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CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Residential Property Assessed Clean Energy:

A Connecticut Program Viability Assessment

Topline Summary

January 30, 2015

The Connecticut Green Bank (Green Bank) commissioned the Clean Energy States Alliance (CESA) to prepare a report on the legal framework, need for, and viability of establishing a Residential Property-Assessed Clean Energy (R-PACE) program in Connecticut. CESA is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy, and includes many of the most innovative, successful, and influential clean energy initiative funders in the country.

CESA report recommendations:

- Connecticut should consider implementing an R-PACE program and take appropriate actions to mitigate legal and regulatory challenges.[1]

- R-PACE implementing legislation should authorize and direct the Green Bank to be the program administrator.[2][3]

- The legislation should remove the lien subordination provision that prevents R-PACE assessments from gaining the senior-lien status needed to attract low cost financing.[4]

- The Green Bank, as program administrator, needs to aggressively market R-PACE[5], maximize private investment, and secure consistent public policy support.

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[1] Other states' R-PACE programs suggest there are ways to mitigate existing concerns.

[2] Green Bank management would involve supporting contractor and municipal marketing with sales collateral materials and branding, contractor oversight, development of standard underwriting terms, capital sourcing, and marshalling other compatible resources.

[3] CESA recommends giving considerable discretion to the Green Bank when implementing R-PACE, so it can respond to market forces and learn from early program experiences.

[4] Legislation should also provide for a loan-loss reserve along the lines of California's approach, and allow for leases and power purchase agreements.

[5] Connecticut residents would probably have high interest, considering the state's high home ownership rates, high energy costs, legislative and Green Bank support, the known success of Commercial Property Assessed Clean Energy (C-PACE), and a robust contractor community.

Residential Property Assessed Clean Energy

A Connecticut

Program Viability Assessment

January 2015

Prepared by

Clean Energy States Alliance

for

Connecticut Green Bank

Acknowledgements and Authorship

Many different people contributed to this report. Nate Hausman of CESA was project manager and lead editor. Warren Leon helped edit the report. Maria Blais Costello of CESA copyedited and formatted it. CESA research assistants Jillian Corley and Colin Mew conducted informational interviews and drafted several sections of the report and appendices. Dave Dayton, Kyra Hoskins, and Steve Morgan of Clean Energy Solutions researched and drafted the PACE Regulatory Challenges, Emerging Solutions, and Market Receptiveness section, the Recommendations section, and Appendix C on Legal and Legislative Battles, and provided comments on the report. Emily Fadrhonc of Lawrence Berkeley National Laboratory drafted the Key PACE Program Design Choices section. In addition to Emily Fadrhonc, Greg Leventis and Mark Zimring of Lawrence Berkeley National Laboratory provided comments on the entire report. Kerry O'Neill and Alexandra Lieberman of Connecticut Green Bank commissioned the report and provided critical oversight and insight throughout. Kerry O'Neill and Alexandra Lieberman significantly amended and improved the Connecticut Clean Energy Financing Landscape Sections and Appendix A on Connecticut's Residential Clean Energy Financing Programs. Other Connecticut Green Bank staff played roles in the preparation of this report. They include Jessica Bailey, John D' Agostino, Brian Farnen, Eitan Hochster, Bert Hunter, Alexei Kovtunenko, and Fiona Stewart. A full list of people who were interviewed in the preparation of this report is provided in Appendix E. Many thanks to all the authors and reviewers of this report and to all the people who furnished valuable information for it.

About this Report

This report has been produced in response to a June 6, 2014 mandate from the Connecticut General Assembly requiring the Connecticut Green Bank, formerly known as the Clean Energy Finance and Investment Authority (CEFIA), to analyze the potential for a residential property assessed clean energy (R-PACE) program in the state.[1] In 2011, the Connecticut General Assembly enacted legislation enabling R-PACE and in 2012, passed legislation authorizing a commercial PACE (C-PACE) program.[2] No R-PACE programs have been implemented in Connecticut yet. On the commercial side, however, the Connecticut Green Bank-administered C-PACE program launched in January 2013 and has achieved significant success. To date, Connecticut's C-PACE program has helped finance energy-saving and renewable energy projects worth more than $55 million with another $100 million in the pipeline, and has become a model for other C-PACE programs around the country. This report examines the legal framework, need for, and viability of establishing an R-PACE counterpart program for the residential sector in Connecticut. The Connecticut Green Bank secured the assistance of the Clean Energy States Alliance (CESA) in preparing this report.

CESA conducted the R-PACE assessment and drafted this report with the participation of contributing authors from the consulting firm Clean Energy Solutions and from Lawrence Berkeley National Laboratory. Any inferences or conclusions herein are the authors' alone.

[1] Section 24 of Public Act No. 14-94 states, "Not later than January 1, 2015, the Connecticut Green Bank shall submit a report, in accordance with the provisions of section 11-4a of the general statutes, to the joint standing committee of the General Assembly having cognizance of matters relating to energy. Such report shall assess the potential success and need for a residential property assessed clean energy program, including, but not limited to, an evaluation of (1) potential consistency between such a program and the commercial property assessed clean energy program, as described in section 16a-40g of the general statutes, as amended by this act, and similar programs on the national level, (2) the legal framework for a residential property assessed clean energy program, and (3) the need for such a program, in light of similar current or developing programs at the state or federal level."

[2] Conn. Gen. Stat. § 7-121n.

About the Connecticut Green Bank (CGB)

The Clean Energy Finance and Investment Authority (CEFIA) was established by Connecticut's General Assembly on July 1, 2011 as a part of Public Act 11-80. This new quasi-public agency, now known as the Connecticut Green Bank, superseded the former Connecticut Clean Energy Fund. The Green Bank's mission is to lead the green bank movement by accelerating private investment in clean energy deployment for Connecticut to achieve economic prosperity, create jobs, promote energy security and address climate change. As the nation's first full-scale green bank, the organization leverages public and private funds to drive investment and scale-up clean energy deployment in Connecticut. For more information about the CT Green Bank, visit www.ctcleanenergy.com.

About the Clean Energy States Alliance (CESA)

Clean Energy States Alliance is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy. CESA members—mostly state agencies—include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.

CESA works with state leaders, federal agencies, industry representatives, and other stakeholders to develop and promote clean energy technologies and markets. It supports effective state and local policies, programs, and innovation in the clean energy sector, with emphasis on renewable energy, power generation, financing strategies, and economic development. CESA facilitates information sharing, provides technical assistance, coordinates multi-state collaborative projects, and communicates the positions and achievements of its members. See www.cesa.org.

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EXECUTIVE SUMMARY

Clean energy upgrades can come with steep upfront price tags, even when they will ultimately generate savings over time. To make energy improvements affordable, many customers need long-term, low-cost financing to cover the initial costs of the upgrade. They can then pay off the price of the upgrade over time as savings are realized.

Based upon our analysis of the landscape in Connecticut, we believe that the Connecticut General Assembly should consider modifying its current Property Assessed Clean Energy (PACE) legislation for the residential market. When implemented at scale, PACE can help states achieve their clean energy deployment goals while saving homeowners money on their energy bills and enabling much-needed upgrades to their homes. PACE allows customers to invest in clean energy improvements by attaching the costs to their property tax bill through a special tax assessment that remains in place for the life of the obligation, similar to a sewer assessment.[3] Like a sewer assessment, PACE obligations transfer to subsequent property owners[4] and provide a strong security interest for investors.[5] Because the obligations are secured by the underlying properties, they can support repayment terms of 20 years or longer at extremely attractive interest rates, enabling more energy upgrades to become cash-flow positive for more homeowners.[6] Residential PACE (R-PACE) allows a homeowner's clean energy investments to be paid off over an assigned term of years through a special assessment on the homeowner's property tax bill. In contemplating revisions to its residential PACE legislation, this white paper recommends that the Connecticut General Assembly consider and evaluate how other parts of the country have attempted to address the legal and regulatory challenges R-PACE has faced.

An R-PACE program in Connecticut could address key residential clean energy financing challenges, even though several other programs and private market clean energy financing tools are already available in the state. Most notably, Connecticut's Smart-E loan program, developed by the Connecticut Green Bank, allows homeowners to finance a variety of energy improvements through private capital provided by a constellation of qualified lenders.[7] A new version of the program, jointly developed with the Connecticut Energy Efficiency Board and its program administrators, will include an on-bill repayment (OBR) option for customers, which will allow them to repay loans for qualifying energy improvements through a line-item charge on their monthly utility bill.[8] The OBR-enabling legislation passed in 2013 included provisions for keeping the repayment obligation with the meter in the event of sale of a home and the ability to

[3] "PACE Financing, DSIRE," http://www.dsireusa.org/solar/solarpolicyguide/?id=26.
[4] Jonathan B. Wilson, Maura A. Marcheski, and Elias B. Hinckley, *The Great PACE Controversy: Renewable Energy Financing Program Hits a Snag*, 25 Prob. & Prop. 38 (2011): 39.
[5] "Property Assessed Clean Energy Financing: Benefits and Barrier Busting," *Institute for Building Efficiency: An Initiative of Johnson Controls*, http://www.institutebe.com/InstituteBE/media/Library/Resources/Financing%20Clean%20Energy/PACE-Benefits-and-Barrier-Busting.pdf.
[6] Morgan Lee, "Borrowing from Taxman to Buy Solar," *San Diego Union-Tribune*, July 8, 2014, http://www.utsandiego.com/news/2014/jul/08/pace-financing-arri-san-diego/.
[7] "Energize Connecticut, Smart-E Loans," http://www.energizect.com/residents/programs/smarte.
[8] "Smart-E On-Bill Repayment Program Document," May 5, 2014.

shutoff utility service for nonpayment.[9] The Connecticut Green Bank and the Energy Efficiency Board are using a multi-phase approach to implementing the program's OBR component. Phase I is scheduled for launch in 2015.[10]

The Energy Efficiency Board has resolved that it "will not approve an OBR program that allows for shutoff of utility" when a customer defaults on an energy improvement loan.[11] Without the threat of utility shutoff, the energy loans will not provide the same level of security interest for lenders, which may make it difficult to attract lenders willing to offer long-term loans and interest rates that are attractive to consumers. Uncertainty around whether OBR as implemented will allow for transferability to a new homeowner upon sale of a home further reduces the program's appeal to potential lenders. For these reasons, the OBR program in Connecticut is unlikely to resolve all of the clean energy financing challenges in the residential market in the near future.

Connecticut seems particularly well positioned for R-PACE because the state has an experienced clean energy financing program administrator in place in the Connecticut Green Bank. The Connecticut Green Bank's mission is to support the State of Connecticut in meeting its clean energy goals through innovative financing programs, and the Connecticut Green Bank has proven its leadership nationally in developing clean energy financing programs.[12] Moreover, the state and the Connecticut Green Bank have experience with commercial PACE. In 2012, the Connecticut General Assembly authorized a PACE program for commercial properties and multi-family residences. The Connecticut Green Bank launched its C-PACE program in early 2013.[13] It quickly outpaced projections and became the largest C-PACE program in the country. It has financed the deployment of over ten megawatts of solar PV generation and millions of dollars in energy efficiency savings.[14]

In 2011, the Connecticut General Assembly enacted legislation authorizing R-PACE.[15] To date, however, no R-PACE programs have been implemented in Connecticut, due to the junior-lien status of R-PACE liens and the lack of an appointed statewide administrator in the enabling statute.[16] These concerns could be addressed if the Connecticut legislature amended its R-PACE enabling statute.

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[9] Conn. Gen. Stat. § 16a-40m.
[10] "Smart-E On-Bill Repayment Program Document," May 5, 2014.
[11] "Energy Efficiency Board Monthly Meeting Minutes," April 9, 2014, http://www.energizect.com/sites/default/files/EEB%204.9.14%20Meeting%20Minutes,%20approved.pdf.
[12] "Who We Are," http://www.ctcleanenergy.com/Default.aspx?tabid=62.
[13] Luther Turmelle, "Connecticut Program Helps Fund Clean Energy Upgrades," *The Middletown Press*, January 28, 2013, http://www.middletownpress.com/general-news/20130128/connecticut-program-helps-fund-clean-energy-upgrades-2.
[14] Maria Blais Costello, "The Connecticut Green Bank's C-PACE Program: Low-cost, Long-term Financing for Clean Energy Upgrades," *Renewable Energy World*, December 24, 2013, http://www.renewableenergyworld.com/rea/blog/post/2014/12/the-connecticut-green-banks-c-pace-program-low-cost-long-term-financing-for-clean-energy-upgrades.
[15] Conn. Gen. Stat. § 7-121n.
[16] Of particular concern regarding Connecticut's current R-PACE enabling legislation is its subordination of the PACE lien.

While the Connecticut market is primed for R-PACE, R-PACE program implementation across the county faces considerable legal and regulatory challenges. As legislation was enacted across the country in 2008, 2009, and 2010, government-sponsored entities, including Fannie Mae and Freddie Mac, which purchase, guarantee, and securitize home mortgages from banks and small lenders, became concerned that R-PACE posed a threat to the secondary mortgage market (i.e., Fannie Mae and Freddie Mac) because PACE assessments create senior liens superior to existing mortgages. Satisfaction of PACE assessments in arrears typically takes priority over mortgage satisfaction.[17]

On July 6, 2010, the Federal Housing and Finance Agency (FHFA), the agency which oversees and serves as conservator of Fannie Mae and Freddie Mac, issued a directive declaring that PACE assessments present significant risk to secondary mortgage markets.[18] FHFA directed Fannie Mae and Freddie Mac to cease purchasing the mortgages of PACE-encumbered properties, to ensure that loan covenants require prior mortgage holder approval for PACE assessments to be levied, and to adopt additional guidelines to ensure the soundness of their operations. The FHFA further reinforced this message in a second release on December 22, 2014.[19]

The FHFA's directive stymied the growth of R-PACE.[20] Although PACE advocates filed several lawsuits challenging the authority of the FHFA to issue such a sweeping directive, the lawsuits eventually terminated in rulings favorable to the FHFA.[21] At least three bills have been introduced in the U.S. Congress to legislatively address the issue, but none has made it out of committee.[22]

While the majority of states with R-PACE legislation have not proceeded to develop R-PACE programs due to legal and regulatory risk and uncertainty, several states have moved forward with R-PACE programs in spite of the FHFA's position.[23] These programs have taken different approaches to mitigating the FHFA concern.[24] California's R-PACE administrators have moved forward with primary lien assessment programs. California, however, has established a $10

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[17] Jeremy Brown, "PACE in Texas: The Future of Contractual Assessment Financing for Conservation Improvements," *Center for Global Energy, International Arbitration, and Environmental Law*, April 2013, https://www.utexas.edu/law/centers/energy/wp/wp-content/uploads/centers/energy/property_assessed_clean_energy_texas.pdf.

[18] Corinne Russell and Stefanie Johnson, "FHFA Statement on Certain Energy Retrofit Loan Programs," *Federal Housing Finance Agency*, July 6, 2010, http://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Statement-on-Certain-Energy-Retrofit-Loan-Programs.aspx.

[19] "Statement of the Federal Housing Finance Agency on Certain Super Priority Liens," *Federal Housing Finance Agency*, December 22, 2014, http://www.fhfa.gov/Media/PublicAffairs/Pages/Statement-of-the-Federal-Housing-Finance-Agency-on-Certain-Super-Priority-Liens.aspx.

[20] Stephen Lacey, "The Narrative That Residential PACE Is 'Dead' Is Now Pretty Much Dead Itself," *GreenTech Media*, August 6, 2014, http://www.greentechmedia.com/articles/read/the-narrative-that-residential-pace-is-dead-is-now-pretty-much-dead-itself.

[21] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013: 1.

[22] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013: 1.

[23] "PACE Financing, DSIRE," http://www.dsireusa.org/solar/solarpolicyguide/?id=26.

[24] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013.

million loan-loss reserve fund "to mitigate risk to potential first mortgage holders by making them whole for losses incurred due to the existence of a first-priority PACE lien on a property during a foreclosure or forced sale."[25] The California Home Energy Renovation Opportunity (HERO) program also notifies homeowner applicants that they should carefully review their mortgages for any PACE-triggered provisions and that they may have to pay off their PACE assessments in the event they sell or refinance their home.

California's loan-loss reserve coupled with the overall program design has provided sufficient confidence to R-PACE loan originators, who have experienced significantly increased volume in California.[26] On the other hand, the FHFA has informed California officials that the reserve fund was inadequate. Alfred Pollard, the FHFA's general counsel wrote that "The Reserve Fund does not sufficiently address the risks to the Enterprises [Fannie Mae and Freddie Mac] that we have previously described, and FHFA will continue our policy of not authorizing the Enterprises to purchase or refinance mortgages that are encumbered by PACE loans in a first lien position."[27] Notwithstanding the FHFA position on PACE assessments, the California HERO R-PACE program has successfully brought to market two securitizations in 2014 totaling more than $230 million in capital raised, evidencing that the capital markets are comfortable with this matter. Moreover, Kroll Bond Rating Agency, who rated the securities "AA" concluded these risks, while material, are remote.[28] Renovate America, the R-PACE administrator for the California HERO program, argues that the FHFA is unlikely to allow Fannie Mae and Freddie Mac to devalue their own portfolio by redlining PACE communities and is unlikely to be able to muster the resources to enforce its directive.[29]

Outside of California, Efficiency Vermont has implemented an R-PACE program with a subordinate lien to ameliorate the FHFA's qualms.[30] Other program administrators have explored limiting their program to homeowners who do not have mortgages. Florida has moved forward with primary lien R-PACE programs, but underscores the high percentage of Florida homeowners who own their homes outright and are therefore unaffected by the FHFA directive.[31]

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[25] PACE Loss Reserve Program Summary," *California Alternative Energy and Advanced Transportation Financing Authority*, September 10, 2014, http://64.166.146.155/docs/2014/IOC/20141103_361/19135_State%20PACE%20Loss%20Reserve%20Program%20Summary.pdf.

[26] Roy L. Hales, "Movers in the Spread of California's PACE Programs, *Clean Technica*, November 26, 2014, http://cleantechnica.com/2014/11/26/movers-in-the-spread-of-californias-pace-programs/.

[27] Stephen Lacey, "Why Residential PACE Is Growing in Spite of Opposition From Federal Housing Lenders." *GreenTech Media*, July 24, 2014, http://www.greentechmedia.com/articles/read/Why-Residential-PACE-Is-Growing.

[28] "Renovate America and 400 Capital Complete Second PACE Securitization," *PR Newswire*, November 18, 2014, http://www.prnewswire.com/news-releases/renovate-america-and-400-capital-complete-second-pace-securitization-283054931.html.

[29] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013: 9.

[30] "Local Option-Property Assessed Clean Energy, DSIRE," http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=VT38F&re=1&ee=1.

[31] Jonathan Schaefer, in discussion with Colin Mew, November 2014. A full list of people interviewed for this report is provided in Appendix E.

R-PACE programs in California have generated renewed interest in R-PACE in spite of the FHFA directive.[32] Connecticut must consider whether it is prudent to wait until the current legal and regulatory hurdles are resolved or at least closer to resolution before implementing a revised R-PACE program with a senior lien superior to existing mortgages.

If Connecticut decides to pursue R-PACE in the near future, policymakers, program sponsors, and administrators in Connecticut should ensure that R-PACE program design elements successfully navigate the FHFA's concerns and embed lessons learned from PACE programs across the country. Common elements of successful R-PACE programs include significant marketing efforts, reliable investment, consistent policy support, stakeholder engagement, and efficient program administration, to encourage private investment and reduce risk for public dollars. Key design recommendations, therefore, include the following:

- Allow R-PACE liens to take senior-lien status;
- Ensure that the R-PACE liens do not accelerate, in order to provide security to senior mortgage holders;
- Facilitate R-PACE lien disclosure to R-PACE borrowers in light of legal and regulatory issues, notably those issues stemming from the FHFA;
- Establish minimum underwriting criteria around total lien-to-property value to provide protection to R-PACE borrowers and senior mortgage holders;
- Enable risk credit enhancements such as a loan-loss reserve, to help mitigate regulatory and legal concerns, notably those from the FHFA;
- Allow for leases and power purchase agreements;
- Establish a statewide administrator of the program. This will:
    - Provide quality assurance around eligible measures, contractors, and originators;
    - Ensure that the power of placing a senior lien on a property is performed by a public or quasi-public agency, which minimizes the risk of predatory lending and limits excessive risk to current senior lienholders;
    - Allow municipalities to opt in, ensuring the buy-in of key participants in the administrative process;
    - Enable the creation and centralized administration of credit enhancements, including aggregation to support private capital inflows into the state;
    - Create an efficient structure for engaging with municipalities, regulators, and private capital market providers;
    - Allow for the provision, evaluation, and central administration of credit enhancements, such as loan-loss reserves.

