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CPACE Financing Turns 10: Impacts, Challenges, and What Comes Next

Tuesday October 6, 2020

3:00 – 4:00 pm EDT



Sean Williamson
U.S. Department of Energy

Background

Commercial property assessed clean energy (C-PACE) is a mechanism for financing energy efficiency, renewable energy, and resilience measures through a voluntary tax assessment. *Benefits include:*

- Secured, long-term financing (20+ years) for a variety of commercial property types;
- Competitive, non-recourse, non-accelerating financing for a range of eligible measures;
- Option to transfer the tax assessment at time of property sale.

Establishing C-PACE programs and a pipeline of projects is a multi-step, multi-year process occurring at the state and local level. *Ten years of hard work from state and local leaders has resulted in:*¹

- Enabling legislation in **37 states plus Washington, D.C.**, and **20+ states** have financed projects;
- More than **\$1.6 billion** invested across **2,500 projects**;
- More than **7.9 tWh** in energy saved to date.

1. Source: PACENation Market Data. Available online: <https://pacenation.org/pace-market-data/>.

Today's Objectives

- 1. Reflect on the C-PACE 10-year milestone, including:**
 - Accomplishments and market trends
 - Assessing impacts and the evolution of state and local roles
 - Growing pains, tipping points, and building the project pipeline
- 2. Look ahead to the next 10 years**



DOE Resources

[Lessons in Commercial PACE Leadership: The Path from Legislation to Launch](#)

Fast track program set-up; learn from early C-PACE adopters.

[Commercial PACE Working Group](#)

*Commercial PACE Working Group: Year in Review (2018-2019)
Issue Brief – Commercial PACE Financing and the Special Assessment Process: Understanding Roles and Managing Risks for Local Governments*

[Better Buildings Financing Navigator 2.0](#)

Connect with Financial Allies including C-PACE service providers.

[Toolkit: Commercial PACE Financing for Resiliency](#)

Featuring a fact sheet, recorded webinars, and case studies.



Lessons in Commercial PACE Leadership:
THE PATH FROM LEGISLATION TO LAUNCH
FEBRUARY 2018

June 2019

Commercial PACE Financing and the Special Assessment Process: Understanding Roles and Managing Risks for Local Governments
Greg Leventis and Lisa Schwartz, Lawrence Berkeley National Laboratory

EXECUTIVE SUMMARY
This is to part (C-PACE) whether specific C-PACE forecasts risks labor included.

Key findings to date

Since the passage of other local

Commercial PACE

WHAT IS COMMERCIAL PROPERTY ASSESSED CLEAN ENERGY?
Commercial property-assessed clean energy (CPACE) is a financing structure in which building owners borrow money for energy efficiency, renewable energy, or other projects and make repayments via an assessment on their property tax bill. The financing arrangement then remains with the property even if it is sold, facilitating long-term investments in building performance. CPACE may be funded by private investors or government programs, but it is only available in states with enabling legislation and active programs.

BETTER BUILDINGS FINANCING NAVIGATOR

HOME EXPLORE FIND CONNECT

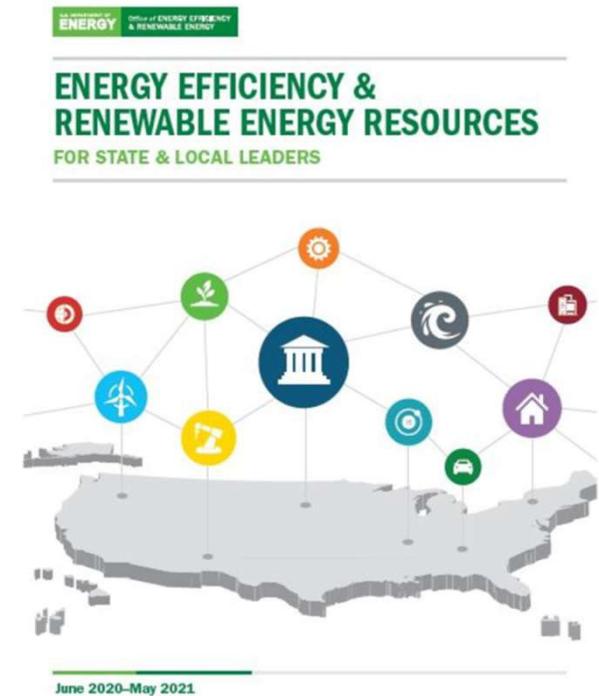
SOLUTIONS PROGRAMS & PARTNERS SUMMIT & SWAP LEARN MORE

EXPLORE BY TOPICS BROWSE SOLUTION TYPES TOOLKITS FINANCING NAVIGATOR

Stay Connected

- **State and Local Solution Center:** <http://energy.gov/eere/slsc>
 - More than **400** tools, resources, and best practices
- **State and Local Spotlight:** <http://energy.gov/slsc/subscribe>
 - Monthly newsletter with ~**33,000** subscribers

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State and Local Inbox
stateandlocal@ee.doe.gov



[Energy Efficiency and Renewable Energy Resources for State and Local Leaders](#)

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Today's Presenters



Mike Centore
PACENation



Greg Leventis
Lawrence Berkeley National Lab



Charlene Heydinger
Texas PACE Authority



Mike Centore

Director of Market Research
PACENation

Our mission is to promote Property Assessed Clean Energy financing by providing leadership, support, problem solving, data and networking opportunities for a growing universe of PACE market participants.

Our work includes:

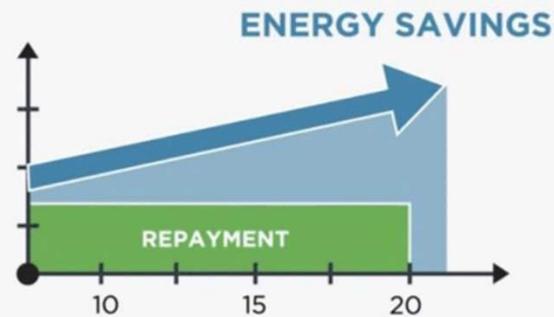
- National PACE events
- Market research
- Policy and market development
- Informational resources for members

[PACENation.org](https://www.PACENation.org)

