is expected that strong growth in the residential solar market will continue, due to strong electricity price fundamentals as well as continued increases in concerns over energy security and climate-related issues. Despite the projected sunset of the solar tax credits,⁷ growth is projected to increase at nearly 10% per year by the mid 2020s.⁸ If the tax credits are further extended, these figures would grow substantially beyond this rate.

⁴ “New Energy Outlook 2019”, Bloomberg New Energy Finance. June, 2019

⁵ “US Solar Market Insight”, Solar Energy Industries Association. March, 2020

⁶ “US Solar Market Insight”, Solar Energy Industries Association. March, 2020

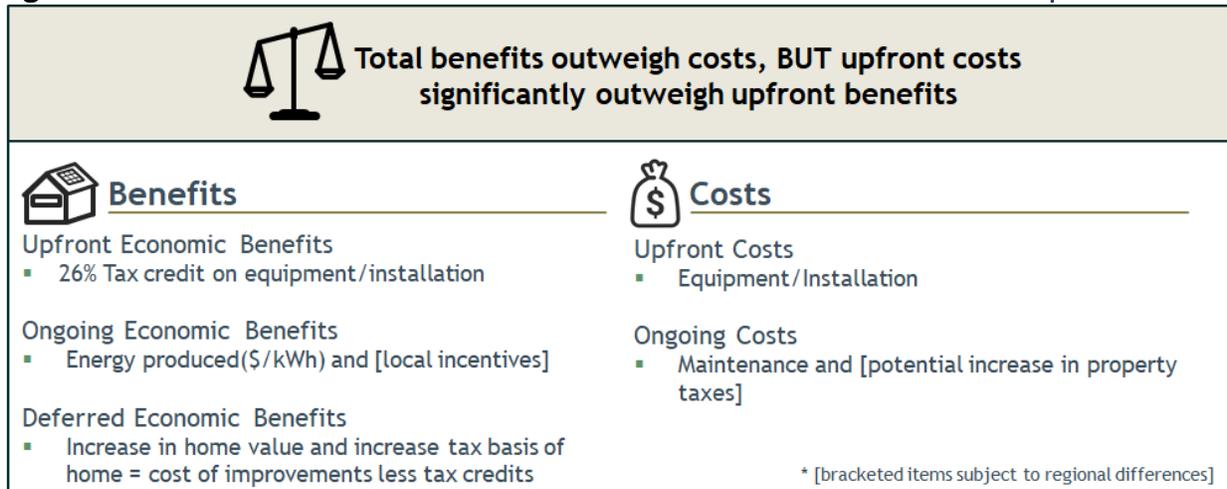
⁷ Solar tax credits include Internal Revenue Code (“IRC”) Section 46 investment tax credits (more specifically, IRC Section 48 energy credits, also called the investment tax credit (“ITC”),) for businesses and IRC Section 25D individual / residential credits. In general, both tax credits are, as a percentage of eligible costs, 26% for 2020 and 22% for 2021; beginning in 2022, the IRC Section 46 investment tax credits and IRC Section 25D individual credits are, as a percentage of eligible costs, 10% and 0%, respectively.

⁸ “US Solar Market Insight”, Solar Energy Industries Association. March, 2020

Economic Benefits and Costs for Residential Solar

Residential solar systems may be installed for a variety of reasons, most centrally for the economic benefits they provide relative to the costs associated with installation. Below is a table comparing such benefits and costs for a typical solar installation in 2020.

Figure 2: 2020 Economic Scorecard for U.S. Residential Solar Ownership



This overall return-on-investment (“ROI”) makes owning residential solar an attractive economic proposition for homeowners in many locations, especially with upfront incentives such as the 26% tax credit, falling solar installation costs, and the increasing costs of retail electricity. However, those consumers with little tax liability against which to apply the tax credit, or little cash on hand, may struggle with the timing of benefits relative to the upfront installation cost. In 2020, upfront installation costs are only 26% offset by tax credits, with the balance of benefits generated over time. For example, in Q4 2019, a residential system cost averaged \$2.84/W⁹ before installer markups. Assuming an installed price of \$3.00/W and an average system size of 5-6 kW, this represents a financial investment of \$15,000-18,000, or \$11,100-13,320 after a 26% tax credit benefit, which is above the level of median household savings in the United States.¹⁰ As a result, a number of consumer financial products have been introduced to help customers manage the upfront cost of acquiring solar.

U.S. Residential Solar Financing Options

Typical payment methods for residential solar include:

- **Cash Purchase:** With a cash purchase, customers use available cash (i.e. savings) to pay for solar systems and recoup their upfront investment through incentives such as the tax credit, reduced electricity bills over time, and the potential increase in the customer’s home valuation (based on the value of remaining solar benefits, in the event the home is sold during the productive life of the solar system).
- **Cash Purchase with Customer-sourced Debt:** Customers may also pay for solar systems by borrowing funds, most often with a Home Equity Line of Credit (HELOC),

⁹ “US Solar Market Insight”, Solar Energy Industries Association. March, 2020

¹⁰ “Survey of Consumer Finances”, U.S. Federal Reserve 2016. <https://www.federalreserve.gov/econres/scfindex.htm>

home improvement loan, or credit card. Customers often repay this debt through a combination of means, such as income, savings, or extra cash on hand due to solar benefits, such as the tax credit and reduced electricity bills over time, and the potential increase in the customer's home valuation (based on the value of remaining solar benefits, in the event the home is sold during the productive life of the solar system).

- **Power Purchase Agreement (PPA):** Some residential solar installers will offer customers a PPA, under which customers agree to purchase, at specified prices, all of the electricity from their solar systems. With a PPA, ownership of the solar systems remains with a third-party, who pays for the installation. As a result, customers avoid paying upfront for installation and may save money on electricity costs (if prices charged for their solar contribution are lower than what they would pay their utility for electricity). PPAs often include an annual price escalator that can affect the net savings for the customer over time. The system owner / PPA provider recoups its investment in the solar system through both ongoing customer PPA payments and upfront incentives such as tax credits. PPA underwriting is subject to certain customer qualifications, including customer FICO score, projected customer electricity savings, and clear ownership of the underlying home or property on which the solar is installed.
- **Lease:** Some residential solar installers will offer customers an operating lease, under which the customer agrees to lease their solar system, as installed and owned by a third-party at specified lease rates over time. By doing so, customers avoid paying upfront for installation and will consider leasing solar when monthly lease costs are expected to generate electricity savings through avoided retail electricity costs. Lease rates often include a rate escalator that can affect the net savings for the customer over time. The system owner / lease provider recoups its investment in the solar system through both ongoing customer lease payments and upfront incentives such as tax credits. Much like PPAs, leases are subject to certain customer qualifications such as customer FICO score, projected customer electricity savings, and clear ownership of the underlying real estate.
- **Subscription:** Solar subscriptions are a fairly new way to pay for solar energy, and subscriptions may be available through a community solar project, where a centralized solar plant will provide solar energy to customers via virtual, on-bill charges through their utility, or with individual program sponsors, who will install solar on a customer's home in exchange for a subscription fee. With solar subscriptions, customers avoid paying upfront for installation and will consider subscribing solar when monthly subscription costs are expected to generate electricity savings through avoided retail electricity costs.¹¹
- **Specialty Loan:** Specialty loan products are now widely available to finance residential solar systems quickly and efficiently; they are originated by national lenders familiar with the risks and returns of solar assets. With specialty loans, customers pay for their solar systems with loans that often contain flexibility in their repayment terms to create alignment with expected solar benefits. As a result, customers may repay specialty loans with extra cash on hand, as generated through solar incentives such as the tax credit and reduced electricity bills over time. With a specialty loan, there is clear ownership of the

¹¹ Note, the Authors were unable to verify customer requirements such as FICO scores for solar subscriptions programs.

system by the homeowner, potentially increasing the customer's home valuation (based on the value of remaining solar benefits). Much like PPAs and leases, specialty loans are subject to certain customer qualifications including customer FICO score, projected customer electricity savings, and clear ownership of the underlying real estate.

- **Property-Assessed Clean Energy (PACE):** PACE financing is secured by a property tax lien and repaid by increasing the assessed property taxes by the amount of property improvements and related cost of financing.¹² With PACE financing, the PACE provider provides debt-like financing for customers to pay for their solar systems, in exchange for a tax lien on the home. This tax lien is created under a special tax assessment (when allowed by local governments) for qualifying property improvements. As a result, customers repay PACE financing through increased property tax installments (generally in semi-annual lump sum amounts over time). Payments are typically made through a combination of means, such as income, savings, or extra cash on hand due to solar benefits, such as the tax credit and reduced electricity bills over time. PACE financing is subject to local property tax regulations / administration and certain customer qualifications, which includes clear ownership of the underlying real estate, home equity assessments, and a credit assessment that may include a customer FICO score or other analysis of customer assets and liabilities.

¹² <https://www.energy.gov/eere/slsc/property-assessed-clean-energy-programs>

Figure 3: Summary of Common Payment Options for Residential Solar
 (available full-sized in Appendix A)

Market Share ¹	Payment Option	System Owner	Qualification Criteria	Provider Example ³
	Cash Purchase	Homeowner	Homeowner must have cash on hand (or access to credit card/HELOC, etc)	All Solar Providers
33%	Power Purchase Agreement (PPA)	Third-party	Subject to FICO/credit assessment	
	Lease	Third-party	Subject to FICO/credit assessment	  SUNPOWER [®]
	Subscription	Third-party	Tesla's third-party PPAs & leases have historically had FICO requirements, but we were unable to verify requirements for Tesla Subscriptions.	
45%	Specialty Loan	Homeowner	Subject to FICO/credit assessment	  LOANPAL  Sunlight Financial [®] SUNPOWER [®] 
	Property Assessed Clean Energy (PACE)	Homeowner	Subject to home equity/credit assessment and local property tax regulations/administration	 

¹ <https://www.greentechmedia.com/articles/read/as-solar-loans-start-to-dominate-loan-providers-see-increasing-value-in-ins#gs.5pufou>
² FICO as disclosed on April 27, 2020 on <https://www.nerdwallet.com/best/loans/personal-loans/solar-loans-solar-panel-system-financing-options> and https://www.gosolarcalifornia.ca.gov/tools/marketing/consumer_guides/Homeowner_Guide_to_Solar_Financing_February_2015.pdf
³ Financing availability as disclosed on provider websites as of April 24, 2020: <https://www.vivintsolar.com/solar-plans>, <https://www.sunrun.com/solar-plans-and-services>, <https://www.tesla.com/support/energy/solar-panels/learn/subscription-solar>, <https://sunlightfinancial.com/>, <https://www.joinmosaic.com/>, <https://loanpal.com/green-energy>, <https://ygrene.com/about-ygrene-financing>, <https://www.renovateamerica.com/financing/hero>, <https://us.sunpower.com/home-solar/save-with-solar-panels>

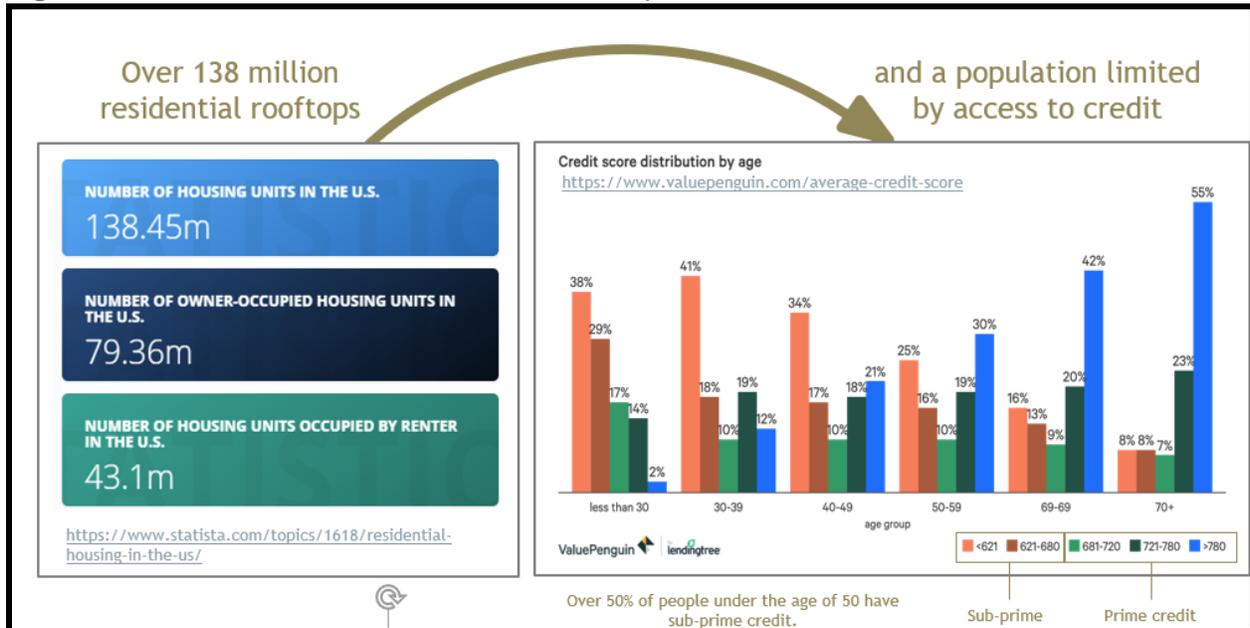
The above financing options have fundamentally expanded and improved the U.S. residential solar market. In 2019, third-party and specialty loans accounted for over three quarters of residential solar installations and have made it far easier for homeowners with high FICO scores to consider rooftop solar.

Current Residential Solar Financing Options Exclude Some Customer Segments

While the advent of third-party financing has facilitated the rapid expansion of the residential solar market for those with high FICO scores, it has restricted many populations from being able to participate.

The following Figure 4 outlines how home ownership and credit score requirements de-select a large portion of families for residential solar.

Figure 4: Addressable Market, as Limited by Renters and Financial Credit



While there are approximately 138 million residential rooftops, approximately 1/3 of those were renters that could not be considered for third-party or loan financing since they are not the owners of the underlying roof on which the solar would be mounted. Similarly, more than half of the U.S. population under 50 years of age have sub-prime credit scores, making them far less eligible for underwriting by third-party solar or loan financing. Reducing requirements for home ownership and high FICO would significantly expand the eligible pool of potential solar customers, but the perceived increased financial risk to banks and financial firms would likely also increase the cost of the financing, if the financing is offered at all.

Introduction to Pay As You Save® (PAYS)®

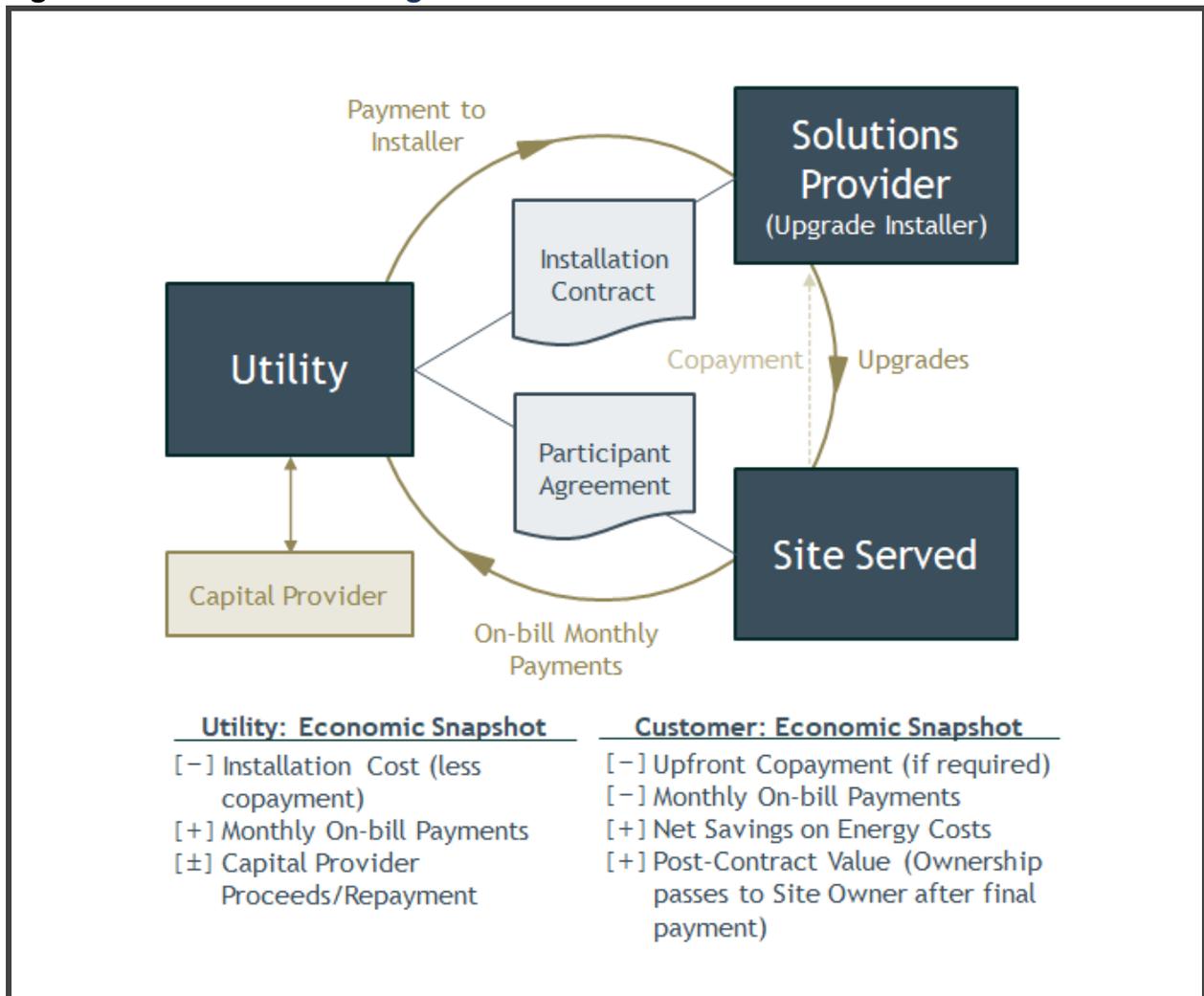
The PAYS system is an investment program set up to allow electric utilities and cooperatives (each a “Utility”) to pay for energy efficiency measures and generation (“EE Upgrades”) on the customer side of the meter and fully recover the costs through site-specific tariffed charges on their utility bills.¹³ PAYS was designed to remove many of the barriers, such as credit qualifications or availability to renters, that exist for customers (each a “Customer”, and in aggregate “Customers”) to invest in energy efficiency and distributed energy assets. PAYS programs have been set up at eighteen electric cooperatives, utility districts, and utilities.¹⁴

With the PAYS system, utilities pay solutions providers (“Solutions Providers”) for EE Upgrades delivered as an essential utility service, and in return, customers make initial copayments, if required, as well as ongoing payments under a PAYS tariff to the utilities. When the utility costs are recovered, the upgrades belong to the site owner.

¹³ “What is PAYS” Energy Efficiency Institute, Inc. website www.eeivt.com, last accessed May 2020.