With this in mind, we recommend the Connecticut General Assembly amend its existing R-PACE authorizing legislation to remove the provision that R-PACE assessments "shall not have priority over any prior mortgages;"[33] authorize and direct the Connecticut Green Bank to serve as

[32] Stephen Lacey, "The Narrative That Residential PACE Is 'Dead' Is Now Pretty Much Dead Itself," *GreenTech Media*, August 6, 2014, http://www.greentechmedia.com/articles/read/the-narrative-that-residential-pace-is-dead-is-now-pretty-much-dead-itself.

[33] PACE assessments should be made *pari passu* with other municipal claims, and above those of other debt.

administrator of the program; provide for a loan-loss reserve fund; and unambiguously allow for leases and power purchase agreements.

Despite its significant regulatory and legal hurdles, R-PACE enables access to long-term, low-cost capital because it is secured by the property and automatically transfers the outstanding balance of an R-PACE assessment to a subsequent property owner. For these reasons, if Connecticut can successfully design, time, and implement an R-PACE program, it can become a viable financing and marketing tool to rapidly scale up residential clean energy deployment in Connecticut.

I. INTRODUCTION

Clean energy technologies[34] offer many public benefits, including energy demand and greenhouse gas emissions reduction, economic development and job growth, and greater energy security. However, the high upfront price of these technologies poses a significant barrier to widespread deployment. A key challenge to clean energy deployment in the residential market is providing access to low-cost capital to help homeowners overcome the high upfront costs.[35] Long-term capital solutions offer homeowners the opportunity to invest in clean energy technologies with minimal initial cash output and to spread out the cost of these investments over time, helping homeowners save on their energy bills and making clean energy more accessible for scaled deployment. [36]

Customers who borrow money to finance clean energy upgrades may desire flexibility and unique features not found in typical clean energy financing products.[37] Transferability is the ability of a loan or lease to change ownership if the property is sold, thereby allowing the loan or lease to stay with the property rather than with the owner who initiated the agreement.[38]

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[34] Connecticut's General Statutes Section 16-245n defines "clean energy" as follows:

> solar photovoltaic energy, solar thermal, geothermal energy, wind, ocean thermal energy, wave or tidal energy, fuel cells, landfill gas, hydropower that meets the low-impact standards of the Low-Impact Hydropower Institute, hydrogen production and hydrogen conversion technologies, low emission advanced biomass conversion technologies, alternative fuels, used for electricity generation including ethanol, biodiesel or other fuel produced in Connecticut and derived from agricultural produce, food waste or waste vegetable oil, provided the Commissioner of Energy and Environmental Protection determines that such fuels provide net reductions in greenhouse gas emissions and fossil fuel consumption, usable electricity from combined heat and power systems with waste heat recovery systems, thermal storage systems, other energy resources and emerging technologies which have significant potential for commercialization and which do not involve the combustion of coal, petroleum or petroleum products, municipal solid waste or nuclear fission, financing of energy efficiency projects, projects that seek to deploy electric, electric hybrid, natural gas or alternative fuel vehicles and associated infrastructure, any related storage, distribution, manufacturing technologies or facilities and any Class I renewable energy source, as defined in section 16-1.

[35] Jorge Madrid and Adam James, "Power for the People: Overcoming Barriers to Energy Efficiency for Low-Income Families," *Center for American Progress*, February 15, 2012, https://www.americanprogress.org/issues/green/report/2012/02/15/11127/power-for-the-people/.

[36] Recovery Through Retrofit, *Middle Class Task Force, Council on Environmental Quality*, October 2009, http://www.whitehouse.gov/assets/documents/Recovery_Through_Retrofit_Final_Report.pdf.

[37] When considering whether or not to undertake a clean energy upgrade, a homeowner will look at the periodic savings over time, or whether the savings will pay for the debt service in any given time period (say, monthly or annually). Rate is just one consideration in determining whether or not the operating savings will pay for the debt expense. Many clean energy assets are relatively long-lived. HVAC systems have estimated useful lives of 10-15 years, while solar panels can last upwards of 30 years. When taken with the fact that most homeowners stay in their home about 13 years, the payback can be relatively uncertain. Long-term financing plus transferability solves this issue and allows the obligation to stay with the property, even after the original owner moves away.

[38] A. Justin Kirkpatrick and Lori S. Bennear, "Promoting Clean Energy Investment: An Empirical Analysis of Property Assessed Clean Energy," 26 Journal of Environmental Economics and Management 357 (2014).

Transferability allows a loan or lease to be paid back while the clean energy upgrades it finances are generating savings, which customers may prefer.

Assuming that high-interest rates and lack of transferability are part of what keeps customers from financing clean energy upgrades, R-PACE could be part of the solution.[39] R-PACE allows a homeowner's clean energy investments to be paid off over an assigned term of years through a special assessment on the homeowner's property tax bill. The investor, taxing jurisdiction, and customer agree upon a repayment plan to pay back the cost of the improvements plus interest over a period of years.[40] The special assessment remains with the property even after sale, so the payment obligation transfers to subsequent property owners. Levied as a special assessment senior to other non-tax debt on property, R-PACE provides reduced risk of homeowner non-payment. With this increased security in place, R-PACE allows investors to supply capital at lower interest rates over longer term durations.[41]

The first R-PACE program, called the Financing Initiative for Renewable and Solar Technology (FIRST), emerged in Berkeley, California in November 2008. The FIRST program began as a pilot to test the feasibility of using a PACE security mechanism to fund residential solar photovoltaic installations.[42] Although the initial program had mixed results, it demonstrated demand for clean energy financing and paved the way for other PACE programs across the country.[43] In the months that followed, many states passed PACE authorizing legislation, and PACE programs quickly proliferated.[44]

On the residential side, the growth of R-PACE dramatically slowed in 2010 with the emergence of significant federal regulatory hurdles for the R-PACE market.[45] These regulatory issues are discussed in Section IV. Because of the differences in the way in which the residential and commercial mortgage markets are regulated, C-PACE programs were largely unaffected and continued to gather momentum in many places. Recently, in spite of the federal regulatory challenges, there has been renewed interest in R-PACE.[46]

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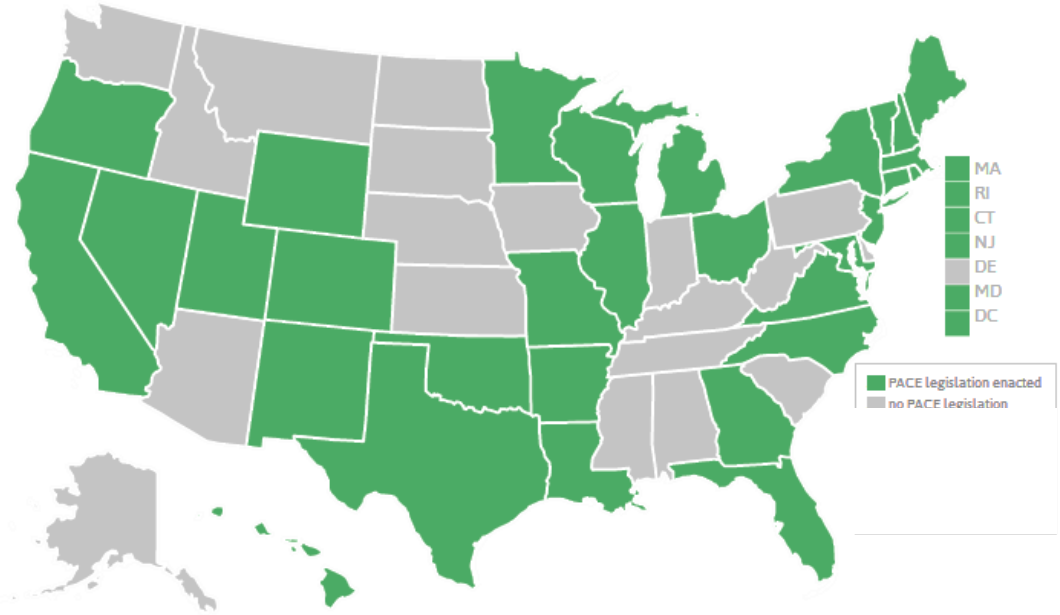
[39] Cisco Devries, "The Story of PACE," *State & Local Energy Report*, August 10, 2013, http://stateenergyreport.com/2013/08/10/the-story-of-pace/.
[40] "Property-Assessed Clean Energy (PACE): Financing of Renewables and Efficiency," *National Renewable Energy Laboratory*, July, 2010, http://www.nrel.gov/docs/fy10osti/47097.pdf.
[41] Sijia Qiu and Jocelyn Durkay, "PACE Financing," *National Conference of State Legislatures*, October 20, 2014, http://www.ncsl.org/research/energy/pace-financing.aspx.
[42] "Berkeley FIRST Final Evaluation," *City of Berkeley, Planning and Development Department Office of Energy and Sustainable Development*, November 2010, https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/Berkeley%20FIRST%20Final%20Evaluation%20current.pdf.
[43] "Commercial PACE (Property Assessed Clean Energy) Study," Vermont Public Service Department, January 15, 2013, http://www.leg.state.vt.us/reports/2013ExternalReports/285688.pdf.
[44] Michael A. Wrapp, *Property Assessed Clean Energy (PACE): Victim of Loan Giants or Way of the Future*, 27 Notre Dame Journal of Law, Ethics & Pub. Policy 273 (2013): 278-279, http://scholarship.law.nd.edu/ndjlepp/vol27/iss1/11.
[45] Ian M. Larson, *Keeping PACE: Federal Mortgage Lenders Halt Local Clean Energy Programs*, 76 Mo. L. Rev. (2011), http://scholarship.law.missouri.edu/mlr/vol76/iss2/10.
[46] Stephen Lacey, "Why Residential PACE Is Growing in Spite of Opposition from Federal Housing Lenders." *GreenTech Media*, July 24, 2014, http://www.greentechmedia.com/articles/read/Why-Residential-PACE-Is-Growing.

Currently, over 30 states have authorized some form of PACE program.[47] There are R-PACE programs operating or in development in at least six states: California, Florida, Maine, New York, Rhode Island, and Vermont.[48] There are C-PACE programs operating in at least ten states as well as the District of Columbia.[49] The figure below[50] shows states with PACE-enabling legislation in place.

States with PACE-Enabling Legislation in Place



Source: PACENow

This report assesses the prospects and obstacles associated with R-PACE in Connecticut in the context of the state's other residential clean energy program offerings. Section II provides an overview of Connecticut's successful C-PACE program and explains implementation challenges associated with on-bill repayment implementation in Connecticut. Section III examines different R-PACE program design choices. Section IV discusses R-PACE regulatory challenges, different approaches that have been adopted to address these challenges, and capital markets' growing interest in R-PACE. Section V offers recommendations for how Connecticut might proceed.

[47] "List of All PACE Enabling States by State," *PACENow*, http://www.pacenow.org/resources/pace-enabling-legislation/.
[48] "List of All PACE Enabling States by State," *PACENow*, http://www.pacenow.org/resources/pace-enabling-legislation/; "Rhode Island – Residential Property Assessed Clean Energy Program Frequently Asked Questions," State of Rhode Island, Office of Energy Resources, http://www.energy.ri.gov/renewable/pace/.
[49] List of All PACE Enabling States by State," *PACENow*, http://www.pacenow.org/resources/pace-enabling-legislation/.
[50] "PACE Market is Growing," *PACENow*, http://www.pacenow.org/pace-programs/.

II. CONNECTICUT'S CLEAN ENERGY FINANCING LANDSCAPE

Connecticut has been a leader in developing clean energy policy and programs. Among other things, the state has an ambitious Renewable Portfolio Standard (RPS) target, with 27 percent of all electricity sales required to come from clean energy by 2020.[51] In addition, Connecticut requires utilities to increase energy savings by 1.4 percent annually through 2015 using customer energy efficiency programs.[52] These state targets have served as guideposts for Connecticut's development of financing tools to encourage clean energy investment. Connecticut's clean energy policy goals are embedded in statute, regulation (Conservation and Load Management Plan[53]), and planning (Comprehensive Energy Strategy[54] and Integrated Resource Plan[55]).[56]

When thinking about whether to add R-PACE to the mix of Connecticut's clean energy policies and programs, it is useful to consider it in relationship to two of those programs—C-PACE and On-Bill Financing.

1. Connecticut's C-PACE Program

The Connecticut C-PACE Program is the most successful commercial PACE program in the nation and is frequently cited as a model for other states.[57] To date, the Connecticut Green Bank has approved and closed roughly $55 million in C-PACE deals and has a current pipeline of $100 million under consideration.[58]

Achieving this success started with appropriate statutory provisions detailed in Connecticut General Statutes Section 16a-40g, which specifies administration on a statewide basis under the authority of the Connecticut Green Bank.[59] The statute animated the PACE market because it:

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[51] "PACE Financing, DSIRE," http://www.dsireusa.org/solar/solarpolicyguide/?id=26.
[52] "Connecticut, State and Local Policy Database, *American Council for an Energy-Efficient Economy (ACEEE)*, October 2014, http://database.aceee.org/state/connecticut.
[53] Current and Approved C&LM Plans, *Energize Connecticut*, http://www.energizect.com/about/eeboard/plans#current.
[54] "Comprehensive Energy Strategy," *Connecticut Department of Energy and Environmental Protection*, February 19, 2013, http://www.ct.gov/deep/lib/deep/energy/cep/2013_ces_final.pdf.
http://www.ctcleanenergy.com/Portals/0/CEFIA%20FY15%20and%20FY16%20Comprehensive%20Plan.pdf.
[55] "Draft Integrated Resource Plan," *Connecticut Department of Energy and Environmental Protection*, December 11, 2014, http://www.ct.gov/deep/lib/deep/energy/irp/2014_irp_draft.pdf.
[56] Connecticut Green Bank Comprehensive Plan: Fiscal Years 2015 and 2016, *Connecticut Green Bank* (July 18, 2014): 4, 10-12, http://www.ctcleanenergy.com/Portals/0/CEFIA%20FY15%20and%20FY16%20Comprehensive%20Plan.pdf.
[57] Maria Blais Costello, "The Connecticut Green Bank's C-PACE Program: Low-cost, Long-term Financing for Clean Energy Upgrades," *Renewable Energy World*, December 24, 2013, http://www.renewableenergyworld.com/rea/blog/post/2014/12/the-connecticut-green-banks-c-pace-program-low-cost-long-term-financing-for-clean-energy-upgrades.
[58] Alexander Soule, "Tax Financing Eyed for Home Solar Arrays," *Stamford Advocate*, December 31, 2014, http://www.stamfordadvocate.com/business/article/Tax-financing-eyed-for-home-solar-arrays-5988003.php.
[59] Conn. Gen. Stat. § 16a-40g.

- Respects existing mortgage holders' rights by requiring their consent for a C-PACE benefit assessment lien to be placed on a property on which they hold a first lien;

- Requires a robust process to evaluate energy savings by requiring the Connecticut Green Bank to confirm that energy savings exceed the assessment payments over the life of the improvements;

- Allows municipalities to opt in, ensuring the buy-in of these essential participants in the placement of the benefit assessment lien on the property. The timely placement of the benefit assessment lien is fundamental for perfecting the capital providers' security interest in the property, and is the key to unlocking millions of dollars of economic activity and jobs to local communities across the state.[60]

Notably, the statute identified the Connecticut Green Bank as the statewide administrator of the C-PACE program. In 2013, the Connecticut Green Bank's Board of Directors approved a $40 million funding warehouse credit facility using the Connecticut Green Bank's funds.[61] This internal warehouse lending allowed the Connecticut Green Bank to step into the early stage of the C-PACE market to prove the concept and give early borrowers and contractors confidence that funding would be available for their projects—and to establish underwriting criteria which enabled private capital to step into the Connecticut Green Bank's shoes in less than a year.

The first securitization by the Connecticut Green Bank in late 2013 of $30 million of C-PACE benefit assessment liens was a significant milestone.[62] It demonstrated how the Connecticut Green Bank can strategically use relatively small amounts of ratepayer funds to attract private capital, driving millions of dollars of private capital into the clean energy marketplace. Twenty-four million dollars of the Connecticut Green Bank's investment will be replenished in the first half of 2015 from Clean Fund, the winner of the C-PACE 2013 Sell Down Auction.[63] Additionally, the Connecticut Green Bank will retain a 20 percent subordinated role in the capital stack during the term, and benefit from cash flows of the loan over time.

In early 2015, the Connecticut Green Bank will take another step in bringing private investment into the market by sourcing an external capital facility via a public process.[64] This will enable borrowers to benefit from lower rates found in asset-backed securities markets, achievable with the security PACE allows. The Connecticut Green Bank's involvement during C-PACE's early stages was critical to bringing the program to a scale at which it could provide significant

[60] Connecticut Public Act 12-2, § 157 (PA 12-2) (June 15, 2012).
[61] "CEFIA Announces Sale of Commercial Property Assessed Clean Energy Benefit Assessment Liens," *MarketWatch*, May 19, 2014, http://www.marketwatch.com/story/cefia-announces-sale-of-commercial-property-assessed-clean-energy-benefit-assessment-liens-2014-05-19.
[62] Nick Lombardi, "In a 'Watershed' Deal, Securitization Comes to Commercial Efficiency," *GreenTech Media*, May 19, 2014, http://www.greentechmedia.com/articles/read/the-first-known-commercial-efficiency-securitization.
[63] Nick Lombardi, "In a 'Watershed' Deal, Securitization Comes to Commercial Efficiency," *GreenTech Media*, May 19, 2014, http://www.greentechmedia.com/articles/read/the-first-known-commercial-efficiency-securitization.
[64] Nick Lombardi, "Inside Story of How CT C-PACE Program Became So Influential in Energy Efficiency Finance," *Sustainable Real Estate Solutions*, July 8, 2014, http://srmnetwork.com/inside-story-of-how-ct-c-pace-program-became-so-influential-in-energy-efficiency-finance.

benefits to borrowers via low rates and a liquid program, while reducing the burden on ratepayers.

2. On-Bill Financing in Connecticut

Homeowners seeking to make clean energy improvements have a range of private and public financing options available to them. However, financing options do not serve all market segments well, especially expensive projects with longer paybacks (e.g. solar, comprehensive whole-home performance upgrades), and projects for income-constrained customers who need to minimize their monthly payments through a longer financing term for projects of all sizes.[65]

None of the currently available residential financing options in Connecticut provides a security interest and transferability, which are key features to attracting long-term, low-cost private capital.[66] Providing easier access to low-cost and long-term capital will help make clean energy more affordable, accessible, and attractive to consumers. Availability of attractive financing products is a key element to driving the rapid scale-up of adoption of deeper energy savings and clean energy production in the residential sector.

On-Bill Financing (OBF) is one useful option for providing consumers with long-term, low-cost capital,[67] although it does not necessarily eliminate the need for also having R-PACE as an option. OBF allows utility customers to invest in energy efficiency and clean energy improvements by attaching an additional charge as a repayment plan onto the utility customer's bill.[68] The utility customers who receive the energy upgrades pay back the investments over time through the added charge on their monthly utility bills. Such programs often result in neutral or positive cash flow, because the resulting monthly energy efficiency or clean energy savings are equal to or greater than the monthly payments. As of 2012, at least 23 states either offered or were in the process of implementing OBF programs.[69] On-Bill Repayment (OBR) refers specifically to the use of the utility bill as a repayment mechanism, independent of where the capital for the financing comes from.[70] Typically, OBF utilizes a utility's balance sheet as its source of capital. In Connecticut's on-bill program, private sector financing will be used to place the obligation on the meter. So, for purposes of this section, the program will be referred to as On-Bill Repayment or OBR.