PACE Benefits



Covers 100% of a project's hard and soft costs

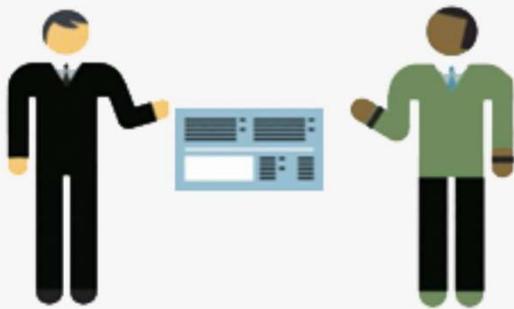


Terms up to 30 years maximize annual cash flow



Transfers on sale of the property, non-accelerating & non-recourse

PACE Benefits



Split-incentive solution allows costs and benefits to pass through to tenants



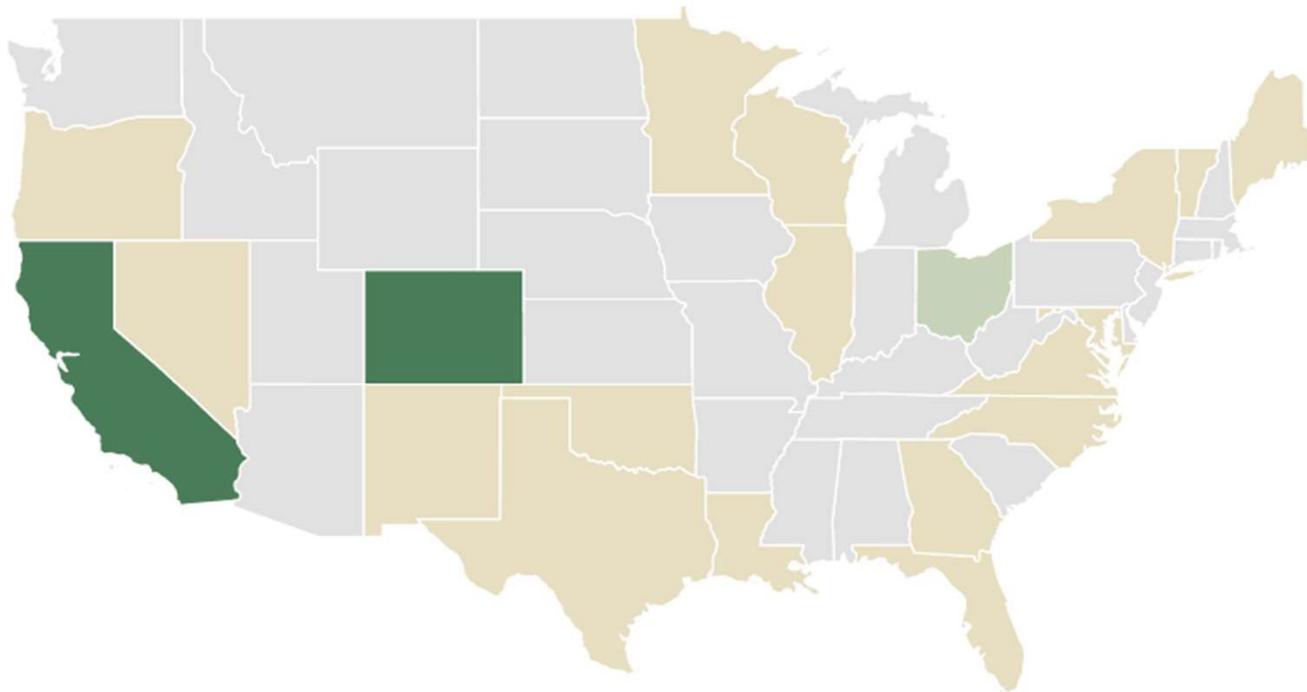
Preserves capital by replacing higher-interest debt or equity in the capital stack



Substantial environmental, economic, and resiliency benefits for communities

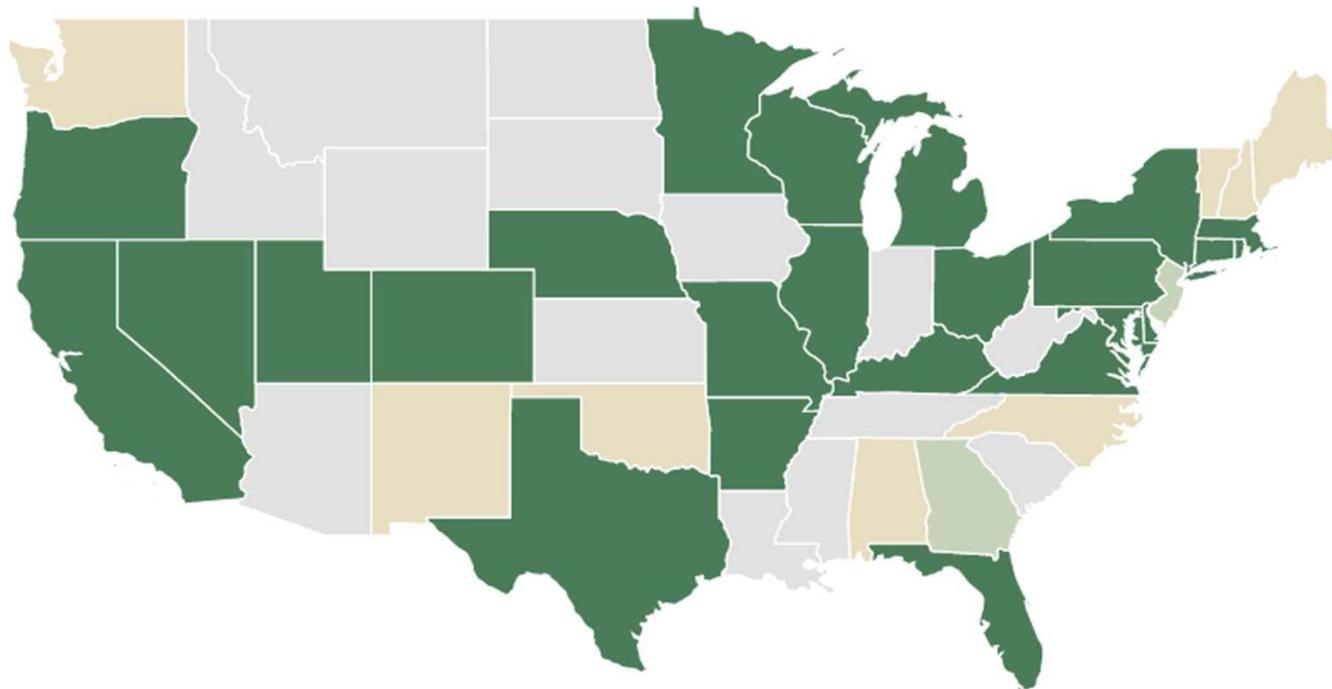
C-PACE in 2010

20 states C-PACE enabled, **2** with active programs
58 projects completed, **\$5** million

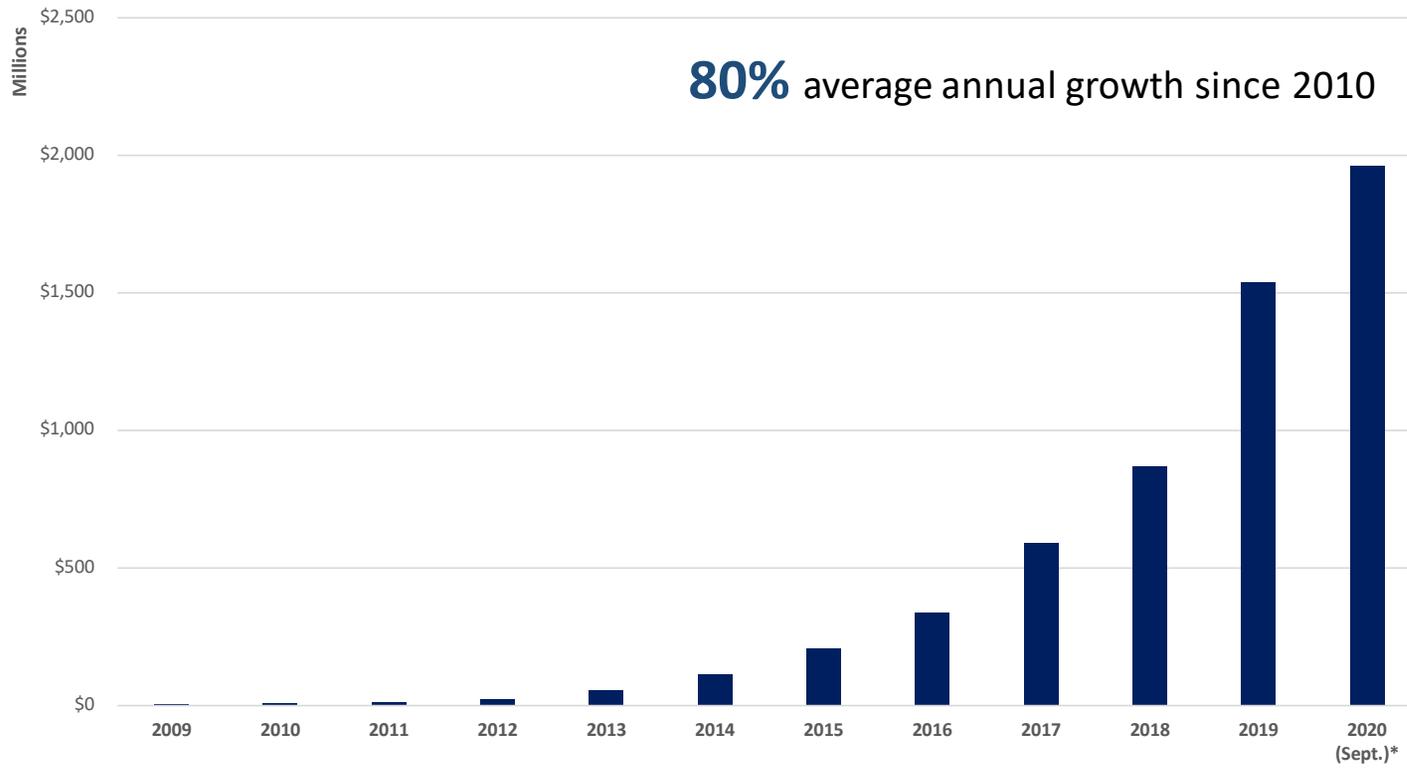


C-PACE in 2020

37 states plus D.C. C-PACE enabled, **24** plus D.C. with active programs
2,500+ projects completed, **\$1.93** billion