¹⁴ <https://www.eeivt.com/status-reports/>

Figure 5: PAYS Structure Diagram



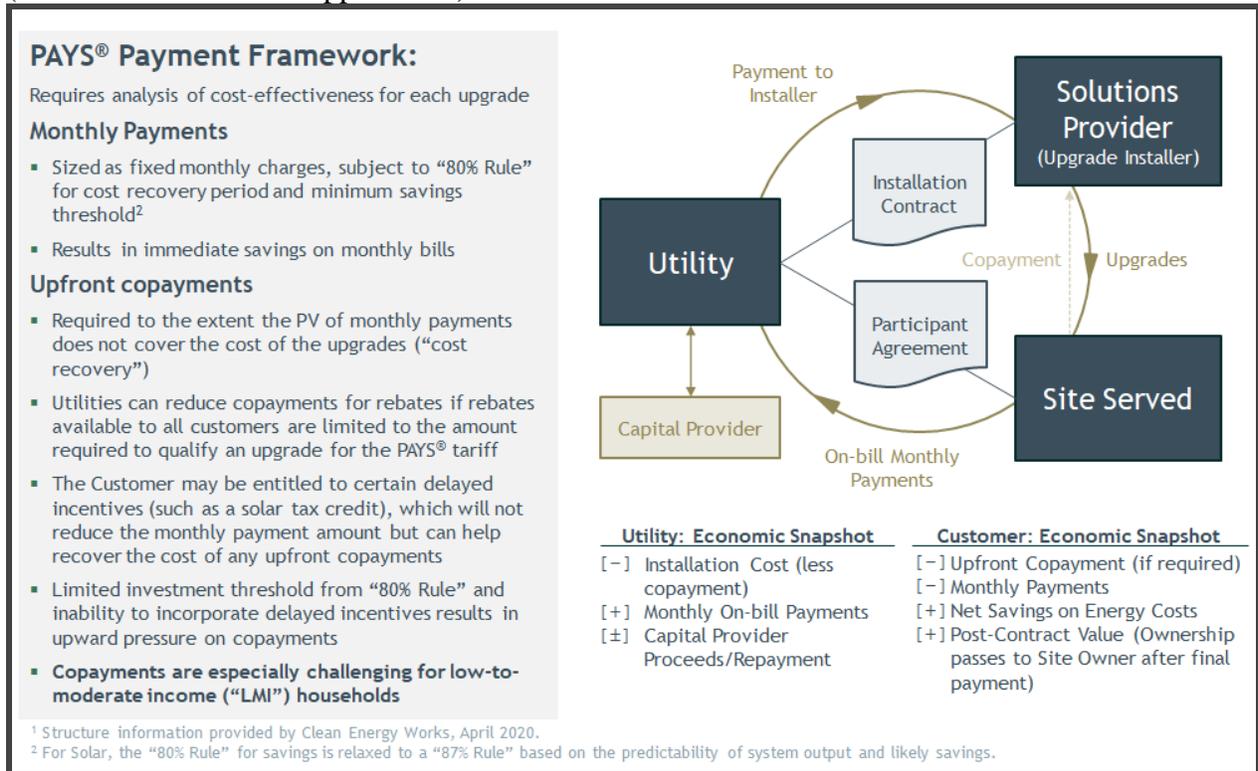
Key features of PAYS programs include the following:

- Tariffed charges are assigned to a metered location, not to an individual customer;
 - Results in no new debt for consumers
 - Unpaid service charges will remain with the meter and apply automatically to successor customers
 - No liens on real estate
- Billing and payment on the customer’s utility bill is secured by the potential for disconnection for non-payment (charges are suspended for repairs or inactive meters due to vacancy); and,
- Independent certification is required to ensure products are appropriate and that savings estimates exceed payments, both near and long term.
 - Proven technologies
 - “80% Rule”

- Max PAYS cost recovery term is initially 80% of estimated life of shortest-lived component or warranty
- Max monthly program service charges are limited to 80% of estimated average monthly gross savings calculated with no price escalator for current rates
 - Upgrades transfer to site owner once the utility’s costs are recovered

Furthermore, EE Upgrades financed through PAYS must be evaluated on a project-specific basis to ensure both sufficient customer savings from the upgrade as well as the ability for participating utilities to recover upfront costs during the specified PAYS term. The customer is required to provide an upfront copayment if the maximum monthly PAYS payment meeting those two conditions is not able to fully cover the upfront cost of an upgrade. The following chart outlines the monthly payments and copayments.

Figure 6: PAYS Payments Framework¹⁵
 (available full-sized in Appendix A)



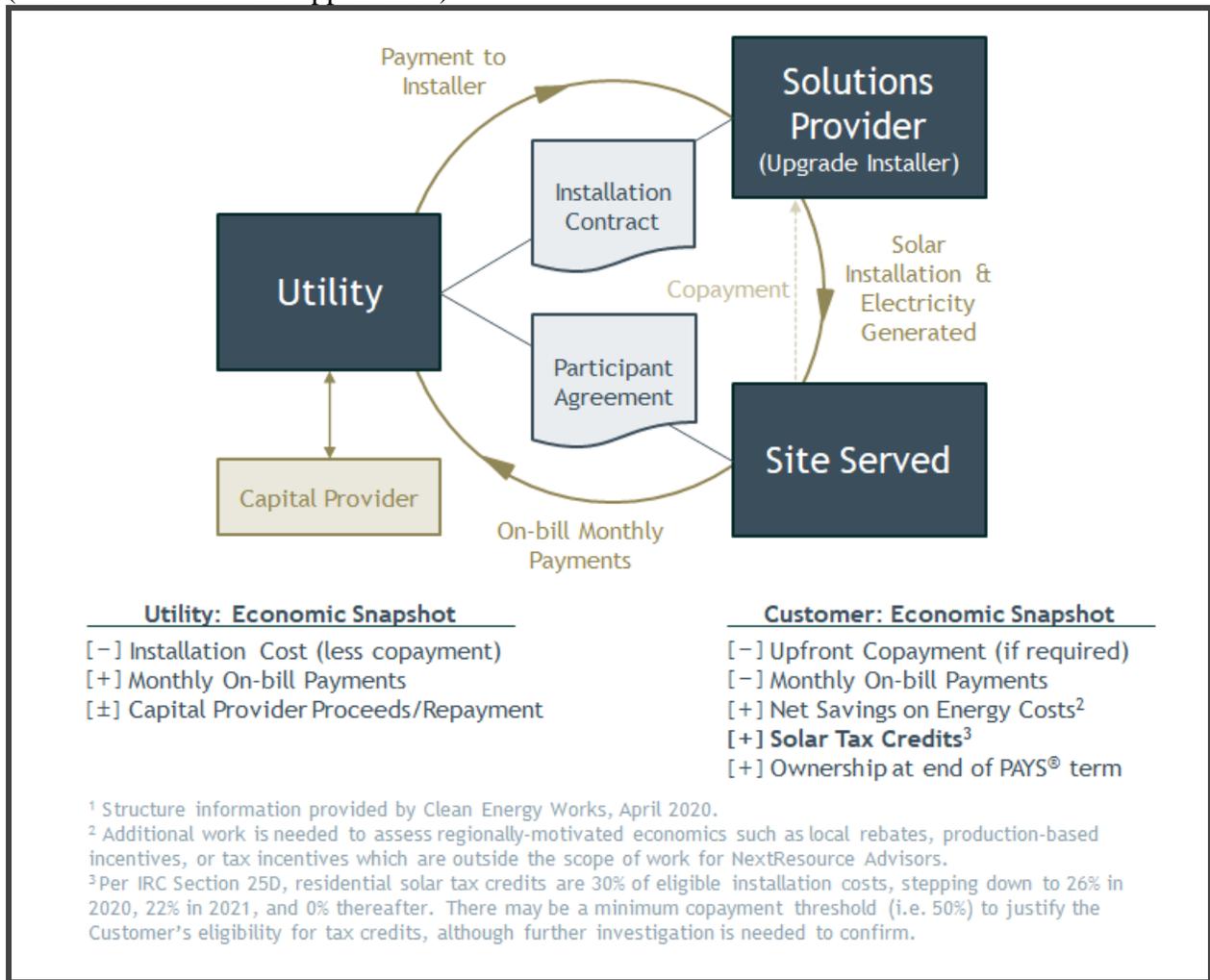
Existing PAYS® Structure Not Compatible with Solar

When applying PAYS to solar upgrades, the upfront payment may be quite large, especially compared to a PAYS finance structure as currently used for energy efficiency improvements alone. With solar, however, financial professionals hoped policies would allow customers to directly monetize the Solar Tax Credit to offset that copayment.

¹⁵ Structure information provided by Clean Energy Works based on field observations, April 2020.

This section discusses the structure for Solar PAYS that advocates hoped to enact using the existing PAYS structure and two issues related to the Customer ability to utilize the Solar Tax Credit when considering the required copayment. The following structure diagram depicts use of the existing PAYS structure applied to solar based on EE Upgrades.

Figure 7: PAYS Structure as Adapted from Energy Efficiency¹⁶
 (available full-sized in Appendix A)



Issues Specific to using the existing PAYS® structure applied to Solar

Solar tax credits (up to 26% of Installation Costs in 2020) are not part of the economics for most EE Upgrades, but they currently make up a large portion of solar economics and may be problematic in using the existing PAYS® structure applied to solar for two reasons:

1. **Eligibility:** Customers may not be eligible for tax credits if the Utility is the initial owner of the solar upgrades and pays the Solutions Provider; and,

¹⁶ Structure information provided by Clean Energy Works based on field observations, April 2020.

2. **Timing:** Even if Customers are eligible for tax credits, the upfront Copayment is due without regard to the timing of tax credit benefits, so Customers may not realize an immediate benefit due to the timing of tax filing and estimated tax payments, or Customers may lack the tax capacity to use tax credits in the initial tax year.¹⁷

Let's examine each of these issues.

Issue #1: Customer Eligibility

It appears to be the case that the Customer is not eligible for tax credits since the Utility owns the solar system during the period of cost recovery. The reason for this concern is that tax credit eligibility is generally established by considering:

- 1) Ownership of the solar asset; and
- 2) Eligible costs paid.

In the case of using the existing PAYS structure applied to solar:

- 1) The Utility owns the system until completion of the PAYS cost recovery (monthly payment) term, after which the system passes to the Site Owner (which may or may not be the Customer); and
- 2) The Utility pays the Solutions Provider.

Both of these structure features may make a Customer ineligible to claim tax credits. Based on these observations:

- Changes in tax policy would be needed if Customers are intended to receive tax credits.
 - Further discussions with tax experts (i.e. accounting firms / tax counsel) would be required to determine if there is a fact pattern that supports the Customers' claim to tax credits; and
 - conclusions may require additional support from a Private Letter Ruling or other regulatory changes (safe harbor publication, or even tax reform).

¹⁷ As previously discussed, due to the sunset of tax credits under IRC Section 25D, individuals would be unable to benefit from tax credits after December 31, 2021, whereas businesses would still be able to claim a 10% ITC under IRC Section 48 in 2022 and beyond.

- Alternate structures should be considered to eliminate Customer eligibility issues.
 - Third-party ownership models have set precedents for clear ownership and tax credit eligibility with other types of solar financing products; and
 - there could be a third-party tax credit monetization model for the PAYS structure in which customers would not need to be able to use tax credits because the tax benefits would be priced into the Copayment & Monthly Payment amounts.

Issue #2: Tax Credit Timing and Customer Copayment

Even if customers can claim tax credits, the timing of copayments relative to the timing for tax benefits may be challenging for customer economics:

- Customer copayments are made at the beginning of the PAYS term, and calculated as follows:
 - Total amount upfront costs paid by the Utility to the Solutions Provider
 - LESS costs recovered by monthly fixed PAYS tariff charges¹⁸
- Tax Credits are generated when the solar system is placed-in-service, but the benefit may be delayed:
 - Customers may need to wait until their annual tax return has been filed and claim a refund of taxes paid: the resulting timing difference between the copayment date and the tax credit benefit could be over a year.
 - Customers may not pay enough taxes to use the tax credit: as a result, the tax credits would “carry forward” until they can be used, with a possibility that the benefit is never realized (especially true for LMI households).
- Without legislative changes to restructure the tax credit, customers cannot expect to realize a benefit for tax credits before they are required to pay upfront copayments.

As a result of this timing difference and above eligibility question, third-party (someone other than the customer) monetization of the tax credit appears to be a much more viable path for applying PAYS to solar. In addition, under a third-party tax credit monetization model for PAYS, the Customer does not need to be able to use the tax credit. Instead, tax benefits could be priced into the cost recovery calculations, thereby reducing copayments and possibly even monthly payments. The following section discusses potential alternative structure options to allow someone other than the customer to utilize solar tax benefits.

¹⁸ In Part 1 of this report, “The Potential for the PAYS System to Make On-Site Solar Photovoltaic Systems Accessible to Low- and Moderate-Income Customers and Renters,” EEI recommends that tariffed charges for Solar PAYS be calculated using a PAYS 87% rule, requiring that monthly PAYS charges be set so that annually they do not exceed 87% of the expected annual savings to the customer.

Four Solar PAYS Options and Considerations

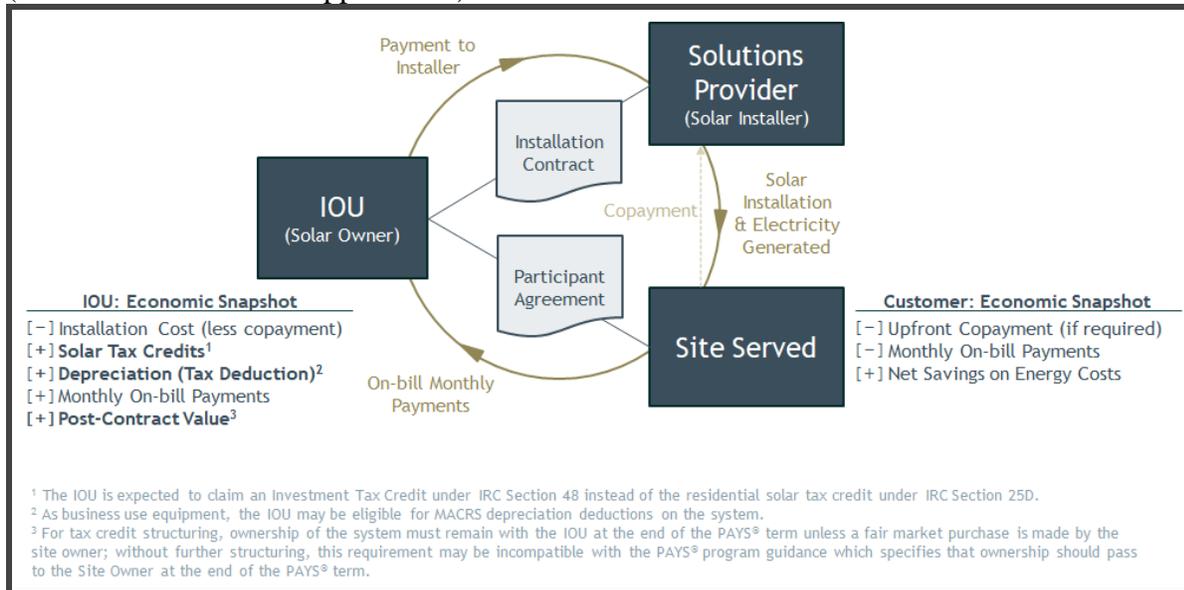
Option 1: Solar PAYS® Structure for Tax Efficient Utilities

As previously noted, two potential issues with using the existing PAYS structure for Solar PAYS include:

- 1) Eligibility: Whether customers are allowed to claim tax credits under Internal Revenue Code (IRC) Section 25D when the utility pays for a portion or all of the upfront cost for the solar installations; and
- 2) Timing: Whether customers with low- to moderate-income can actually benefit from tax credits and in a timeframe sufficient to offset upfront copayments.

Both of these issues would be overcome if utilities simply capitalized the full upfront cost, took ownership of the systems, and claimed the tax credits,¹⁹ thereby moving tax benefits from the customer to the utility (see Figure 8). In this structure (“Option 1, Solar PAYS Tax Efficient Structure”), utilities would also have the added benefit of depreciation deductions, which could be used to offset taxable income, and utilities would be able to adjust the customer’s copayment by factoring those additional tax benefits into cost recovery calculations. Furthermore, utilities would be entitled to a 10% tax credit after December 31, 2021, whereas a residential homeowner would no longer be entitled to any tax credit.²⁰

Figure 8: Option 1, Solar PAYS Tax Efficient Structure
 (available full-sized in Appendix A)



¹⁹ For-profit, tax-efficient utilities could claim investment tax credits under IRC Section 48 (instead of the residential credits under IRC Section 25D) and MACRS depreciation on the solar systems.

²⁰ Solar tax credits include Internal Revenue Code (“IRC”) Section 46 investment tax credits (more specifically, IRC Section 48 energy credits, also called the investment tax credit (“ITC”),) for businesses and IRC Section 25D individual / residential credits. In general, both tax credits are, as a percentage of eligible costs, 26% for 2020 and 22% for 2021; beginning in 2022, the IRC Section 46 investment tax credits and IRC Section 25D individual credits are, as a percentage of eligible costs, 10% and 0%, respectively.

It is important to note that this Option 1, Solar PAYS Tax Efficient Structure requires utilities to be tax-efficient, for-profit entities. For example, an investor owned utility (IOU) with tax liabilities (and therefore able to benefit from tax credits and depreciation deductions) would be able to offer Solar PAYS under this Option 1, Solar PAYS Tax Efficient Structure. Further structural adjustments would be required to allow non-profit utilities to offer a Solar PAYS program, and the same would be true for for-profit utilities that are not tax efficient (i.e. due to construction / retirement of infrastructure and capital assets).

When constructing solar power plants and distributed solar assets, many utilities and solar developers (who cannot efficiently use tax benefits) will employ financial structures to monetize tax benefits. These financial structures, often referred to as tax equity structures, will essentially transfer tax benefits to a tax efficient investor (“Tax Investor”) in exchange for capital. Commonly used tax equity structures include the following:

- Sale Leaseback (“SLB”)
- Partnership Flip (“PF”)
- Lease Pass-through (“LPT”)

The Authors believe it is possible to combine any of the above tax equity structures with the Solar PAYS Structure for tax efficient utilities (Option 1, Solar PAYS Tax Efficient Structure) in order to enable for-profit utilities that are tax inefficient to offer Solar PAYS, and with further modification discussed below, these structures could allow nonprofit utilities to offer a Solar PAYS program that monetizes the solar tax credits as well.

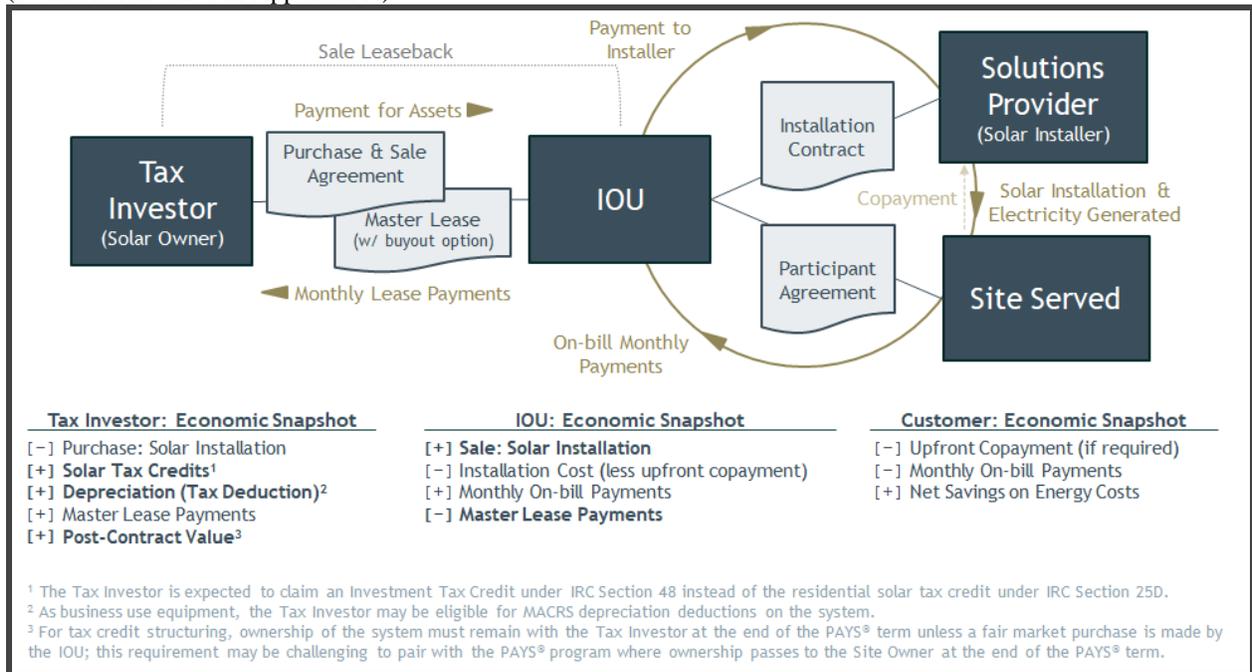
Option 2: Solar PAYS® with a Sale Leaseback Structure

Sale Leaseback transactions are commonly used to finance capital assets, including rail cars, airplanes, general business equipment, and solar assets. In a Sale Leaseback, the Tax Investor (typically a bank) will purchase newly constructed assets from a business, thereby freeing up working capital for the business. The business will then enter into an operating lease to use the assets in exchange for periodic lease payments.

For Solar PAYS, an investor-owned (for-profit) electric utility (“IOU”) that is not tax efficient could monetize tax benefits by entering into a Sale Leaseback transaction with a Tax Investor (“Option 2, Solar PAYS SLB Structure”). The ownership of the systems and underlying tax benefits would shift from the IOU to the Tax Investor with the introduction of the sale and operating lease, thereby relieving the IOU of the need to be tax efficient (see Figure 9).

Figure 9: Option 2, Solar PAYS SLB Structure

(available full-sized in Appendix A)



The following contains a step-by-step description of transactions that may be part of this Option 2, Solar PAYS SLB Structure:

Customer Origination Process

1. The IOU, or its program operator in cooperation with local Solutions Providers, originates a Customer, who enters into the Participant Agreement with the IOU to pay for solar power under a Solar PAYS tariff; and
2. The IOU enters into an Installation Contract with the Solutions Provider to install the solar system for a fixed price.

Tax Equity Origination Process

3. The IOU enters into a Purchase and Sale Agreement with a Tax Investor to sell the solar system²¹ to the Tax Investor; and
4. Concurrently with the Purchase and Sale Agreement, the IOU also enters into an operating lease agreement (“Master Lease”) with the Tax Investor.