[65] Based on project economics modeling by Connecticut Green Bank staff.
[66] See Appendix A for details on Connecticut's publically supported residential clean energy financing programs.
[67] William Pentland, "The Battle for Your Energy Bill," *Forbes*, June 14, 2013, http://www.forbes.com/sites/williampentland/2013/06/14/the-battle-for-your-energy-bill/.
[68] "On-Bill Financing for Energy Efficiency Improvements," *American Council for an Energy-Efficient Economy (ACEEE),* April 2012, http://www.aceee.org/sector/state-policy/toolkit/on-bill-financing.
[69] Catherine Bell and Steven Nadel, "On-Bill Financing: Exploring the Energy Efficiency Opportunities and Diversity of Approaches," *American Council for an Energy-Efficient Economy (ACEEE),* 2012, http://aceee.org/files/proceedings/2012/data/papers/0193-000035.pdf.
[70] "On-Bill Financing for Energy Efficiency Improvements," *American Council for an Energy-Efficient Economy (ACEEE),* April 2012, http://www.aceee.org/sector/state-policy/toolkit/on-bill-financing.

In June 2013, the State of Connecticut General Assembly authorized an OBR program,[71] enabling the Connecticut Green Bank and the Energy Efficiency Board (EEB)[72] to establish an OBR program and for the Connecticut Green Bank to administer the program using private capital. The legislation included a security interest in the form of disconnection of utility service for non-payment and the ability for the financing obligation to stay with the meter (e.g. transferability).[73] The program is being developed in phases because of concerns on the part of the EEB and the electric utilities (Connecticut Light & Power and United Illuminating) over the disconnection-of-service provision, as well as concerns over the length of time and cost to implement the transferability feature into each utility's billing and accounting systems.[74] Each phase will be treated as a new program requiring approval by EEB and the Connecticut Green Bank, as well as by the Public Utility Regulatory Authority (PURA).

Phase I of the program has been approved and is scheduled to launch in mid-2015. It will not include a security interest or transferability. It is based on the unsecured Smart-E Loan Program,[75] which has already sourced $28 million in private capital from credit unions and community banks statewide, and is currently available statewide through participating lenders. When Phase I launches, it will essentially be marketed as an option for consumers to repay their Smart-E loans through their utility bills. Phase I includes the participation of lenders, the Connecticut Green Bank's Smart-E contractor network, a savings-to-investment (SIR) ratio test to ensure the cost of repayment is lower than the cost of energy saved, and assurances that the loan term will not exceed the useful life of the efficiency upgrades. Smart-E OBR also includes a $500,000 timeliness reserve as an added program feature for lenders to address any payment-timing issues that arise.[76]

The Connecticut Green Bank is establishing an "open access" platform for the OBR program to enable different capital providers with targeted financing products to take advantage of repayment through utility bills. Implementation of additional financing products beyond the Smart-E Loan will not occur until Phase II. The Connecticut Green Bank plans to act as an administrator intermediary between OBR beneficiaries and the capital providers.[77]

Limitations of Phase I OBR implementation are that it does not have a mechanism for shutting off a homeowner's electricity for non-payment, and that it cannot be transferred to subsequent owners of the property. EEB commissioned a report, *Disconnection and On-Bill Repayment, An*

[71] Conn. Gen. Stat. § 16a-40m.
[72] Connecticut's EEB is a group of advisors who advise and assist Connecticut utility companies in developing and implementing energy conservation measures and market development goals. The EEB was created in 1998 by the Connecticut State Legislature, and operates under mandates in Public Acts 11-80 § 33 and 13-298 § 16. The chief mission of the EEB is to distribute the Connecticut Energy Efficiency Fund (CEEF). Money dispersed by the CEEF supports energy efficiency programs and is funded through a surcharge on customer electric and gas bills, the Regional Greenhouse Gas Initiative, and the ISO-NEW England Forward Capacity Market auctions. The EEB is also responsible for conducting independent comprehensive evaluations of CEEF-funded residential, commercial and industrial energy efficiency programs. "Connecticut Energy Efficiency Board," *Energize Connecticut*, http://www.energizect.com/about/eeboard.
[73] Conn. Gen. Stat. § 16a-40m(b)(10).
[74] "Smart-E On-Bill Repayment Program Document," May 5, 2014.
[75] "Energize Connecticut, Smart-E Loans," http://www.energizect.com/residents/programs/smarte.
[76] "Smart-E On-Bill Repayment Program Document," May 5, 2014.
[77] "Smart-E On-Bill Repayment Program Document," May 5, 2014.

Analysis of Risks and Benefits,[78] that examined OBF programs and recommended against service termination to collect unpaid loans. The report highlighted risks to residents from utility termination and argued that utility shut-off will not necessarily secure lower-cost capital and reduce default rates.[79]

After the report was released, the EEB board voted against allowing utility shutoff electricity in the case of customer default. The EEB's resolution stated that "the EEB will not approve an OBR program that allows for shutoff of utility for default on a loan; the EEB will continue to work closely with the Connecticut Green Bank to develop a program utilizing an alternative approach."[80] The EEB's divided decision was supported by Connecticut's two major electric utilities—Connecticut Light & Power and United Illuminating—as well as by the Connecticut Office of Consumer Counsel and the Connecticut Attorney General's Office.[81] Utility representatives whom we contacted for this report indicated that there might be legal barriers to shutoff and feared that inclusion of the shutoff remedy for OBR programs could lead to overly harsh results.[82] Additionally, for utilities, OBR can strain billing systems because utility billing systems require separate line items for repayment, meaning that OBR may necessitate billing software upgrades. These challenges are amplified when a shutoff component is included. For example, OBR programs are currently listed on Connecticut Light & Power's customer utility bills as "non-service balances." Under Connecticut Light & Power's current billing system, non-service balance items do not carry the ability to effectuate shutoff upon default, so such items would have to be reclassified.[83]

The original plan for OBR's Phase II and beyond was that those phases would include additional financing products, utility shutoff, and provisions for OBR transferability to the next owner of a property.[84] But given that those phases require EEB approval and that the EEB is opposed to a utility shutoff provision, it is unlikely that future phases will include that feature.[85] Without the threat of shutoff in the case of default, OBR capital providers have little recourse for collecting on payments in arrears, which makes the loans riskier—essentially, they are unsecured loans. It is also unclear how soon transferability will be able to become part of the OBR program.

Although the OBR program is a useful addition to Connecticut's clean energy financing repertoire, its likely limitations for the foreseeable future leave room for another long-term financing solution with a more potent security mechanism. R-PACE could reach homeowners

[78] Chris Kramer, *Disconnection and On-Bill Repayment: An Analysis of Risks and Benefits*, 2014. http://utilityproject.org/wp-content/uploads/2014/04/OBR-Report-for-CT-EEB-4-2-14.pdf.
[79] Chris Kramer, *Disconnection and On-Bill Repayment: An Analysis of Risks and Benefits*, 2014. http://utilityproject.org/wp-content/uploads/2014/04/OBR-Report-for-CT-EEB-4-2-14.pdf.
[80] "Energy Efficiency Board Monthly Meeting Minutes," April 9, 2014, http://www.energizect.com/sites/default/files/EEB%204.9.14%20Meeting%20Minutes,%20approved.pdf.
[81] "Energy Efficiency Board Monthly Meeting Minutes," April 9, 2014, http://www.energizect.com/sites/default/files/EEB%204.9.14%20Meeting%20Minutes,%20approved.pdf.
[82] Patrick McDonnell in discussion with Nate Hausman, November 3, 2014; Ron Araujo, in discussion with Nate Hausman, November 7, 2014.
[83] Chris Kramer, *Disconnection and On-Bill Repayment: An Analysis of Risks and Benefits*, 2014. http://utilityproject.org/wp-content/uploads/2014/04/OBR-Report-for-CT-EEB-4-2-14.pdf.
[84] "Smart-E On-Bill Repayment Program Document," May 5, 2014.
[85] Patrick McDonnell, in discussion with Nate Hausman, November 3, 2014; Ron Araujo, in discussion with Nate Hausman, November 7, 2014.

who will not be well-served by OBR. For some customers, R-PACE would be able to achieve better outcomes and would be a more attractive offer, thus strengthening the Connecticut Green Banks's arsenal of marketing tools. It could, therefore, be appropriate to advance both OBR and R-PACE in the interests of customer choice. If Connecticut decides to pursue an R-PACE program, it could piggyback on the state's robust and successful C-PACE program, which has proven administrative structures in place, model the program after the successful California HERO R-PACE program, or elect to develop a hybrid program that includes the best features of each program.[86]

[86] Maria Blais Costello, "The Connecticut Green Bank's C-PACE Program: Low-cost, Long-term Financing for Clean Energy Upgrades," *Renewable Energy World*, December 24, 2013, http://www.renewableenergyworld.com/rea/blog/post/2014/12/the-connecticut-green-banks-c-pace-program-low-cost-long-term-financing-for-clean-energy-upgrades.

III. KEY PACE PROGRAM DESIGN CHOICES

Since its introduction in 2008, PACE has been cited as a potential game-changing tool for financing energy efficiency and renewable energy improvements. This section describes key PACE program design features and options, and trade-offs among them. These program design options include:

- Security
- Transferability
- The level of program organization
- Type of program administrator
- Capital source
- Underwriting criteria
- Eligible measures
- Quality assurance

Appendix B offers a more detailed discussion of the program design features and options introduced here.

1. Security

Typical financial products are either secured by a piece of property (e.g., a home mortgage) or are not secured by any specific assets, but instead by a borrower's contractual commitment to repay (e.g., consumer loans). PACE assessments are unique relative to standard secured and unsecured financing tools, in that they are special tax assessments placed on a property rather than loans secured by a property's value or a borrower's creditworthiness. PACE assessments are senior to all other non-tax debt on a property, making them lower risk. This feature may enable a wide range of participants to access low-cost, long-term capital to fund energy improvements.

2. Transferability

The "long payback barrier" to investing in energy improvements occurs when households and businesses are reluctant to invest when it will take longer to payback the improvements than their expected ownership of a property. Automatic transferability of PACE assessments upon property transfer—the automatic transfer of the outstanding balance of a PACE assessment to a subsequent property owner—can overcome this.

Automatic transferability assumes that subsequent owners will value the improvements for which they are being asked to take over the assessment payments. In the event that subsequent owners do not value these improvements, they may simply reduce the amount that they are willing to pay to purchase a property or force the outgoing property owner/tenant to clear the assessment (i.e., pay the balance) as a condition of the sale.

Initial information from the California HERO program suggests that buyers may be comfortable with automatic transferability. But until more data is available, it remains uncertain whether automatic transferability enables property owner reluctance to monetize the value of energy improvements during property transfers.

3. Level of Program Organization

PACE programs may be organized at local, regional, or state levels:

- **Local**. The PACE program is operated within the jurisdiction of a single local government, typically a town or city. This level of local organization was common for the earliest PACE programs (e.g., Berkeley, Boulder, Palm Desert, Sonoma County).

- **Regional**. A single PACE program is operated across the jurisdictions of multiple local governments in a region, each of which typically opts into the regional program by creating its own PACE assessment district (e.g., California HERO).

- **State**. A PACE program is operated at statewide scale and all of the state's municipalities are eligible to opt into the program. Connecticut's existing C-PACE program is organized at a statewide level.

Organization at the local level may allow the greatest flexibility in program design but may also increase the risk of low participation, due to a small pool of potential customers. Regional and statewide programs benefit from economies of scale and may recruit more attractive capital to fund PACE assessments.

4. Type of Program Administrator

PACE program sponsors may select a public, quasi-public, or private administrator to oversee the PACE program:

- **Public or quasi-public**. A public or quasi-public entity is responsible for program administration. The administrator may subcontract certain program functions but retains responsibility for overall program management. The Connecticut Green Bank currently acts as the statewide administrator for the C-PACE program, outsourcing some specialized functions (e.g., technical review and assessment servicing) to private contractors.

- **Private**. A private entity is contracted to act as the PACE program administrator.

A public or quasi-public administration model offers a program sponsor the greatest control and flexibility in program design but places a larger administrative burden on sponsors and increases their financial risk should program participation fail to meet expectations.

Private PACE administrators may be paid for their administration services only (fee for service model) or may provide both administrative services and the exclusive right to finance PACE improvements (one stop shop model). A one-stop-shop administrator may offer PACE programs at no cost to program sponsors in exchange for the exclusive right to fund assessments. This potential benefit to taxpayers should be weighed against the risks of reducing competition among financiers to deliver attractive capital to participants.

5. Capital Source

The upfront capital to fund PACE improvements may come from a range of public and private sources. A program administrator's choice of capital source is often closely tied to the policy goals driving PACE activity.

Funding PACE assessments with public capital offers the greatest flexibility in lending terms. However, if demand outstrips the available supply of public capital, the ability to fund additional PACE assessments will be hindered.

Accessing private capital increases the total amount of funding available. Three basic models for funding PACE assessments with private capital are (1) public administrator acts as warehousing entity, (2) private administrator funds assessments, and (3) open market model.

1) The public administrator as warehouse lending model requires the program administrator to hold assessments until sufficient volume is accumulated to support a re-sale to private investors. This exposes program administrators to the risk that insufficient volume materializes or a private investor cannot be found.

2) Private administrator funding assessments allows for an immediate infusion of private capital and also allows the administrator to re-sell assessments to other private investors. This approach may have higher upfront costs that are passed through to participants, as the private administrator is taking on additional risk by holding assessments.

3) An open market model brings private capital to bear immediately and eliminates the "warehousing" role. Open market models may introduce administrative complexities as multiple lenders interact directly with program participants.

PACE-based financial products are still new. Early PACE investors will offer terms that allow them to cover their costs and to earn a return on their investment and may require concessions or credit enhancements. In the long term, PACE-based products have the potential to offer a low-risk, secure investment opportunity.

6. Underwriting

Underwriting criteria are rarely applied to non-PACE special assessments, so there is little historical experience to inform how to responsibly underwrite PACE assessments. In general, commonly used PACE underwriting criteria are designed to:

- Ensure that the PACE assessment is right-sized to the property's value, to avoid excessive levels of debt and to protect creditors with an interest in the property;

- Align the term of the assessment with the period over which the improvements generate benefits for the property owner; and

- Reveal any major participant issues that could signal a high risk of non-payment.

Programs strike a balance in designing underwriting criteria between extending financing responsibly and achieving broad access to attractive financing

Table 1 summarizes underwriting criteria and other protections advanced by various stakeholders and categorizes these criteria as either property-based, borrower-based, or other.

7. Eligible Measures

PACE financing can be used to fund a range of improvements, including energy efficiency, renewable power systems, and non-energy upgrades such as wind protection. In establishing guidelines, policy makers must balance between driving participation by "meeting the market where it is" and allowing a broad range of single-measure projects versus encouraging or requiring more comprehensive multi-measure upgrades that may generate deeper savings. Allowing a wide range of measures may increase demand and program volume, but risks lower per-project energy savings.

A savings to investment ratio (SIR)—defined as value of *expected* bill savings over the lifetime of an improvement (or PACE assessment) divided by the project's upfront or financed costs—greater than one is advanced by some as consumer protection, but it has uncertain benefits and may reduce program participation, particularly for the residential sector.

8. Quality Assurance

Many existing energy upgrade programs have established quality assurance and quality control protocols. PACE programs should consider building on these existing structures, as PACE-financed measures are likely to be similar to those covered by existing programs.

PACE administrators have implemented various QA/QC and data collection practices, including:

- List of Eligible Contractors.
- List of Qualified Improvements. Connecticut's C-PACE and residential financing programs offers a long list of pre-approved improvements and also reviews other measures on a case-by-case basis.

Quality control post-installation, where the administrator responds to complaints and disciplines or removes poor-performing contractors in accordance with contractor program compliance protocols.

Table 1: PACE Underwriting Criteria and Other Protections Suggested by Various PACE Stakeholders

	White House Guidelines[87]	DOE Guidelines[88]	PACE Assessment Protection Act of 2011 (HR 2599)[89]
Property-based Criteria			
Term of assessment does not exceed useful life of improvements	✓	✓	✓and not to exceed 20 years
PACE assessment: home value[i]	10%	10%	10%
Clear title	✓	✓	✓
No negative equity financing	✓	✓	At least 15% equity in the home
No Involuntary liens of $1,000 or more		✓	✓
Borrower-based Criteria			
No property tax defaults and not more than one late payment in last 3 years	✓	✓	✓
Current on mortgage	✓	✓	✓
No personal bankruptcy within 7 years		✓	✓
Programmatic / Other Criteria			
Reserve fund[ii]	✓		
Recommends escrowing[iii]	✓		
Notification of mortgage holder[iv]		✓	✓
Non-acceleration of PACE assessment[v]		✓	

NOTES

[i]California's PACE enabling legislation includes an "assessment to value" criteria, requiring that the total of annual property tax assessment plus annual PACE assessment does not exceed 5% of property value. Joe Kaatz and Scott J. Anders, "Residential and Commercial Property Assessed Clean Energy (PACE) Financing in California," *Center for Sustainable Energy*, October 2014, http://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/PACE%20in%20California.pdf

[ii] A reserve fund can be used to compensate mortgage holders of properties with PACE assessments, in the event that PACE non-payment leads to verified mortgage holder losses (e.g., California's loan loss reserve). Reserve funds can also be established for PACE lenders to protect them in the event of late or missed payments (e.g., Vermont's loan loss reserve).

[iii] Escrowing monthly installments towards PACE assessments, which are typically due once-twice per year, may increase PACE lenders' confidence that PACE participants will have sufficient cash available when their PACE assessment is due.

[iv] Most existing residential PACE programs do not require mortgage holder notification.

[v] See discussion of acceleration in IV. Regulatory Challenges, Emerging Solutions, and Market Receptiveness. PACE assessments in Connecticut's C-PACE program do *not* accelerate in the event of non-payment.

[87] Available at http://www.whitehouse.gov/assets/documents/PACE_Principles.pdf

[88] Available at http://www1.eere.energy.gov/wip/pdfs/arra_guidelines_for_pilot_pace_programs.pdf

[89] Available at http://thomas.loc.gov/cgi-bin/query/z?c112:H.R.2599:.

Section Summary

The eight program design elements outlined in this section necessitate thoughtful consideration as they may have significant implications for PACE program success. Legislators, program sponsors, and program administrators should carefully consider their policy goals and risk tolerance in making program decisions. Legislation and programs should be designed flexibly so that they can be adjusted as additional data on PACE becomes available.

IV. REGULATORY CHALLENGES, EMERGING SOLUTIONS, AND MARKET RECEPTIVENESS

R-PACE programs were scaling rapidly around the country when concerns began to emerge from regulators related to the soundness and safety of R-PACE assessments.[90] Fannie Mae and Freddie Mac, the government-sponsored enterprises that purchase, guarantee, and securitize home mortgages purchased from banks and small lenders, expressed concern that the increase in PACE programs posed a threat to the secondary mortgage market.[91] According to the Enterprises' Uniform Security Instruments, loans may not have a senior status to a mortgage purchased by the two enterprises.[92] Fannie Mae and Freddie Mac's contended that R-PACE obligations are effectively loans. But because R-PACE assessments hold the same status as tax assessments, they create senior liens superior to existing mortgages and would have to be paid back before any outstanding debt on a mortgage. This creates risks for Fannie Mae and Freddie Mac's mortgage guarantees.[93] Fannie Mae and Freddie Mac also protested that PACE programs lacked sufficient underwriting standards. They noted that because PACE programs are administered by local governments, they vary greatly across the country and are not subject to a set of national, enforceable underwriting criteria.[94]

1. FHFA Directive

On July 6, 2010, the Federal Housing and Finance Agency (FHFA), the agency which serves as conservator of Fannie Mae and Freddie Mac, issued a directive declaring that PACE assessments present significant risk to secondary mortgage markets.[95] The FHFA's statement noted that the senior lien status of PACE assessments exposes Fannie Mae and Freddie Mac to financial risk, that PACE assessments differ from traditional tax assessments in size and duration, and that PACE assessments do not carry the types of public benefits associated with traditional tax assessments.[96] The statement also declared that PACE loans are inconsistent with traditional lending standards, and have inadequate underwriting standards which result in collateral-based

[90] Michael A. Wrapp, *Property Assessed Clean Energy (PACE): Victim of Loan Giants or Way of the Future*, 27 Notre Dame Journal of Law, Ethics & Pub. Policy 273 (2013): 278-279, http://scholarship.law.nd.edu/ndjlepp/vol27/iss1/11.