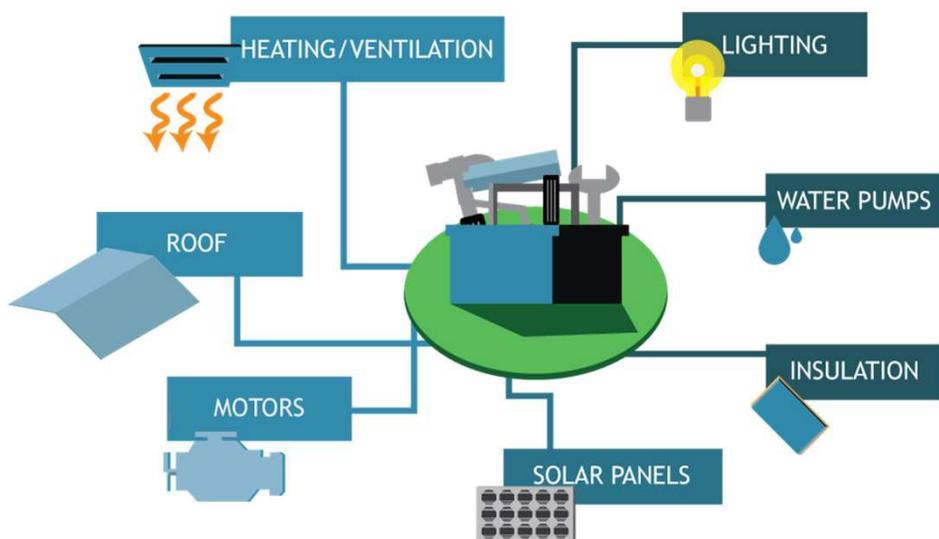
Cumulative C-PACE financing (2009-2020)



*Not yet finalized

States >\$10MM cumulative financing	
CA	625
OH	376
CT	173
TX	112
MN	95
MO	78
CO	70
RI	64
UT	64
MI	49
WI	45
FL	43
DC	41
NE	31
IL	21
MD	13

Financeable measures



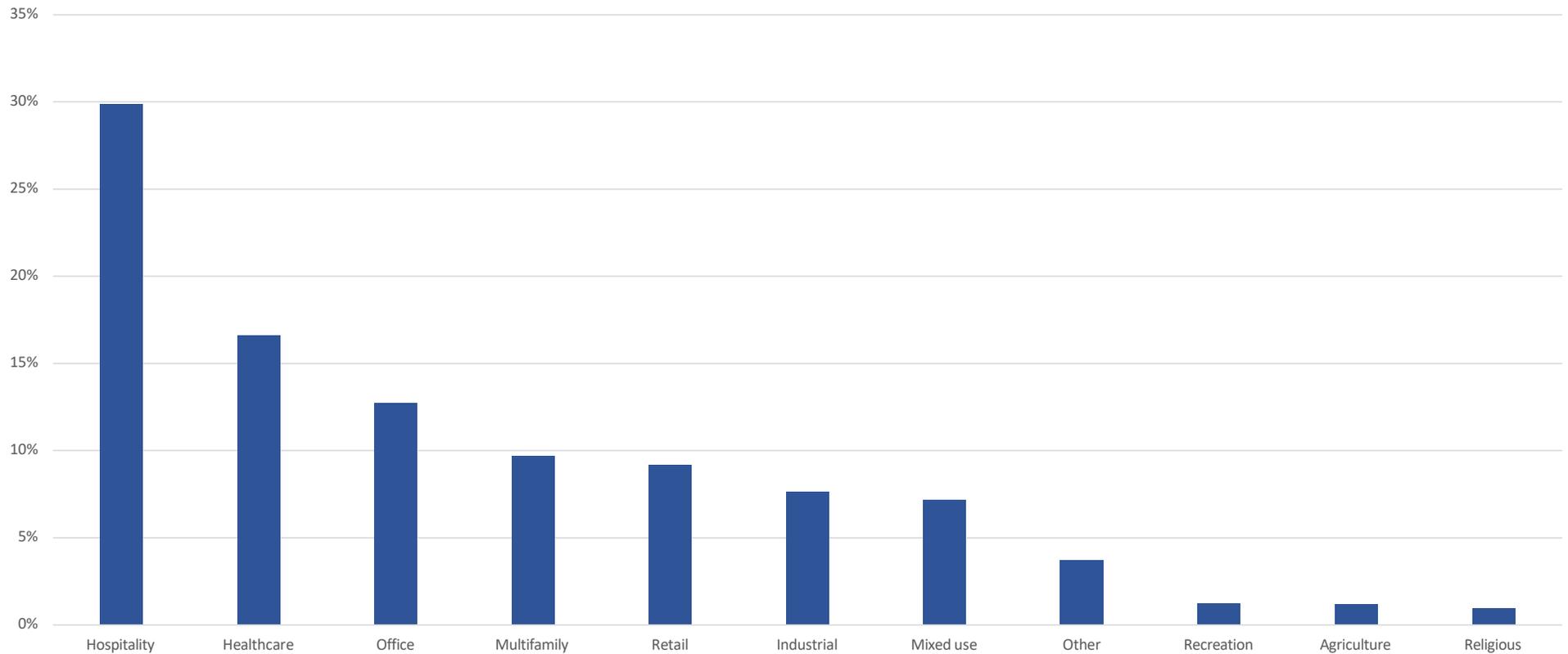
In many cases:

- Cogeneration
- Energy storage
- Microgrids
- Seismic strengthening
- Fuel Cells
- Hurricane resilience

New areas:

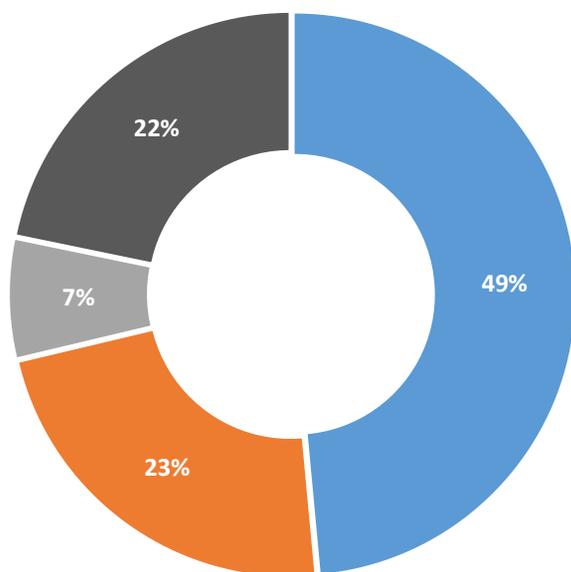
- Infectious disease mitigation (e.g. HEPA filtration, UV lighting, touchless fixtures, antimicrobial surfaces)
- Fire resilience

C-PACE property types (% of dollars invested)



How is C-PACE used?

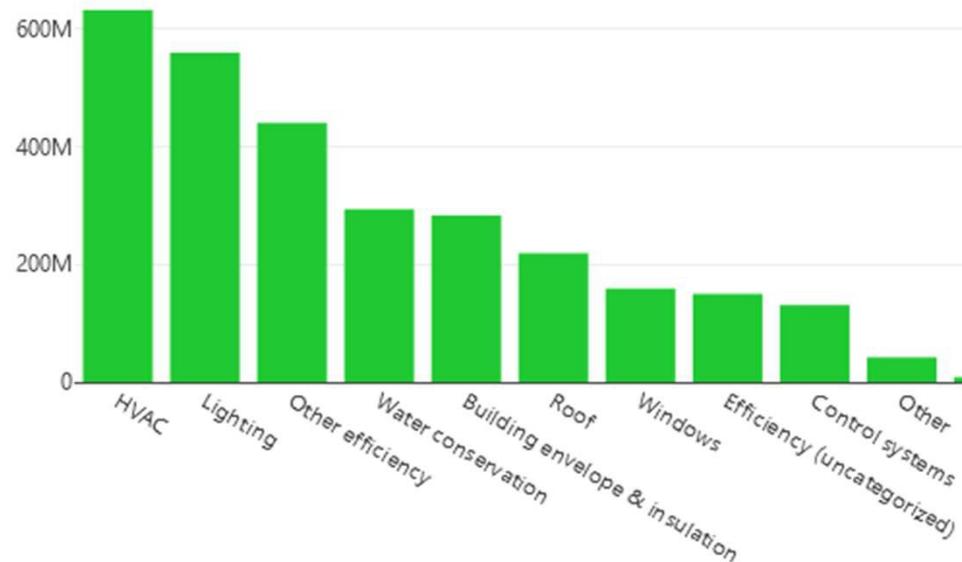
C-PACE funding by category:



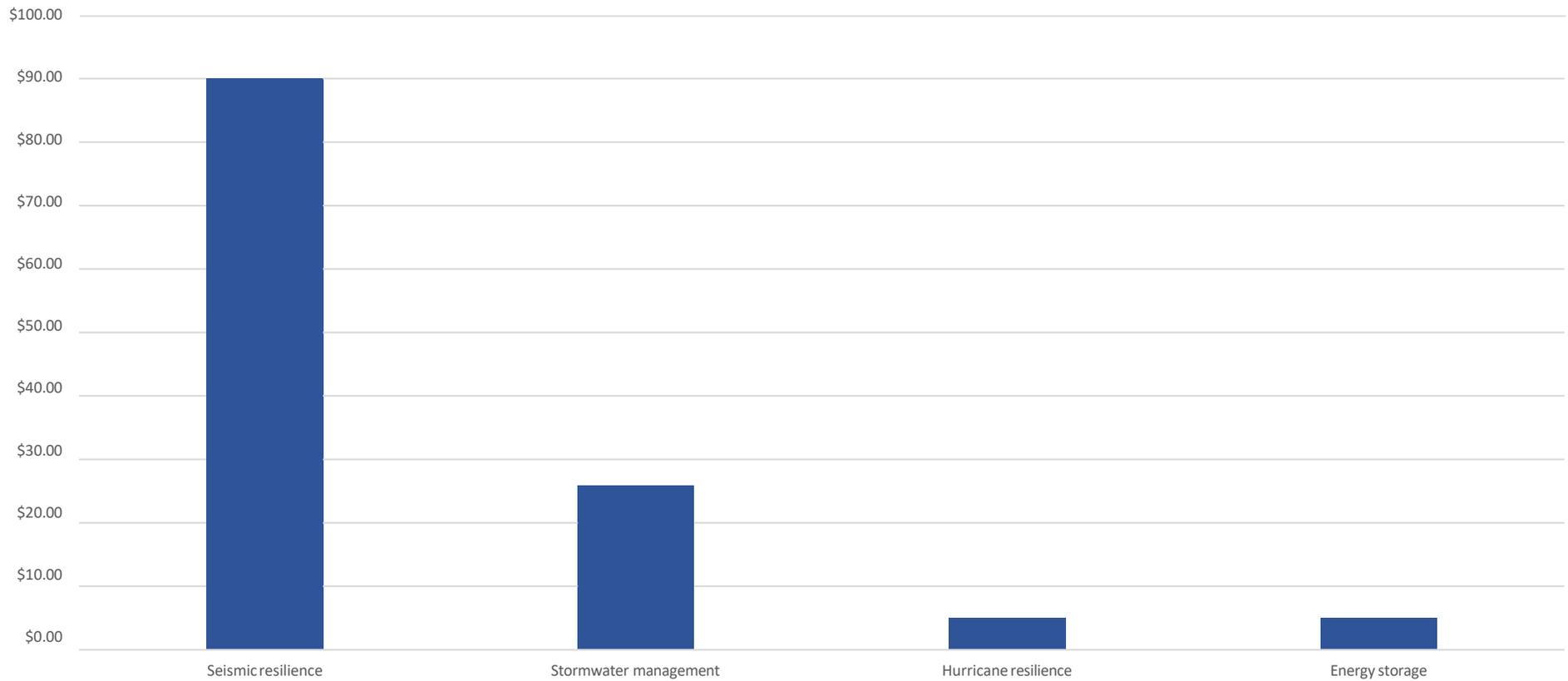
■ Energy efficiency ■ Renewable energy ■ Resilience ■ Mixed projects

Specific measures:

EE-only and mixed projects

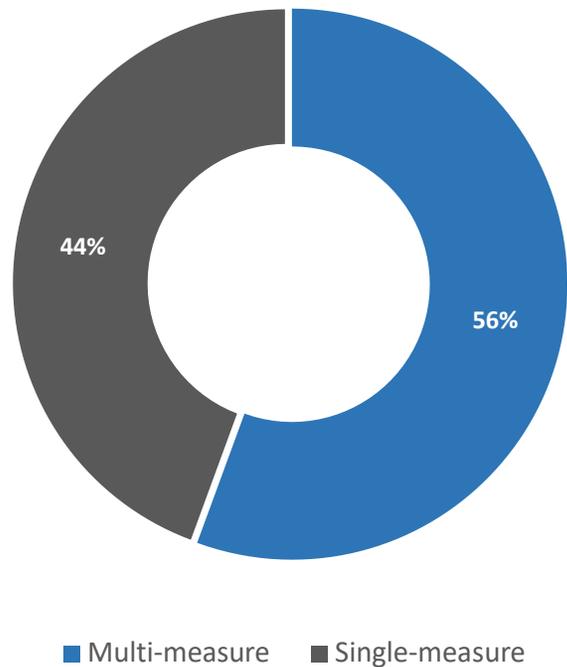


C-PACE resilience measures (\$, millions)

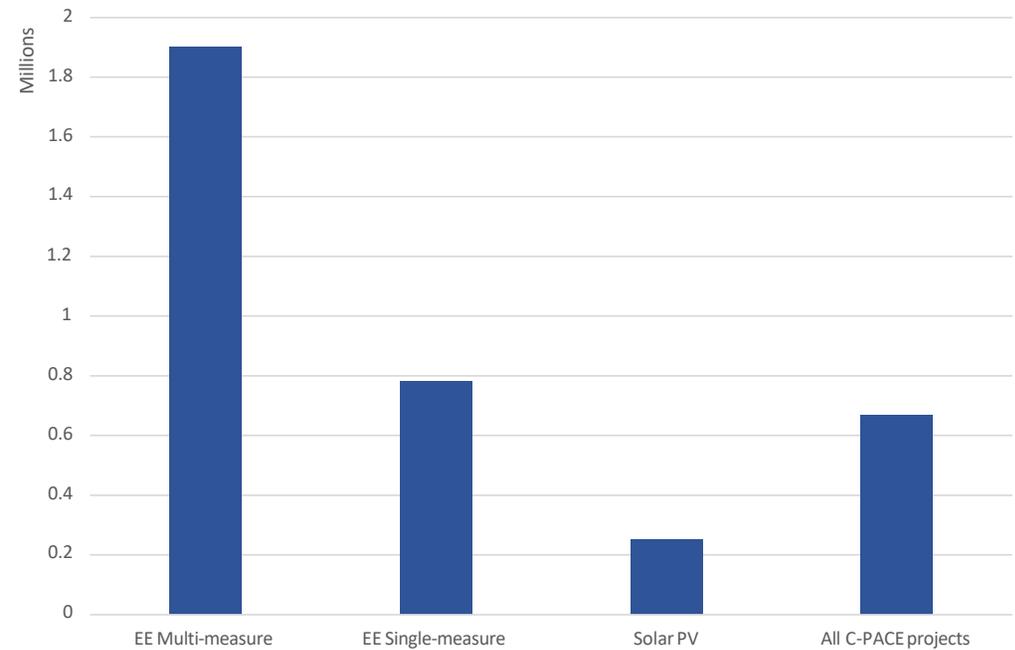


Multi-measure C-PACE projects

Funding: EE Multi-measure vs. EE Single-measure



Average project size: Multi-measure vs. Single-measure



C-PACE impacts



22,400

Job-years created

9.9B

kWh energy saved

\$3.5B

Economic impact

3.5M

Metric tons
carbon abated

Estimated over useful lifetime of installed measures

PACE would have a tremendous impact on the environment and the economy if enabled nationwide.

If C-PACE and R-PACE were used by 15% of eligible buildings in the United States, the total potential market would reach \$650 billion, which represents \$282 billion invested to improve commercial buildings and \$368 billion invested in homes.

PROJECTED IMPACT IF PACE WERE UTILIZED IN 15% OF ELIGIBLE BUILDINGS IN EACH STATE

	Job-years Added	Economic Output (\$)	Energy Saved (kWh)	Total Carbon Abated (metric tons)
Commercial PACE	3,270,000	512,146,400,000	990,858,970,000	351,680,000
Residential PACE	6,440,000	772,180,070,000	1,293,751,040,000	467,680,000
Total market	9.71 million	1.28 trillion	2.28 trillion	819 million

Impacts are estimated over useful lifetime of installed measures. Includes data reported to PACENation as of April 1st, 2020.