Installation and Payment Process

Once installation is complete:

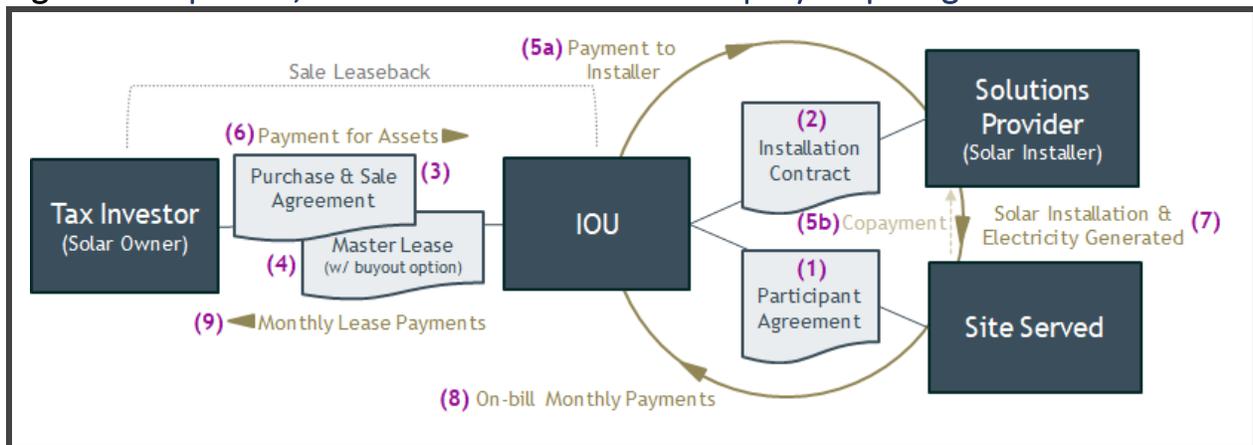
5. Upon installation, the solar installation payment is made, consisting of (a) the IOU payment to the Solutions Provider²² for the installation of the solar system under the

²¹ The Sale Leaseback has some timing flexibility in terms of document execution and transfer of consideration / assets, but the transaction must be completed (e.g. transfer of ownership with lease in place) within 90 days of a system achieving the internal revenue code definition for “placed-in-service.”

- terms of the Installation Contract, and (b) the Customer copayment to the Solutions Provider, due for the balance of the upfront cost;
6. The Tax Investor pays the IOU for the solar system under the terms of the Purchase and Sale Agreement;
 7. The Customer receives electricity generated from the system;
 8. The IOU bills the Customer for solar energy services with a fixed charge on the monthly bill that is less than the estimated savings provided by the on-site solar and the Customer pays those bills, consistent with the terms of the Solar PAYS tariff and Participant Agreement; and
 9. During the operating lease term, the IOU keeps the Customer payments and makes any upfront (pre-payment) and monthly lease payments owed to the Tax Investor under the terms of the Master Lease.²³

The operating lease may contain a fair-market value purchase option²⁴ should the IOU wish to buy the systems back from the Tax Investor. If the IOU does not opt to purchase the systems, the Tax Investor will be entitled to capture 100% of any remaining system value (which would include a claim to any energy produced as well as any residual sale value) at the end of the lease term.

Figure 10: Option 2, Solar PAYS SLB Structure: Step-by Step Diagram



Option 3: Solar PAYS® with a Partnership Flip

Like Sale Leaseback structures, Partnership Flip structures are also commonly used to monetize tax benefits. Originally used for wind projects monetizing IRC Section 45 production tax credits from wind transactions, the Internal Revenue Service issued safe harbor guidelines in Rev. Proc.

²² There may be a delay in receiving funds from the Tax Investor relative to when payments are owed under the installation contract. As a result, the IOU may wish to obtain a working capital facility or line of credit.

²³ The lease may have a “rent holiday” of up to 90 days to allow time for the IOU to commence billing and collecting.

²⁴ This Master Lease purchase option is separate from any buyout provisions contained in the Participant Agreement with the Customer (e.g. “PAYS Refi”). Subject to further review, the Master Lease terms will need to align with transaction changes brought about by any buyer rights exercised under the Participant Agreement.

2007-65, which have since been adapted for use in solar transactions. The intent of the Partnership Flip is to efficiently monetize front-loaded tax benefits and provide an exit of the Tax Investor at a reduced rate once the tax benefits have been realized. As a result, the key feature in Partnership Flip transactions is for partners' interests to adjust (or "flip") from economic benefit being allocated in favor of the tax investment partner during the early life of the asset, to an economic benefit sharing in favor of the development partner once predefined return metrics have been achieved.

Solar projects using the Partnership Flip structure often are set up as follows:

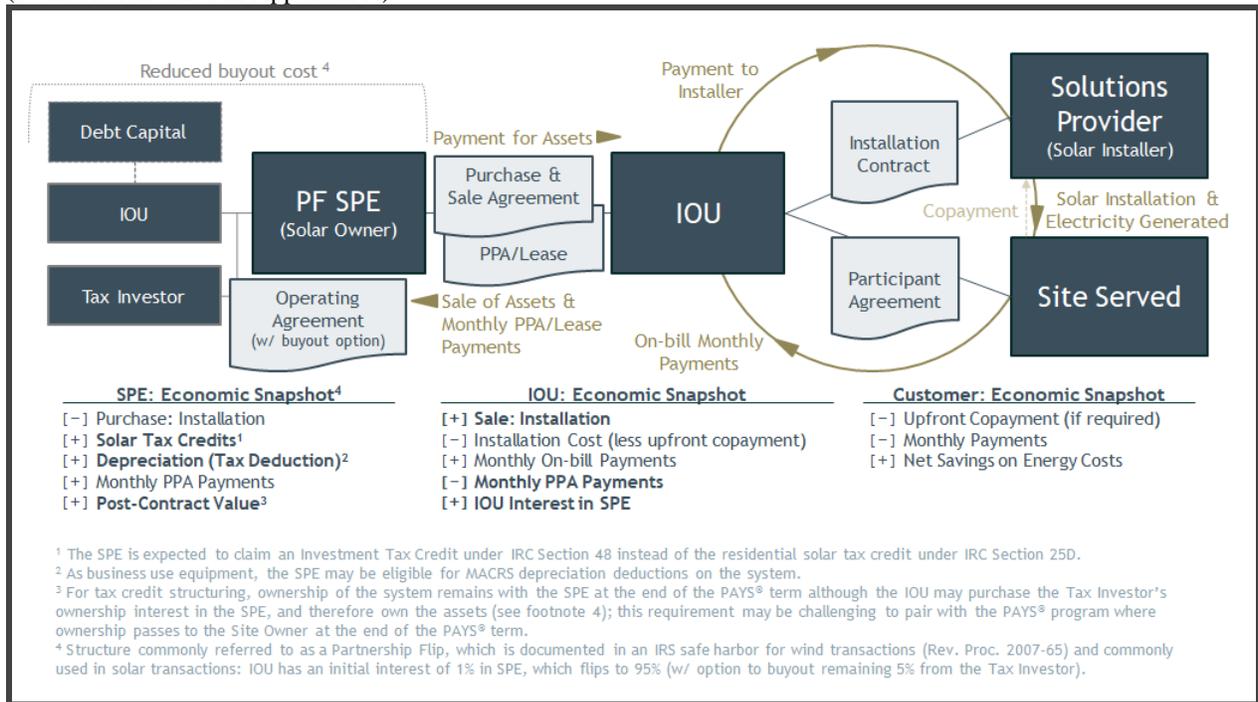
- A utility or solar developer ("Sponsor") and Tax Investor create a special purpose entity (SPE), which is usually a limited liability company electing to be taxed as a partnership ("Partnership").
- The SPE owns the solar assets and underlying tax benefits, and as a Partnership, the tax benefits flow to its members (Sponsor and Tax Investor).
- The Tax Investor begins with a 99% interest in income, losses, and tax credits to maximize the amount of tax benefits monetized to the tax-efficient member, and the Sponsor holds the remaining 1% interest in income, losses, and tax credits.
- After a minimum of five²⁵ years, the Tax Investor's interest flips down to 5%, with an option for the Sponsor to purchase the remaining interest of the Tax Investor at fair market value.
- If the Sponsor opts to buyout the Tax Investor, the SPE effectively dissolves, and the Sponsor becomes the sole owner of the solar assets.

For use with Solar PAYS, the IOU would be the Sponsor in the Partnership Flip structure and either sell or contribute the solar assets to the SPE, as described above ("Option 3, Solar PAYS PF Structure"). The PAYS tariff may require the IOU to be the direct provider of solar electricity to site, but the SPE (solar owner) has the legal right to that solar electricity. To accommodate that right, a slight modification to the general Partnership Flip structure may be necessary: should the IOU enter into a PPA with the SPE to purchase the solar electricity, the IOU could then resell that solar electricity directly to customers via the regulatory framework of the PAYS tariff. The resulting structure effectively moves ownership and tax benefits from the IOU to a SPE / Partnership for monetization (see Figure 11).

²⁵ Tax credit recapture period for IRC Section 48 solar investment tax credits.

Figure 11: Option 3, Solar PAYS PF Structure

(available full-sized in Appendix A)



Option 4: Solar PAYS® with a Lease Pass-through

Of the three structures used to monetize tax benefits for solar assets, the Lease Pass-through structure²⁶ is the least commonly used for a number of reasons, including a smaller investor pool and the inability to monetize depreciation without introducing contortions that further complicate the structure and introduce perceived tax structure risk for investors. That said, the Lease Pass-through structure in its simplest form is beneficial in its ability to monetize tax credits without transferring ownership away from the Sponsor.

Similarly, to the Sale Leaseback structure, with Lease Pass-through transactions, the Sponsor enters into an operating lease with a Tax Investor, but the lessor and lessee roles are reversed. As a result, the Sponsor retains ownership of the solar assets and leases them to the Tax Investor. Concurrently with the Master Lease, the Tax Investor typically enters into a sublease (or PPA) with the Customer and makes ongoing payments on the Master Lease from the Customer collections under the sublease (or PPA). The parties would also file an election to pass the tax credits through the Master Lease under IRC Section 50(d)(5), effectively monetizing the tax credits to the Tax Investor.

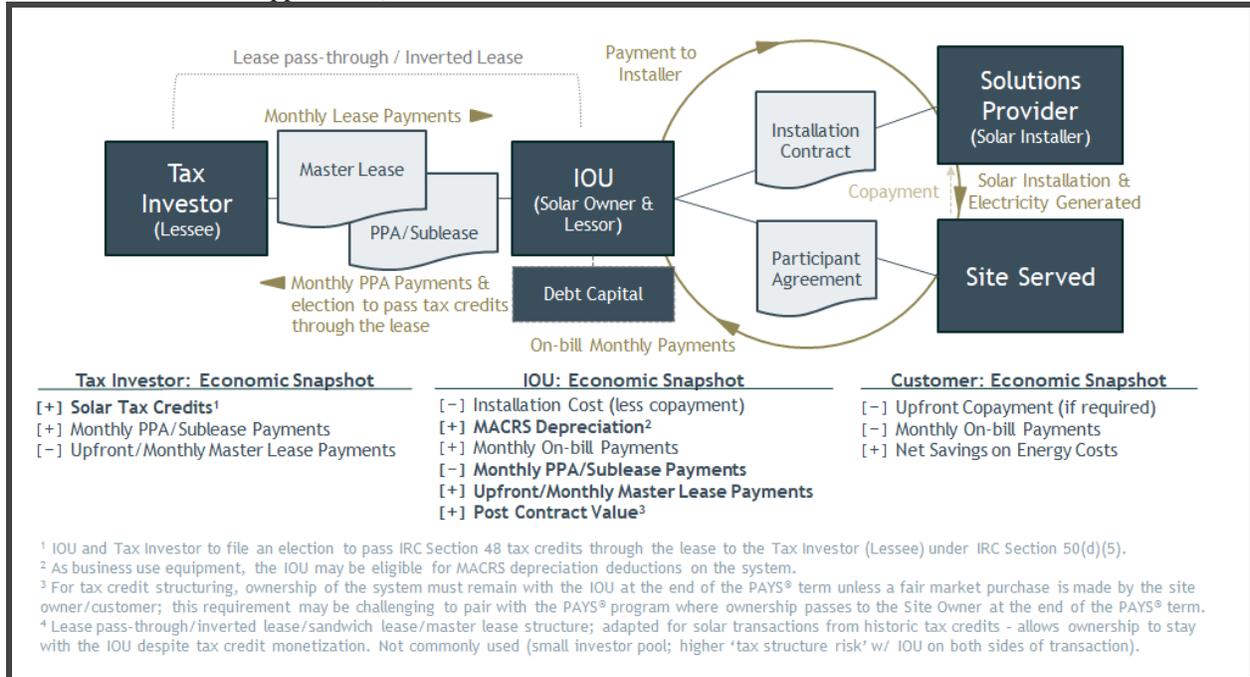
For use of a Lease Pass-through structure combined with a Solar PAYS tariff, the IOU would be the Sponsor owner and lessor (“Option 4, Solar PAYS LPT Structure”). As Sponsor, the IOU would enter into a Master Lease with a Tax Investor and file an election to pass the tax credits through the lease. As a slight modification to the general Lease Pass-through structure, the Tax Investor may retain a sublease (or PPA) with the IOU, rather than directly with the Customer, to

²⁶ The Lease Pass-through originated with Historic Tax Credit transactions and is also called an Inverted Lease, Sandwich Lease, or Master Lease Structure, among other monikers.

allow the IOU to administer the sale of electricity to customers via the regulatory framework of the PAYS tariff. The resulting structure monetizes tax credits through a sandwich lease (or Master Lease with PPA) while retaining ownership of the solar systems.

Figure 12: Option 4, Solar PAYS LPT Structure

(available full-sized in Appendix A)



Tax Equity Considerations for Non-Profit Utilities & Options for Solar PAYS® Structures

When combined with a Solar PAYS tariff, the aforementioned Sale Leaseback, Partnership Flip, and Lease Pass-through structures contemplated a utility Sponsor that is for-profit but not tax-efficient. While non-profit utilities are generally denied tax credits and depreciation deductions under the Modified Accelerated Cost Recovery System (MACRS), they may be able to monetize tax benefits similarly with their for-profit counterparts with strategically created and placed for-profit “blocker entities.” The use of “blocker entities” would require further review, but could look something like this:

Figure 13: Three Options for Solar PAYS with Blocker Entities to Facilitate Tax Equity Access for Non-Profit Utilities
(available full-sized in Appendix A)

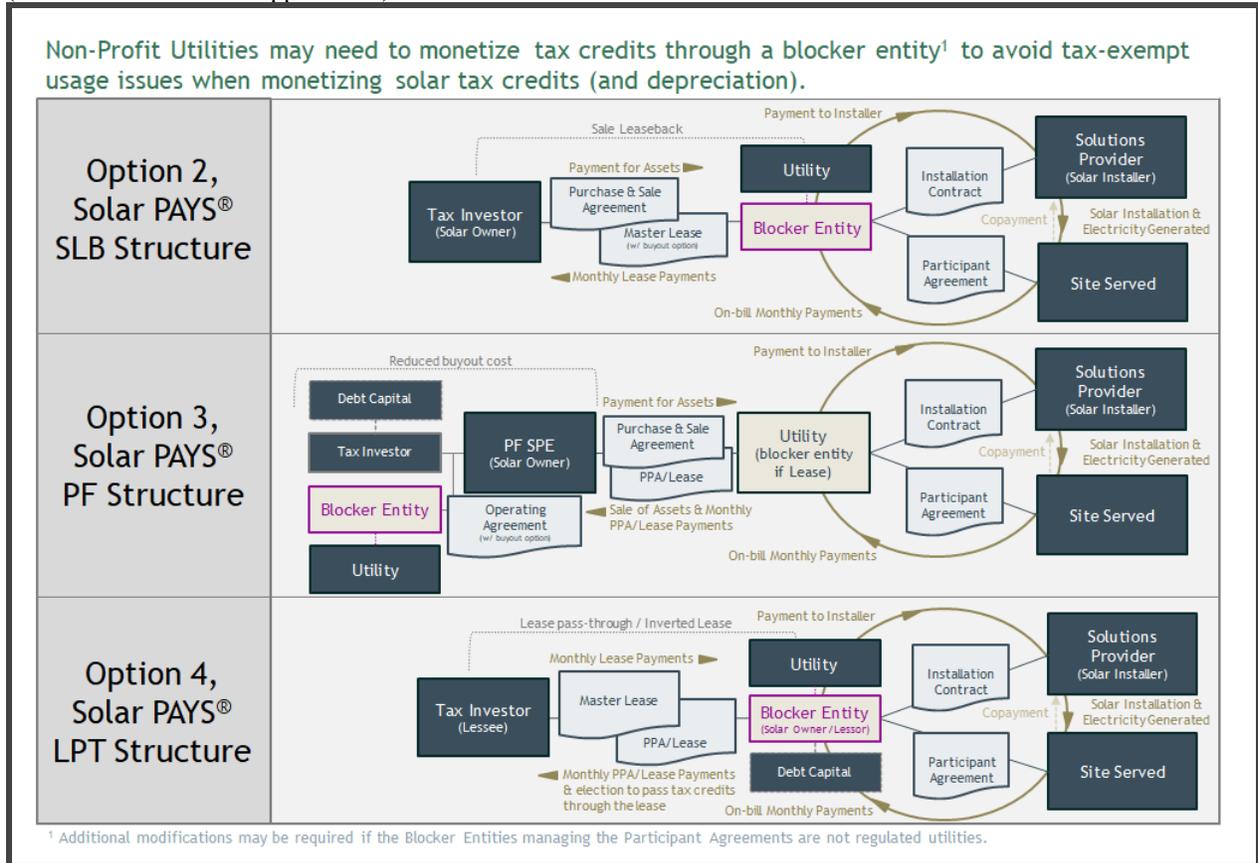
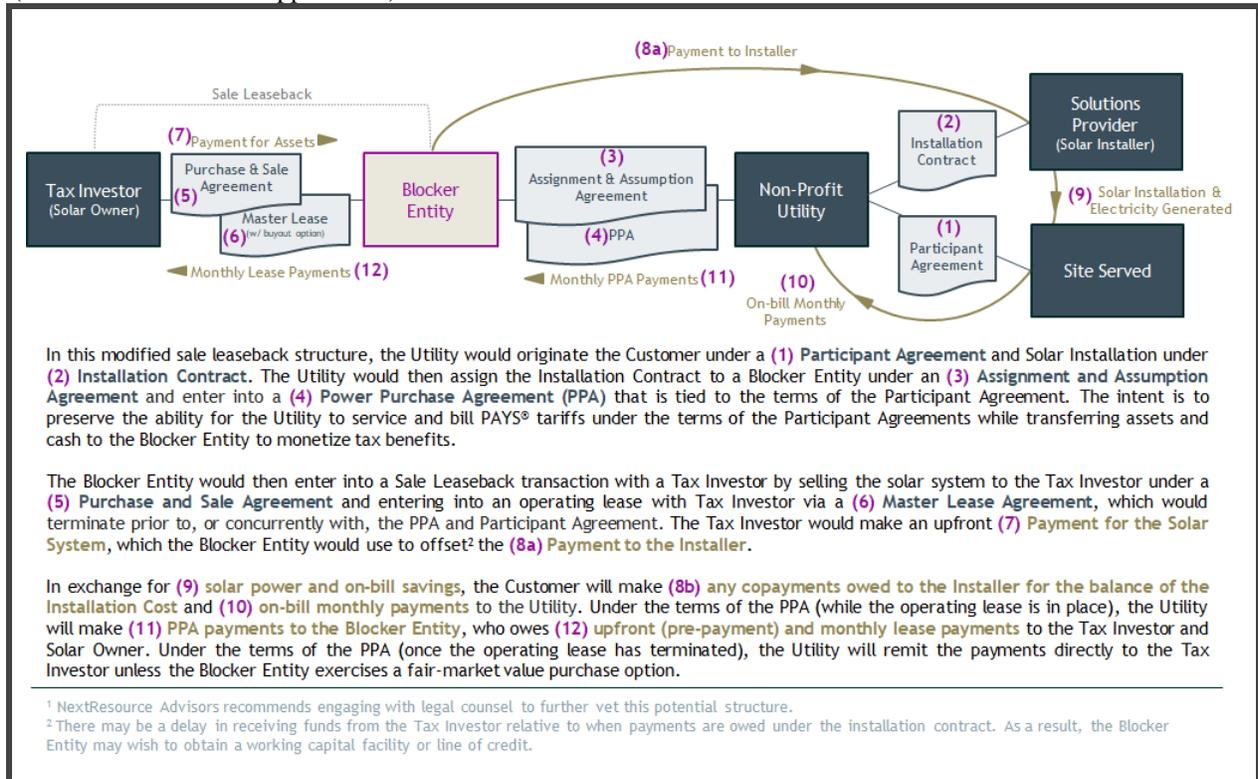


Figure 14: Step-by-Step Diagram for Option 2, Solar PAYS SLB Structure, as Modified for an Unregulated Blocker Entity
 (available full-sized in Appendix A)



The Authors solicited preliminary feedback regarding the potential modifications for the Option 2, Solar PAYS SLB Structure to facilitate use by non-profit utilities (see Figure 14 above) from several solar industry participants, including two banks with equipment leasing finance specialists, a utility debt financier, an accounting firm, and a generation and transmission cooperative, as well as a distribution utility cooperative. The general consensus was as follows:

1. The structure has potential, although a thorough legal review of the structure is required to reduce the risk that the IRS could take the position that the blocker entity should be ignored, thereby causing the Tax Investor to lose the solar tax credits and MACRS depreciation; and
2. The ability to aggregate projects for scale is key to ensuring a minimum economic threshold and successful outcome.²⁷

Based on this feedback, the Authors have included further vetting of this structure in Section 6. *Summary of Findings and Recommended Next Steps*, and in the following Section 5. *Aggregation Requirements and Considerations for Scale*, we explore potential aggregation and scale requirements.