[91] Corinne Russell and Stefanie Johnson, "FHFA Statement on Certain Energy Retrofit Loan Programs," *Federal Housing Finance Agency*, July 6, 2010, http://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Statement-on-Certain-Energy-Retrofit-Loan-Programs.aspx.

[92] "Security Instruments," *Fannie Mae*, https://www.fanniemae.com/singlefamily/security-instruments; "Security Instruments," *Freddie Mac*, http://www.freddiemac.com/uniform/unifsecurity.html;

[93] Corinne Russell and Stefanie Johnson, "FHFA Statement on Certain Energy Retrofit Loan Programs," *Federal Housing Finance Agency*, July 6, 2010, http://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Statement-on-Certain-Energy-Retrofit-Loan-Programs.aspx.

[94] Jordan M. Collins, "PACE-ing in Purgatory: Outlook for Property Assessed Clean Energy Financing," *Mintz-Levin Law Firm*, January 19, 2012.

[95] Corinne Russell and Stefanie Johnson, "FHFA Statement on Certain Energy Retrofit Loan Programs," *Federal Housing Finance Agency*, July 6, 2010, http://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Statement-on-Certain-Energy-Retrofit-Loan-Programs.aspx.

[96] Public benefits that are associated with tax assessments traditionally have included public improvements such as streetlights, paved roads, or power line maintenance.

lending instead of lending based on "ability-to-pay."[97] Finally, the FHFA speculated that improvements financed through PACE may not actually produce substantial reductions in energy use, and that PACE financing is "not essential for successful programs to spur energy conservation."[98]

Because the nature of commercial mortgages affords commercial mortgage holders more protection, the FHFA's directive targeted R-PACE rather than C-PACE. It instructed government-sponsored entities like Fannie Mae and Freddie Mac to alter underwriting where PACE exists. The FHFA specifically directed Fannie Mae and Freddie Mac to adjust loan-to-value ratios, ensure loan covenants require approval or consent for PACE loans, tighten borrower debt-to-income ratios, and adopt additional guidelines as needed to ensure the safety and soundness of their operations.[99]

PACE assessments may present risks to mortgage holders in two circumstances: (1) during property sale and (2) in the case of PACE assessment non-payment. We explore these two situations and describe possible protections below.

During Sale: Transferability as Protection?

During sale, mortgage holders may be concerned that a PACE assessment will affect a borrower's ability to repay (clear) the mortgage. If a buyer does not wish to assume the PACE assessment, the original owner may be forced to clear the PACE lien. If the PACE-funded improvements did not maintain or increase the market value of a property, this might reduce the amount of capital remaining to pay off the mortgage holder and, in extreme cases where the home is underwater, it could result in the mortgage holder not being repaid in full.

Automatic transferability of PACE assessments has been advanced as a remedy to these concerns. If the obligation to repay a PACE assessment can be automatically shifted to a subsequent owner, buyers may consider the assessment as separate from the value of the home itself.[100] If the PACE assessment can be insulated from a buyer's valuation of the home, purchase price may not be influenced by the assessment. Assuming the home's value is greater than the mortgage balance outstanding (i.e., the home is not underwater), there could be no effect to the mortgage holder, who would be paid off in full. This has not yet been widely tested in actual resale markets.[101]

[97] Corinne Russell and Stefanie Johnson, "FHFA Statement on Certain Energy Retrofit Loan Programs," *Federal Housing Finance Agency*, July 6, 2010, http://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Statement-on-Certain-Energy-Retrofit-Loan-Programs.aspx.
[98] Corinne Russell and Stefanie Johnson, "FHFA Statement on Certain Energy Retrofit Loan Programs," *Federal Housing Finance Agency*, July 6, 2010, http://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Statement-on-Certain-Energy-Retrofit-Loan-Programs.aspx.
[99] Corinne Russell and Stefanie Johnson, "FHFA Statement on Certain Energy Retrofit Loan Programs," *Federal Housing Finance Agency*, July 6, 2010, http://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Statement-on-Certain-Energy-Retrofit-Loan-Programs.aspx.
[100] A. Justin Kirkpatrick and Lori S. Bennear, "Promoting Clean Energy Investment: An Empirical Analysis of Property Assessed Clean Energy," 26 Journal of Environmental Economics and Management 357 (2014).
[101] As data accumulates, we may know more about resale effects to mortgage holders.

In Default: Non-Acceleration as Protection?

Property owners who repeatedly fail to make PACE assessment payments will face a range of enforcement actions, including an eventual foreclosure on the property. Because tax liens are senior to all other debt, mortgage holders often pay off tax liens to avoid owing penalties or interest when the property is eventually resold. A mortgage holder may then foreclose on the property and recoup its investment through the resale. The specifics of property tax non-payment procedures vary from state to state, but can be broadly categorized into two scenarios:

- **The special assessment is accelerated**. A tax lien is placed against the property for the entire balance of the assessment (not just the delinquent payments plus penalties and interest) after an extended delinquency.

- **The special assessment is not accelerated**. Only the assessment amount in arrears, plus penalties and interest, must be paid to clear the tax lien. This is the case for C-PACE in Connecticut.

In either case, the property owners may clear the lien by paying off the amount due and, if they do not, face potential foreclosure.

In theory, in a jurisdiction with non-acceleration, the mortgage holder could pay just the PACE assessment amount in arrears and resell the property, with the remaining balance of the PACE assessment attached, and the subsequent owner would resume PACE payments. However, tax liens in their entirety are often cleared as a condition of sale, meaning that, even if a lien was not accelerated originally, a new buyer may effectively require acceleration, resulting in no practical value of non-acceleration to the mortgage holder.

It is also possible that, even if state law specifies non-acceleration, a bankruptcy court (or financial regulator) might find that PACE assessments more closely resemble loans than assessments and require that they be cleared during foreclosure. Should a bankruptcy court require a PACE assessment to accelerate during a foreclosure proceeding, the benefit of non-acceleration might be limited.

PACE proponents recommend non-acceleration of the PACE lien if possible, while investors in PACE-based assets will prefer acceleration. Until PACE assessments build a track record in tax lien sale and foreclosure situations, uncertainty remains regarding how the assessments will be treated during default and foreclosure.

A range of efforts have attempted to address secondary mortgage market concerns, including the issuance of Guidelines for Pilot PACE Financing Programs from the Department of Energy.[102] Some parties have challenged the FHFA's policy towards PACE in court.[103] Members of

[102] "Guidelines for Financing Pilot PACE Financing Programs, U.S. Department of Energy, May 7, 2010, http://www1.eere.energy.gov/wip/pdfs/arra_guidelines_for_pilot_pace_programs.pdf.

[103] *California v. Federal Housing Financing Agency*, No. C-10-03084 (N.D. Cal. 2010); *Sonoma County v. Federal Housing Financing Agency*, (9th Cir. 2012); *Town of Babylon v. Federal Housing Financing Agency*, 790 F. Supp.

Congress have introduced legislation to address the issue.[104] None of these effort have changed the FHFA's position on the issue, however. The legal and legislative battles concerning R-PACE and the FHFA's directive are chronicled in Appendix C.

The FHFA's directive had a chilling effect on R-PACE. In the wake of its issuance, several R-PACE programs in California, one in New York, and one in Florida, shut down.[105] Other state and local governments abandoned their plans to start R-PACE programs. Some developed protections or continued to operate in contravention of the FHFA guidance.[106]

2. Emerging Strategies for R-PACE

States and local governments have employed various strategies in implementing residential PACE programs in spite of the FHFA's directive. Some are forging ahead with fully intact residential programs that offer a senior lien status, while others have acquiesced to the FHFA's demands and have instead implemented programs with junior liens. Still other programs are only offering residential PACE loans to homeowners without mortgages on their homes. Below are a few important examples. More detailed case studies are provided in Appendix D.

California

To mitigate FHFA concerns, California established a $10 million loan-loss reserve fund as a backstop for defaults. Specifically, the loan-loss reserve is designed "to mitigate risk to potential first mortgage holders by making them whole for losses incurred due to the existence of a first-priority PACE lien on a property during a foreclosure or forced sale."[107] To be eligible for the loan-loss reserve, PACE administrators must apply and meet minimum underwriting criteria, and pay a small administrative fee. California's loan-loss reserve covers assessments issued by participating PACE programs for their full terms, or until the fund is exhausted. The state administrator collects data on the financing activity and the performance of the PACE assessment.[108]

2d 47 (E.D.N.Y. 2011); *National Resources Defense Council v. Federal Housing Financing Agency*, 815 F. Supp. 2d 630 (S.D.N.Y. 2011); *Leon County v. Federal Housing Financing Agency*, 816 F. Supp. 2d 1205 (11th Cir. 2012).

[104] Mike Thompson, "H.R. 5766: PACE Assessment Protection Act of 2010," The Library of Congress, July 15, 2010, https://www.govtrack.us/congress/bills/111/hr5766#overview. H.R. 4285; Mike Thompson, "H.R.4285: "PACE Assessment Protection Act of 2014," *Congress.Gov*, March 24, 2014, https://www.congress.gov/bill/113th-congress/house-bill/4285.

[105] Ian M. Larson, *Keeping PACE: Federal Mortgage Lenders Halt Local Clean Energy Programs*, 76 Mo. L. Rev. (2011), http://scholarship.law.missouri.edu/mlr/vol76/iss2/10.

[106] Kevin E. McCarthy, "Issues With Property Assessed Clean Energy Programs," *Connecticut Office of Legislative Research*, January 19, 2012, http://www.cga.ct.gov/2012/rpt/2012-R-0027.htm.

[107] PACE Loss Reserve Program Summary," *California Alternative Energy and Advanced Transportation Financing Authority*, September 10, 2014, http://64.166.146.155/docs/2014/IOC/20141103_361/19135_State%20PACE%20Loss%20Reserve%20Program%20Summary.pdf.

[108] PACE Loss Reserve Program Summary," *California Alternative Energy and Advanced Transportation Financing Authority*, September 10, 2014, http://64.166.146.155/docs/2014/IOC/20141103_361/19135_State%20PACE%20Loss%20Reserve%20Program%20Summary.pdf.

In California, there are a range of PACE programmatic models.[109] Programs may be funded publicly, privately, or through a mixture of public and private funds. A city, county, or special district may administer the programs themselves, contract with a private third party, or join a public entity to contract with a private third party.

California HERO (Home Energy Renovation Opportunity) represents a particularly successful PACE programmatic model.[110] Launched in December 2011, it was created by the Western Riverside Council of Governments, a joint-powers authority. It is the fastest growing R-PACE program in the country. It is now available to 70 percent of California residents and is available in nearly 225 communities, including large cities such as San Diego, San Jose, and Berkeley. It has already allocated $200 million, with an additional $300 million in approved projects.[111]

California HERO offers both residential and commercial PACE. It provides funding for energy efficiency and clean energy generation projects, as well as water conservation projects. HERO's platform for approvals, marketing, and partnership building is administered by Renovate America.[112]

The HERO program's administrators decided to move forward with R-PACE in the face of the FHFA directive, partly because they believed that the FHFA did not have the capacity to enforce it. They deemed it unlikely that FHFA would allow Fannie Mae and Freddie Mac to devalue their assets in PACE communities by redlining communities.[113] Renovate America's CEO, J.P. McNeill recently said that the FHFA's restrictions were a "non-issue" for California.[114] He claimed that the rule does not necessarily prevent action by consumers, many of whom are quite aware of the FHFA controversy, but choose to enter into PACE obligations anyway. Furthermore, he pointed out that his company meets with the FHFA often to discuss the program, and that the FHFA provided guidance for California HERO's underwriting standards.[115]

The HERO program provides a disclosure of risk associated with the FHFA's statements, but does not require lender consent for a property owner to obtain a PACE assessment. To protect lenders, the program has relatively strict eligibility requirements. Property owners must be current on all property taxes for at least twelve months and must be current on all property debt. Furthermore, property owners may not have any other material liens, and must not have declared bankruptcy for the past seven years. Mortgage debt may not exceed 90 percent of the property's

[109] Joe Kaatz and Scott J. Anders, "Residential and Commercial Property Assessed Clean Energy (PACE) Financing in California," *Center for Sustainable Energy*, October 2014, http://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/PACE%20in%20California.pdf.
[110] "HERO," *Renovate America*, https://www.heroprogram.com/faq.
[111] A full list of HERO communities, see https://www.heroprogram.com/participating.
[112] "HERO," *Renovate America*, https://www.heroprogram.com/faq.
[113] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013: 9.
[114] Stephen Lacey, "Why Residential PACE Is Growing in Spite of Opposition from Federal Housing Lenders." *GreenTech Media*, July 24, 2014, http://www.greentechmedia.com/articles/read/Why-Residential-PACE-Is-Growing.
[115] Stephen Lacey, "Why Residential PACE Is Growing in Spite of Opposition from Federal Housing Lenders." *GreenTech Media*, July 24, 2014, http://www.greentechmedia.com/articles/read/Why-Residential-PACE-Is-Growing.

market value, proposed improvement costs may not exceed 15 percent of market value, and total property tax and assessments may not exceed 5 percent of market value. The minimum financing amount for HERO is $5,000 and the maximum amount is 15 percent of the property's market value.[116]

Vermont

Efficiency Vermont has implemented an R-PACE program with a subordinate lien to ameliorate the FHFA's concerns.[117] When Vermont first passed PACE enabling legislation in 2009, a primary lien structure was maintained for residential PACE assessments, but concerns arose about the risk of PACE-encumbered mortgages in secondary markets. Vermont therefore passed legislation that made PACE liens subordinate to mortgages and existing liens. The law also established a loan-loss reserve maintained by the State Treasurer.[118]

While Efficiency Vermont's subordinate loan structure may satisfy the FHFA, subordinating a PACE assessment to existing liens reduces its core value. The concept of a subordinate tax assessment does not exist in many states, and further this subordination may negatively impact the low-risk, low-cost borrowing terms expected of a typical PACE assessment. It is questionable whether a subordinated PACE assessment, with its weaker protections for PACE lenders, justifies the resources and considerable effort involved with establishing a PACE program.

Florida

Florida has three commercial and residential PACE programs—Florida PACE Funding Agency,[119] Florida Green Energy Works,[120] and Ygrene Clean Energy Green Corridor.[121] Florida's PACE-enabling statute allows for energy efficiency and clean energy generation upgrades, as well as improvements that make properties more resistant to wind and hurricane damage. The three programs can levy PACE assessments, offer financing, and receive assessment payments collected at the county level. Each program has its own financing structure and scope in terms of the energy upgrades covered under the program.[122]

PACE assessments are given superior lien status in Florida. Despite this, Florida PACE supporters do not see a conflict with the FHFA directive for several reasons.[123] First, roughly 30

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[116]Joe Kaatz and Scott J. Anders, "Residential and Commercial Property Assessed Clean Energy (PACE) Financing in California," *Center for Sustainable Energy*, October 2014, http://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/PACE%20in%20California.pdf.

[117] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013.

[118] Kevin E. McCarthy, "Issues With Property Assessed Clean Energy Programs," *Connecticut Office of Legislative Research*, January 19, 2012, http://www.cga.ct.gov/2012/rpt/2012-R-0027.htm.

[119] "How It Works," *Florida PACE Funding Agency*, http://floridapace.gov/how-it-works/.

[120] "About Us," *Florida Green Energy Works*, http://www.floridagreenenergyworks.com/about.

[121] "About Clean Energy Green Corridor," *Ygrene*, https://ygrene.us/fl/green_corridor/about.

[122] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013.

[123] There are several cases pending (appealed by lower court validation action) challenging several Florida R-PACE programs, brought by the Florida Bankers Association.

percent of homeowners do not have mortgages, so lien superiority is a non-issue for them.[124] Second, during the 2010 legislative session, the Florida Bankers Association participated in negotiations on the legislative language of the PACE bill.[125] The resulting legislation passed both House and Senate committees without a single "no" vote.[126] Moreover, there is a clause in the state's PACE-enabling legislation that precludes the acceleration of a senior lien mortgage on account of a PACE lien, meaning all liens are owned by the property owners who are simply required to pay off the lien if they move or refinance.[127] Lastly, Florida's enabling statute includes minimum underwriting criteria for its PACE programs.[128]

3. Recent Developments

Some members of the clean energy industry hoped that the FHFA would change its position after a new director, Melvin Watt, formerly a Democratic Congressman from North Carolina, was sworn in on January 6, 2014.[129] However, the FHFA further reinforced its position in a notice released on December 22, 2014.[130]

4. Capital Markets' Receptiveness

In spite of FHFA concerns, private capital markets have demonstrated their receptiveness to securitized PACE financings, including residential placements. California has been in the lead for some time, but other states have seen substantial participation by private investors. The "leveraging" capacity of Green Banks in New York and Connecticut have attracted much attention this year. For example, Robert Piano of KGS-Alpha noted, "We have been working on capital markets financing for PACE for the past about two years and successfully sourced a $60 million purchase facility (for commercial PACE) for a California-based company last November, closing the deal in March. We've been having a dialogue with the Connecticut Green Bank for the past several months about their commercial PACE program and are very impressed with the platform they've built so far."[131] The Connecticut Green Bank accomplished the first real securitization of PACE loans with its $30 million sale of its C-PACE portfolio to Clean Fund.

[124] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013.
[125] "PACE in Florida," *PACENow*, http://www.pacenow.org/resources/pace-in-florida/.
[126] "Daily Brief," *Associated Industries of Florida*, April 20, 2010, http://aif.com/legislative_info/2010/DB27.pdf; "P.A.C.E. Financing Energizes Committee, Moves Forward," *Florida House of Representatives House Majority Office*, March 17, 2010, http://www.southeastglass.org/docs/PACE%20Committee%20PR.pdf.
[127] Fla. Stat. § 163.08.
[128] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013.
[129] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013.
[130] "Statement of the Federal Housing Finance Agency on Certain Super Priority Liens," *Federal Housing Finance Agency*, December 22, 2014, http://www.fhfa.gov/Media/PublicAffairs/Pages/Statement-of-the-Federal-Housing-Finance-Agency-on-Certain-Super-Priority-Liens.aspx
[131] Robert Piano, in discussion with David Dayton, November 2014.

Clean Fund is active nationally is such deals, setting a goal of $1 billion worth of PACE loans (including direct and purchased assets).[132]

Over $350 million in residential PACE projects have been executed in communities across the country.[133] Interviews with leading representatives of the financial community—Brock Wolf (Executive Director for Structured Credit at Natixis Global Asset Management), Robert Piano (Head of ABS Structuring at ABS-Alpha), Ian Fischer (Chief Operating Officer of Urban Ingenuity), and Natalie Trojan (with the Bank of America PACE Program)—confirm substantial appetite for packaged residential PACE loans that take advantage of five "leverage" functions:(1) longer duration, (2) high rating, (3) bundling of over $50 million per package, (4) 144A format,[134] and (5) in early cases, some degree of credit enhancement until the volume and familiarity build.[135] In addition, PACE programs will be more attractive to investors when they have stringent eligibility requirements for homeowner participation.