C-PACE project examples



Hospitality

Hyatt Regency Salt Palace
Salt Lake City, UT



Office

PAE Living Building
Portland, OR



Retail

Greenleaf Grocery
St. Louis, MO



Industrial

Pacific Ethanol
Madera, CA



Mixed Use

OM Station
Madison, WI



Apartments / Mixed

DuPont Building
Wilmington, DE



C-PACE project examples



Healthcare

Agriculture

Religious

Acute Care Hospital System

Various Locations



Wheatfield Gardens

Niagara County, NY



Congregation Beth Israel

Austin, TX



Recreation

Education

D.C. United Stadium

Washington, D.C.



Elsie Whitlow Stokes Charter School

Washington, D.C.



Recent legislative & program developments



2020 year-to-date:

- Washington enacts C-PACE (+ resilience) legislation (SB5730/HB1796)
- Massachusetts launches C-PACE program
- Bills introduced in Michigan to expand PACE for environmental hazard mitigation incl. lead mitigation for drinking water
- Illinois enables C-PACE funded resilience investments: incl. seismic, flood mitigation, fire suppression, energy storage, microgrid, backup power generation (HB3501)
- New York enables C-PACE funding for new construction projects (A.7805/S.6523)
- First projects closed in Pennsylvania



Greg Leventis

Program Manager - Electricity Markets & Policy
Lawrence Berkeley National Lab



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Practices for Demonstrating Energy Savings from Commercial PACE Projects

Greg Leventis, Lawrence Berkeley National Laboratory
Better Buildings
October 6, 2020

This work was funded by the U.S. Department of Energy Weatherization and Intergovernmental Programs Office, under Contract No. DE-AC02-05CH11231.



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Agenda

- Introduction
- Energy impact assessments
- Assessment methods
- Value proposition





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Introduction



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Introduction

- C-PACE Working Group issue brief series
 - Issue brief 1: [Commercial PACE Financing and the Special Assessment Process: Understanding Roles and Managing Risks for Local Governments](#)
 - Issue brief 2: *Practices for Demonstrating Energy Savings from Commercial PACE Projects*
 - Issue brief 3: Beginning development

- Objective of issue brief 2: provide a resource for state and local policymakers as well as other C-PACE stakeholders on the range of energy impact assessment methods available, the benefits of using them, and their tradeoffs





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Energy impact assessments



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Energy impact assessments

- C-PACE programs produce have many benefits including beneficial energy impacts

- Energy impact assessment—a process to determine and quantify how an energy efficiency project or program affects energy use

- Motivations for using energy impact assessments include:
 - Enabling legislation or program requirements
 - Complying with any existing reporting requirements
 - Promoting the program and supporting program growth
 - Validating energy and cost savings if a certain amount of savings is promised (for example, in a performance contract) or required (for example, by a savings-to-investment ratio requirement)





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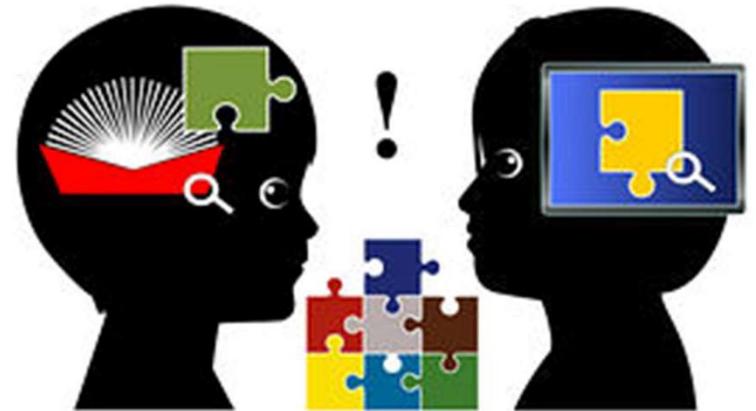
Assessment methods



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Assessment methods

- Methods that can support C-PACE include:
 - Deemed savings
 - Consumption data analysis
 - Building energy simulation



Assessment methods—Deemed savings

- **Deemed savings**—Assessment of savings based on predetermined estimates; “fully deemed” methods draw estimates from other settings, “partially deemed” savings supplement those estimates with site-specific adjustments
 - Can forecast energy savings ahead of project implementation but does not indicate actual savings
 - Estimates impacts of individual measures
 - “Fully deemed” values can be straightforward and low-cost if there is access to reliable and applicable deemed savings values
 - Lower accuracy in some applications, especially in the case of “fully deemed” approaches depending on the quality of the deemed savings values

Assessment methods—Consumption data analysis

- **Consumption data analysis**—Comparison of pre- and post-project energy consumption data
 - Reflects actual consumption
 - Can control for external factors (e.g., weather)
 - Requires access to energy consumption data
 - No assessment of individual measures

Assessment methods—Building energy simulation

- **Building energy simulation**—Use of engineering models to forecast energy savings
 - Can forecast energy savings ahead of project implementation but does not indicate actual savings
 - Can assess individual measures and whole building (though whole building estimates are the most common output)
 - Can capture site specifics
 - Requires access to specific information about building and at least historic energy use
 - May require particular expertise and significant effort (costs) to develop models and calibrate (i.e., capture site specifics)



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Value proposition



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Value proposition

□ Benefits

- Validation of the public benefit nature of the program (e.g., a demonstration for policymakers that the program is providing energy savings)
- Proof of concept (i.e., evidence that C-PACE saves energy for participants) to encourage increased participation among building owners, local governments and mortgage holders
- An illustration of the impact of C-PACE for public policy goals (i.e., confirmation of energy savings realized as progress towards savings targets)
- An approach for assessment of different program aspects (e.g., identifying outliers and patterns of performance with specific measures, or assessing participating contractors)

□ Drawbacks

- It presents an added cost that often includes a third-party verification expense and takes up significant administrative staff time
- Some assessment methods require collecting sensitive private information from property owners
- Property owners may see impact assessments as a burden, especially for projects where energy savings are not central to the project's business case



Contacts

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For more information

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Charlene Heydinger

President

Texas PACE Authority



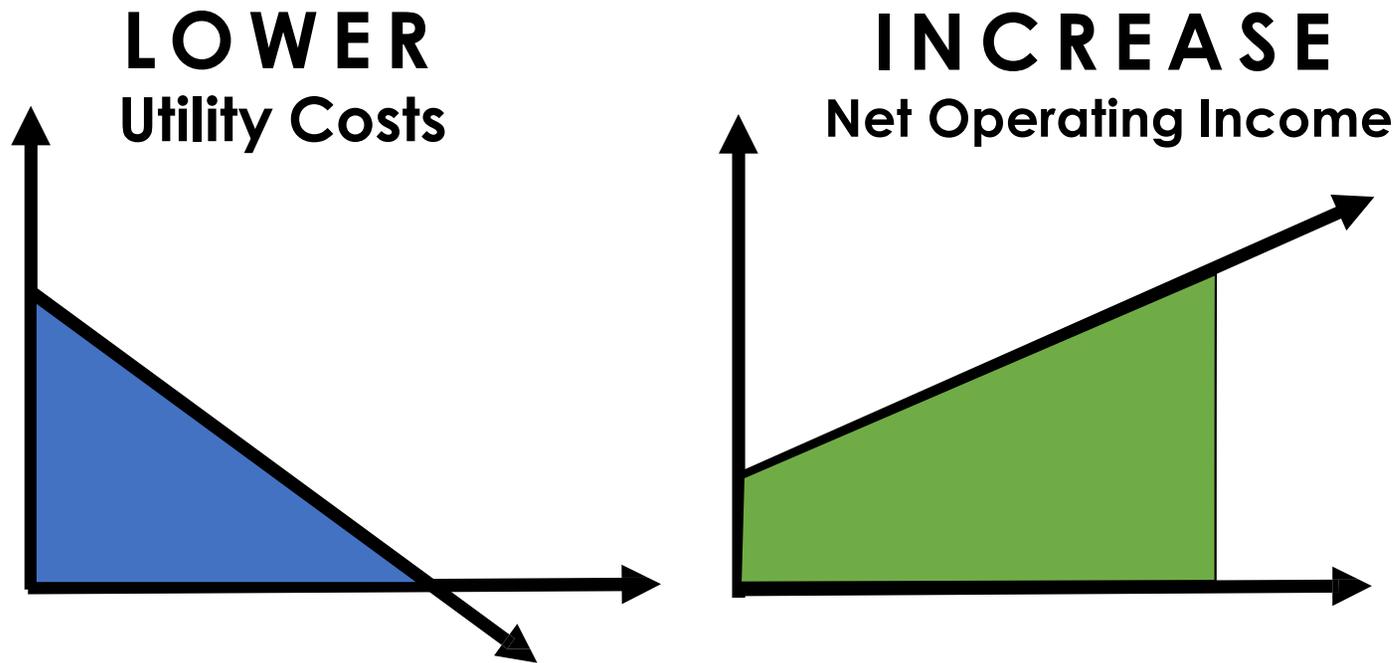
PACE:

8 years In Texas:

Growing pains, tipping points, and building the project pipeline

October 6, 2020

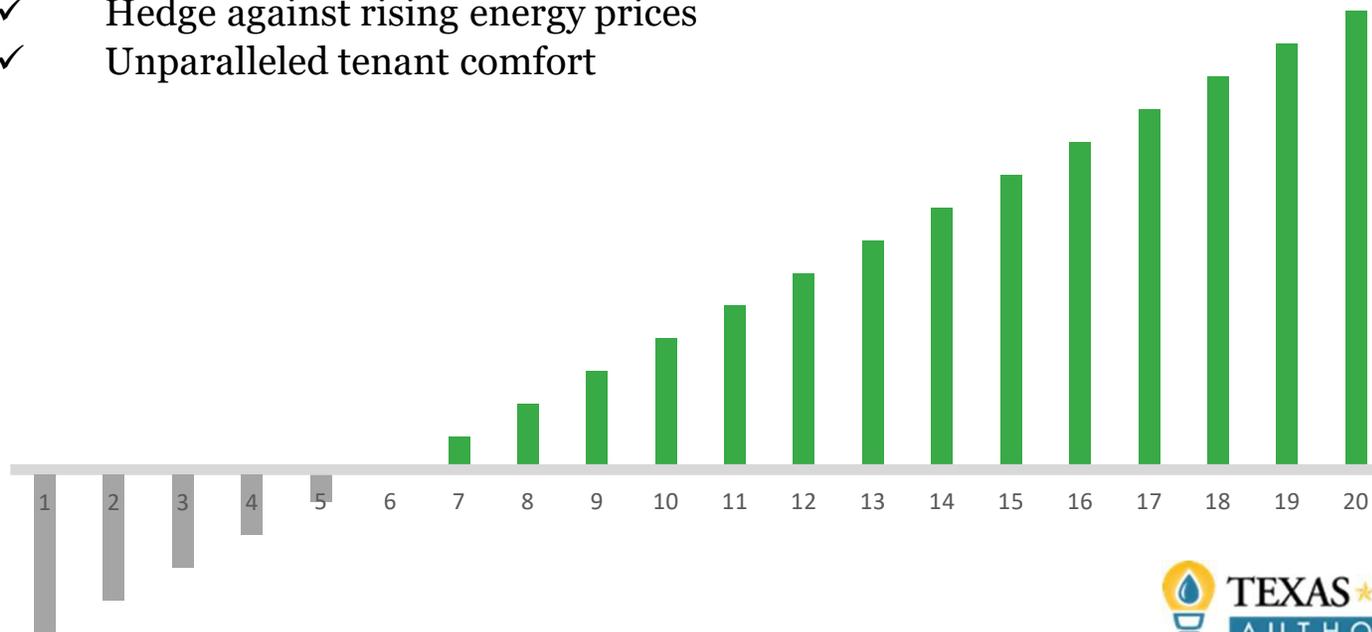
WHAT TX-PACE DOES



Bottom Line: Increased Building Value

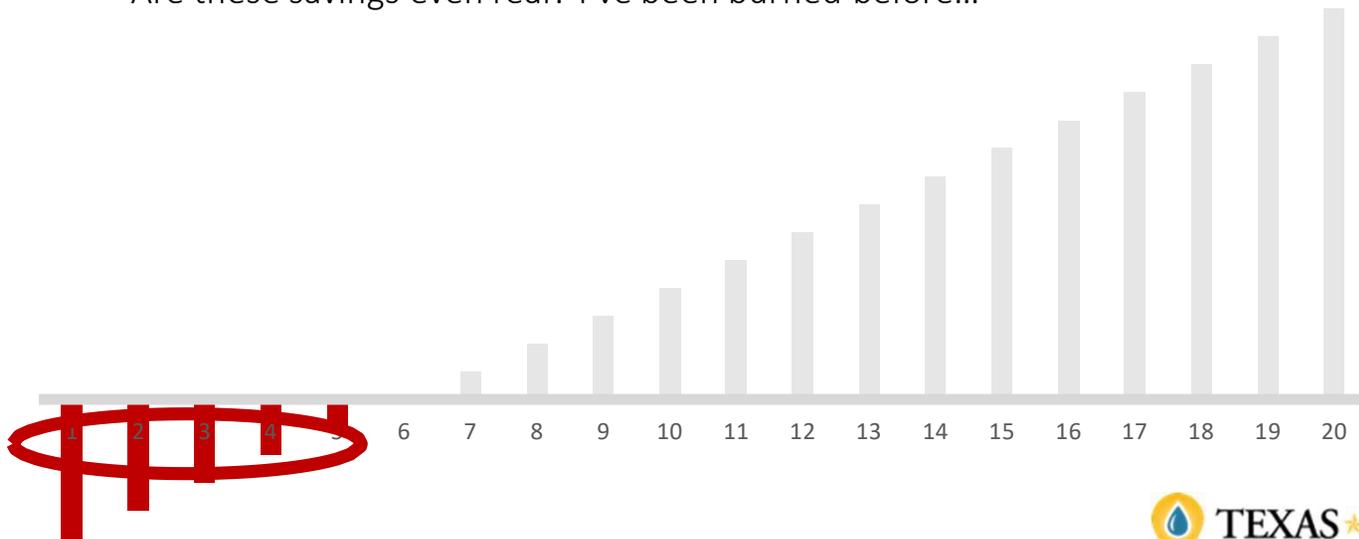
What Contractors PITCH

- ✓ Strong ROI – will save \$5.6M over system life
- ✓ Innovative – groundbreaking efficient technology
- ✓ 20-year warranties, proven expertise
- ✓ Hedge against rising energy prices
- ✓ Unparalleled tenant comfort



What the CFO/Owner HEARS...

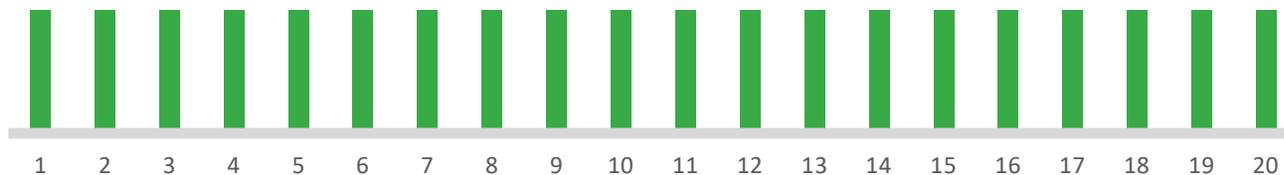
- X Where will I get the funding?
- X What if I sell the building in 5 years?
- X We only do 3-Year payback projects
- X Good technology...but my tenant pays the energy bills
- X Are these savings even real? I've been burned before...