²⁷ There was also consensus that community solar projects may be an efficient way to address the minimum aggregation threshold for efficiently monetizing tax credits. A review of community solar structures and economics are outside the scope of this engagement, and as such, the Authors have not included a discussion around community solar projects or structures.

Challenges with Customer Path to Ownership in Solar PAYS® Structure Under Options 1-4

Although these Solar PAYS structures for tax-efficient utilities (and utilities engaging with third-party Tax Investors) could enable the monetization of tax benefits to reduce copayment requirements for customers, it should be made clear that these structures do not provide the same customer path to ownership as traditional PAYS for EE Upgrades; in the traditional PAYS system implementing tariffs approved by regulators in multiple states, EE Upgrades belong to site owners at the end of the PAYS term once all of the utility's costs are recovered. Unless there is a performance-based regulatory framework, utility tariffs in most states must be cost-based, non-discriminatory, just, reasonable, and fair. For that reason, once the utility's costs are recovered, including its cost of capital, there is no further basis for cost recovery and the charges end. At that point, the Customer(s) at the metered location have paid all costs, and the installed upgrades belong to the site owner.

That said, all four options for a Solar PAYS structure explored in this section would treat the site owner's path to ownership differently than it would for energy efficiency upgrades. Instead of automatically transferring ownership to site owners once the PAYS cost recovery term is complete, these Solar PAYS structure options would require site owners to purchase the solar systems at fair market value. This is due to the fact that the systems would be owned by a third-party (either the utility or the Tax Investor) that cannot sell the assets for less than fair market value without undermining a claim of ownership of the solar system and therefore the original claim to the tax benefits of the associated tax credits.

To solve this potential barrier to ownership, interested parties could theoretically pursue legislative changes to enable the transfer of ownership to the site owner at the end of the PAYS term (e.g. via Internal Revenue Service safe harbor or Internal Revenue Code modification). More practically and simply, this aim could be met by additional changes to the terms of the Participant Agreement in order to enable ultimate customer purchase of the system at fair market value. For example, there may be a purchase reserve option or PAYS refinance option after the tax credit recapture period ends and the depreciation benefit has been fully utilized, approximately 5-6 years from the installation date. The following Figure 15 summarizes these initial ideas to create a path to ownership for site owners.

Figure 15: Potential Solutions Addressing “Path to Ownership” Issues for Solar PAYS Site Owners

(available full-sized in Appendix A)

Legislative Solution:	Potential Participant Agreement Solutions:		
<p>Create safe harbor for transfer of ownership to site owner without jeopardizing the tax credit structure</p>	<p>Have a portion of payments go toward a reserve to be used to purchase the system and convey ownership at the end of the PAYS® term (requires further review by tax accountants or counsel)</p> <p>Or, consider allowing Solar PAYS® implementation in 2 phases; participant agreement would provide for:</p> <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top; width: 50%;"> <p>20-year PAYS® (“lease-like”)</p> <ul style="list-style-type: none"> ▪ Monthly payments based on 80% Rule ▪ Copayment based on cost recovery² ▪ Ownership stays with IOU or 3rd party solar owner without subsequent refinance-- there is no transfer of ownership at the end of the PAYS® term; the solar owner may re-contract with the Customer to continue the purchase of solar electricity at the end of the PAYS® term. </td> <td style="vertical-align: top; width: 50%;"> <p>PAYS® “Refi” at Year 5¹</p> <ul style="list-style-type: none"> ▪ At/after year 5, Customer offered PAYS® “refinance” buyout option, which would provide a path to ownership at option of Site Owner and Customer, like traditional PAYS® ▪ Re-set monthly payments based on 80% Rule, accounting for changes in actual consumption and rates ▪ Copayment based on [remaining cost recovery needed]² </td> </tr> </table>	<p>20-year PAYS® (“lease-like”)</p> <ul style="list-style-type: none"> ▪ Monthly payments based on 80% Rule ▪ Copayment based on cost recovery² ▪ Ownership stays with IOU or 3rd party solar owner without subsequent refinance-- there is no transfer of ownership at the end of the PAYS® term; the solar owner may re-contract with the Customer to continue the purchase of solar electricity at the end of the PAYS® term. 	<p>PAYS® “Refi” at Year 5¹</p> <ul style="list-style-type: none"> ▪ At/after year 5, Customer offered PAYS® “refinance” buyout option, which would provide a path to ownership at option of Site Owner and Customer, like traditional PAYS® ▪ Re-set monthly payments based on 80% Rule, accounting for changes in actual consumption and rates ▪ Copayment based on [remaining cost recovery needed]²
<p>20-year PAYS® (“lease-like”)</p> <ul style="list-style-type: none"> ▪ Monthly payments based on 80% Rule ▪ Copayment based on cost recovery² ▪ Ownership stays with IOU or 3rd party solar owner without subsequent refinance-- there is no transfer of ownership at the end of the PAYS® term; the solar owner may re-contract with the Customer to continue the purchase of solar electricity at the end of the PAYS® term. 	<p>PAYS® “Refi” at Year 5¹</p> <ul style="list-style-type: none"> ▪ At/after year 5, Customer offered PAYS® “refinance” buyout option, which would provide a path to ownership at option of Site Owner and Customer, like traditional PAYS® ▪ Re-set monthly payments based on 80% Rule, accounting for changes in actual consumption and rates ▪ Copayment based on [remaining cost recovery needed]² 		
<p>¹ If Customer and Site Owner opt to stay with PAYS® “lease”, there is no transfer of ownership at the end of the PAYS® term; the IOU may re-contract with the Customer to continue the purchase of solar electricity at the end of the PAYS® term.</p> <p>² Exact mechanics to be flushed out with modeling (possibly in a second phase of work).</p>			

Further work would be required to assess the viability of these options, particularly the more practical option of changes to the terms of the PAYS Solar Tariff and the Participant Agreement, which is an important area for further exploration as noted in Section 6. *Summary of Findings and Recommended Next Steps.*

Aggregation Requirements and Considerations for Scale

Scale Requirements for Tax Equity Program

When considering the various structure options for Solar PAYS (with or without additional modifications for non-profit utilities), it is important to factor in the costs of completing each transaction and understand the corresponding minimum efficient scale required to allow such transactions to be undertaken by a Utility, and, in the case of a tax equity program, the additional minimum efficient scale required to allow such transactions to be undertaken by both the Sponsor and Tax Investor. Failure to consider these costs and thresholds will result in either higher transaction costs or, more likely, the inability to find a Tax Investor when needed. The following factors were considered when determining potential threshold requirements.

Solar tax equity transactions typically have minimum size thresholds:

- There are significant legal structuring, commercial underwriting and due diligence costs required to close tax equity portfolios; third-party transaction costs of \$500,000 are not uncommon. Closing larger transactions lowers the economic impact of these costs (\$ per watt) on the delivered solar systems;

- Tax Investors need to consider overall annual targets which are easier to hit when closing larger individual transactions; and
- As a result, tax equity investment minimums above \$25 million are common.

For utilities that are not tax efficient, the complexity of monetizing the tax credits in a Solar PAYS program may create additional upward pressure on minimum size²⁸:

- Distributed generation (DG) solar portfolios typically require aggregation where larger numbers of smaller projects are combined to create a final portfolio over a period of time. Projects in the final portfolio may not be fully identifiable at the time the tax equity transaction closes, and it may be necessary to group Customers for periodic funding requests from the Tax Equity investor as projects come online.
- A new Sponsor without a strong relevant track record will create additional perceived risks, typically around deployment and asset performance.
- New financial structures and products, such as the PAYS regulatory framework and Participant Agreement, introduce even more risk in the form of both transaction risk (i.e. failure to close) and perceived operating risk until field data can validate such new financial structures and product assumptions.
- A Tax Investor may refuse to invest time and resources to understand these new risks without motivations such as strong economics and scale.

Minimum scale may depend on structure:

- The Authors expect Partnership Flip and Lease Pass-through investors to require at least \$25 million per facility,²⁹ with a strong expectation of repeat transactions, with Sale Leaseback investors able to consider smaller investments.³⁰
- As a result, the number of customers required to fill a Sale Leaseback facility would be much lower than either a Partnership Flip or Lease Pass-through facility due to a combination of the smaller size requirements for Sale Leaseback transactions and higher funding levels under Sale Leaseback facilities. (Under a Sale Leaseback, the Tax Investor purchases the full solar project rather than a subset of economic benefits.)

In general, the minimum number of customers is a function of the minimum investment size for the Tax Investor and the amount of economic benefits generated by each customer. If the Tax Investor can consider a lower investment size or is able to monetize a greater portion of benefits from a given installation, the minimum number of residential systems required is reduced. The following table compares the potential number of installations needed to fill a \$25 million Partnership Flip Facility, \$25 million Lease Pass-through facility, and \$10-15 million Sale Leaseback facility.

²⁸ Note, these tax credit monetization structures could be unnecessary if the tax credits were refundable or convertible to a grant payment from the U.S. Treasury, as they were under Section 1603 of the American Recovery and Reinvestment Act of 2009. More information at <https://home.treasury.gov/policy-issues/financial-markets-financial-institutions-and-fiscal-service/1603-program-payments-for>

²⁹ The facility size corresponds to the amount of capital the Tax Investor would commit to funding for projects, typically limited to a specific timeframe for deploying solar assets such as a calendar year.

³⁰ Sale Leaseback transactions can typically be done on a smaller transaction size basis since the structure is generally less complex.

Table 1: Minimum Residential Project Aggregation Requirements by Structure³¹
(available full-sized in Appendix A)

	Partnership Flip	Lease Pass-through	Sale Leaseback
Tax Investor Minimum Investment Size (\$)¹	\$25M²	\$25M²	\$10M-15M³
\$ Investment per Customer	\$~3,500⁴	\$3,300⁵	\$15,000⁶
# Customers Required for a \$15,000 system⁷	~7,000	~7,500	700-1000

¹ Assuming third-party financial partner or syndicator. This minimum threshold will likely be lower for strategic participants such as tax-efficient co-ops.
² Refer to previously discussed Scale Requirements for Tax Equity Programs.
³ SLB average size assumed to be \$10 million, based on lower level of transaction complexity and smaller average size in equipment lease finance markets which typically employ sale-leaseback transaction structures.
⁴ Estimated Tax Investor's investment per Customer based on \$3/W Fair Market Value ("FMV"), 5kW average size system, 22% ITC, and PF funding terms of \$1.05 /credit with 99% of ITC monetized by TE.
⁵ Estimated Tax Investor's investment per Customer based on \$3/W FMV, 5kW average size system, 22% ITC, and LPT funding terms of \$1.00 /credit with 100% of ITC monetized by TE.
⁶ Estimated Tax Investor's investment per Customer based on \$3/W FMV, 5kW average system size for a SLB structure.
⁷ The resulting cost of a \$3W FMV, 5kW average system size is \$15,000.

As shown, the number of standard residential participants is expected to be significantly lower for a Sale Leaseback facility at 700-1000 customers, as compared to 7,000-7,500 for a Partnership Flip or Lease Pass-through facility, due to the minimum expected Tax Equity investments and potential funding amount for each participating residential installation.

Addressable Market Size of Co-ops

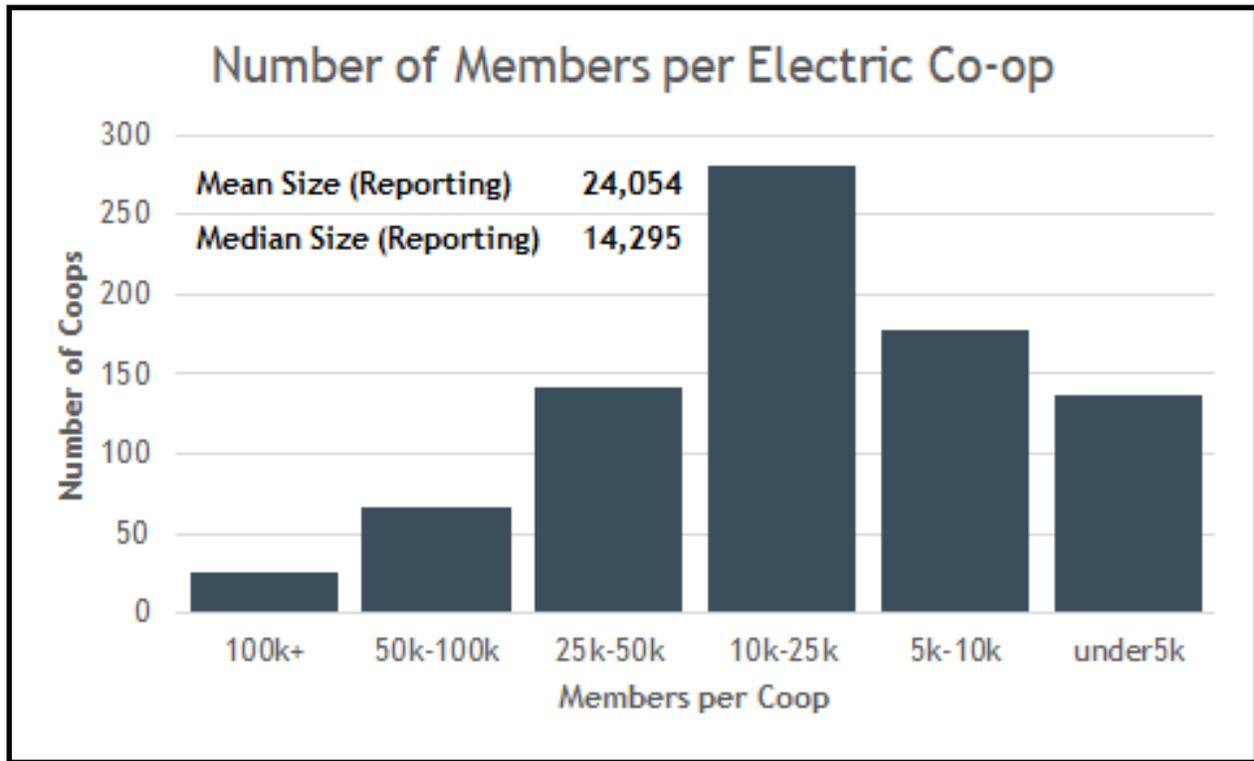
The Authors also looked at the addressable market for residential solar from within existing electric cooperatives to assess their potential to scale.

- Initial research into addressable market for Solar PAYS indicated that as of May 2020, there are approximately 1,060 members of the National Rural Electric Cooperative Association with 835 reporting their membership size.³²
- Based on these reports, the average U.S. cooperative appears to have between 15,000-25,000 member-owners. The vast majority are residential accounts.

³¹ Assumes the Tax Investor is a third-party financial partner or syndicator. This minimum threshold will likely be lower for strategic participants such as tax-efficient co-ops. Average size for SLB Tax Investor assumed to be \$10 million, based on lower level of transaction complexity and smaller average size in equipment lease finance markets which typically employ sale-leaseback transaction structures. Estimated Tax Investor's investment per Customer based on \$3/W Fair Market Value ("FMV"), 5kW average size system, 22% ITC, and PF funding terms of \$1.05 /credit with 99% of ITC monetized by TE, LPT funding terms of \$1.00 /credit with 100% of ITC monetized by TE, and SLB funding terms based on 100% of FMV. The resulting installation cost of a \$3W FMV, 5kW average system size is \$15,000.

³² <https://www.electric.coop/our-organization/nreca-member-directory/>

Figure 16: Number of Members per Electric Cooperative



Assuming electric cooperatives have a median reported size of 14,295 customers, we can calculate the percentage of customers that would be required to fill the Tax Equity facilities as follows:

Table 2: Comparison of % of Median-Sized Cooperative Required to fill Tax Equity Facilities

	Partnership Flip	Lease Pass-through	Sale Leaseback
Minimum # Customers	7,000	7,500	1,000
Min as % of Median Coop	49%	52%	7%

Based on these calculations, the necessary percentage participation from a given cooperative could be around 50% to fill either a Partnership Flip or Lease Pass-through facility, but less than 10% for a Sale Leaseback facility. As a result, the Sale Leaseback structure has a distinct advantage over either Partnership Flip or Lease Pass-through structures, at least during the early phase of introducing a Solar PAYS structure without an aggregation strategy involving multiple distribution electric cooperatives.

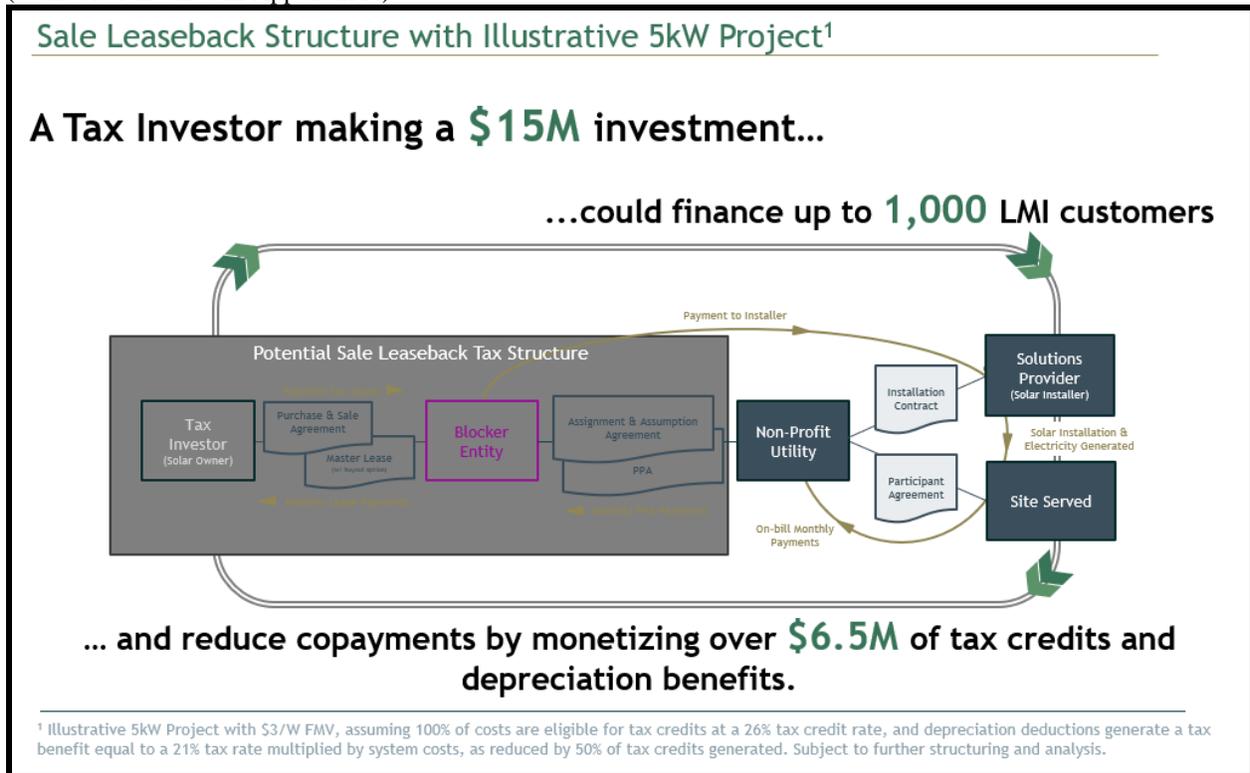
Aggregation Considerations: Conclusions

Given the aggregation requirements and complexity for a tax-equity fund, the Authors believe:

1. Financial Tax Investor (i.e. banks and syndicators) options appear limited:
 - Partnership Flip & Lease Pass-through:
 - Based on minimum investment thresholds and added complexities from introducing Solar PAYS / new Sponsor risks, it would be difficult to attract a traditional Partnership Flip Lease or Pass-through Tax Investor.
 - The Authors are already seeing execution challenges with less complicated structures and a proven Sponsor, largely due to a Tax Investor market with limited tax capacity.
 - Especially given the recent COVID19-related economic downturn and near-term uncertainty, the Authors expect challenges to convince a Partnership Flip or Lease Pass-through provider to invest the time and effort required to successfully execute a transaction.
 - Sale Leaseback:
 - While the required transaction size is smaller than Partnership Flip and Lease Pass-through structures, the Authors are not clear at this point whether Tax Investors would consider a Sale Leaseback with a utility installing residential solar systems under a Solar PAYS program.
 - This is worthy of further investigation in the next phase of this investigation.
2. Sources of tax equity that are strategically aligned may be more promising than strictly financial institutions and may include the following:
 - Seeking (or partnering with) cooperatives that have tax capacity
 - Partnering with existing residential solar aggregators that have existing tax-capacity
 - This could involve working with existing solar aggregators to originate projects with a Solar PAYS Participant Agreement which the solar aggregator would own, finance, and claim tax benefits.
 - Solar aggregator examples: PosiGen, Sunrun
 - Partnering with other Financial Intermediaries working in energy solutions for low-to-moderate income customers
 - Financial intermediary example: Inclusive Prosperity Capital
3. Scale may be achievable with generation and transmission cooperatives:
 - Generation and transmission cooperatives could leverage existing relationships to aggregate customers across their member cooperatives.