Most of the volume to date has been in residential PACE financing, and properly securitized residential loans have, to date, been well-received by investors. Deutsche Bank led the way in March 2014 by structuring and placing a $104 million of R-PACE assessment-backed notes with insurance companies and other large asset managers. The proceeds go to the California HERO program and its terms include a 20-year maturity, AA rating, and a 4.75 percent fixed coupon (a second $129 million issuance of notes followed in October).[136]

The AA rating of the California R-PACE notes comes at the expense, however, of substantial credit enhancement in a complex structure that would be hard to replicate with smaller (less than $50 million) tranches. According to Adam Tempkin, in an *International Financing Review* article in March 2014:

> Excess interest, overcollateralization, and a liquidity reserve provided protection on the deal: For instance, the single-tranche transaction paid a coupon of 4.75%, compared with an underlying coupon of 8% on the underlying PACE limited obligation bond. Additionally, the deal doesn't advance par - it advances approximately 97 cents on the dollar, according to sources familiar with the transaction. Overcollateralization will be 3.00% of the initial aggregate PACE bond principal amount, and the liquidity reserve amount will initially be 3.00% of the aggregate PACE bond principal amount, which equals approximately seven months of interest. The liquidity reserve will gradually build up to 7.00% of the outstanding collateral principal, which equals approximately 17 months of interest, Kroll said. There are also a number of eligibility requirements on top of all this, covering the

[132] Nick Lombardi, "In a 'Watershed' Deal, Securitization Comes to Commercial Efficiency," *GreenTech Media*, May 19, 2014, http://www.greentechmedia.com/articles/read/the-first-known-commercial-efficiency-securitization
[133] Stephen Lacey, "Why Residential PACE Is Growing in Spite of Opposition From Federal Housing Lenders." *GreenTech Media*, July 24, 2014, http://www.greentechmedia.com/articles/read/Why-Residential-PACE-Is-Growing.
[134] 144A format refers to a safe-harbor provision of the federal Securities Act, which allows for certain private restricted securities to be resold to qualified institutional buyers if certain requirements are met.
[135] A full list of people interviewed for this report is provided in Appendix E.
[136] Allison Bisbey, "California Sets the PACE Again," Asset Securitization Report, March 31, 2014, http://www.structuredfinancenews.com/news/california-sets-the-pace-again-248804-1.html.

property owner and property. There is also a requirement that the lien that gets assessed against the property could not be more than 15% of the property value.[137]

For investors, PACE can provide access to a "diverse pool of priority-lien, real estate backed obligations with a low assessment-to-value ratio," according to an article published in March 2014 by the Kramer Levin Naftalis & Frankel law firm.[138] "For any fixed-income investor in rated asset-backed securities or in residual cash flow from securitization trusts, or for equity investors interested in companies that originate financial obligations, PACE programs deserve special attention." The article argued that the investments would be relatively safe, in part because PACE programs' maximum assessment-to-value ratio "encourages prudent property behavior," and the relatively small size of most PACE assessments keeps property owners' overall "land-secured obligations at a manageable level." Moreover, "because PACE assessments are collected with a property owner's real estate taxes by a local taxing authority and then remitted to the trustee for the related PACE bond," PACE assessments "provide cash flow that typically would support securitization in considerable volume."[139]

The article acknowledges that there are challenges to developing a market for PACE programs, one being their "unique legal and commercial features," and another being the "scope of underwriting and eligibility guidelines (that) vary among PACE programs." Investors need to be aware of the various underwriting and eligibility requirements, and to be cognizant of the fact that the issuer in the case of PACE bonds is a municipal entity, which makes "a significant difference" in the case of a potential bankruptcy proceeding.[140]

Further evidence of capital markets' receptiveness comes from recent equity investments in organizations doing residential as well as commercial PACE lending. For example, Renovate America, which administers the California HERO program, recently raised $50 million in growth equity from Valor Equity Partners, Macquarie, RockPort Capital and Spring Creek.[141]

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[137] Adam Tempkin, "First Energy Efficiency Bonds Sold." *International Financing Review*, 2023, March 14, 2014,
[138] Laurence Pettit, "PACE Financing- Municipal Finance Meets ABS," *Funds Talk*, Kramer Levin Naftalis & Frankel LLP, March 2014, http://www.kramerlevin.com/files/Publication/79bf0aa2-9cc2-4b0f-a921-74b9c4b0b87b/Presentation/PublicationAttachment/970caff5-5d6b-489c-9c12-7a22507979b8/FundsTalk_March2014.pdf.
[139] Laurence Pettit, "PACE Financing- Municipal Finance Meets ABS," *Funds Talk*, Kramer Levin Naftalis & Frankel LLP, March 2014, http://www.kramerlevin.com/files/Publication/79bf0aa2-9cc2-4b0f-a921-74b9c4b0b87b/Presentation/PublicationAttachment/970caff5-5d6b-489c-9c12-7a22507979b8/FundsTalk_March2014.pdf.
[140] Laurence Pettit, "PACE Financing- Municipal Finance Meets ABS," *Funds Talk*, Kramer Levin Naftalis & Frankel LLP, March 2014, http://www.kramerlevin.com/files/Publication/79bf0aa2-9cc2-4b0f-a921-74b9c4b0b87b/Presentation/PublicationAttachment/970caff5-5d6b-489c-9c12-7a22507979b8/FundsTalk_March2014.pdf.
[141] "Renovate America Closes $50 Million Equity Investment," *PR Newswire*, July 16, 2014, http://www.prnewswire.com/news-releases/renovate-america-closes-50-million-equity-investment-267381501.html.

V. RECOMMENDATIONS FOR CONNECTICUT

The overall recommendation of this report is that Connecticut should proceed with implementation of an R-PACE program. Although there have been concerns around proceeding with R-PACE in light of the FHFA's position, the experience of R-PACE programs in other states suggests that there are ways to mitigate these concerns in structuring and implementing a program.

There is a large potential market for energy-related home improvements that can pay for themselves out of the combined avoided costs of repairs, water, and energy. Building on the success of Connecticut's C-PACE program, R-PACE financing could have the combined marketing appeal and financing scalability needed to address more fully the Connecticut potential. Compared to other energy upgrade and home-improvement loan programs, R-PACE offers longer terms, less burdensome credit checks, and better assurance that savings equal or surpass debt service.

1. R-PACE Market Capacity in Connecticut

Given the limited data on the demographic characteristics, mortgage levels, and credits scores of participants in R-PACE programs in other states, it is impossible to know with certainty whether Connecticut homeowners would be more or less likely to adopt PACE financing than residents of other states. However, factors such as high home ownership rates, high energy costs, legislative and Connecticut Green Bank support, the state's C-PACE program success, and a robust contractor community all suggest that Connecticut would likely have relatively high uptake. This is confirmed by interviews with potential investors and brokers, who consistently ranked Connecticut high among the states of interest. Scalability is somewhat limited by the state's relatively small population, but it is enhanced by Connecticut's percentage of home ownership and of owner-occupied 1-4 unit dwellings. It is further advanced by the likely impact of Connecticut Green Bank's central administration, standardization, marketing, continuity of public policy, and availability of supplemental funds. In any event, the scalability of PACE financing exceeds that of other public programs in Connecticut because it would be self-funding and not reliant on utility, ratepayer, or taxpayer support.

Ultimately, of course, success will depend on the four elements that have made other public-private enterprises succeed or fail:

1) aggressive marketing, to build volume – likely led by contractors, supported by Connecticut Green Bank collateral materials, utility rebates, and readily available low-cost, long-term financing attaching to the property;

2) efficient securitization of the retail loans, to maximize private investment on competitive terms – supported by high volume, standard terms, conservative underwriting criteria, long durations, and efficient packaging;

3) consistent public-policy support, to minimize perceived risk and support early development – evidenced by stable legislative and administrative commitments; and

4) effective central administration, to manage (1)-(3) – provided by the resources and management of the Connecticut Green Bank.

A principal responsibility and capacity of the Connecticut Green Bank would be statewide program management and support of contractor and municipal marketing with sales collateral materials and branding, contractor oversight, development of standard underwriting terms, capital sourcing, and assistance in marshalling all compatible resources.

2. Legislative Recommendations

The existing legislation[142] authorizing R-PACE should be amended in several ways:

1) It should remove the existing provision that R-PACE assessments "shall not have priority over any prior mortgages."[143] As noted above, subordination may negatively impact the low-risk, low-cost financing terms expected of a typical PACE assessment and could unduly restrict effective implementation of R-PACE. However, senior-lien status should be combined with non-acceleration, limiting the risk exposure to the senior mortgage holder.

2) The legislation should authorize and direct the Connecticut Green Bank to serve as administrator of the R-PACE program. To ensure that the R-PACE program can respond to changes in the clean energy market and learning from the early PACE experiences, the Connecticut Green Bank should be given considerable discretion as program administrator in implementing an R-PACE program in Connecticut. The Connecticut Green Bank has a strong track record of driving financing volume for clean energy improvements. On the commercial side, the Connecticut Green Bank has approved and closed roughly $55 million in C-PACE deals and has a current pipeline of $100 million under consideration. On the residential side, the Connecticut Green Bank has approved and closed over $39 million in residential loans and leases since 2013.

3) The legislation should provide for a loan-loss reserve along the lines of California's approach.

4) Lastly, the legislation should unambiguously allow for leases and power purchase agreements.

[142] See Conn. Gen. Stat. § 7-121n.
[143] PACE assessments should be made *pari passu* with other municipal claims, and above those of other debt.

APPENDIX A—Connecticut's Residential Clean Energy Financing Programs

Connecticut has led the country in developing clean energy policy and programs. Among other things, the state has an ambitious Renewable Portfolio Standard (RPS) target, with 27 percent of all electricity sales required to come from renewables by 2020.[144] In addition, Connecticut requires utilities to increase energy savings by 1.4 percent annually through 2015 using customer energy efficiency programs.[145] Connecticut's clean energy policy goals are embedded in statute, regulation (Conservation and Loan Management Plan[146]), and planning (Comprehensive Energy Strategy[147] and Integrated Resource Plan[148]).[149]

These energy goals have been a catalyst for Connecticut's implementation of a range of financing mechanisms for clean energy investment. This appendix highlights publicly supported residential financing programs from various actors, including those provided in partnership with nonprofits: the Connecticut Green Bank, the Connecticut Energy Efficiency Fund (CEEF), Connecticut Housing Investment Fund Inc. (CHIF), the Housing Development Fund Inc. (HDF), the Connecticut Department of Energy and Environmental Protection (DEEP), and electric and gas utilities. The 30 clean energy and energy efficiency residential programs developed by combinations of this coalition (including those in this appendix) are promoted to consumers via the Energize Connecticut initiative.[150] Energize Connecticut was established in 2012 by DEEP, CEEF, the Connecticut Green Bank and Connecticut's electric and gas utilities, and acts as a centralized source of information

CEEF's stated aim is to reduce pollution and promote energy efficiency in Connecticut while encouraging economic development. The organization funds efficiency rebates and programs, including several efficiency financing programs through a **Combined Public Benefits Charge** that appears on Connecticut's utility companies—United Illuminated (UI) and Connecticut Light and Power (CL&P)—consumers' monthly electricity bills, and a conservation charge that appears on Connecticut's gas companies—Connecticut Natural Gas (CNG), Southern Connecticut Gas Company (SCG) and Yankee Gas Services Company (YG)—customers' bills.

[144] "PACE Financing, DSIRE," http://www.dsireusa.org/solar/solarpolicyguide/?id=26.
[145] "Connecticut, State and Local Policy Database, *American Council for an Energy-Efficient Economy (ACEEE)*, October 2014, http://database.aceee.org/state/connecticut.
[146] Current and Approved C&LM Plans, *Energize Connecticut*, http://www.energizect.com/about/eeboard/plans#current.
[147] "Comprehensive Energy Strategy," *Connecticut Department of Energy and Environmental Protection*, February 19, 2013, http://www.ct.gov/deep/lib/deep/energy/cep/2013_ces_final.pdf.
[148] "Draft Integrated Resource Plan," *Connecticut Department of Energy and Environmental Protection*, December 11, 2014, http://www.ct.gov/deep/lib/deep/energy/irp/2014_irp_draft.pdf.
[149] Connecticut Green Bank Comprehensive Plan: Fiscal Years 2015 and 2016, *Connecticut Green Bank* (July 18, 2014): 4, 10-12, http://www.ctcleanenergy.com/Portals/0/CEFIA%20FY15%20and%20FY16%20Comprehensive%20Plan.pdf..
[150] Programs, *Energize Connecticut*, http://www.energizect.com/residents/programs#results.

The fund is also supported with the proceeds from Regional Greenhouse Gas Initiative (RGGI) and the ISO-New England[151] Forward Capacity Market auctions.

CEEF is managed by the **Energy Efficiency Board (EEB)**, which has 15 members based on 1998 state legislation. The EEB assists state utilities in developing energy conservation programs that help Connecticut's residents and businesses reduce their energy use. The members represent private and public entities from the residential, business, agriculture, community, and municipal sectors. The EEB helps direct CEEF funds to support Energize Connecticut's mission statement. In addition, EEB evaluates residential programs and offers recommendations that support DEEP's statutory mandates and legislation. For more information, see www.energizect.com/about/eeboard/overview.

CHIF is a private nonprofit certified by the U.S. Treasury Department as a Community Development Financial Institution (CDFI) and recognized under Connecticut's State Legislature as a Community Housing Development Corporation (CHDC). CHIF support sustainable housing in Connecticut through a range of financial mechanisms and lending programs. The Connecticut Department of Housing (DOH) delegated it to administer two DOH's energy conservation programs, the Energy Conservation Loan Program and the Multifamily Energy Conservation Loan Program, which are funded through state bonds. CHIF also administers the CEEF residential financing programs available through the Home Energy Solutions Program (also known as Residential Energy Efficiency Financing program or REEF).

The Connecticut Green Bank's residential programs include the Smart-E Loan program for all energy upgrade measures, the CT Solar Loan Program, and the CT Solar Lease Program. CGB, in partnership with the EEB and utilities are in the process of launching an OBR program (see Section II Connecticut's Clean Energy Financing Landscape for a description of the OBR program). The Clean Energy Finance and Investment Authority (CEFIA) was established by Connecticut's General Assembly on July 1, 2011 as a part of Public Act 11-80. This new quasi-public agency, now known as the Connecticut Green Bank, superseded the former Connecticut Clean Energy Fund. The Green Bank's mission is to lead the green bank movement by accelerating private investment in clean energy deployment for Connecticut to achieve economic prosperity, create jobs, promote energy security and address climate change. As the nation's first full-scale green bank, the organization leverages public and private funds to drive investment and scale-up clean energy deployment in Connecticut. For more information about the CT Green Bank, visit www.ctcleanenergy.com.

The Housing Development Fund (HDF) is also a CDFI. HDF has operated since 1989 to help residents of Connecticut become homeowners. HDF administers the Cozy Home Loan Program in conjunction with CGB, a residential offering that helps Connecticut's low-income residents in three counties invest in clean energy and efficiency upgrades.

The **gas utility companies** administer the Heating Loan Program, an OBF program for heating equipment upgrades supported by ratepayer funds and created by legislation in 2013.

[151] ISO – New England (NE) is the non-profit Regional Transmission Organization (RTO) that operates in Connecticut in addition to the five other New England states.

A few of these programs are supported by **AFC First**, a HUD-approved FHA PowerSaver lender. AFC First is a lending program that supports efforts that target energy efficiency improvements for homeowners by providing a simple, preferred rate for residential financing programs. In Connecticut, AFC First has formed a partnership with three programs that include: the Cozy Home Loan program, the Energize CT Heating Loan program and the CT Solar Lease program.

Two of the key ways to group Connecticut's many programs is to divide them into those programs that allow transferability and/or security and those that do not. Transferability is the ability of a loan or lease to change ownership if the property is sold, thereby allowing the loan or lease to stay with the property rather than with the owner who initiated the agreement. Security is a residual asset or value that a debtor has claim to in the event of a default, such as the homeowner's property. Table 2 summarizes the various publicly supported residential financing options.

Table 2: Connecticut's Publicly Supported Residential Financing Programs

Energy Program	Adminis-trator	Opera-tional Status	Public Support	Max. Term and Rate	Security	Transferability
CT Solar Loan	CGB	Operating since 2013	Loan Loss Reserve Ware-house	15 years 6.49%	UCC lien	Does not transfer automatically, but may transfer if subsequent owner is credit-qualified
CT Solar Lease	CGB	Operating since 2013	Loan Loss Reserve	20 years N/A	Leasing company owns equipment	Does not transfer automatically, but may transfer if subsequent owner is credit-qualified
Energy Conservation Loan (ECL)	CHIF	Operating since 1979	State Bonds for capital	10 years	Mortgage	Does not transfer
Multifamily Energy Conservation Loan Program (MEL)	CHIF	Operating since 1979	State Bonds for capital	10 years	Mortgage	Does not transfer
Heating Loan Program	Gas utilities (CNG, SCG, Yankee Gas)	Operating since 2014	Ratepayer Funds for capital	Up to 10 years 0% - 2.99%	Unsecured	Does not transfer
HES Financing Program (aka Residential Energy Efficiency Financing Program – REEF)	EEB; UI and CL & P; CHIF	Operating since 2011	Rate-payer Funds and Utility Capital for capital	3 - 10 years 0% - 5.99%	Unsecured	Does not transfer
Cozy Home Loan	HDF; CGB	Operating since 2013	Loan Loss Reserve	10 years 2.99%	Unsecured	Does not transfer
SMART – E	CGB	Operating since 2012	Loan Loss Reserve	Up to 12 years 2.99% - 6.99%	Unsecured	Does not transfer

APPENDIX B—Key R-PACE Program Design Choices

Since its introduction in 2008, PACE has been cited as a potential game-changing tool for financing energy efficiency and renewable energy improvements. PACE is an extension of the authority provided by states to local governments to levy special property assessments to fund projects that deliver public benefits. The specifics of this assessment authorization differ across the country, but most states require legislation to establish the public purpose of PACE programs. State legislation has varied with regards to restrictions attached to the authority states grant to local governments to create PACE assessment districts. These restrictions have been a major contributor to the diversity of PACE program designs implemented across the country. Based on this diverse national experience, this section describes key PACE program design features and options, and trade-offs among them. These program design options include:

- Security
- Transferability
- The level of program organization
- Type of program administrator
- Capital source
- Underwriting criteria
- Eligible measures
- Quality assurance

1. Security

Key Takeaways

- PACE assessments must be senior to all other non-tax debt on a property, which may enable a wide range of participants to access low-cost, long-term capital to fund energy improvements.

Typical financial products are either secured by a piece of property (e.g., a home mortgage) or are not secured by any specific assets, but instead by a borrower's contractual commitment to repay (e.g., consumer loans). Secured financial products typically create less risk of loss for lenders, leading to lower interest rates and longer loan terms than unsecured loans.

PACE assessments are unique relative to these standard secured and unsecured financing tools, in that they are special tax assessments placed on a property rather than loans secured by a property's value or a borrower's creditworthiness. As special assessments, PACE obligations are "super senior," that is, senior to all other non-tax debt on the property, even mortgages. This seniority reduces the risk that PACE participants will fail to pay their assessments (households and businesses commonly pay their property taxes, understanding that non-payment can lead to serious consequences, including loss of their property) and reduces the risk that PACE investors will experience a loss should PACE participants fail to make payment (property taxes are repaid before any other liens on a property should it go into foreclosure and eventually be re-sold).

Proponents hope that this exceptionally strong security will attract large pools of accessible, low-cost, long-term capital for eligible participants.

2. Transferability

Key Takeaways

- The "long payback barrier" to investing in energy improvements occurs when households and businesses are reluctant to invest when it will take longer to payback the improvements than their expected ownership of a property.
- Automatic transferability of PACE assessments upon property transfer, which is the automatic transfer of the outstanding balance of a PACE assessment to a subsequent property owner, may overcome the "long payback barrier."

Beyond PACE's inherent security, the potential for the balance of a PACE assessment to be assumed, automatically, by a subsequent owner upon a property's sale—known as automatic transferability—may create additional value.[152] Transfer of the PACE assessment is intended to align the realization of the PACE-funded project's benefits (e.g., comfort, lower utility bills) with repayment of the obligation. Transferability may help overcome the "long project payback" barrier, whereby potential participants are reluctant to invest in projects with long paybacks because they anticipate leaving a property before the full benefits of the improvements are realized, because consumers may have increased confidence that they will only be responsible for making PACE payments while they are occupying the property and benefiting from the improvements.

Importantly, the value of automatic transferability in overcoming the long payback barrier is based on the assumption that subsequent owners will value the improvements for which they are being asked to assume the assessment payments. In the event that subsequent owners do not value these improvements, one could reasonably assume that they will simply reduce the amount that they are willing to pay to purchase a property or force the outgoing property owner/tenant to clear the assessment (i.e., pay the balance) as a condition of the sale. Thus, if buyers of a home with a PACE assessment do not value the upgrades that the assessment financed, automatic transferability may not have significant value as purchasers would simply lower their purchase price by the amount of the assessment or require the seller to clear the assessment as a condition of sale.