Changing the Story

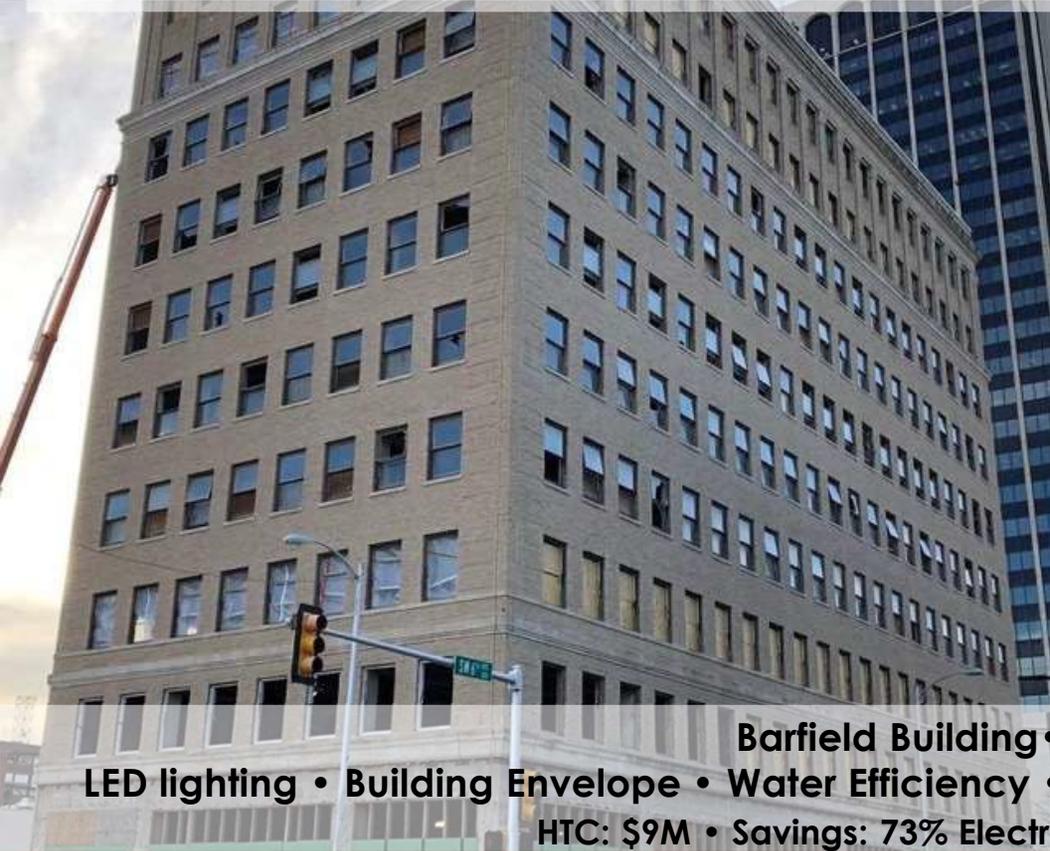
What if you could develop a solution that...

1. Provides 100% up front funding of all hard and soft costs?
2. Allows a 20+ Year repayment term = **immediate income source**
3. Allows transfer of obligation automatically on sale
4. Doesn't tie up borrowing capacity
5. Requires savings to be validated by third party review

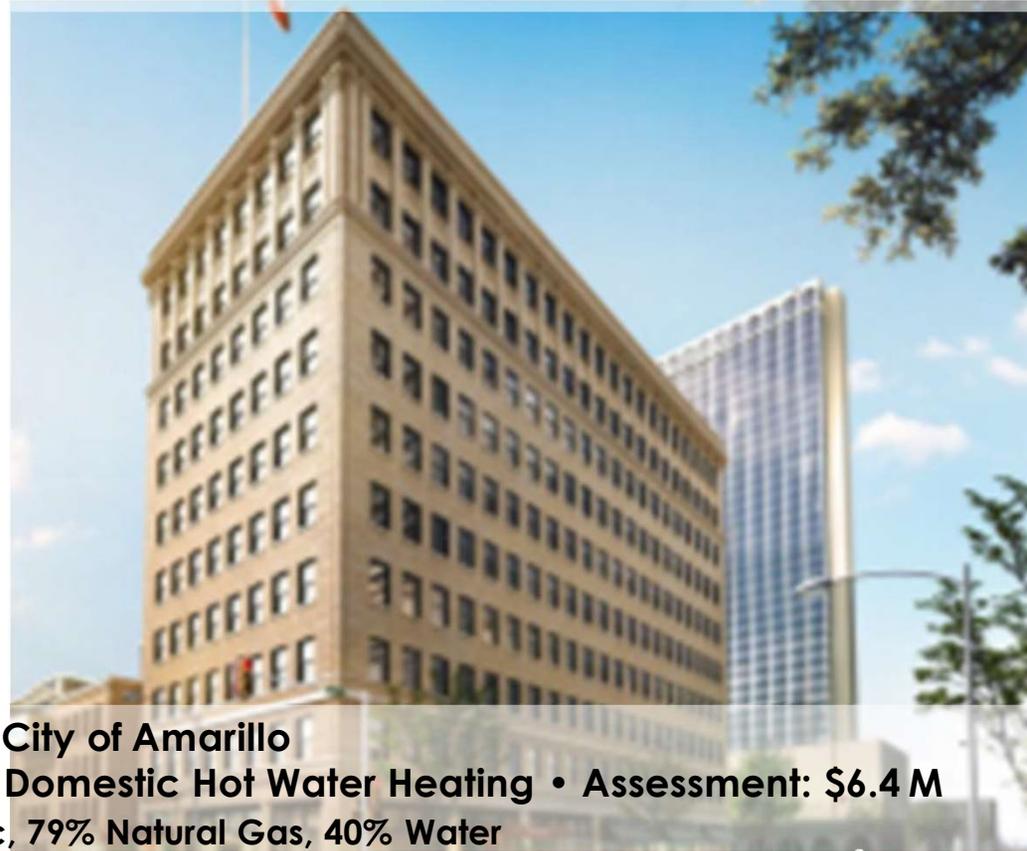


WHAT TX-SPACE DOES

BEFORE



AFTER

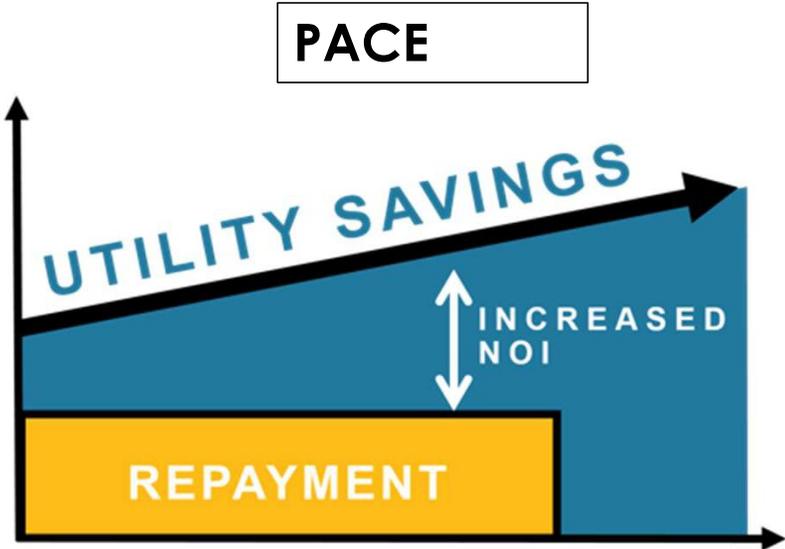
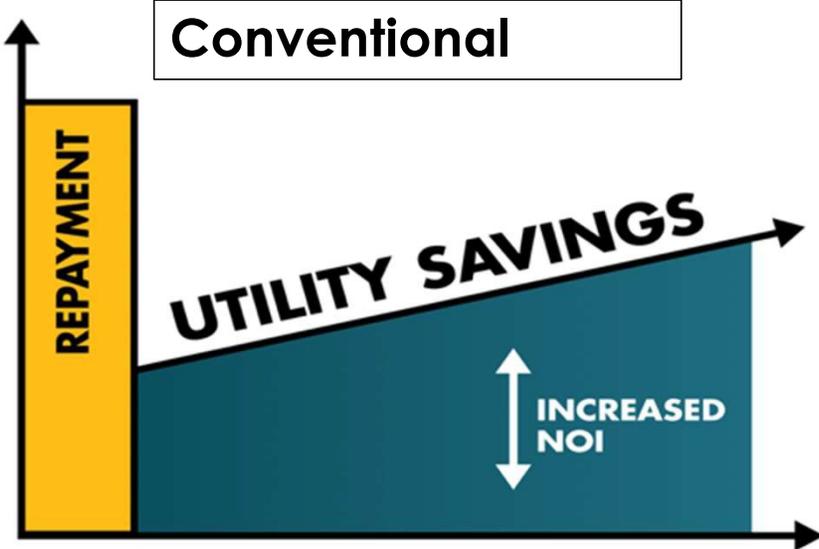


Barfield Building • City of Amarillo

LED lighting • Building Envelope • Water Efficiency • Domestic Hot Water Heating • Assessment: \$6.4 M
HTC: \$9M • Savings: 73% Electric, 79% Natural Gas, 40% Water

WHY TX-PACE?