- If scale is sufficient, these generation and transmission cooperatives could pursue partnership with cooperative banks with access to Tax Investors, leverage cooperative’s existing tax capacity, or work with traditional Tax Investors.

Figure 17: Sale Leaseback Structure with Illustrative 5kW Project³³
 (available full-sized in Appendix A)



As shown in Figure 17, aggregating and executing even just a \$15 million Sale Leaseback facility (instead of a larger Partnership Flip or Lease Pass-through facility), could unlock Solar PAYS for over 1,000 low-to-moderate income customers. In 2020, the value of the monetized tax credits and depreciation benefits in this scenario could exceed 40% of the total investment,³⁴ directionally reducing the cost of the copayments and monthly cost recovery charges for participating customers.

Summary of Findings and Recommended Next Steps

This section summarizes the questions and issues uncovered, initial conclusions drawn, as well as recommended next steps.

³³ Illustrative 5kW project with \$3/W FMV, assuming 100% of costs are eligible for tax credits at a 26% tax credit rate, and depreciation deductions generate a tax benefit equal to a 21% tax rate multiplied by system costs, as reduced by 50% of tax credits generated. Subject to further structuring and analysis.

³⁴ Depreciation benefits calculated by multiplying the estimated amount of depreciation deductions by a corporate tax rate of 21% before accounting for taxable income generated from customer payments. The total value of depreciation benefits may be reduced by the amount of taxable income generated.

Table 3: Summary of Questions and Issues Uncovered

Structure	Context	Question/Issue
Existing PAYS Structure	Tax Credit Issues Around Customer Eligibility	Customers may or may not be eligible for tax credits, depending on a range of factors such as the specifics of the PAYS program, the Participant Agreement, the amount of Copayment by the customer, and as a result, the underlying ownership of the EE Upgrades for tax purposes.
	Tax Credit Issues Around Customer Ability to Benefit from Tax Credits in timely manner	A large portion of upfront Customer economics depend on the ability to utilize the tax credits, as Customers may lack the tax capacity to use the tax credit in the initial tax year. Additionally, the timing of tax filing and estimated tax payments / refunds is also important.
3rd Party Tax Structure³⁵	Customer Path to Ownership	In 3 rd party tax structures, ownership of the system typically stays with the party claiming tax benefits. The Customer’s path to ownership would require a buyout option, may or may not involve extending the cost recovery period for participating customers.
	Customer Path to Ownership (i) Consider Reserves	Is there a way to set aside a portion of monthly PAYS payments for a buyout reserve that would create a path to ownership without jeopardizing the tax structure?
	Customer Path to Ownership (ii) Consider PAYS lease & refi	Could you create an operating lease with an option to refinance under PAYS?
	Minimum Aggregation Threshold	If the utility is not tax-efficient, a tax equity structure would be needed. Most Tax Investors have a minimum aggregation threshold for the financial scale of the deal. What are the prospects and preferences for scale / aggregation / structures for the utilities most likely to apply PAYS to on-site solar first?

Conclusions

Through this engagement, the Authors have arrived at three broad conclusions related to the application of PAYS to on-site solar and the quest for a Solar PAYS structure to introduce in the field.

³⁵ 3rd Party Tax Structures include: Option 1, Solar PAYS Tax Efficient For-Profit Utility Structure; Option 2, Solar PAYS SLB Structure; Option 3, Solar PAYS PF Structure; and Option 4, Solar PAYS LPT Structure.

1. Minimize upfront copayments by participating Solar PAYS customers; it is essential to monetize the solar tax benefits through an outlet that is not the customer.

The Authors arrive at this conclusion for the following reasons: even today, most customers are unable to monetize residential solar tax credits in a timeframe that would allow them to apply such benefits to offset a Solar PAYS copayment. Additionally, residential solar tax credits for individual taxpayers will be eliminated entirely after 2021, but investment tax credits for businesses will remain at 10%.³⁶ Furthermore, while the residential customer would not be able to utilize any benefits associated with accelerated depreciation, its use would be possible by other parties. The Solar PAYS financing structures, as contemplated in Section 4. *Four Solar PAYS Options and Considerations*, would allow parties other than the customer to benefit from solar tax benefits, thereby reducing the amount of customer copayment required.

2. Utilities using Solar PAYS must be able to either internally or externally monetize the associated tax benefits.

Electric cooperatives and for-profit utilities participating in Solar PAYS structures should be able to either internally monetize the tax benefits from portfolios of on-site residential solar systems (if they are for-profit entities with sufficient tax capacities) or externally monetize these tax benefits. Externally monetizing tax benefits can be done through addition of existing tax-equity structures broadly employed across the U.S. solar financing markets, including Sale Leaseback, Partnership Flip, and Lease Pass-through structures (Options 2-4, as contemplated in Section 4. *Four Solar PAYS Options and Considerations*), provided that such arrangements follow existing tax guidance and are structured such that Tax Investors are motivated to participate.

3. Considerations of project scale and transaction efficiency should drive structuring decisions for Solar PAYS transactions.

Closing transactions for new products is challenging, and if the utilities also require external monetization of tax benefits, the pool and appetite of Tax Investors is limited. As a result, deference should be given to investors based on their constraints and preferences. While we have suggested, for example, that the Sale Leaseback structure has advantages over the others due to lower minimum scale requirements and simplicity, ultimately structure selection should depend on the preference of available Tax Investors. We believe this is most likely to initially result in Sale Leaseback structures, but all structures should be considered if willing counterparties preferring other structures present themselves. Even more importantly, finding scale partners with their own tax capacity or existing tax-equity relationships would obviate the need to separately structure tax credit transactions and allow for faster implementation.

³⁶ Under IRC Section 25D, the solar tax credit available to individuals is scheduled to drop from 22% to zero after December 31, 2021, while under IRC Section 48, solar tax credits for businesses will reduce from 22% down to 10% after December 31, 2021, would allow businesses such as Tax Investors or Utilities to continue claiming tax credits for residential systems owned by these third-party businesses.

Recommended Next Steps

Based on the questions and issues summarized above, as well as the initial next steps considered, the Authors recommend refining and vetting aggregation of solar systems prioritizing Option 1, Solar PAYS Tax Efficient Structure and Option 2, Solar PAYS Sale Leaseback Structure, as the most likely pathway for early adopters. The work needed to further refine these options may include the following:

- Determine the willing utility, strategic, and financial participants for various stages of a Solar PAYS scale-up;
 - Engage with scalable partners including solar aggregators, generation & transmission cooperatives, and others able to efficiently roll-out Solar PAYS programs within a single utility service area, across a state, or nationally.
 - Engage with potential Tax Investors, especially sale lease-back providers with experience in distributed generation solar or electric cooperatives.
 - For regulated utilities, engage with Commissions to evaluate their interest in approving the PAYS system to affect the investment of on-site solar systems at the homes of LMI customers and possibly renters.
 - Prepare financial model(s) to perform a sensitivity analysis of expected outcomes for the transaction participants (including an analysis of the potential impact on Customer copayments).

- Based on willing participants and the likely stages for scale, confirm the appropriate Solar PAYS structure(s) to pursue;

- Further vet the structures, including the use of blocker entities (as required), with accountants or legal counsel, who are likely to bill at an hourly rate rather than sign up for a fixed fee arrangement;
 - Accountants with expertise in this space include: “Big Four” accounting firms, as well as mid-sized specialty firms with relevant expertise.
 - Legal counsel with specific expertise in distributed solar tax structures. Note, legal counsel may include lawyers with expertise in various specialties such as corporate, environmental, project finance, equipment leasing, revenue contracts, or tax law.

- Engage with legal counsel to draft contracts required to pilot, including any required structure documents, the Participant Agreement, and the Installer Agreement (or amendments to existing Participant and Installer Agreements); and,

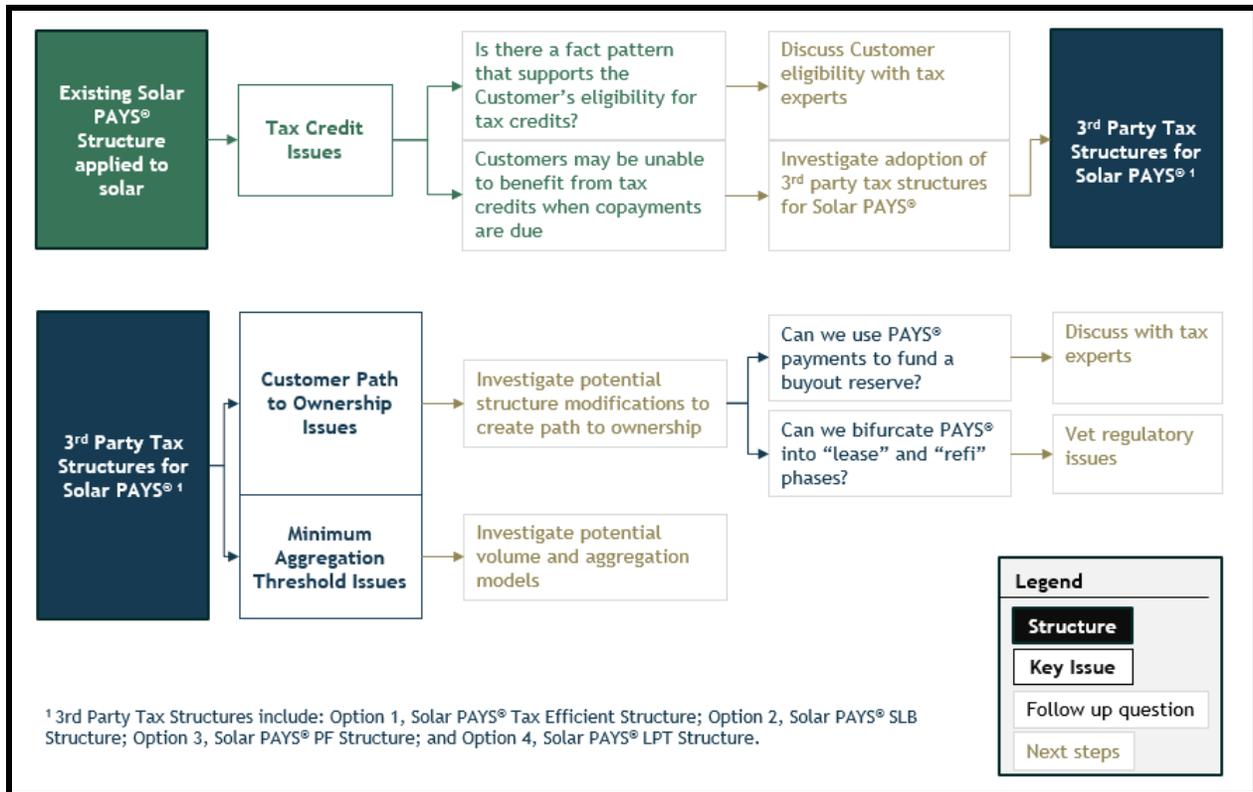
- As a pilot becomes viable, engage with appraisers, independent engineers, and others, as may be required by Tax Investors or other parties to diligence the transaction. A sample financial diligence checklist for solar projects is included as *Appendix B*.

To the extent these areas were not covered above, further explore:

- Solutions for structuring a pathway to ownership for Solar PAYS participants that is compatible with the cost recovery analysis for the assets;

- Viable arrangements for Blocker Entities, which would be especially important to non-profit utilities; and
- Financial modeling to characterize the value streams and cash flows for the two most promising options (e.g. Option 1 and Option 2).

Figure 18: Questions and Issues Dependency Tree with Next Steps
 (available full-sized in Appendix A)



List of Appendices

Appendix A. NextResource Advisors Solar PAYS Financial Structuring Considerations Slide Deck

Appendix B. Sample Financial Due Diligence Checklist for Solar Assets

Appendix C. Detailed Description of Work Performed

Appendix A. NextResource Advisors Solar PAYS Financial Structuring Considerations Slide Deck

Solar PAYS® Financial Structuring Considerations

A deliverable for the US Department of Energy EERE grant DE-EE0008567/0000, Accelerating Low Income Financing and Transactions (“LIFT”) for Solar Access Everywhere

Prepared for Clean Energy Works | May 29, 2020

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Author Qualifications



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Mr. Cook has more than twenty years of experience in renewable energy finance, during which he has built and led renewable energy finance platforms. He co-founded NextResource Advisors with Connie Chern, providing general advisory and financial strategy services to start-ups and mature companies with renewable energy, infrastructure, and project finance challenges. He also co-founded NextPower Capital, where he is a Managing Partner leading investment banking activities.

Prior to founding NextPower Capital, Mr. Cook was a Vice President in the Structured Finance & Global Markets groups at SolarCity (now Tesla Energy), where he was instrumental in creating its Structured Financing group which raised capital for over \$9 billion of its projects. Earlier in his career, Mr. Cook led the finance group at Recurrent Energy, a leading solar developer, and a Director of Structured Finance at SunPower.

Mr. Cook also developed infrastructure for Bechtel's project finance and development group, although he began his career co-founding and running SELCO, a distributed solar project developer, financier, and operator focused on emerging markets. Mr. Cook holds an MBA from the Stanford Graduate School of Business and graduated with honors in economics and physics from the University of Virginia. Mr. Cook holds Series 7, 63, and 79 securities licenses (securities-related work performed through Burch & Company, Inc).



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Ms. Chern has over 15 years of experience with tax-advantaged investments and has structured financing for over \$2.5 billion of renewable energy assets. She co-founded NextResource Advisors with Benjamin Cook, providing general advisory and financial strategy services to start-ups and mature companies with renewable energy, infrastructure, and project finance challenges. Ms. Chern is also a Managing Director at NextPower Capital, where she leads and supports capital raising transactions and investment banking activities.

Prior to joining NextPower Capital, Ms. Chern was a Director in Tesla Energy's (fka SolarCity) Financial Products and Structured Finance groups, where she was responsible for developing financial products, managing platform operations, and raising capital. She played a leading role in structuring and raising over \$1bn in tax-equity and debt for distributed solar and battery storage installations.

Before SolarCity, Ms. Chern was with Novogradac & Company LLP, where she co-founded and developed the firm's presence in New York, providing audit, tax, and advisory services for over \$1.5 billion in real-estate and renewable energy assets. She is licensed as a certified public accountant in California and holds a B.A. in Legal Studies and a minor in business administration from the University of California, Berkeley. She also holds Series 63 and 79 securities licenses (securities-related work performed through Burch & Company, Inc).

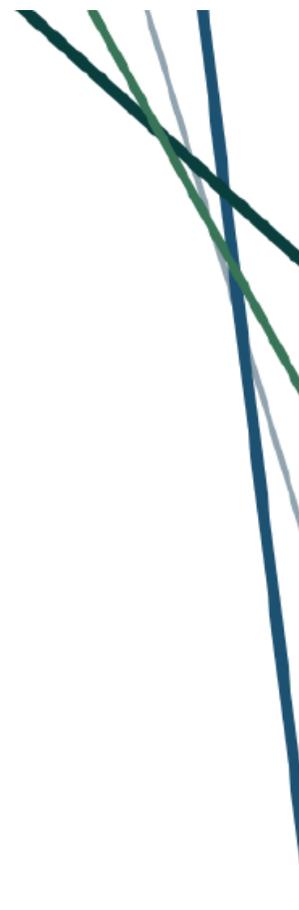


Overview

Content Sections

- 1 Background on US Residential Solar Market and PAYS®
- 2 Initially Proposed Structure for Solar PAYS®
- 3 Alternate Structure Options Considered
- 4 Aggregation Considerations
- 5 Recommended Next Steps





Background

US Residential Solar Market & PAYS® History

Residential Solar Market Conditions Advantage Households with Higher Credit & Income

The high upfront cost of installing a rooftop residential solar system is generally recovered through a combination of upfront tax incentives and ongoing electricity savings. As a result, solar adoption has been higher for those with access to credit, and the ability to utilize such tax incentives upfront.

2020 Economic Scorecard for US Residential Solar Ownership



Total benefits outweigh costs, BUT upfront costs significantly outweigh upfront benefits



Benefits

Upfront Economic Benefits

- 26% Tax credit on equipment/installation

Ongoing Economic Benefits

- Energy produced(\$/kWh) and [local incentives]

Deferred Economic Benefits

- Increase in home value and increase tax basis of home = cost of improvements less tax credits



Costs

Upfront Costs

- Equipment/Installation

Ongoing Costs

- Maintenance and [potential increase in property taxes]

* [bracketed items subject to regional differences]

Most US Residential Solar Systems are Financed

Summary of typical payment options for residential solar

Approximately 78% of residential solar is financed through third-party ownership or loans¹ and dependent on homeowner credit (min. FICO 650-680²)

Market Share ¹	Payment Option	System Owner	Qualification Criteria	Provider Example ³
	Cash Purchase	Homeowner	Homeowner must have cash on hand (or access to credit card/HELOC, etc)	All Solar Providers
33%	Power Purchase Agreement (PPA)	Third-party	Subject to FICO/credit assessment	vivint.Solar
	Lease	Third-party	Subject to FICO/credit assessment	vivint.Solar, sunrun, SUNPOWER®
	Subscription	Third-party	Third-party PPAs & leases have historically had FICO requirements, but we were unable to verify requirements for current Subscriptions.	TESLA
45%	Specialty Loan	Homeowner	Subject to FICO/credit assessment	vivint.Solar, sunrun, LOANPAL, Sunlight Financial, SUNPOWER®, MOSAIC
	Property Assessed Clean Energy (PACE)	Homeowner	Subject to home equity/credit assessment and local property tax regulations/administration	Ygrene, hero by RENOVATEAMERICA

¹ <https://www.greentechmedia.com/articles/read/as-solar-loans-start-to-dominate-loan-providers-see-increasing-value-in-ins#gs.5pufou>

² FICO as disclosed on April 27, 2020 on <https://www.nerdwallet.com/best/loans/personal-loans/solar-loans-solar-panel-system-financing-options> and https://www.gosolarcalifornia.ca.gov/tools/marketing/consumer_guides/Homeowner_Guide_to_Solar_Financing_February_2015.pdf

³ Financing availability as disclosed on provider websites as of April 24, 2020: <https://www.vivintsolar.com/solar-plans>, <https://www.sunrun.com/solar-plans-and-services>, <https://www.tesla.com/support/energy/solar-panels/learn/subscription-solar>, <https://sunlightfinancial.com/>, <https://www.ioinmosaic.com/>, <https://loanpal.com/green-energy>, <https://ygrene.com/about-ygrene-financing>, <https://www.renovateamerica.com/financing/hero>, <https://us.sunpower.com/home-solar/save-with-solar-panels>

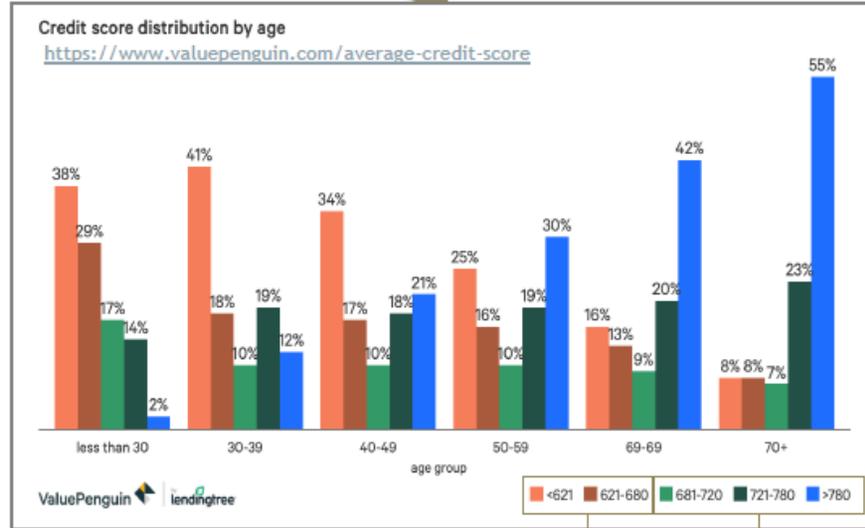
Financing Options Limit US Residential Solar Market

Addressable market for residential rooftop solar is highly dependent on access to credit

“In 2019, the average age of Americans who’d reached a [FICO] score of 700 was 54-years-old”¹

Over 138 million residential rooftops

and a population limited by access to credit



Over 50% of people under the age of 50 have sub-prime credit.