[152] Optional transferability is available for other financing tools, including on-bill financing products. Financial tools featuring optional transferability require that purchasers explicitly consent to the transfer of the obligation. These products are discussed in detail in "Financing Energy Improvements on Utility Bills: Market Updates and Key Program Design Considerations for Policymakers and Administrators," *SEE Action*, May, 2014, https://www4.eere.energy.gov/seeaction/publication/financing-energy-improvements-utility-bills-market-updates-and-key-program-design.

To reinforce uncertainty about the value of automatic transferability, it is worth examining how other home improvements with useful lives that exceed a household's expected home ownership are financed. When a homeowner invests in a kitchen renovation and finances the project using a home equity line of credit, she would not expect the subsequent buyer to take over repayment of that loan. Instead, owners make these investments with the expectation that a remodeled kitchen will increase the value of their home. Upon the home's sale, the proceeds from a higher sale price can then be used to repay the balance of the financing product.

Relatively little data on how buyers assess the value of energy improvements during transfer—and how this effects their willingness to assume PACE assessment as part of the transfer—is available. The Western Riverside Council of Governments (WRCOG) "HERO" program, which has closed more residential PACE financing than any other program, offers some insight: of the 300 participating properties that have been resold, assessments were only cleared in eight cases.[153] This suggests that buyers may be comfortable with automatic transferability. However until more data is available, it remains uncertain whether automatic transferability has substantial value in overcoming property owner reluctance to make long-payback investments in energy improvements or their ability to monetize the value of these improvements during property transfers.

3. Level of Program Organization

Key Takeaways

- PACE programs may be organized at local, regional, or state-wide levels.
- Local program organization may allow greatest flexibility in program design but may also increase the risk of low levels of participation, due to a small pool of potential customers.
- Regional and statewide programs may benefit from economies of scale and may recruit more attractive capital to fund PACE assessments due to the larger pool of potential customers.

There are three general geographic levels at which PACE programs are organized:

1) Local Organization

The PACE program is operated within the jurisdiction of a single local government, typically a town or city. This level of local organization was common for the earliest PACE programs, including the cities of Berkeley and Palm Desert in California and the city of Boulder, Colorado. Local program organization offers municipalities the greatest flexibility in program design, but

[153] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013.

may come at a significant cost—locally-organized programs have the smallest pool of potential customers, which increases the risk that the number of program participants will be low. This low participation rate may, in turn, make PACE programs expensive to launch and operate (fewer customers to cover program administration costs). Low participation rates may also make it challenging for program sponsors to identify attractive sources of capital to fund PACE assessments, as capital providers generally prefer high-volume programs to offset their costs of participating. While some local PACE programs remain, there is a trend towards regional and state-wide approaches.

2) Regional Organization

A single PACE program is operated across the jurisdictions of multiple local governments in a region, each of which typically opts into the regional program by creating its own PACE assessment district. Regional programs are often developed where there are existing regional governance entities willing to act as PACE program sponsors. In regional programs, individual local governments retain responsibility for placing PACE assessments on properties, collecting payments and reverting those payments to the appropriate entity. For example, in California, the Western Riverside Council of Governments (WRCOG), a voluntary association of municipalities that provides cooperative planning, coordination, and technical assistance, developed the regional Home Energy Renovation Opportunity (HERO) PACE program. Of WRCOG's 19 member municipalities, 18 participate in the regional program.[154] In Texas, the state's PACE authorizing legislation explicitly permits municipalities to form regional cooperative PACE programs. This regional model may enable local governments to maintain some level of flexibility to tailor PACE programs to regional needs while minimizing program administration costs through the centralization of program functions and the potential to recover these costs across a larger customer base.

3) Statewide Organization

A PACE program is operated at statewide scale and all of the state's municipalities are eligible to opt into the program. Connecticut's existing commercial PACE (C-PACE) program is organized at a statewide level; to participate, municipalities must opt in to the statewide program. The statewide model benefits from the same potential economies of scale as those PACE programs administered regionally. In addition, the statewide model creates a single set of program rules and participation processes for the entire state, which—particularly in small states like Connecticut—may be more attractive to contractors, customers and capital providers than navigating differing protocols across multiple local or regional programs. Like regional programs, individual local governments retain responsibility for placing PACE assessments on properties, collecting payments and reverting those payments to the appropriate entity.

[154] WRCOG has three non-municipal members: the County of Riverside's Office of the Superintendent, the Eastern Municipal Water District, and the Western Municipal Water District.

4. Type of Administrator

Key Takeaways

- PACE program sponsors may select a public, quasi-public or private administrator to oversee the PACE program.
- Private PACE administrators may be paid for their administration services only (fee for service model) or may provide both administrative services and the exclusive right to finance PACE improvements (one stop shop model). A one stop shop administrator may offer PACE programs at no cost to program sponsors in exchange for the exclusive right to fund assessments. This potential benefit to taxpayers should be weighed against the risks of reducing competition among financiers to deliver attractive capital to participants.
- A public or quasi-public administration model offers a program sponsor the greatest control and flexibility in program design but places a larger administrative burden on sponsors and increases their financial risk should program participation fail to meet expectations.

PACE program sponsors, regardless of the level at which programs are organized, have two basic choices in selecting a program administrator (see sidebar for delineation between program sponsors and program administrators):

1) Public or Quasi-Public Administrator

A public or quasi-public entity is responsible for program administration. The administrator commonly subcontracts certain program functions (e.g., quality assurance, marketing) but retains responsibility for overall program management. In Connecticut, the Connecticut Green Bank currently acts as the statewide administrator for the C-PACE program, outsourcing some specialized functions (e.g., technical review and assessment servicing) to private contractors. Public entities that take on program administration functions beyond simply placing assessments and collecting payment on property tax bills should consider which PACE-related functions are within their core competency and which are not. In some cases, particularly where extensive energy efficiency and renewable energy program infrastructure already exists, it may be more cost-

PACE Program Sponsors are government or quasi-government entities that establish PACE districts and agree to record, place, and service PACE assessments.

PACE Program Administrators implement the PACE program and are responsible for processing applications, marketing, outreach, contractor qualification, data tracking, record keeping, etc. Program Sponsors can also act as Administrators or Administrators may be other public or private entities.

effective to outsource certain functions than to develop or expand them internally. This outsourcing may have the additional benefit of driving integrated program offerings through which PACE is offered as a financing tool that is part of a broader suite of programmatic offerings (e.g., financial incentives, technical assistance) targeting the multiple barriers to clean energy investment.

2) Private Administrator

A private entity is contracted to act as the PACE program administrator (e.g., Lean and Green Michigan's program administrator, Levin Energy Partners). Private PACE administrators have developed a range of program delivery models, with two primary approaches:

a) *Fee for Service.* In this model, a private administrator is paid directly by program sponsors for their management and implementation services (program sponsors may recoup these costs through program participation fees). This "third party administrator" model has a long track record in utility ratepayer-funded energy efficiency programs.

b) *One Stop Shop.* The private administrator also plays the role of financier, getting the exclusive right to provide the capital to fund PACE assessments. The private administrator earns a return on this capital—in some cases, private administrators have offered PACE programs at no cost to program sponsors in exchange for the exclusive right to act as the capital provider. A one stop shop model may reduce consumer choice and crowd out other interested investors, but the private entities offering this model shoulder the risk that their investment in program implementation and administration will not pay back should customer participation be low. Program sponsors may be able to mitigate some of the anti-competitive effects of exclusivity by negotiating clear program guidelines with the administrator.

5. Primary Capital Source

Key Takeaways

- The up-front capital to fund PACE improvements may come from a range of public and private sources.
- Funding PACE assessments with public capital offers the greatest flexibility in lending terms; however, if demand outstrips the available supply of public capital, the ability to fund additional PACE assessments will be hindered.
- Accessing private capital increases the total amount of funding available to interested PACE participants. Three basic models for funding PACE assessments with private capital are (1) public administrator acts as warehousing entity, (2) private administrator funds assessments, and (3) open market model.
    - The public administrator as warehouse lending model requires the program administrator to hold assessments until sufficient volume is accumulated to support a re-sale to private investors. This exposes program administrators to the risk that insufficient volume materializes or a private investor cannot be found.
    - Private administrator funding assessments allows for an immediate infusion of private capital and also allows the administrator to re-sell assessments to other private investors. This approach may have higher upfront costs that are passed through to participants, as the private administrator is taking on additional risk by holding assessments.
    - An open market model brings private capital to bear immediately and eliminates the "warehousing" role. Open market models may introduce administrative complexities as multiple lenders interact directly with program participants.
- PACE-based financial products are still new. Early PACE investors will offer terms that allow them to cover their costs rand to earn a return on their investment and may require concessions or credit enhancements. In the long term, PACE-based products have the potential to offer a low-risk, secure investment opportunity.

Similar to other energy efficiency financing products, the up-front capital to fund PACE improvements may come from a range of public and private sources. A program administrator's choice of capital source is often closely tied to the policy goals driving PACE activity.

1) Public Capital

Program administrators use taxpayer or other public monies (e.g., Regional Greenhouse Gas Initiative proceeds) to fund PACE assessments, which participants then use to cover the up-front

cost of eligible improvements. As PACE assessments are repaid, these monies are used to fund additional PACE assessments or for other public purposes. This model provides the most flexibility to programs with regards to the terms at which PACE assessments are offered (i.e., no re-sale to private investors that might require higher interest rates or shorter assessment terms is necessary). However, demand for PACE assessments may eventually outstrip the supply of public capital, especially since many PACE assessments are long in duration, tying up public capital for up to 20 years before it is repaid and available to fund more assessments.

2) Private Capital

In the private capital model, PACE assessments are funded by private investors. We sub-divide privately-funded PACE programs into one of three basic models, though other models are possible as well.[155]

Paths to Private Capital

Broadly, two approaches to selling PACE assessments to private capital providers have been observed:

1. Revenue Bonds are issued by public or quasi-public entities and are backed by specific revenues streams, in this case, the cash flows from PACE assessment repayments. Revenue bonds are relatively less costly to issue and thus may be offered in smaller denominations that other approaches (e.g. $5M).
2. Asset Backed Securitizations (ABSs) may be issued by private entities and, in the PACE context, are backed by PACE assets only. ABSs are not tied to an issuing jurisdiction as a revenue bond would be. ABSs require more upfront diligence and the involvement of specialized financial firms, leading to higher upfront costs. ABSs are also typically reviewed by a credit rating agency prior to sale, adding cost. High transaction costs mean that ABSs are rarely issued for less than $100M.

In either structure, a PACE-supported bond can be sold to one of two groups:

1. A private placement refers to a bond sold to a subset of sophisticated bond investors (typically insurance firms, pension funds, etc). Bonds sold in the private market need not receive a credit rating, reducing cost to the issuer, but often will obtain a rating to satisfy regulatory requirements.
2. The public bond market is the general pool of all bond investors. The public bond market is significantly larger than the private market. Bonds sold to the public market are typically rated by a credit rating agency, adding to issuance cost.

[155] For example, this report does not describe the "up-front capital raise" model through which public program administrators raise capital from private investors up-front and use these monies to fund PACE assessments. For more information on the up-front capital raise model, see page 31 of "Financing Energy Improvements on Utility Bills: Market Updates and Key Program Design Considerations for Policymakers and Administrators," *SEE Action*, May, 2014, https://www4.eere.energy.gov/seeaction/system/files/documents/onbill_financing.pdf.

i. **Public Program Administrator Acts as Warehousing Entity.** In the warehouse model, a program administrator uses public capital to initially fund PACE assessments. They then hold these assessments ("warehouse" them) until they have aggregated a sufficient pool of assessments to sell to private investors. The sale of an assessment, often packaged with others, is a "secondary" transaction, since these investors were not the original funders of the assessment. The original funding of the assessment with public capital is a "primary" transaction. Packaging and re-selling PACE assessments can have financial and transaction costs, so program administrators typically seek to accumulate a relatively large pool of assessments before pursuing a secondary sale. The re-sale of these PACE assessments replenishes the program administrator's ability to make capital available to fund new PACE projects, allowing a program to continue growing.

Connecticut utilized this approach in its commercial PACE program. The Connecticut Green Bank aggregated commercial PACE assessments until approximately $30 million had accumulated. These assessments were then packaged and sold by the Public Finance Authority as revenue bonds (see side bar "Paths to Private Capital" for definition) to Clean Fund, a private investor.[156] Similarly, the Toledo-Lucas County Port Authority uses its Revolving Loan Fund to fund individual PACE assessments, which it then packages and sells onwards to private investors. A 2012 bond issuance combined 11 individual PACE assessments and raised $6.4 million of private capital.

One issue for program administrators to consider is whether to pre-negotiate the terms of the sale of the pool of PACE assessments with a purchaser or to sell these pools at "market rates" once sufficient volume has been aggregated. The advantage of pre-negotiating terms of these sales is that program administrators have certainty in the pricing at which they will be able to resell PACE assessments and can structure the pricing of their financial products to ensure they are able to make these sales without incurring substantial losses. The advantage of pursuing "market rate" transactions is that programs may be able to competitively seek out larger pools of capital and more favorable terms for a secondary sale once a pool of assessments has been assembled, and ratings agencies and/or potential purchasers have had a chance to conduct diligence on the assets to be purchased. A range of structures can be used to facilitate this sale (see side bar "Paths to Private Capital" for examples).

Some early PACE programs did not include a warehousing function and relied on the "pooled bonding" approach. Instead of funding PACE assessments as applications came in, PACE applications were provisionally approved and only funded once sufficient PACE demand warranted issuing a bond to fund a large number of PACE assessments at one time. This pooled bond model reduce risk to the program administrators of not finding a buyer for PACE assessments and did not tie up public capital during before a bond was issued. However, this model has been largely abandoned because the waiting period between applying to PACE and having one's PACE assessment funded had substantially negative impacts on program participation.

[156] The Connecticut Green Bank retained approximately $6 million of these assessments. See forthcoming SEE Action publication "Accessing Secondary Markets as a Capital Source for Energy Efficiency Finance Programs" for a detailed discussion of this and other transactions.

ii. **Private Program Administrator Funds Assessments.** Similar to the first model, the private program administrator model typically entails the private entity securing a line of credit or other investment capital to fund PACE assessments at their origination. The private entity may then choose to (1) hold these assessments as an investment or (2) re-sell them in a secondary transaction. In several cases, the private entity has negotiated to have public entities harness public bonding mechanisms on their behalf to facilitate this secondary markets transaction.

The Western Riverside Council of Governments (WRCOG)'s Home Energy Renovate Opportunity (HERO) illustrates this approach. Renovate America, the private PACE administrator, funds individual PACE assessments using private capital. Once sufficient volume has accumulated, PACE assessments are packaged into an asset-backed security (see side bar "Paths to Private Capital for definition) structure and re-sold to private investors. In February 2014, the program completed a $104 million asset backed securitization, which received a very favorable (AA) rating and was sold in a private transaction.

iii. **Open Market Model**. The third approach for sourcing private capital is the open market or "open source" model, in which one or more financial institutions underwrite individual PACE assessments and deliver the capital to fund the assessment at terms they negotiate. Any qualified financial institution may participate, allowing them to use the property tax bill for security and repayment. This model avoids program sponsor or administrator involvement in capital provision and encourages competition, driving financial institutions to innovate and to offer more attractive (e.g., lower interest rate, longer term) and more accessible products. The open market approach means that multiple financial institutions could be interacting with program administrators, which may necessitate additional infrastructure to coordinate activities.

While PACE assessments have the potential to offer a low-risk, secure investment opportunity, there is still limited performance information available for PACE products. Early PACE investors will offer terms that allow them to cover their costs rand to earn a return on their investment. In addition, early investors may require concessions because the market for PACE-based financial products is nascent, reducing liquidity and making it potentially challenging to find a buyer.

6. Underwriting Criteria

Key Takeaways

- Underwriting criteria are rarely applied to non-PACE special assessments, so there is little historical experience to inform how to responsibly underwrite PACE assessments.
- Programs strike a balance in designing underwriting criteria between extending financing responsibly and achieving broad access to attractive financing to achieve wide-scale clean energy and energy efficiency deployment.

Typically, local governments exercise their special property taxing power with little evaluation of the ability of the property owner to repay the property taxes being levied or to the underlying value of the properties being taxed. These assessments are commonly levied on properties preparing for new construction on which there is little outstanding residential mortgage debt to fund infrastructure improvements (e.g., sewer extension). Despite the lack of application of rigorous underwriting criteria, the non-payment and loss rates on special assessments, like all other property taxes, are extremely low.

While the application of special assessments to existing properties, most of which have outstanding mortgage debt, is not new, PACE's popularity has generated scrutiny over what type of underwriting criteria, the metrics used to assess whether a PACE applicant can responsibly be provided access to PACE financing, programs should utilize. These metrics are designed to: 1) ensure that PACE participants are well-positioned to repay PACE financing; and 2) minimize the risk to existing mortgage holders created by pursuing the public goal of increased clean energy production and a more efficient building stock.

While PACE performance has been very strong, some program sponsors and administrators have taken a cautious approach to ensuring they are responsibly achieving broad access to attractive capital, without creating unintended system risks. As more data on PACE performance—and its impact on property values and mortgage holders—becomes available, it is likely that underwriting criteria will shift. Table 1 summarizes underwriting criteria and other protections advanced by various stakeholders and categorizes these criteria as either property-based, borrower-based, or other.

Table 3: PACE Underwriting Criteria and Other Protections Suggested by Various PACE Stakeholders

	White House Guidelines[157]	DOE Guidelines[158]	PACE Assessment Protection Act of 2011 (HR 2599)[159]
Property-based Criteria			
Term of assessment does not exceed useful life of improvements	✓	✓	✓and not to exceed 20 years
PACE assessment: home value[i]	10%	10%	10%
Clear title	✓	✓	✓
No negative equity financing	✓	✓	At least 15% equity in the home
No Involuntary liens of $1,000 or more		✓	✓
Borrower-based Criteria			
No property tax defaults and not more than one late payment in last 3 years	✓	✓	✓
Current on mortgage	✓	✓	✓
No personal bankruptcy within 7 years		✓	✓
Programmatic / Other Criteria			
Reserve fund[ii]	✓		
Recommends escrowing[iii]	✓		
Notification of mortgage holder[iv]		✓	✓
Non-acceleration of PACE assessment[v]		✓	

NOTES

[i] California's PACE enabling legislation includes an "assessment to value" criteria, requiring that the total of annual property tax assessment plus annual PACE assessment does not exceed 5% of property value. Joe Kaatz and Scott J. Anders, "Residential and Commercial Property Assessed Clean Energy (PACE) Financing in California," *Center for Sustainable Energy*, October 2014, http://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/PACE%20in%20California.pdf.

[ii] A reserve fund can be used to compensate mortgage holders of properties with PACE assessments, in the event that PACE non-payment leads to verified mortgage holder losses (e.g., California's loan loss reserve). Reserve funds can also be established for PACE lenders to protect them in the event of late or missed payments (e.g., Vermont's loan loss reserve).

[iii] Escrowing monthly installments towards PACE assessments, which are typically due once-twice per year, may increase PACE lenders' confidence that PACE participants will have sufficient cash available when their PACE assessment is due.

[iv] Most existing residential PACE programs do not require mortgage holder notification.

[v] See discussion of acceleration in Section IV Regulatory Challenges, Emerging Solutions, and Market Receptiveness. PACE assessments in Connecticut's C-PACE program do *not* accelerate in the event of non-payment.

[157] Available at http://www.whitehouse.gov/assets/documents/PACE_Principles.pdf

[158] Available at http://www1.eere.energy.gov/wip/pdfs/arra_guidelines_for_pilot_pace_programs.pdf

[159] Available at http://thomas.loc.gov/cgi-bin/query/z?c112:H.R.2599

In general, PACE underwriting criteria are designed to:

- Ensure that the PACE assessment is right-sized to the property's value, to avoid excessive levels of debt and to protect creditors with an interest in the property.

- Align the term of the assessment with the period over which the improvements generate benefits for the property owner. This may have multiple advantages, including allowing owners to offset assessment payments with realized energy savings and allowing assessment terms to extend beyond any given owner's period of occupancy.