Sub-prime

Prime credit

¹ <https://money.com/fico-score-average-2019/>

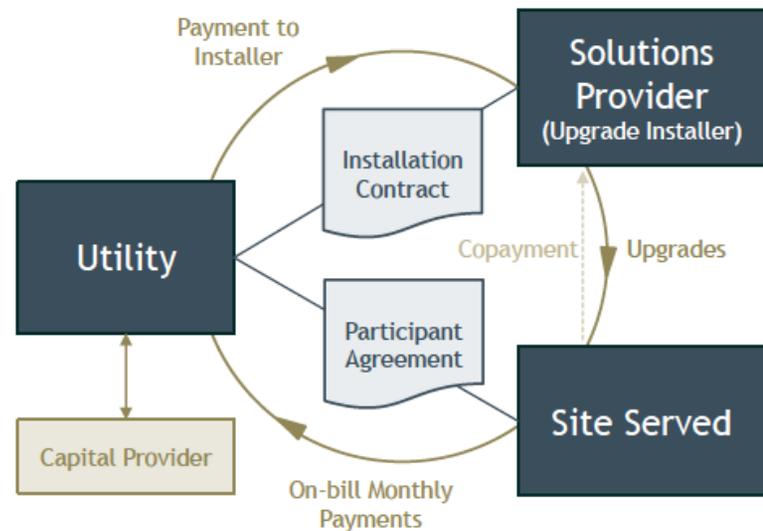
Introduction to PAYS® for Efficiency Upgrades

Structure and Features of Pay-As-You-Save (PAYS®)

PAYS® programs enable utilities to invest in, and recover their costs from, customer-sited and cost-effective energy efficiency and renewable energy equipment

Key Features of PAYS® Programs:

- **Tariffed charge assigned to a site, not to an individual customer;**
 - no new debt for consumers
 - payment obligations automatically transfer to successor customers
 - no liens on real estate
- **Billing and payment on the utility bill with disconnection for non-payment (charges suspended for repairs or vacancy);**
- **Independent certification** that products are appropriate and savings estimates exceed payments, both near and long term
 - Proven technologies
 - “80% Rule”
 - Max cost recovery term = 80% of estimated life of shortest-lived component or warranty, and
 - Max monthly program service charges limited to 80% of gross savings
- **Upgrades belong to site owner** at conclusion of PAYS® cost recovery/bill term



Utility: Economic Snapshot

- [-] Installation Cost (less copayment)
- [+] Monthly On-bill Payments
- [±] Capital Provider Proceeds/Repayment

Customer: Economic Snapshot

- [-] Upfront Copayment (if required)
- [-] Monthly On-bill Payments
- [+] Net Savings on Energy Costs
- [+] Post-Contract Value (Ownership passes to Site Owner after final payment)

¹ Structure information provided by Clean Energy Works, April 2020.

Payments Under PAYS® for Efficiency Upgrades

Monthly payments and copayments tied to customer savings and utility cost recovery thresholds¹

PAYS® Payment Framework:

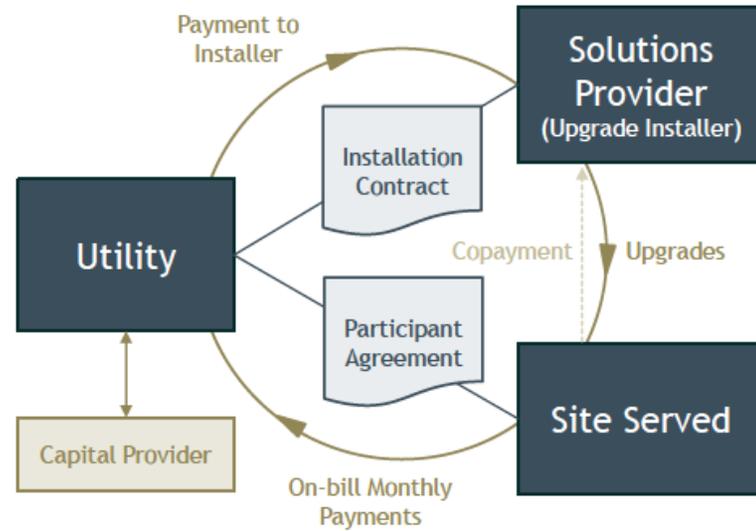
Requires analysis of cost-effectiveness for each upgrade

Monthly Payments

- Sized as fixed monthly charges, subject to “80% Rule” for cost recovery period and minimum savings threshold²
- Results in immediate savings on monthly bills

Upfront copayments

- Required to the extent the PV of monthly payments does not cover the cost of the upgrades (“cost recovery”)
- Utilities can reduce copayments for rebates if rebates available to all customers are limited to the amount required to qualify an upgrade for the PAYS® tariff
- The Customer may be entitled to certain delayed incentives (such as a solar tax credit), which will not reduce the monthly payment amount but can help recover the cost of any upfront copayments
- Limited investment threshold from “80% Rule” and inability to incorporate delayed incentives results in upward pressure on copayments
- Copayments are especially challenging for low-to-moderate income (“LMI”) households



Utility: Economic Snapshot	Customer: Economic Snapshot
[-] Installation Cost (less copayment)	[-] Upfront Copayment (if required)
[+] Monthly On-bill Payments	[-] Monthly Payments
[±] Capital Provider Proceeds/Repayment	[+] Net Savings on Energy Costs
	[+] Post-Contract Value (Ownership passes to Site Owner after final payment)

¹ Structure information provided by Clean Energy Works, April 2020.

² For Solar, the “80% Rule” for savings is relaxed to a “87% Rule” based on the predictability of system output and likely savings.

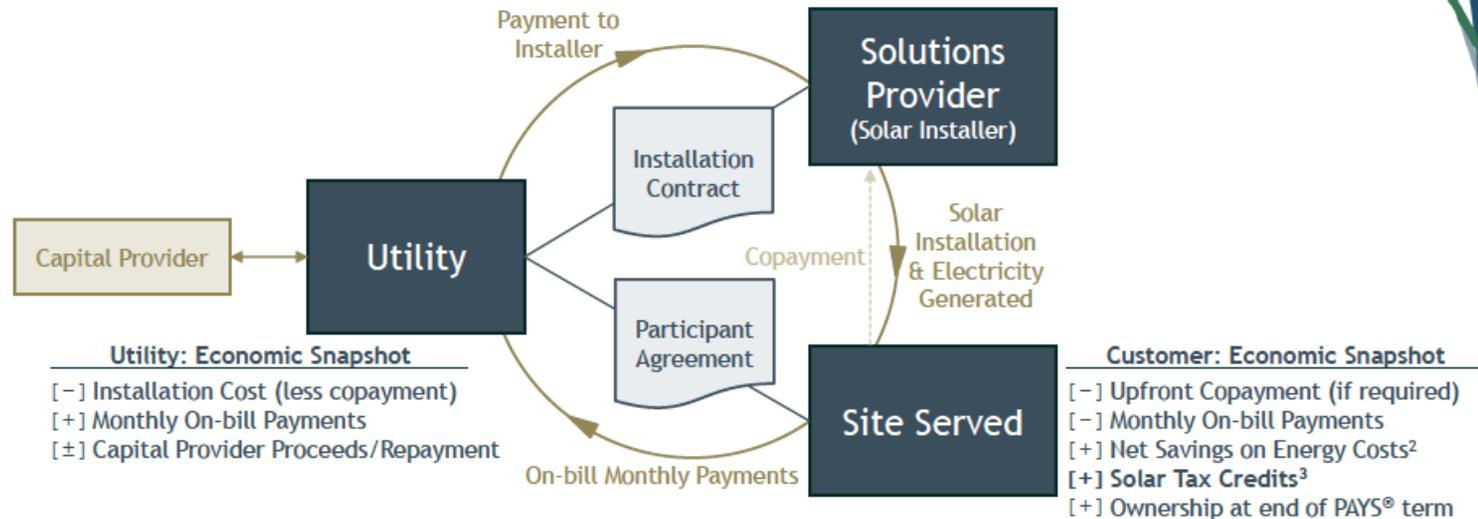


Proposed Structure

Adapting PAYS® for Solar: Proposed Structure and Discussion

Solar PAYS® Structure

Structure as Adapted from Energy Efficiency¹ & Potential Issues²



Potential Solar-Specific Structure Issues

Solar tax credits (up to 30% of Installation Costs³) are not part of most Energy Efficiency economics, but they make up a large portion of solar economics and may be problematic in the PAYS® structure for the following reasons:

- 1) Eligibility: Customer may not be eligible for tax credits since the utility is the initial owner of the solar upgrades and pays the Solutions Provider
- 2) Timing: Even if the Customer is eligible for tax credits, the upfront Copayment is due without regard to the timing of tax credit benefits - Customers may not realize an immediate benefit due to timing of tax filing and estimated tax payments, or Customer may lack the tax capacity to use the tax credit in the initial tax year

¹ Structure information provided by Clean Energy Works, April 2020.

² Additional work is needed to assess regionally-motivated economics such as local rebates, production-based incentives, or tax incentives which are outside the scope of work for NextResource Advisors.

³ Per IRC Section 25D, residential solar tax credits are 30% of eligible installation costs, stepping down to 26% in 2020, 22% in 2021, and 0% thereafter. There may be a minimum copayment threshold (i.e. 50%) to justify the Customer's eligibility for tax credits, although further investigation is needed to confirm.

Issue #1: Confirm Customer Tax Credit Eligibility

Discussion & Work Plan

Concern: The Customer may not be eligible for tax credits since the Utility pays the Solutions Provider.

Discussion:

- Generally tax credit eligibility is based on 1) ownership and 2) eligible costs paid
- With PAYS®, 1) the Utility owns the system until completion of the PAYS® cost recovery (monthly payment) term, after which the system passes to the Site Owner (which may or may not be the Customer), and 2) the Utility pays the Solutions Provider. Both structure features raise concerns around the Customer's eligibility for tax credits.

Work Plan:

- NR to vet the following questions:
 - Is there a fact pattern that supports the Customer's eligibility for tax credits?
 - For example, would it impact the conclusion if the Customer is required to make a minimum copayment based on a percentage of the total cost? Does it matter how/who pays the Solutions Provider?
- Confirm/Discuss with tax experts (i.e. accounting firms/tax counsel)
 - Conclusion may require additional support from Private Letter Ruling or regulatory changes (safe harbor publication, or even tax reform)
- Investigate Alternate Structure Options
 - Third-party ownership models have set precedence for clear ownership and tax credit eligibility with other types of solar financing products;
 - There could be a third-party tax credit monetization model for the PAYS® structure in which Customer does not need to be able to use tax credit - instead, tax credit benefit is priced into the Copayment & Monthly Payment amounts

Issue #2: Consider Tax Credit Timing

Discussion & Work Plan

Concern: The upfront Copayment is due without regard to the timing of tax credit benefits. Customers may not realize an immediate benefit due to the timing for tax filing and estimated tax payments/refunds, or Customers may lack the tax capacity to use the tax credit in the initial tax year.

Discussion:

- **Copayment Determination:** Paid at the beginning of the PAYS® term, and calculated as follows: total amount upfront costs paid by the Utility to the Solutions Provider less costs recovered by monthly fixed PAYS® tariff charges (which in turn are sized using the “80% rule”)
- Tax Credits are generated when the solar system is placed-in-service, but the benefit may be delayed:
 - Taxpayer may need to wait until their annual tax return has been filed and claim a refund of taxes paid: the resulting timing difference between the copayment date and the tax credit benefit could be over a year
 - Taxpayer may not pay enough taxes to use the tax credit: as a result, the tax credits would “carryforward” until they can be used, with a possibility that the benefit is never realized (especially true for LMI households)

Work Plan: Investigate Alternate Structure Options

- Without legislative changes¹ to restructure the tax credit, Customers may not realize a timely benefit for tax credits to offset the upfront copayment charges. As a result, Alternate Structure Options may be a much more viable path to address this challenge.
- In addition to addressing ownership and tax credit eligibility, third-party ownership models have addressed the issue of ability of taxpayers to benefit from the tax credits while also eliminating the need for upfront payments by separately bringing in a tax investor.
- There may be a third-party tax credit monetization model for PAYS® structure where Customer does not need to be able to use tax credit - instead, tax credit benefit is priced into the Copayment & Monthly Payment amounts.

¹ Possible legislative changes include making IRC Section 25D a federal rebate, grant, or refundable tax credit.



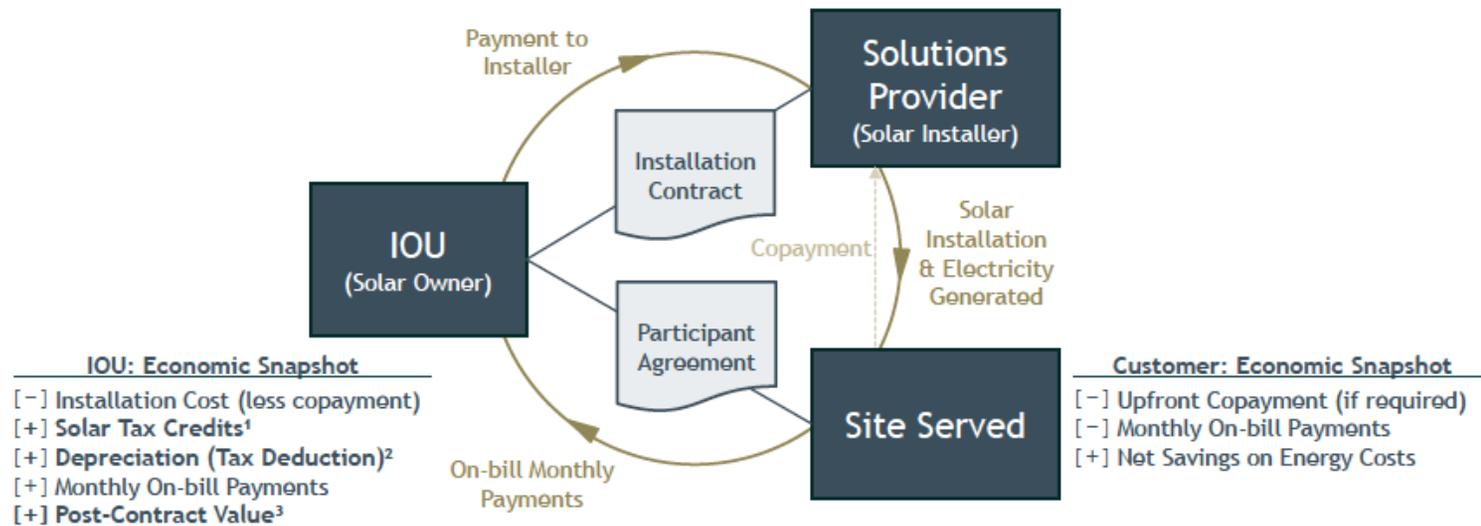
Alternate Structure Options

Structuring for Tax Credit Issues

Option 1: Solar PAYS® Tax Efficient Structure

Includes All Ownership Benefits in Cost Recovery Calculations

In this structure, a tax-efficient Utility (e.g. IOU) would own the system and factor the tax credits (and added bonus of depreciation) into the cost recovery calculations when determining any required copayment amounts.



¹ The IOU is expected to claim an Investment Tax Credit under IRC Section 48 instead of the residential solar tax credit under IRC Section 25D.

² As business use equipment, the IOU may be eligible for MACRS depreciation deductions on the system.

³ For tax credit structuring, ownership of the system must remain with the IOU at the end of the PAYS® term unless a fair market purchase is made by the site owner; without further structuring, this requirement may be incompatible with the PAYS® program guidance which specifies that ownership should pass to the Site Owner at the end of the PAYS® term.

Discussion of Option 1, Solar PAYS® Tax-Efficient Structure

Pros, Cons, and Potential Issues

PRO	CON/ISSUE
<ul style="list-style-type: none"> ▪ Customer does not need to be tax efficient ▪ Added benefit of depreciation deductions ▪ Potential reduction or elimination of Customer copayment requirements 	<ul style="list-style-type: none"> ▪ Requires IOU to be tax efficient and able to benefit from tax credits and depreciation ▪ Additional structure costs may require a minimum threshold for favorable economics and scale ▪ Post-contract value stays with the IOU, which may be incompatible with PAYS®

[Footer]

Addressing Tax-Efficiency Requirements

Issue & Work Plan

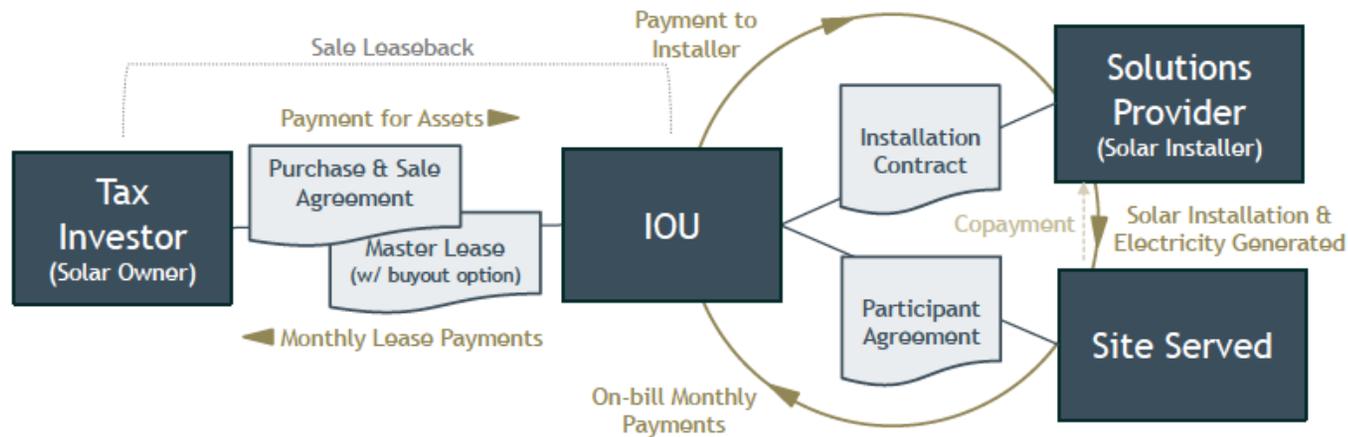
- **Issue:** Many IOUs are not tax efficient
- **Work plan:** Investigate existing structures used for tax equity investments and ability to monetize tax benefits within the PAYS® program.
- **Tax Equity Structures include:**¹
 - Sale Leaseback
 - Partnership Flip using a Special Purpose Entity (SPE)
 - Lease Pass-through
- Non-profit structure modifications for adaptation by POUs, Cooperatives, etc

¹ Third-party ownership structures may introduce new ownership issues; depending on the structure, the IOU may not own the system without a buyout of the tax investor. The structure analysis will include a discussion around possible paths to ownership for the IOU. The path to ownership by the Customer/Site Owner may be addressed in the Participant Agreement and potential structure options, as previously discussed (reserves, and/or PAYS® Refi).

Option 2, Solar PAYS® SLB Structure

Sale Leaseback tax equity structure as adapted from equipment financing and solar transactions

Tax credits could be monetized with a sale leaseback if the Utility (IOU) is a for-profit enterprise but not tax efficient.



Tax Investor: Economic Snapshot

- [-] Purchase: Solar Installation
- [+] Solar Tax Credits¹
- [+] Depreciation (Tax Deduction)²
- [+] Master Lease Payments
- [+] Post-Contract Value³

IOU: Economic Snapshot

- [+] Sale: Solar Installation
- [-] Installation Cost (less upfront copayment)
- [+] Monthly On-bill Payments
- [-] Master Lease Payments

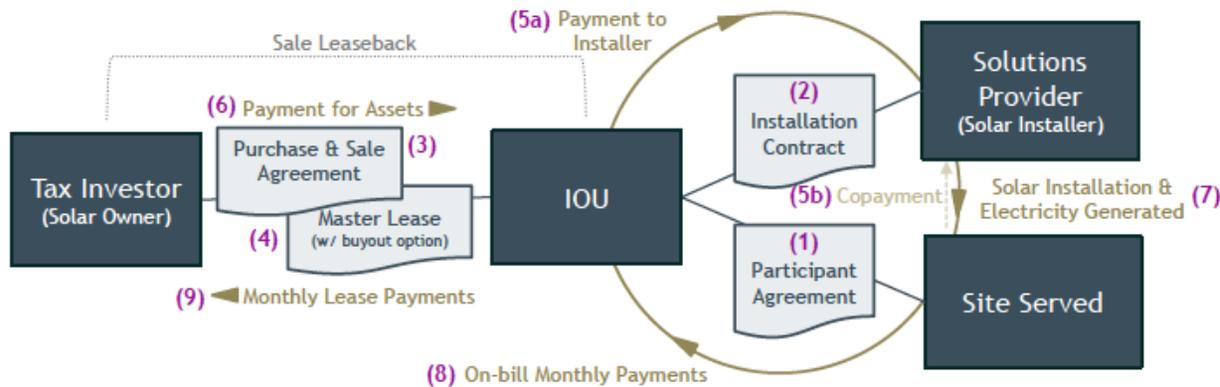
Customer: Economic Snapshot

- [-] Upfront Copayment (if required)
- [-] Monthly On-bill Payments
- [+] Net Savings on Energy Costs

¹ The Tax Investor is expected to claim an Investment Tax Credit under IRC Section 48 instead of the residential solar tax credit under IRC Section 25D.
² As business use equipment, the Tax Investor may be eligible for MACRS depreciation deductions on the system.
³ For tax credit structuring, ownership of the system must remain with the Tax Investor at the end of the PAYS® term unless a fair market purchase is made by the IOU; this requirement may be challenging to pair with the PAYS® program where ownership passes to the Site Owner at the end of the PAYS® term.