- Reveal major participant issues that could signal a high risk of non-payment.

Some states' PACE-enabling statutes include specific underwriting criteria, but the majority of jurisdictions leave this decision up to PACE administrators—leaving the decision to administrators may create more flexibility to adaptively manage PACE programs as additional data on PACE performance becomes available. Connecticut's Commercial PACE enabling legislation calls for the establishment of underwriting guidelines, but does not specify individual underwriting criteria, with the exception of calling for a savings to investment ratio (SIR) of greater than 1 (see following section for explanation of SIR). Underwriting guidelines developed for the Commercial PACE program may offer some insight, but are unlikely to be directly transferable to a residential program, as commercial underwriting utilizes different metrics and practices than residential underwriting.

A lack of historical performance data makes it impossible to definitively identify a set of optimal underwriting criteria. In the PACE context, program administrators are working to strike a responsible balance between prudent underwriting standards and criteria that might undermine PACE's potential to bring attractive capital to a range of eligible consumers.

7. Eligible Measures

Key Takeaways

- PACE financing can be used to fund a range of improvements, including energy efficiency, renewable power systems, and non-energy upgrades such as wind protection. Allowing a wide range of measures may increase demand and program volume, but risks lower per-project energy savings.
- A savings to investment ratio (SIR) greater than one is advanced by some as consumer protection, but it has uncertain benefits and may reduce program participation, particularly for the residential sector.

Because PACE assessments are attached to individual properties, state legislation typically specifies that financed improvements must be permanently affixed to the property and not easily

transferrable.[160] Beyond this basic requirement, program administrators have taken a range of approaches to defining which measures are eligible for PACE programs, with focus on three general areas of consideration: (1) types of measures; (2) single measure vs. comprehensive retrofits; and (3) whether to restrict project eligibility based on expected savings to investment ratio (SIR).[161]

1) Type of Measure

State legislatures and program sponsors have taken a range of approaches to defining eligible measures for PACE programs. The unifying element across these measures is that legislatures and program sponsors deem them to have public benefits worthy of permitting local governments to exercise their taxing power. Some programs have limited eligibility to energy efficiency or renewable energy. Others have taken a more expansive approach, permitting water efficiency and non-energy measures that are necessary to the proper functioning of efficiency and renewable energy equipment or to the health and safety of occupants. Still others have recognized the benefits of increase the resilience of the building stock to the risk of natural disasters. In Florida, for example, PACE programs permit wind resistance measures designed to reduce the risk of catastrophic damage from hurricanes. Typically, legislators set broad bounds on eligible measures, enabling program sponsors and administrators to specify more detailed measure eligibility, which creates flexibility to accommodate technology innovation. In Connecticut's C-PACE enabling legislation, both energy efficiency and renewable energy improvement are eligible, so long as they are permanently affixed to the property or, in the case of solar PV, are under leases or power purchase agreements with a contract term of 15 years or more.

2) Single vs. Comprehensive

Some property owners will prefer a multi-measure home upgrade while others will want to replace one or two key components of their home. In setting guidelines regarding measure eligibility, policy makers must balance between driving participation by "meeting the market where it is" and allowing a broad range of single-measure projects compared to generating deeper savings by encouraging or requiring more comprehensive multi-measure upgrades. If an important policy goal is job creation and program volume, policy makers may decide to allow single-measure projects in the short term, with an option to shift towards multi-measure projects in the longer term. In contrast, if the primary goal is generating deep energy savings, a program might be structured to require a minimum level of energy savings or even a certain compulsory set of energy efficiency measures. Some PACE programs require an energy audit (e.g., California FIRST, Connecticut's C-PACE program) or encourage PACE participants to adopt energy efficiency reduction targets (e.g., the Milwaukee Me2 commercial PACE program requires borrowers to join the Better Building Challenge, which sets a voluntary goal of 20 percent energy use reduction by 2020).

[160] The Windsor, California "PAYS" on-bill program offers an interesting approach to improvements that would not normally be considered permanently attached (e.g., appliances,). Appliances are physically secured to the property to prevent owners from removing them during a move.

[161] Defined as present value of bill savings over life time of improvements compared to upfront cost.

Decisions on eligible measures are likely to affect realized demand for PACE products. Using on-bill programs as a proxy, we observe that programs that achieve high volume often allow single-measure projects. It is reasonable to assume that, in the PACE context, programs that allow single measure replacements rather than requiring comprehensive upgrades may also achieve higher volumes. Early PACE experience suggests a similar effect in the PACE context. The HERO program, the largest residential PACE program with over $100M of assessments closed, reports that 35 percent of projects are single measure, solar PV. Sonoma County's experience also supports this narrative—the County found that requiring a 10 percent energy efficiency improvement in all PACE-funded projects led to a significant drop in demand, and Sonoma eventually removed this requirement.[162] [163]

If renewable energy systems are eligible for PACE financing, policy makers may wish to encourage property owners to undertake efficiency improvements before installing renewable energy systems. Implementing energy efficiency measure before installing a renewable energy system can reduce the overall size and cost of the renewable energy project. Some PACE programs require participants to achieve a certain level of energy efficiency improvement as a prerequisite to receiving financing for a renewable system. For example, Sonoma County required a 10 percent improvement in energy efficiency before properties became eligible for PACE-financed solar. Connecticut's enabling legislation does not require a specific energy efficiency improvement before renewables may be considered.

3) Savings-to-Investment Ratio

Savings-to-investment ratio (SIR) is defined as the value of expected bill savings over the lifetime of an improvement (or PACE assessment) divided by the project's upfront or financed costs.[164] Some PACE programs require projects to achieve a SIR of one or greater, including CT's C-PACE offering, which requires a SIR of greater than one and defines SIR as energy savings over the project's lifetime greater than total eligible project investment cost (including financing and closing costs). The rationale for this criteria is that, if savings exceed repayments over the life of the assessment, the PACE assessment may be cash flow positive (i.e., bill savings are greater than assessment payments), resulting in a low risk of PACE assessment non-payment. However, in practice, expected savings may differ from realized savings by as much as 30 percent, making the relationship between calculated SIR and actual bill impacts uncertain (Kaufman, 2010). In addition, there is little evidence that cash flow positive improvements lead to lower rates of financing non-payment—it is often much larger factors (e.g., business bankruptcy, family health issue) not incremental energy savings that trigger non-payment.

[162] Although Sonoma found that education and contractor training might help, see "Property Assessed Clean Energy (PACE) Replication Guidance Package for Local Governments," *Sonoma County Energy Independence*, March 30, 2012, http://www.mpowerplacer.org/wp-content/uploads/2012/04/PACE-Manual.pdf.

[163] Some programs have reached a compromise; for example, in Los Angeles' PACE program single measure and PV-only projects are eligible for financing but only projects that achieve a 10 percent energy efficiency improvement are able to access a county-wide loan loss reserve, which yields more attractive financing. Joe Kaatz and Scott J. Anders, "Residential and Commercial Property
Assessed Clean Energy (PACE) Financing in California," *Center for Sustainable Energy*, October 2014, http://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/PACE%20in%20California.pdf.

[164] Jurisdictions vary in their specific SIR definition (for example, what discount rate is used to calculate present value, how savings are defined).

Finally, households and businesses regular need to replace equipment or otherwise invest in their properties to maintain their value or working condition (e.g., replace HVAC system upon failure)—rather than require the entire cost of these improvements pay for themselves, programs may consider only requiring that the incremental costs of more efficient systems relative to a baseline be covered by savings.

When considering an SIR requirement, policy makers should consider the limits that this this criteria may place on measures that can be financed through PACE. For example, non-energy measures that address health and safety concerns may be an important demand driver for certain market segments and deliver a clear public benefit. But, since these measures do not directly deliver energy savings, including non-energy measures may raise challenges in meeting a SIR >1 requirement. Extrapolating from on-bill program experience, a similar requirement for "bill neutrality" was not seen to correlate with lower default rates than programs without this requirement. Additionally, on-bill programs requiring bill neutrality achieved less volume, on average, than other on-bill programs. [165] [166]

8. Quality Assurance

Key Takeaways

- Many existing energy upgrade programs have established quality assurance and quality control protocols. PACE programs should consider leveraging these existing structures, as PACE-financed measures are likely to be similar to those covered by existing programs.
- Ongoing data collection and reporting will allow program sponsors to assess impact and refine PACE programs over time, but may be seen as burdensome by participants. A program administrator may wish to take on this effort on participants' behalf.

Quality assurance and quality control (QA/QC) are important aspects of any energy upgrade program. Many energy efficiency and renewable energy programs have established programmatic infrastructure in place to oversee QA/QC. Since the measures financed by PACE

[165] White House PACE Guidelines, DOE PACE Guidelines, and HR 2599 all recommend SIR > 1, as do several PACE advocates, including Keeping PACE in Texas.

[166] In a national survey of on-bill programs, no correlation between "bill neutrality" (similar to SIR > 1 requirement) and default rates was observed. Programs that required bill neutrality achieved, on average, ten times *less* volume than programs without a bill-neutrality requirement. This raises questions of (1) if bill neutrality is effective as a customer protection and (2) if it is worth the tradeoff of reduced demand. See "Financing Energy Improvements on Utility Bills: Market Updates and Key Program Design Considerations for Policymakers and Administrators," *SEE Action*, May, 2014, https://www4.eere.energy.gov/seeaction/system/files/documents/onbill_financing.pdf for more discussion.

will be similar to measures covered by other programs, it is reasonable to leverage existing QA/QC protocols and procedures for the PACE context.

PACE administrators have implemented various QA/QC and data collection practices, including:

1) List of Eligible Contractors

Several PACE programs maintain lists of eligible contractors, and many PACE stakeholders support this as a best practice. A list of eligible contractors can streamline contractor selection by homeowners and also gives the program administrator control over contractor qualifications. For example, to be accepted to the HERO program, contractors must complete a "PACE 101" training course. This ensures that contractors, as the face of the HERO PACE program, can answer questions and generally guide homeowners through the PACE process.

2) List of Qualified Improvements

A list of qualified improvements can steer participants towards high-value projects that generate savings and enhance property value. Many program administrators (e.g., Milwaukee, Sonoma) take a balanced approach, offering both a list of pre-approved measures as well as a custom application process for improvements not listed. Connecticut's C-PACE program offers a long list of pre-approved improvements and also reviews other measures on a case-by-case basis.

3) Third-Party Review

Notably, Texas's PACE-enabling legislation requires an independent third-party review of savings calculations and a post installation audit. Other administrators have voluntarily adopted third-party review processes, including Connecticut. Connecticut's existing two-tier technical review process for C-PACE projects can likely be adapted for R-PACE projects, but this may create a significant cost and administrative burden for smaller higher volume residential projects.

4) Post-Installation Monitoring

Michigan's PACE-enabling legislation requires that "each [PACE] contract will require and provide adequate funding for monitoring and verification of energy savings throughout the life of the special assessment, to be conducted by independent third parties and/or dedicated software as determined appropriate." Early projects in Michigan comply with this requirement by using ENERGY STAR's Portfolio Manager platform to document savings over time. Other program administrators have voluntarily included requirements that PACE participants share their post-retrofit utility data (including Connecticut and Wisconsin).

QA/QC practices are important to verifying savings and identifying non-performing measures, projects, or contractors. Without sufficient QA/QC and data collection measures, PACE administrators may not be able to detect opportunities for improvement or to verify energy savings realized from PACE projects. However, overly detailed QA/QC may create friction with contractors or program participants, potentially reducing demand. Connecticut currently collects data from C-PACE projects through a customized web-based tool. Post-project data collection is largely accomplished directly between utilities and the Connecticut PACE Administrator, the

Connecticut Green Bank. Owners sign a release form allowing the Green Bank to access their utility information. This process removes the burden of reporting from PACE participants, and may be an appealing approach in the residential sector as well. Pre-retrofit information is collected more manually using spreadsheet templates and a cloud-based software platform. Residential PACE participants (or their contractors) may be unlikely to take on this activity and its added cost. The Green Bank may wish to provide resources to conduct this data collection, removing the burden from homeowners while ensuring that quality data is available for ongoing analysis.

Section Summary

The eight program design elements outlined in this section necessitate thoughtful consideration as they may have significant implications for PACE program success. Legislators, program sponsors and program administrators should carefully consider their policy goals and risk tolerance in making program decisions. A focus on designing legislation and programs flexibly such that they can be adjusted as additional data on PACE becomes available may be warranted.

APPENDIX C—Legal and Legislative Battles Over R-PACE, 2010-2014

On July 6, 2010, the Federal Housing and Finance Agency (FHFA), the agency which oversees and serves as conservator of Fannie Mae and Freddie Mac, issued a directive declaring that PACE assessments present significant risk to secondary mortgage markets. The FHFA directed Fannie Mae and Freddie Mac to cease purchasing the mortgages of PACE-encumbered properties, to ensure that loan covenants require prior mortgage holder approval for PACE assessments to be levied, and to adopt additional guidelines to ensure the soundness of their operations.

In the wake of the FHFA's directive PACE advocates filed several lawsuits challenging the authority of the agency to issue such a sweeping directive. The first to file an official complaint was the Attorney General of California, Edmund G. Brown, in July of 2010. Sonoma County, Placer County, and the Sierra Club followed suit and filed separate complaints against the FHFA within a month of the original statement.[167]

One month later, on August 31, 2010, Fannie Mae and Freddie Mac issued another set of guidelines that declared they would not purchase mortgages secured by properties subject to PACE obligations that provide for a first-lien priority. They also stated that they would not refinance mortgages with a first lien PACE obligation unless that obligation was paid first.[168]

In October of 2010, Babylon, New York; Leon County, Florida; and the National Resources Defense Council file suits against the FHFA accusing it of violating Administrative Procedures Act (APA), National Environmental Policy Act (NEPA), and the Tenth Amendment, which grants state jurisdiction on those powers not expressly granted to the federal government.

In February 2011, the FHFA sent another letter to Fannie Mae and Freddie Mac, reiterating its concerns and emphasizing that the Enterprises were not to purchase first-lien encumbered mortgages, and to "carefully monitor through their seller-services any programs that create such first-lien obligations."[169] Lastly, the FHFA reinforced its opposition to R-PACE where the PACE lien maintains a senior position in a further release on December 22, 2014.

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[167] *California v. Federal Housing Financing Agency*, No. C-10-03084 (N.D. Cal. 2010). California's petition is available at http://pacenow.org/blog/wp-content/uploads/09-15-2010-CA-vs-FHFA-PACE-Lawsuit.pdf.

[168] Patricia J. McClung "Mortgages Secured by Properties with an Outstanding Property Assessed Clean Energy (PACE) Obligation," *Freddie Mac Bulletin*, August 31, 2010, http://www.freddiemac.com/singlefamily/guide/bulletins/pdf/bll1020.pdf.

[169] *Sonoma County v. Federal Housing Financing Agency*, (9th Cir. 2012), https://www.courtlistener.com/opinion/855621/county-of-sonoma-v-fhfa/?q=people+of+the+state+of+california+v+FHFA&order by=score+desc&stat Precedential=on

1. State of California v. FHFA

Four separate suits in California were consolidated into one case due to the similarities of complaints raised against the FHFA. In the original complaint, Attorney General of California, Edmund G. Brown, argued that the FHFA directive interfered with state and local jurisdiction over PACE programs. He argued that the directive created lost opportunities for the adoption of PACE programs and lost opportunities to address climate change.

The plaintiffs cited the APA, claiming that the FHFA failed to comply with the notice-and-comment processes and therefore erred procedurally in failing to properly promulgate its directive. Further, the plaintiffs asserted that FHFA failed to produce an environmental impact assessment prior to issuing its directive in contravention of NEPA.

A federal district court ruled that the FHFA's directive was subject to both the APA and NEPA and that issuance of its directive constituted a "major federal action" under NEPA. As a result, the court held that FHFA violated the APA and NEPA. The court issued a preliminary injunction on September 30, 2011, requiring the FHFA to begin a formal rulemaking process pertaining to residential PACE.[170] In the wake of this decision, the FHFA issued an Advanced Notice of Proposed Rulemaking on January 26, 2012, while at the same time, the agency appealed to the Ninth Circuit.[171]

2. Rulemaking Efforts

On June 15, 2012, the FHFA issued a Notice of Proposed Rulemaking with final comments due by July 30, 2012.[172] The revised rule advised the Enterprises to take immediate action to secure their right to demand due the full amount of any mortgage that became subject to a priority-lien PACE obligation and parroted its original directive, directing the Enterprises to abstain from purchasing any first-lien encumbered mortgages.[173] In the Notice, the FHFA also stated that it would withdraw the Notice of Proposed Rulemaking if its legal appeal at the Ninth Circuit proved successful.

3. Ninth Circuit of Appeals Decision

The rulemaking procedures ceased when the Ninth Circuit of Appeals vacated and dismissed the case on June 15, 2012. The Ninth Circuit reversed the district court's decision holding that FHFA's action was not subject to the APA or NEPA, because the agency was acting as a conservator when it issued its directive, shielding the agency from judicial review and obviating it from the procedural mandates of the APA and NEPA. The Ninth Circuit reasoned that, if an

[170] *California v. Federal Housing Financing Agency*, No. C-10-03084 (N.D. Cal. 2010). California's petition is available at http://pacenow.org/blog/wp-content/uploads/09-15-2010-CA-vs-FHFA-PACE-Lawsuit.pdf.
[171] "Mortgage Assets Affected by PACE Programs, Advanced Notice of Proposed Rulemaking," *77 Fed. Reg. 17*, January 19, 2012, http://www.gpo.gov/fdsys/pkg/FR-2012-01-26/html/2012-1345.htm.
[172] "Enterprise Underwriting Standards: Notice of Proposed Rulemaking, Request for Comments," *77 Fed. Reg. 116*, June 15, 2012, http://www.gpo.gov/fdsys/pkg/FR-2012-06-15/pdf/2012-14724.pdf.
[173] "Enterprise Underwriting Standards: Notice of Proposed Rulemaking, Request for Comments," *77 Fed. Reg. 116*, June 15, 2012, http://www.gpo.gov/fdsys/pkg/FR-2012-06-15/pdf/2012-14724.pdf.

agency is acting in the capacity of conservator, "no court may take any action to restrain or affect the exercise of powers or functions of the agency."[174]

4. Town of Babylon, National Resources Defense Council, and Leon County Lawsuits

Several other legal challenges to the FHFA directive were filed in the wake of its issuance. In October, 2011, Babylon, New York brought suit against the FHFA claiming that the FHFA violated the Tenth Amendment by interfering with states sovereign taxing authority. Under Babylon's theory of the case, establishing special assessment districts under states' taxing authority was constitutionally reserved to the states and FHFA's directive constituted unconstitutional federal regulatory interference.[175] In 2008, the Town of Babylon had implemented a residential PACE program, Long Island Green Homes, which helped over 500 homeowners retrofit their homes. The Eastern District Court of New York dismissed the Babylon case on threshold issues. The Town of Babylon appealed to the Second Circuit.[176]

The National Resources Defense Council also filed a case in October, 2011, asserting that the FHFA had violated the APA and NEPA in failing to observe procedural mandates when it issued its directive. The district court dismissed the case. NRDC appealed the decision to the Second Circuit. Due of similarities between the Babylon and NRDC cases, the Second Court consolidated the two cases and upheld both district court decisions to dismiss.[177]

Another suit against the FHFA was filed by Leon County, Florida alleging the FHFA's directive violated a state statutory provision. Leon County had established the Leon County Energy Improvement District in April 2010 for the purposes of implementing a PACE program. Leon County claimed the FHFA's directive impermissibly interfered with a Florida law protecting special tax districts, but again, the plaintiffs were denied when the district court dismissed the case. Leon County appealed the case to the Eleventh Circuit, where the appeals court upheld the district court's decision.[178]

As mounting legal challenges to the FHFA's directive were denied, many R-PACE programs around the country screeched to a halt.