Option 2, Solar PAYS® SLB Structure

Walk-through of Solar PAYS® Sale Leaseback Transaction



In a sale leaseback structure, the IOU would originate the Customer under a (1) Participant Agreement and pay the Solutions Provider via an (2) Installation Contract. The IOU would then sell the solar system¹ to a Tax Investor under a (3) Purchase and Sale Agreement and enter into an operating lease via a (4) Master Lease Agreement with the Tax Investor (“Sale Leaseback”).

Upon installation, the (5a) IOU would pay the Installer, and (5b) the Customer would make any upfront copayment owed. The Tax Investor would then make an upfront (6) Payment for the Solar System, which the IOU would use to offset² the payment to the installer.

The Customer receives (7) solar power and on-bill savings, and makes (8) on-bill monthly payments. During the operating lease term, the IOU will keep those payments and make (9) any upfront (pre-payment) and monthly lease payments owed to the Tax Investor/Solar Owner.³

The operating lease may contain a fair-market value purchase option⁴ should the IOU wish to buy the Systems back from the Tax Investor. If the ‘buyout’ provision is not executed, the Tax Investor will be entitled to capture 100% of any remaining system value at the end of the lease term.

¹ The sale leaseback has some timing flexibility in terms of document execution and transfer of consideration/assets, but the transaction must be completed (e.g. transfer of ownership with lease in place) within 90 days of a system achieving “placed-in-service.”

² There may be a delay in receiving funds from the Tax Investor relative to when payments are owed under the installation contract. As a result, the IOU may wish to obtain a working capital facility or line of credit.

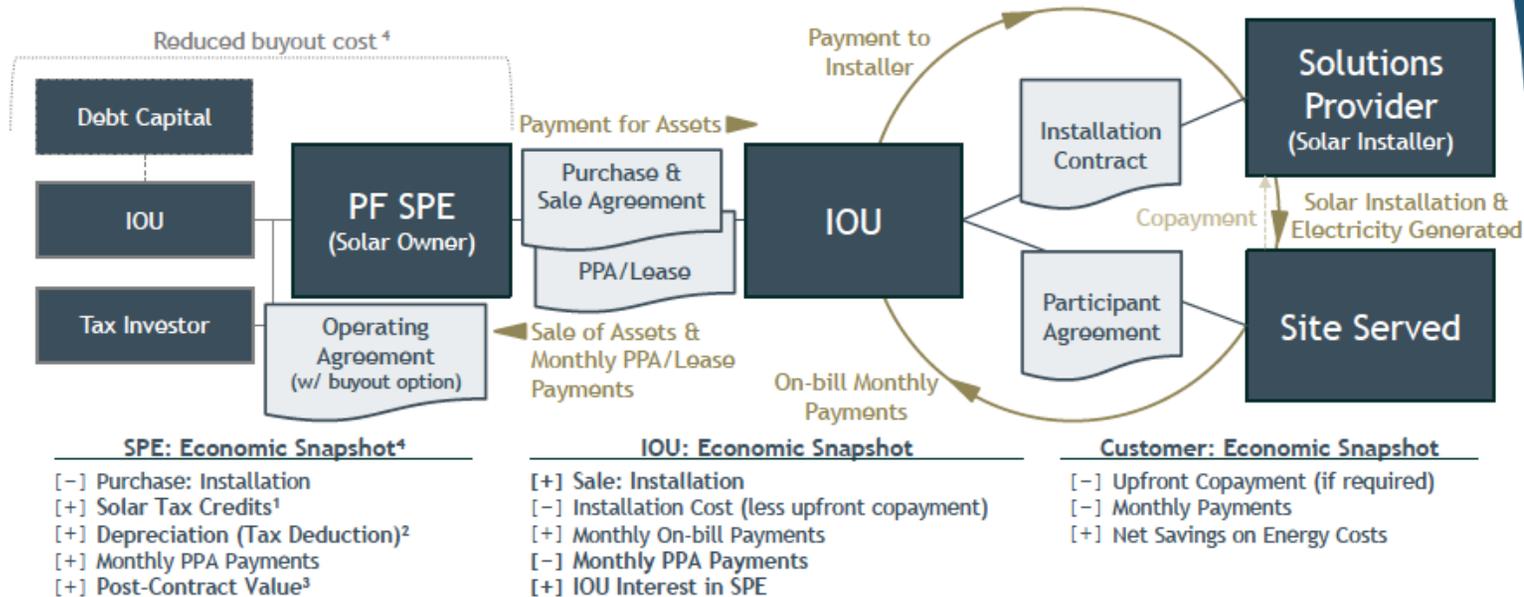
³ The lease may have a “rent holiday” of up to 90 days to allow time for the IOU to commence billing and collecting funds.

⁴ The Master Lease purchase option is separate from any buyout provisions contained in the Participant Agreement with the Customer (e.g. “PAYS® Refi”). The Master Lease terms will need to align with transactional changes brought about by any buyout rights exercised under the Participant Agreement.

Option 3, Solar PAYS® PF Structure

Partnership Flip tax equity structure as adapted from wind and solar transactions⁴

Alternatively, tax credits could be monetized via Special Purpose Entity to reduce the cost of the buyout option and add [low-cost] debt capital.



¹ The SPE is expected to claim an Investment Tax Credit under IRC Section 48 instead of the residential solar tax credit under IRC Section 25D.

² As business use equipment, the SPE may be eligible for MACRS depreciation deductions on the system.

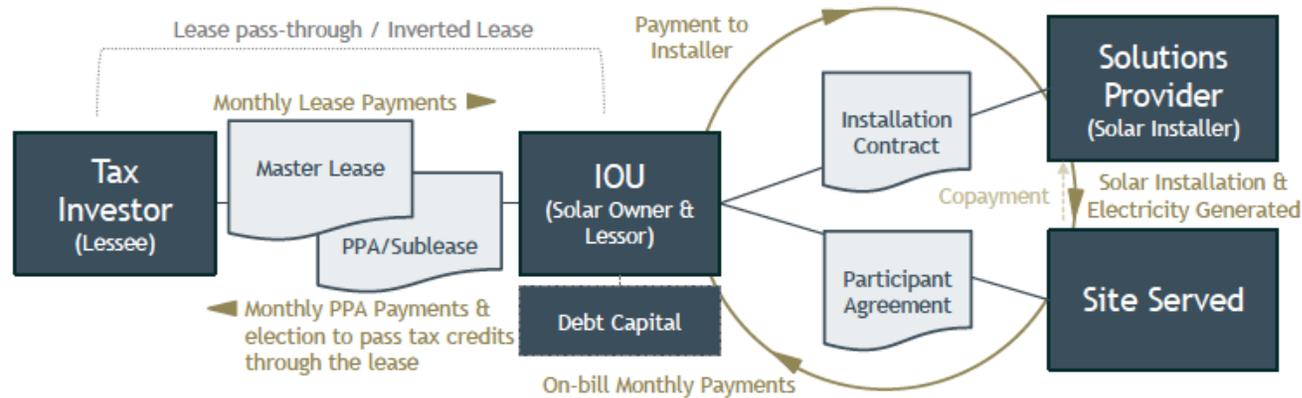
³ For tax credit structuring, ownership of the system remains with the SPE at the end of the PAYS® term although the IOU may purchase the Tax Investor's ownership interest in the SPE, and therefore own the assets (see footnote 4); this requirement may be challenging to pair with the PAYS® program where ownership passes to the Site Owner at the end of the PAYS® term.

⁴ Structure commonly referred to as a Partnership Flip, which is documented in an IRS safe harbor for wind transactions (Rev. Proc. 2007-65) and commonly used in solar transactions: IOU has an initial interest of 1% in SPE, which flips to 95% (w/ option to buyout remaining 5% from the Tax Investor).

Option 4, Solar PAYS® LPT Structure

Lease Pass-through tax equity structure adapted from historic tax credit and solar transactions⁴

Alternatively, tax credits (but not depreciation) could be monetized via lease pass-through⁴ to eliminate the need for a buyout option while preserving the ability to obtain [low-cost] debt capital.



Tax Investor: Economic Snapshot

- [+] Solar Tax Credits¹
- [+] Monthly PPA/Sublease Payments
- [-] Upfront/Monthly Master Lease Payments

IOU: Economic Snapshot

- [-] Installation Cost (less copayment)
- [+] MACRS Depreciation²
- [+] Monthly On-bill Payments
- [-] Monthly PPA/Sublease Payments
- [+] Upfront/Monthly Master Lease Payments
- [+] Post Contract Value³

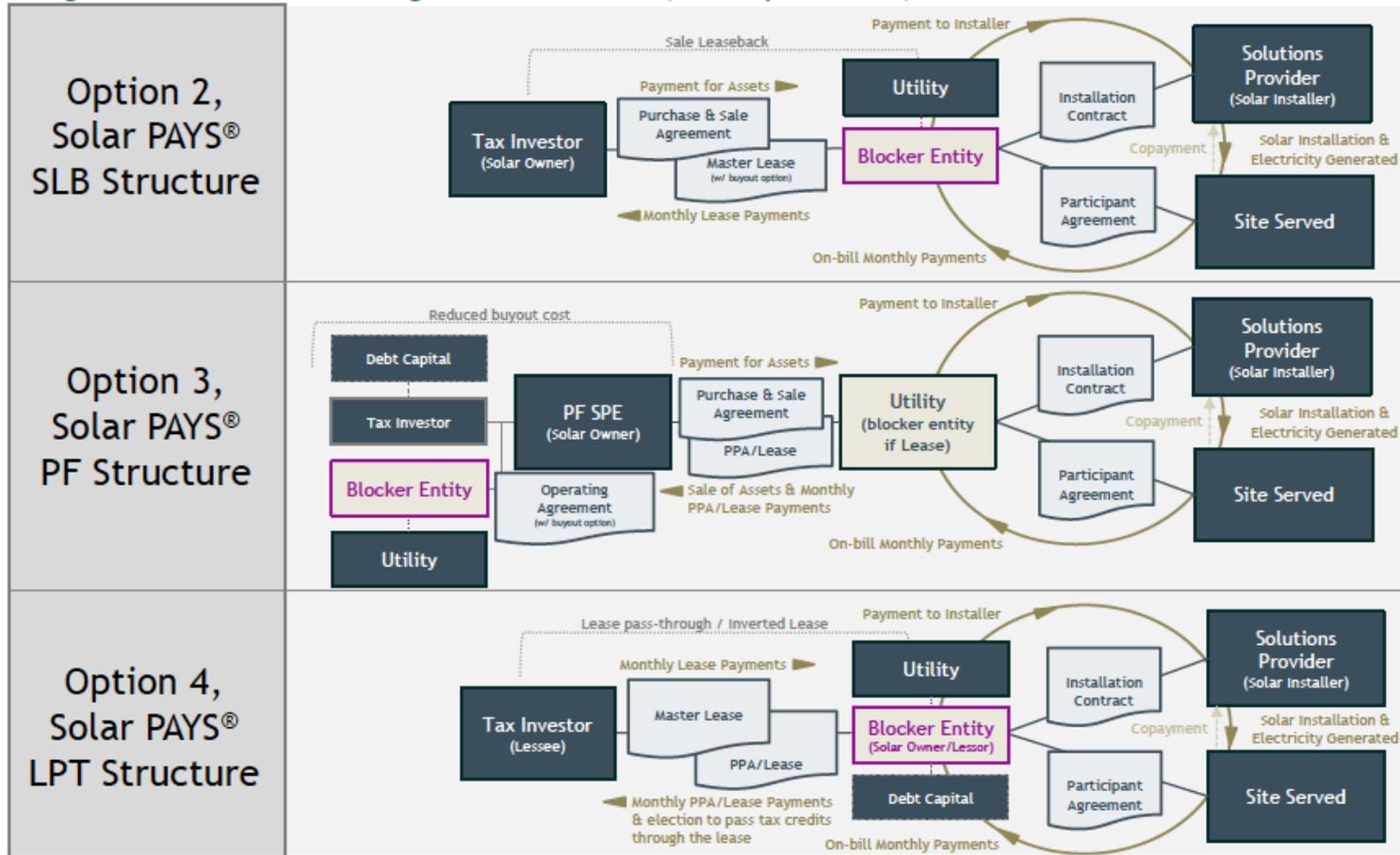
Customer: Economic Snapshot

- [-] Upfront Copayment (if required)
- [-] Monthly On-bill Payments
- [+] Net Savings on Energy Costs

¹ IOU and Tax Investor to file an election to pass IRC Section 48 tax credits through the lease to the Tax Investor (Lessee) under IRC Section 50(d)(5).
² As business use equipment, the IOU may be eligible for MACRS depreciation deductions on the system.
³ For tax credit structuring, ownership of the system must remain with the IOU at the end of the PAYS® term unless a fair market purchase is made by the site owner/customer; this requirement may be challenging to pair with the PAYS® program where ownership passes to the Site Owner at the end of the PAYS® term.
⁴ Lease pass-through/inverted lease/sandwich lease/master lease structure; adapted for solar transactions from historic tax credits - allows ownership to stay with the IOU despite tax credit monetization. Not commonly used (small investor pool; higher 'tax structure risk' w/ IOU on both sides of transaction).

Non-Profit Considerations: Additional Structure Modifications

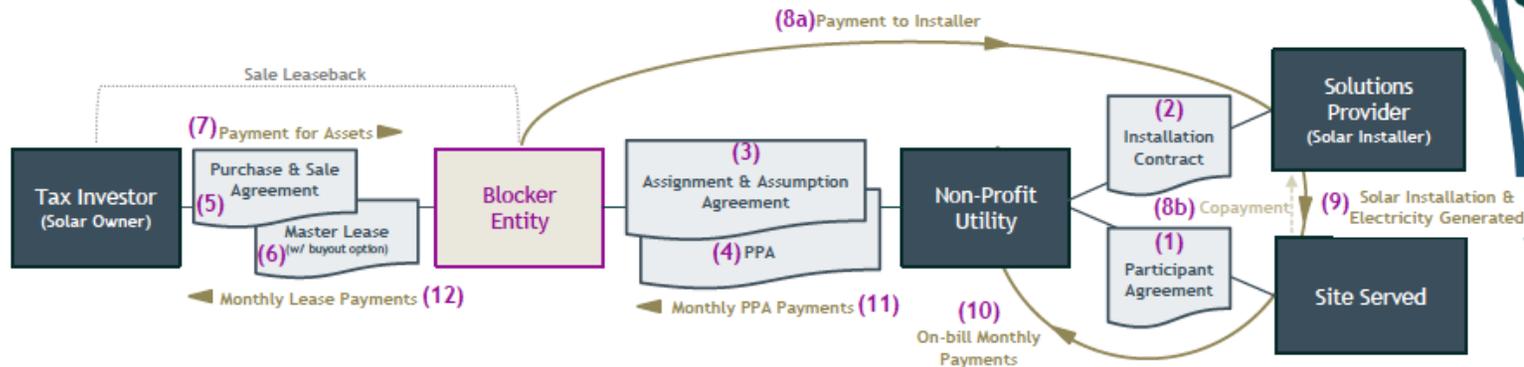
Non-Profit Utilities may need to monetize tax credits through a blocker entity¹ to avoid tax-exempt usage issues when monetizing solar tax credits (and depreciation).



¹ Additional modifications may be required if the Blocker Entities managing the Participant Agreements are not regulated utilities.

Further Modification for Unregulated Blockers

Potential Option 2, Solar PAYS® SLB Structure modification for unregulated blocker entity¹



In this modified sale leaseback structure, the Utility would originate the Customer under a (1) Participant Agreement and Solar Installation under (2) Installation Contract. The Utility would then assign the Installation Contract to a Blocker Entity under an (3) Assignment and Assumption Agreement and enter into a (4) Power Purchase Agreement (PPA) that is tied to the terms of the Participant Agreement. The intent is to preserve the ability for the Utility to service and bill PAYS® tariffs under the terms of the Participant Agreements while transferring assets and cash to the Blocker Entity to monetize tax benefits.

The Blocker Entity would then enter into a Sale Leaseback transaction with a Tax Investor by selling the solar system to the Tax Investor under a (5) Purchase and Sale Agreement and entering into an operating lease with Tax Investor via a (6) Master Lease Agreement, which would terminate prior to, or concurrently with, the PPA and Participant Agreement. The Tax Investor would make an upfront (7) Payment for the Solar System, which the Blocker Entity would use to offset² the (8a) Payment to the Installer.

In exchange for (9) solar power and on-bill savings, the Customer will make (8b) any copayments owed to the Installer for the balance of the Installation Cost and (10) on-bill monthly payments to the Utility. Under the terms of the PPA (while the operating lease is in place), the Utility will make (11) PPA payments to the Blocker Entity, who owes (12) upfront (pre-payment) and monthly lease payments to the Tax Investor and Solar Owner. Under the terms of the PPA (once the operating lease has terminated), the Utility will remit the payments directly to the Tax Investor unless the Blocker Entity exercises a fair-market value purchase option.

¹ NextResource Advisors recommends engaging with legal counsel to further vet this potential structure.

² There may be a delay in receiving funds from the Tax Investor relative to when payments are owed under the installation contract. As a result, the Blocker Entity may wish to obtain a working capital facility or line of credit.

Customer Ownership Considerations

Potential Post-Contract Value Solutions

In each of the Solar PAYS® Structure Options 1-4, the post-contract value stays with the IOU, which appears incompatible with PAYS® but which could be addressed with further action, as follows:

Legislative Solution:	Potential Participant Agreement Solutions:		
<p>Create safe harbor for transfer of ownership to site owner without jeopardizing the tax credit structure</p>	<p>Have a portion of payments go toward a reserve to be used to purchase the system and convey ownership at the end of the PAYS® term (requires further review by tax accountants or counsel)</p> <p>Or, consider allowing Solar PAYS® implementation in 2 phases; participant agreement would provide for:</p> <table border="0"> <tr> <td data-bbox="598 763 1113 1153"> <p>20-year PAYS® (“lease-like”)</p> <ul style="list-style-type: none"> Monthly payments based on 80% Rule Copayment based on cost recovery² Ownership stays with IOU or 3rd party solar owner without subsequent refinance-- there is no transfer of ownership at the end of the PAYS® term; the solar owner may re-contract with the Customer to continue the purchase of solar electricity at the end of the PAYS® term. </td> <td data-bbox="1134 763 1669 1153"> <p>PAYS® “Refi” at Year 5¹</p> <ul style="list-style-type: none"> At/after year 5, Customer offered PAYS® “refinanco” buyout option, which would provide a path to ownership at option of Site Owner and Customer, like traditional PAYS® Re-set monthly payments based on 80% Rule, accounting for changes in actual consumption and rates Copayment based on [remaining cost recovery needed]² </td> </tr> </table>	<p>20-year PAYS® (“lease-like”)</p> <ul style="list-style-type: none"> Monthly payments based on 80% Rule Copayment based on cost recovery² Ownership stays with IOU or 3rd party solar owner without subsequent refinance-- there is no transfer of ownership at the end of the PAYS® term; the solar owner may re-contract with the Customer to continue the purchase of solar electricity at the end of the PAYS® term. 	<p>PAYS® “Refi” at Year 5¹</p> <ul style="list-style-type: none"> At/after year 5, Customer offered PAYS® “refinanco” buyout option, which would provide a path to ownership at option of Site Owner and Customer, like traditional PAYS® Re-set monthly payments based on 80% Rule, accounting for changes in actual consumption and rates Copayment based on [remaining cost recovery needed]²
<p>20-year PAYS® (“lease-like”)</p> <ul style="list-style-type: none"> Monthly payments based on 80% Rule Copayment based on cost recovery² Ownership stays with IOU or 3rd party solar owner without subsequent refinance-- there is no transfer of ownership at the end of the PAYS® term; the solar owner may re-contract with the Customer to continue the purchase of solar electricity at the end of the PAYS® term. 	<p>PAYS® “Refi” at Year 5¹</p> <ul style="list-style-type: none"> At/after year 5, Customer offered PAYS® “refinanco” buyout option, which would provide a path to ownership at option of Site Owner and Customer, like traditional PAYS® Re-set monthly payments based on 80% Rule, accounting for changes in actual consumption and rates Copayment based on [remaining cost recovery needed]² 		

¹ If Customer and Site Owner opt to stay with PAYS® “lease”, there is no transfer of ownership at the end of the PAYS® term; the IOU may re-contract with the Customer to continue the purchase of solar electricity at the end of the PAYS® term.

² Exact mechanics to be flushed out with modeling (possibly in a second phase of work).

Additional Discussion Areas

Transactions will likely have minimum threshold for execution

- In selecting program structure, there should be strong focus on simplicity and expediency for proof-of-concept pilot project
 - Some more involved structures may be best in mature market but not actionable until such point
 - Consider “crawl→walk→run” ordering

- Consider existing residential solar aggregation models:
 - Utilize existing residential solar aggregators and their existing tax-capacity
 - Provide origination and monthly collections channel
 - Examples: SunRun, SolarCity/Tesla, Vivint, PosiGen

- Can existing community solar arrangements be tapped for third-party options at scale? [Table for now]

[Footer]



Aggregation Considerations

Structuring for Tax Credit Issues

Scale Requirements for Tax Equity Programs

Minimum check sizes & volume requirements to spread transaction costs

- **Solar Tax Equity transactions¹ typically have minimum size thresholds**
 - There is significant legal structuring, commercial underwriting and due diligence costs required to close tax equity portfolios; third-party transaction costs of \$500k+ are not uncommon. Closing larger transactions lowers the economic impact of these costs.
 - Tax Equity investment firms need to consider overall annual targets which are easier to hit when closing larger individual transactions
 - As a result, Tax Equity investments minimums above \$25 million are common
- **Solar PAYS® complexity may create additional upward pressure on minimum size**
 - Distributed generation (“DG”) solar portfolios require aggregation; larger numbers of smaller projects are combined to create a final portfolio over a period of time; projects in final portfolio may not be fully identified at time of transaction close. Deployment over time required.
 - New sponsors add additional perceived risks. Perceived deployment and asset performance risks increase without a strong sponsor relevant track record.
 - New financial structures and products introduce even further risks
- **We expect partnership-flip and lease-pass-through investors¹ would require at least [\$25 million] per transaction and strong expectation of repeat transactions to consider funding, with Sale-leaseback investors able to consider smaller investments.**

¹ For partnership flip transactions and inverted lease transactions. Sale-leaseback transactions can typically be done on a smaller transaction size basis due to simplified structure.

Minimum Customer Scale¹ by type of structure

The overall number of customers required to fill a sale-leaseback facility will be expected to be much lower than either a partnership-flip or lease pass-through tax equity facility due to:

- Smaller size requirements for sale leaseback transactions
 - SLB facilities have lower level of complexity than PF or LPT
- Higher funding levels under SLB facilities
 - Under a SLB, the investor is buying the full project rather than a subset of project benefits

	Partnership Flip	Lease Pass-through	Sale Leaseback
Tax Investor Minimum Investment Size (\$)¹	\$25M²	\$25M²	\$10M-15M³
\$ Investment per Customer	\$~3,500⁴	\$3,300⁵	\$15,000⁶
# Customers Required for a \$15,000 system⁷	~7,000	~7,500	700-1000

¹ Assuming third-party financial partner or syndicator. This minimum threshold will likely be lower for strategic participants such as tax-efficient co-ops.

² Refer to previously discussed Scale Requirements for Tax Equity Programs.

³ SLB average size assumed to be \$10 million, based on lower level of transaction complexity and smaller average size in equipment lease finance markets which typically employ sale-leaseback transaction structures.

⁴ Estimated Tax Investor's investment per Customer based on \$3/W Fair Market Value ("FMV"), 5kW average size system, 22% ITC, and PF funding terms of \$1.05 /credit with 99% of ITC monetized by TE.

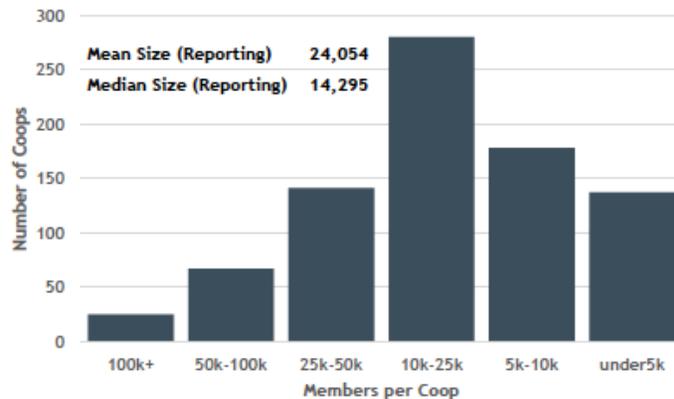
⁵ Estimated Tax Investor's investment per Customer based on \$3/W FMV, 5kW average size system, 22% ITC, and LPT funding terms of \$1.00 /credit with 100% of ITC monetized by TE.

⁶ Estimated Tax Investor's investment per Customer based on \$3/W FMV, 5kW average system size for a SLB structure.

⁷ The resulting cost of a \$3W FMV, 5kW average system size is \$15,000.

Addressable Market Size of Co-ops

- Initial research into addressable market for Solar PAYS® indicates that as of May 2020, there are approximately 1,060 US electric cooperatives, with 835 reporting their membership size¹
- Based on reporting size, the average US co-op appears to have between 15k-25k members



	Partnership Flip	Lease Pass-through	Sale Leaseback
Minimum # Customers	7,000	7,500	1,000
Min as % of Median Coop	49%	52%	7%

- Based on these above sizes, it would be difficult to see a partnership-flip or lease pass-through transaction structure used on a transaction with individual co-op.

¹ <https://www.electric.coop/our-organization/nreca-member-directory/>

Aggregation Considerations: Conclusions

Non-financial tax equity providers appear more promising

Given the aggregation levels required and level of complexity, we believe that:

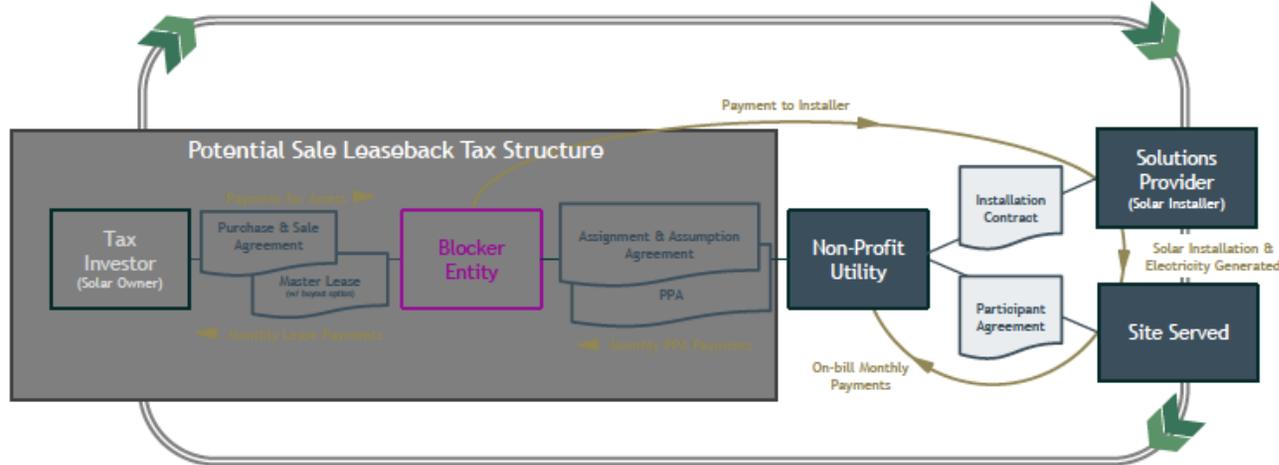
- **Financial tax equity providers (i.e. bank/syndication options) appear limited:**
 - PF/LPT:
 - Based on these above sizes, it would be a difficult path to a partnership-flip or lease pass-through transaction between a bank/syndicators and a given co-op.
 - Simple deals already having challenges getting executed in this market
 - SLB:
 - While the required transaction size is smaller than PF/LPT structures, we are not clear on whether sale-leaseback providers would consider residential assets.
 - We are currently checking with providers of sale-leaseback transactions to confirm if they would consider sale-leaseback of portfolios of residential solar assets with co-ops.
- **Non-financial TE options may be more promising**
 - Co-ops with tax capacity
 - [identify potential parties via CFC, others]
 - Existing residential solar aggregators with existing tax-capacity
 - Work with existing solar aggregators to originate projects which they would own/operate until customer refi
 - Ensure participation agreement allows for PAYS® refinance after end of tax period
 - Examples: Posigen, SunRun
 - Other Financial Intermediaries working in LMI energy solutions
 - Example: Inclusive Prosperity Capital
- **Scale May be Achievable with Generation & Transmission Co-ops**
 - Utilize their existing relationships with co-op members to aggregate customers across their co-op members
 - If scale is sufficient, may pursue traditional bank/syndication tax equity or leverage a co-op with existing tax capacity

Sale Leaseback Aggregation Example

Sale Leaseback Structure with Illustrative 5kW Project¹

A Tax Investor making a **\$15M** investment...

...could finance up to **1,000** LMI customers



... and reduce copayments by monetizing over **\$6.5M** of tax credits and depreciation benefits.

¹ Illustrative 5kW Project with \$3/W FMV, assuming 100% of costs are eligible for tax credits at a 26% tax credit rate, and depreciation deductions generate a tax benefit equal to a 21% tax rate multiplied by system costs, as reduced by 50% of tax credits generated. Subject to further structuring and analysis.



Recommended Next Steps

Timeline, Relevant Review Checklists, & Additional Reviewers

Issue Tracking

Summary of questions and areas of interest for follow up discussions¹

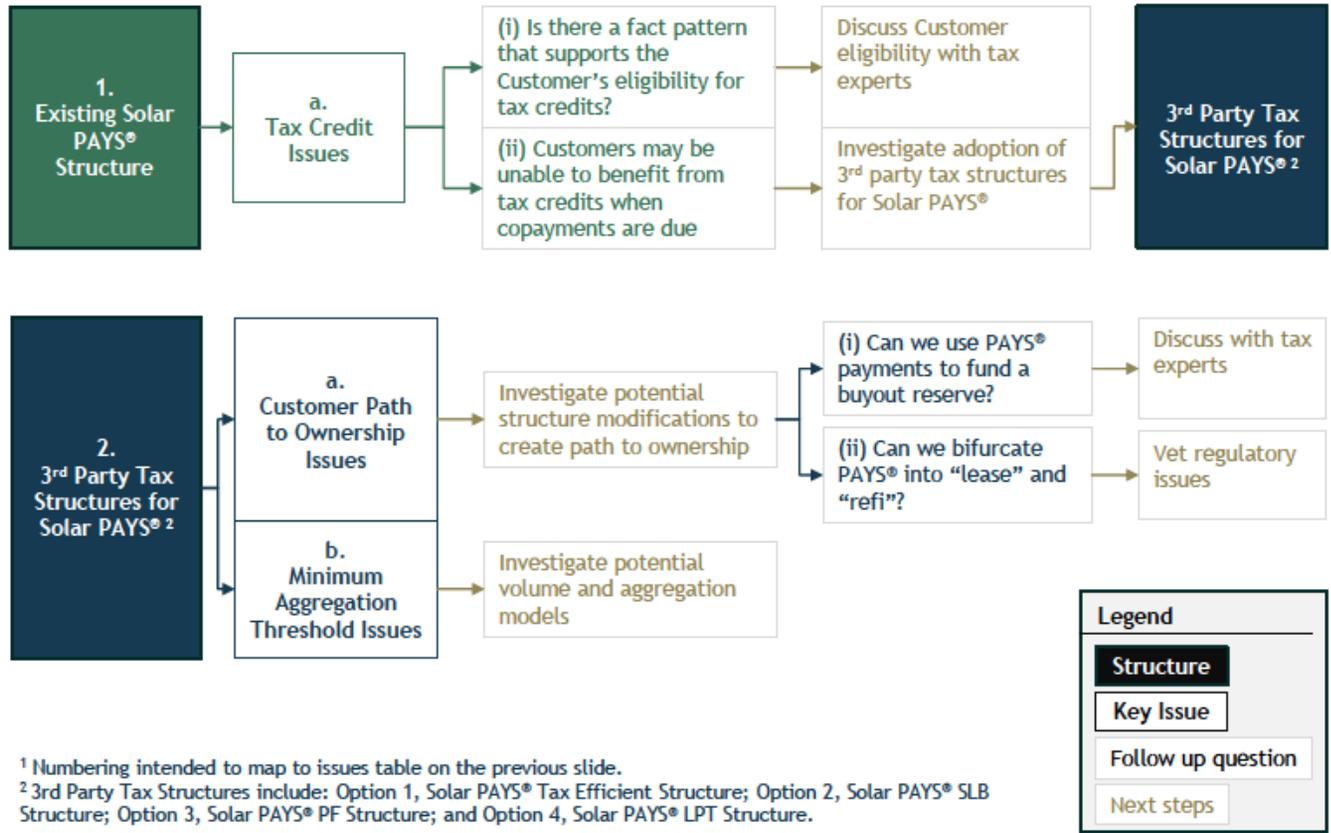
Structure	Context	Question/Issue	Next Steps
1. Existing Solar PAYS® Structure	(a) Tax Credit Issues (i) Customer Eligibility	Customers may not be eligible for tax credits since the Utility pays the Solutions Provider: Is there a fact pattern that supports the Customer's eligibility for tax credits?	Discuss with tax experts (i.e. accounting firms/tax counsel). Considered a low priority due to high potential for LMI Customers to be unable to benefit from tax credits.
	(a) Tax Credit Issues (ii) Customer Ability to Benefit from Tax Credits	A large portion of upfront Customer economics depend on the ability to utilize the tax credits, but benefits may be delayed when they are dependent on the timing for tax filing and estimated tax payments/refunds. Additionally, Customers may lack the tax capacity to use the tax credit in the initial tax year.	None. Investigated 3 rd party tax structures where the Customer would not need to use the tax credit; identified additional questions and issues [See 2].
2. 3 rd Party Tax Structures for Solar PAYS® 2	(a) Customer Path to Ownership	In 3 rd party tax structures, ownership of the system typically stays with the party claiming tax benefits. The Customer's path to ownership would require a buyout option (and possibly refinance), which is inconsistent with the parameters for PAYS®.	Continue investigating potential structure modifications to create a path to ownership, including questions and issues identified [See 2(a)(i) and (ii)].
	(a) Customer Path to Ownership (i) Consider Reserves	Is there a way to set aside a portion of monthly PAYS® payments for a buyout reserve that would create a path to ownership without jeopardizing the tax structure?	Discuss with tax experts (i.e. accounting firms/tax counsel).
	(a) Customer Path to Ownership (ii) Consider PAYS® lease & refi	Could you create a "PAYS® lease" with a "PAYS® refinance" option?	Vet any potential regulatory issues.
	(b) Minimum Aggregation Threshold	If the utility is not tax-efficient, most Tax Investors have a minimum \$ aggregation threshold for scale. How does scale/aggregation look for the utilities most likely to adopt Solar PAYS®?	Continue investigating potential aggregation models, focusing on Solar PAYS® structure Options 1 and 2 if generally preferable due to likely participants, [see also slide 31].

¹ Note: Numbering in table intended to map to dependency tree on the following slide.

² 3rd Party Tax Structures considered include: Option 1, Solar PAYS® Tax Efficient Structure; Option 2, Solar PAYS® SLB Structure; Option 3, Solar PAYS® PF Structure; and Option 4, Solar PAYS® LPT Structure.

Issue Tracking

Dependency Tree¹



¹ Numbering intended to map to issues table on the previous slide.

² 3rd Party Tax Structures include: Option 1, Solar PAYS® Tax Efficient Structure; Option 2, Solar PAYS® SLB Structure; Option 3, Solar PAYS® PF Structure; and Option 4, Solar PAYS® LPT Structure.

Appendix B. Sample Financial Due Diligence Checklist for Solar Assets

- 1. Transaction Structure Diagram**
- 2. Partner/Vendor Diligence***
 - 2.1. Organization chart
 - 2.2. Tax ID
 - 2.3. Articles of Organization/Formation Documents
 - 2.4. Financial statements
 - 2.5. Team resumes/track record
 - 2.6. Product cut sheets and warranties, as applicable
 - 2.7. Other (licenses, proof of insurance, etc.)
- 3. Project Diligence (Site/Asset/Customer)**
 - 3.1. Site location
 - 3.2. Site control documentation, e.g.:
 - 3.2.1. Site lease agreement
 - 3.2.2. Subordination and Non-Disturbance Agreement (SNDA)
 - 3.2.3. Estoppel certificate
 - 3.2.4. Title Report/Title Insurance
 - 3.2.5. ALTA Survey
 - 3.3. Asset diligence
 - 3.3.1. System size
 - 3.3.2. Estimated production
 - 3.3.3. System designs
 - 3.3.4. Environmental Report (Phase 1, and/or other GeoTechnical Report)
 - 3.3.5. Independent Engineer Report
 - 3.3.6. Engineering, Procurement, & Construction Contract (Installer Contract)
 - 3.3.7. Bill of materials/equipment list (to confirm equipment is from an approved vendor w/ appropriate warranties, etc.)
 - 3.3.8. Interconnection agreement
 - 3.3.9. Permits
 - 3.3.10. Lien releases/waivers
 - 3.3.11. Completion Certificates
 - 3.3.12. Commissioning/Permission to Operate notices
 - 3.3.13. UCC Filing
 - 3.3.14. Appraisal
 - 3.3.15. Cost Segregation Report
 - 3.3.16. Tax assessment (local property taxes/sales and use taxes/etc.)
 - 3.4. Customer (off-taker) diligence
 - 3.4.1. Credit policy and credit check
 - 3.4.2. Customer contract (i.e. PPA/Lease/other)
 - 3.4.3. Up to 12 months of past utility bills (to establish baseline consumption and savings premise)
- 4. Other Financial Diligence**
 - 4.1. Tax opinion and analysis
 - 4.2. Financial model
 - 4.3. Definitive documents

* Partners may include developers, installers, manufacturers, financiers, channel partners, subscription managers, O&M servicers, etc.

Appendix C. Detailed Description of Work Performed for Part 3: Limited Technical Review of Tax Structures for PAYS for On-Site Solar

Review of PAYS® Background, Proposed Transaction Structure, & Financial Model

The Authors reviewed available materials on PAYS provided by Clean Energy Works and its other advisors, including the following:

- **Part 1 & 2 of Applying the PAYS® System to On-Site Solar to Expand Access for All, as prepared for the LIFT Solar Project**
 - **Part 1:** Review of “The Potential for the PAYS System to Make On-Site Solar Photovoltaic Systems Accessible to Low- and Moderate-Income Customers and Renters,” a paper with accompanying appendices prepared by the Energy Efficiency Institute, Inc.
 - **Part 2:** Review of “Precedents for the Regulatory Treatment of PAYS for On-site Solar,” a paper, prepared by Nancy Brockway.
- **Transaction Diagrams**
 - **Part 3:** Review of existing PAYS transaction structures proposed for Solar PAYS provided by Clean Energy Works.

As well, this study includes a summary of the U.S. residential solar market as well as background on PAYS in certain sections of this *report*, Part 3, *Limited Technical Review of Tax Structures for PAYS for On-Site Solar*:

- Section 2. *Background on U.S. Residential Solar Market and PAYS*
- Section 3. *Existing PAYS® Structure Not Compatible with Solar*

Outline of Potential Structure Options for Consideration

Based on background materials reviewed, the Authors worked with the Clean Energy Works team and its advisors to identify additional considerations for the transaction structure and prepared alternative structures for consideration. Those structures are outlined in Section 4. *Four Solar PAYS Options and Considerations* and *Appendix A*.

Once the potential structure options were outlined and discussed with potential stakeholders, the Authors worked with Clean Energy Works to consider the size - scale- that might be required for financing, and other implementation considerations. Those requirements and considerations are outlined in Section 5. *Aggregation Requirements and Considerations for Scale*.

Feedback Gathered from Potential Stakeholders & Advisors

As discussed in the Acknowledgements for this memo, the Authors solicited preliminary feedback from a number of financiers, non-profit organizations, structuring advisors, and general participants in the solar and utility infrastructure space. Their responses are highlighted in certain areas of this memo and are an integral part of any initial conclusions drawn or additional questions posed.

Consider Next Steps

Finally, during the course of the advisory assignment, NextResource Advisors identified potential next steps to be undertaken during a future phase of research. These recommendations are outlined in Part 3, Section 6. *Summary of Findings and Recommended Next Steps.*