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[174] *California v. Federal Housing Financing Agency*, No. C-10-03084 (N.D. Cal. 2010). California's petition is available at http://pacenow.org/blog/wp-content/uploads/09-15-2010-CA-vs-FHFA-PACE-Lawsuit.pdf.
[175] Stephen Bellone, "Babylon Files Suit Against Fannie and Freddie in Federal Court for Violating the 10th Amendment." Town of Babylon, October 26, 2010, http://pacenow.org/wp-content/uploads/2013/02/Lawsuit_Filing_Babylon-v-FHFA_release_10-26-10.pdf.
[176] *Town of Babylon v. Federal Housing Financing Agency*, 790 F. Supp. 2d 47 (E.D.N.Y. 2011), http://pacenow.org/wp-content/uploads/2013/02/Babylon-v-FHFA-complaint-final_10-26-10.pdf.
[177] *National Resources Defense Council v. Federal Housing Financing Agency*, 815 F. Supp. 2d 630 (S.D.N.Y. 2011), http://pacenow.org/wp-content/uploads/2013/02/2010-10-6-NRDC-vs-FHFA-PACE-Lawsuit1.pdf.
[178] *Leon County v. Federal Housing Financing Agency*, 816 F. Supp. 2d 1205 (11th Cir. 2012), https://www.courtlistener.com/opinion/2179402/leon-county-v-federal-housing-finance-agency/.

5. Legislative Efforts to Rescind FHFA's Directive

The PACE Assessment Protection Act of 2010 was introduced in the House of Representatives by Rep. Mike Thompson (D-CA). The Protection Act directed Fannie Mae and Freddie Mac to adopt underwriting standards consistent with the Department of Energy's best practice guidelines set forth in May, 2010. The bill prohibited the Enterprises from requiring repayment of a PACE assessment in order for a homeowner to "finance, refinance, or transfer property" that meets the underwriting criteria. The Act further prohibited the FHFA and the Enterprises from discriminating against PACE districts. The bill gained 56 co-sponsors, but died in the House Financial Committee.[179] Rep. Nan Hayworth (R-NY) introduced an identical bill into the Senate in 2011, which also died in committee.[180]

On March 23, 2014, Rep. Mike Thompson introduced a third bill, the PACE Assessment Protection Act of 2014. The bill was referred to the House Committee on Financial Services, and gained 28 co-sponsors. The last person to co-sponsor the bill was Rep. Gwen Moore (R-WI) on June 9, 2014. There has been no action on this bill, however, since its introduction.[181]

[179] "H.R. 5766: PACE Assessment Protection Act of 2010," *Library of Congress*, July 15, 2010, https://www.govtrack.us/congress/bills/111/hr5766#overview.
[180] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013.
[181] "H.R.4285: "PACE Assessment Protection Act of 2014," *Congress.gov*, March 24, 2014, https://www.congress.gov/bill/113th-congress/house-bill/4285

APPENDIX D—State R-PACE Case Studies

To better understand how R-PACE programs are structured and administered, we prepared four state R-PACE program case studies: California, Florida, Maine, and Vermont.

1. California HERO Program

Launched in December 2011, California's HERO Program is the most successful R-PACE program in the country. It is now available to 70% of California residents and has already allocated $200 million with an additional $300 million in approved projects. California passed Assembly Bill 811 in July, 2008 authorizing counties and cities to establish voluntary assessment jurisdictions to fund residential energy efficiency and water conservation projects. California's HERO Program provides funding energy efficiency and clean energy generation projects as well as water conservation projects such as artificial turf and water efficient appliances. HERO's platform for approvals, marketing and partnership building is administered by Renovate America, which is also a funder of the program. As of the end of 2013, the program had distributed an average of $3 million in funding each week with the aim of increasing that amount to $10 million in the coming years. In total, there have been more than 15,000 HERO applications received, totaling more than $280 million in approved projects. HERO is now available in nearly 185 communities in California, including large cities such as San Diego, San Jose, and Berkley.

Program Structure

The minimum loan amount available under the HERO Program is $5,000 and must not exceed the lesser of 1) 15% of property value, 2) $200,000, or 3) a combined mortgage and assessment contract amount of 100% of the property value. A FICO score of 680 or higher is required, but homeowners with FICO scores above 730 will typically see rates around 6.25%. Interest rate ranges from 5.95% and 8.25% with an additional one-time financing fee of 6.25%. Loan terms range from 5-25 years in 5-year increments. Repayment of the loan is collected through a special assessment on property taxes. If the assessment is not paid in full at the time of sale of property, the remaining loan balance can be transferred and paid by the new owner. Funding is provided through a municipal bond created by Western Riverside Council of Governments (WRCOG) for each project and sold to Renovate America. The PACE assessment is equal in priority to property taxes and is senior to private debt on the property, making them first-lien priority. In the case of an assessment payment delinquency, the lending agency will use the judiciary to foreclose on delinquent payments.

Approach to the FHFA's Directive

In response to the FHFA's concerns, California passed Senate Bill 97 in 2013 authorizing a PACE loan-loss reserve fund. California subsequently established a $10 million loan-loss reserve to be used to pay back lenders in case of homeowner default. The FHFA has not acknowledged that California's loan-loss reserve removes the threat of sanctions, however, the threat of such sanctions is no longer considered to be a significant risk by state administrators.

To address the FHFA's concerns, language was also changed in the PACE financing application to advise homeowners about the FHFA directive and payment of the PACE loan. The language advises that homeowners should look for provisions in their mortgages triggered by PACE assessment and that they might be obligated to pay the remaining sum of the assessment when selling or refinancing the property.

Track Record

Renovate America CEO J.P. McNeill cites the marketing strategy and the very simple application process as the key drivers of success of the program.[182] The marketing is done through contractors that market to property owners. "The HERO Program has been proven to create jobs, reduce energy bills and decrease water consumption," said Blair McNeill, Vice President of Development for Renovate America. The program has generated over 2,400 jobs since 2011.

2. Florida PACE Financing Agency

Florida passed PACE enabling legislation in April, 2010[183] with strong bi-partisan support in the Florida legislature. Florida's enabling statute permits improvements to building energy efficiency and clean energy generation upgrades as well as improvements that make properties more resistant to wind and hurricane damage. The state has three commercial and residential PACE programs that have formed under the law: Florida PACE Funding Agency (FPFA), Florida Green Energy Works, and the Clean Energy Corridor. The three programs can levy PACE assessments, offer financing and receive assessment payments collected at the county level. These programs each have their own financing structure and scope in terms of energy upgrades covered under the program.

The Clean Energy Green Corridor District was initiated by the town of Cutler Bay for both residential and commercial PACE. The district is small and includes only communities in southern Florida with a total population of 650,000. Residential PACE will not be available in Miami, the largest jurisdiction in the Green Corridor, effectively making the program exclusively commercial-PACE. Ygrene Energy Fund Florida will administer the program that provides administration, financing, contracting and repayment assurances to participating jurisdictions. Ygrene's main funder is Barclays and is working to gain additional through other sources.

Florida Green Energy Works is administered by EcoCity Partners, L3C and is focused on commercial PACE and does not offer residential financing, due to the uncertainty created by the FHFA. It will be up to participating local governments to decide whether to participate in residential PACE.

[182] Michael Brod, William Miao, and Marley Urdanick, "Report on Prospects for Residential PACE in Connecticut," *Yale Environmental Protection Clinic*, December 17, 2013.
[183] Fla. Stat. § 163.08.

The Florida PACE Funding Agency (FPFA) is considered Florida's primary residential PACE program because it has been adopted by many more jurisdictions statewide. The FPFA was established in June, 2011.

The FPFA Program Structure

The FPFA was initially incorporated in Flagler County and the City of Kissimmee and is a separate legal entity with jurisdiction in counties that allow for PACE. The FPFA is overseen and managed by a three-member board, which in turn outsources contracts to third-party companies with expertise in engineering, installation, and property assessment. Leidos, a private engineering and consulting firm, oversees the design, development, implementation, and management of the FPFA's PACE program. Leidos also manages the EVEST Florida program platform developed by the FPFA to administer the program. Property owners can apply for qualified energy and wind improvements, contractors can apply to become program authorized, and potential energy savings and applicable rebates can be determined through the EVEST platform.

The FPFA allows financing for energy efficiency upgrades and clean energy generation as well as wind resistant upgrades. Given the frequency of severe thunderstorms and hurricanes in the state, the program aims to improve resilience to extreme weather events. According to Program Manager of the FPFA, Jonathan Schaefer, the wind resistance upgrades have reduced the wind portion of insurance bills by up to 75%.

The companies the FPFA contracts with are responsible for negotiating with program participants, training, determining financial eligibility of residence, loan underwriting, property assessments, and payment to contactors. Program loans have a minimum of $2,500 with no maximum; Interest rates are tied to U.S. Treasury Bill rates. Loans terms are from 5-25 years in five-year increments. The program recovers administrative costs with a $50 application fee and 2% on each job financed.

Financing

To date, the FPFA is the only source of PACE financing initially capitalized at $200 million, making funding available immediately. In addition, the FPFA has been approved to capitalize up to $2 billion. Most importantly, the FPFA received validation for up to $2 billion in bond financing in the fall of 2013. Under authority established by Florida Statutes Section 163.01, the FPFA will provide services to its subscribers and can levy assessments as repayment for PACE-funded projects. The $2 billion funding target could be achieved if just 5% of 20-year-old residential and commercial buildings in the state participate in the program with an average project amount of $15,000. Validation of the FPFA's program does not extend to the Green Corridor or Florida Green Energy Works programs, which will have to seek validation of their programs separately.

Most recently, the FPFA recently announced $200 million in funding available through the EVEST Florida Program for both residential and commercial projects. The FPFA financial advisors, Public Financial Management, First Southwest and Southeastern Investment Securities worked diligently with CounterPointe Energy Solutions to complete all the necessary legal

documents and secure the funding from a large institutional investor. Florida has been a model for attracting private financing due to the very large housing market in the state and the loan-loss reserve fund to cover defaults. These have helped address issues relating to the FHFA directive and made the program more attractive to investors.

Loan-Loss Reserve

Florida has over $190 million in Qualified Energy Conservation (QEC) bonds allocated for a loan-loss reserve to cover defaulting homeowners. However, the money has not yet been authorized for use, adding to financing uncertainty. Therefore, there is currently no loan-loss reserve in the state. According to the program administrator, Florida does not view the FHFA directive as a significant threat to R-PACE in the state however.

Approach to the FHFA's Directive

PACE assessments are given superior lien status in Florida. Despite this, PACE supporters in Florida do not see a conflict with the FHFA directive for several reasons. First, roughly 30% of homeowners do not have mortgages. Thus, lien superiority is a non-issue for them. Second, during the 2010 legislative session, the Florida Bankers Association participated in discussions about the legislative language of the PACE bill. The resulting legislation passed both House and Senate committees without a single "no" vote. Moreover, there is a clause in the state's PACE-enabling legislation that precludes the acceleration, meaning all liens are owned by the property owner and property owners are required to pay off the lien if they move or refinance.

Track Record

As of October 2014, three of the state's most populous counties including Miami-Dade County as well as 15 municipalities have allowed PACE to operate within their jurisdictions. The FPFA is currently in the initial evaluation process of several potential residential PACE projects. The program hopes to reduce insurance costs through wind resistance upgrades.

3. Efficiency Maine PACE Loan Program

In April, 2010, the Maine Legislature enacted 35-A Me. Rev. Stat. Ann. § 10156 authorizing municipalities to adopt residential PACE programs. The same month that Maine enacted this PACE-enabling legislation, the U.S. Department of Energy announced that Efficiency Maine was among 25 national winners to receive American Recovery and Reinvestment Act funds to establish a $20 million revolving loan fund for clean energy and efficiency upgrades. Efficiency Maine, an independent, not-for-profit, quasi-state agency, has used some of this funding to launch a PACE program in Maine. Efficiency Maine developed rules to implement a Maine PACE program, which it oversees. Efficiency Maine does not rely on private capital for its program.

Program Structure

Maine's PACE program is offered only to participating municipalities for 1-4 unit residences. Loan terms are up to 15 years with an interest rate of 4.99% and loans up to $15,000. PACE

loan assessments can be transferred between property owners or be paid off in full before deed transfer.

Under its PACE program, Efficiency Maine offers to service the energy loans it issues for participating towns and assigns this service to a third-party provider at no cost to individual municipalities opting in. This means all loan servicing is done by outside, contracted parties and collected on property tax assessments on behalf of the municipality. The division of roles for administration of the PACE program is determined in agreement between the participating municipality and Efficiency Maine. Efficiency Maine is usually responsible for processing the loan applications, collecting and tracking all of the loan payments, and handling defaults. The municipality collects the payments as a special assessment on property taxes. The municipality's role is very important because the municipality transfers the loan funds to the homeowner to implement energy efficiency measures. The municipality may also help determine if the property has outstanding taxes, charges, liens, or delinquencies that have not been cured.

Approach to the FHFA's Directive

In most other states with PACE financing, PACE is defined as a special assessment recorded on the property to be collected through the property tax system. As previously discussed, this arrangement has spurred concerns that if the homeowner defaults on loan payments it could create a senior lien that would interfere with the mortgagor's ability to collect payment or clear title to the property. In passing LD 1717, the state legislature decided not to establish a PACE system that might interfere with the seniority of home mortgages. Instead, under Maine's PACE enabling legislation, a PACE assessment is secured by recording a "notice of a PACE agreement" in the registry of deeds, creating a PACE mortgage on the property. This PACE mortgage is not entitled to any special or senior priority and is junior and subordinate in priority to a home mortgage, thus circumventing the issue of lien superiority for investors and the FHFA.

Maine PACE Loan vs. Powersaver Loan

In addition to PACE, Maine offers another program for financing clean energy and water efficiency projects: the Powersaver Loan program. The major difference between Maine's PACE program and its Powersaver program is that Maine's Powersaver Loan program is available statewide without a municipality having to enact PACE financing legislation. Loan amounts can be up to $25,000 with a term of up to 20 years. The interest rate is the same for PACE loans (4.99%), but is not transferable when a property is sold, meaning homeowners must pay off the loan amount when selling the property. To qualify, applicants must live in a single-family home and have a minimum credit score of 660 and the mortgage will be no less than second position to the primary mortgage.

Track Record

Efficiency Maine PACE financing is still in early stages, but there has been some early success. Currently, 108 towns and municipalities participate covering 65% of the state's population. To date, there have been over 150 loans issued totaling $1.6 million in improvements. The average loan size is $13,500. The program also boasts an impressive 45% average home energy savings. Given that a 15-year $10,000 loan translates into approximately $80 in repayment costs each

month, the average of a 15-year $13,500 translates into about $100 per month cost to homeowners.

4. Efficiency Vermont

Vermont's PACE program began in 2009 after the passage of PACE enabling legislation (V.S.A. Title 24, Chapter 87). In its early form, Vermont's PACE program was structured in such a way that when efficiency loans were granted, they were secured with first-lien status and repaid through a special property tax assessment. But, the state became concerned that the primary lien would inhibit the ability to sell residential mortgages to the secondary market and inhibit PACE transferability between property owners in the wake of the FHFA's directive. Moreover, national banks would only make investments in PACE financing of $200 million or larger. To address these concerns, the Vermont legislature passed an amendment (H.B. 155) in 2011, which became effective in 2012. This amendment subordinated Vermont's PACE lien behind a property mortgage holder's interest and provided for a loan-loss reserve fund to cover default.

Vermont, with a population of roughly 625,000, is too small to get the attention of most national lenders. According to Peter Adamczyk, Managing Consultant at the Vermont Energy Investment Corporation, when engaging in negotiations with Wells Fargo, Barclays, and Deutsche, the banks expressed interest in providing funding, but Vermont's request for $20 million was far too small to be viable. Another problem occurred when Efficiency Vermont approached a group of eight Vermont-based banks regarding program financing. The $20 million target amount was appropriate, but the group could not agree on the proper risk-based capital treatment. Ultimately, National Bank of Middlebury, agreed to commit up to $1 million, but that amount has not yet been required due to low demand.

Program Structure

Efficiency Vermont, a regulated Vermont utility, is the state's PACE administrator. Efficiency Vermont has the responsibility of designing and approving energy efficiency eligibility measures under Vermont's program. For municipalities to opt into the program, an agreement must be drafted between Efficiency Vermont and the participating municipality. Six subscription periods per year run with deadlines for application and implementation of the program. During each subscription period, an adjusted interest rate is established based on the interest rate benchmark provided by the Federal Home Loan Bank of Boston.

Vermont has employed a three-phase approach to PACE financing: 1) homeowner education; 2) project review; and 3) subscription. Phase 1 is an ongoing effort to build relationships with the public. Phase 2 lasts up to eight weeks, during which applicants can submit their application to enroll in the program. In Phase 2, administrators secure PACE financing and establish a loan reserve fund. Phase 3 is the subscription period. In September 2013, Vermont opened its first subscription period.

Vermont has historically low foreclosure rates, which has allowed for lower financing costs. The interest rate is currently 6.5%, based on the Federal Home Loan Bank of Boston's 20/20 Amortizing Advance Rates (3.5%), plus a 2% lender charge and a 1% loan servicer charge. This

rate is not dependent on loan terms. Rates will be established no later than 10 days prior to each of the six subscription periods per year.

Approach to the FHFA's Directive

Since the passage of the amendment H.B. 155, Vermont has largely addressed the issue of the lien superiority and repayment concerns through subordination. The FHFA endorsed Vermont's approach subordinating PACE liens before implementation of the statutory amendment noting that the approach would be "looked upon favorably by the FHFA and thus Fannie and Freddie Mac."

Loan-Loss Reserve Funds

There are two loan-loss reserves in Vermont. Collectively, they contain 7% of each PACE assessment in reserve. The first loan-loss reserve is managed by Efficiency Vermont and funded by a 2% charge on total project costs paid by the homeowner. The second loan-loss reserve is funded through the Regional Greenhouse Gas Initiative and provides funds equal to 5% of total assessments up to $1 million. The second fund is used only when the Vermont-funded, loan-loss reserve runs out. Effectively, this means that the loan-loss reserve maintained by Efficiency Vermont is the primary loan-loss reserve fund for PACE in the state.

Eligibility

Vermont decided to sub-contract the loan underwriting responsibilities to Opportunities Credit Union. Requirements for PACE loan eligibility include a positive cash flow, 10% of the total assessed property value in equity, an evaluation of debt-to-income, and a dollar value assigned to energy savings. Opportunities Credit Union generally does not require income or credit score data in loan evaluation. Applicants must be the legal owners of the property, be current on property taxes, and have had no delinquent payments for three years prior to their application.

Track Record

The Vermont PACE program is relatively new and small compared to other programs. Currently, there are fewer than 100 projects in the pipeline, with less than ten projects closed. According to Peter Adamczyk, the program has limited success due to very poor marketing of the PACE product in addition to several further requirements for qualification, which are based loosely on Maine's PACE program requirements. On the positive side, there has been an increase in the number of homeowners completing projects using other financing mechanisms, which Efficiency Vermont believes is at least partially attributable to the awareness raised by offering a PACE financing option.

APPENDIX E—List of Report Interviewees

- Peter Adamczyk, Vermont Energy Investment Corporation
- Ron Araujo, Connecticut Light & Power
- Cisco DeVries, CEO, Renewable Funding, California
- Dana Fischer, Efficiency Maine
- David Gabrielson, PACE*Now*
- Chris Kramer, EEB Consultant
- Travis Lowder, National Renewable Energy Laboratory
- Pat McDonnell, United Illuminating
- Michael Mendelsohn, National Renewable Energy Laboratory
- Kerry O'Neill, Director of Residential Programs, Connecticut Green Bank
- Robert Piano, Head of ABS Structuring, ABS-Alpha
- Jonathan Schaefer, Florida PACE Funding Agency
- Mark Thielking, Energize New York
- Natalie Trojan, Senior Vice President, Bank of America Merrill Lynch (formerly Senior Director, PACE*Now*)
- Brock Wolf, Executive Director, Structured Credit, Natixis Global Asset Management




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The Clean Energy States Alliance (CESA) is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy. CESA members—mostly state agencies—include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.

CESA works with state leaders, federal agencies, industry representatives, and other stakeholders to develop and promote clean energy technologies and markets. It supports effective state and local policies, programs, and innovation in the clean energy sector, with emphasis on renewable energy, power generation, financing strategies, and economic development. CESA facilitates information sharing, provides technical assistance, coordinates multi-state collaborative projects, and communicates the positions and achievements of its members.