Lower Utility Costs & Increased Net Operating Income



PACE IN A BOX

“PACE in a Box” is a toolkit of recommendations and templates for counties and municipalities to:



- ▶ **Create uniform, user friendly, scalable, and sustainable PACE programs**
- ▶ **Administered by a nonprofit in a transparent manner, focused on gov't tasks; free market with decision/power in hands of property owner**

PACE in a Box Working Groups

Program Underwriting

- Building Owner Qualifications
- Building Qualifications
- Project Qualifications
- Savings to Investment Ratio

Program Design

- Templates for Municipal Resolution
- Application Process
- Collection Process
- Overview / Flow Chart

Technical Standards

- Energy Saving M&V
- Water Savings M&V
- Third Party Review
- M&V Resources



Funding Platform

- Responsible Loan Making
- Attracting Capital
- Bonding

Education and Training

- Education to Municipalities
- Marketing Campaign to Building Owners, Lenders, and Contractors
- M&V training

HOW TX-PACE WORKS – THE DETAILS

How It Works

A Building Owner:



If the owner, building, and project all meet PACE requirements:



Local Gov't Risk Avoidance

- Financial
 - No tax dollars (user fee)
 - No risk to treasury
 - No risk to public servants – HB 2654
 - Limited impact on public servant workload

- Fiduciary
 - Build strong local stakeholder support
 - Best practices/consumer protection
 - Gov't doesn't compete w/private sector

- Gov't costs covered if foreclosure

Free Market Flexibility

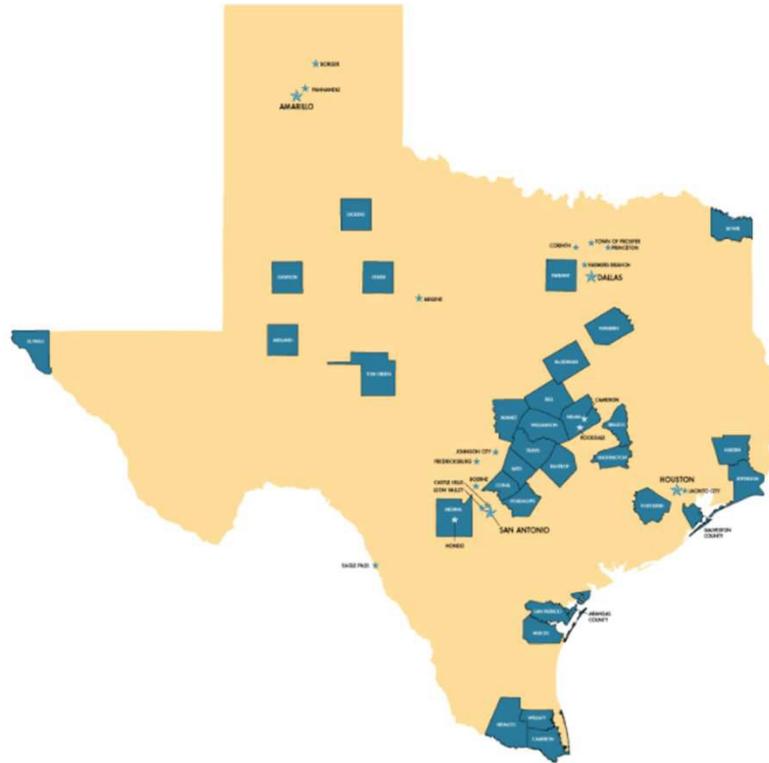
- No mandates, market distortions, or financial incentives that siphon funds away from local government
- Risk stays with property (not transferred to the Gov't or lender)
- Property owner selects lender, contractor and project, negotiates interest rates and other terms
- Private capital (gov't does not need to fund projects through bonds)
- No gov't imposed winners and losers
- Thorough Underwriting and Technical Standards requirements

THE GROWING TX-PACE MARKET

53 TX-PACE Programs

COUNTIES

- | | | |
|---------------------|-------------------|------------------|
| Aransas County | Bastrop County | Bell County |
| Bowie County | Brazos County | Burnet County |
| Cameron County | Comal County | Dickens County |
| El Paso County | Fisher County | Fort Bend County |
| Galveston County | Guadalupe County | Hardin County |
| Hays County | Hidalgo County | Jefferson County |
| Medina County | McLennan County | Midland County |
| Milam County | Navarro County | Nueces County |
| San Patricio County | Tarrant County | Tom Green County |
| Travis County | Washington County | Willacy County |
| Williamson County | | |

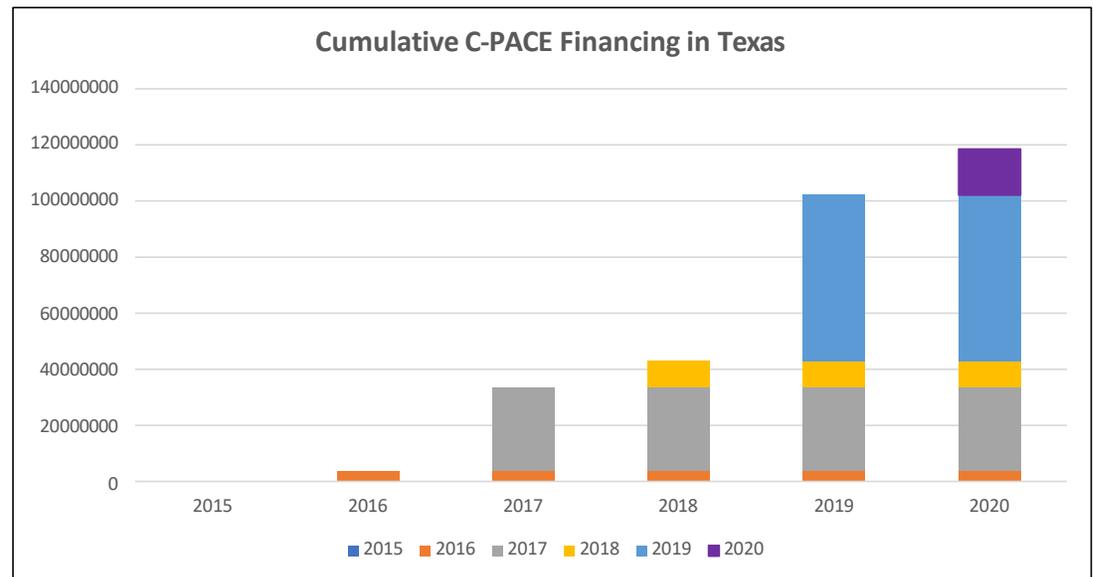
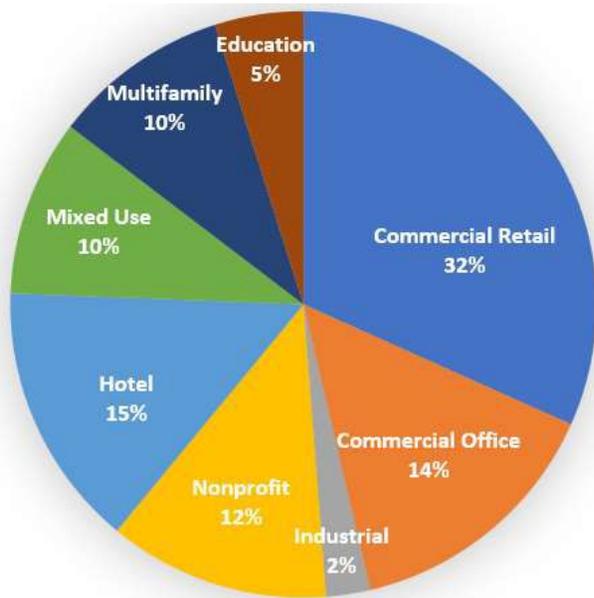


CITIES

- | | | |
|------------------------|------------------------|----------------------|
| City of Abilene | City of Amarillo | City of Boerne |
| City of Borger | City of Cameron | City of Castle Hills |
| City of Corinth | City of Dallas | City of Eagle Pass |
| City of Farmers Branch | City of Fredericksburg | City of Hondo |
| City of Houston | Jacinto City | Johnson City |
| City of Leon Valley | City of Panhandle | City of Princeton |
| Town of Prosper | City of Rockdale | City of San Antonio |

TX-PACE BY THE NUMBERS

➤ \$119 million of investment to date



MEASURE TYPE

Energy Efficiency: 55% / Water Conservation: 33% / Distributed Gen: 12%

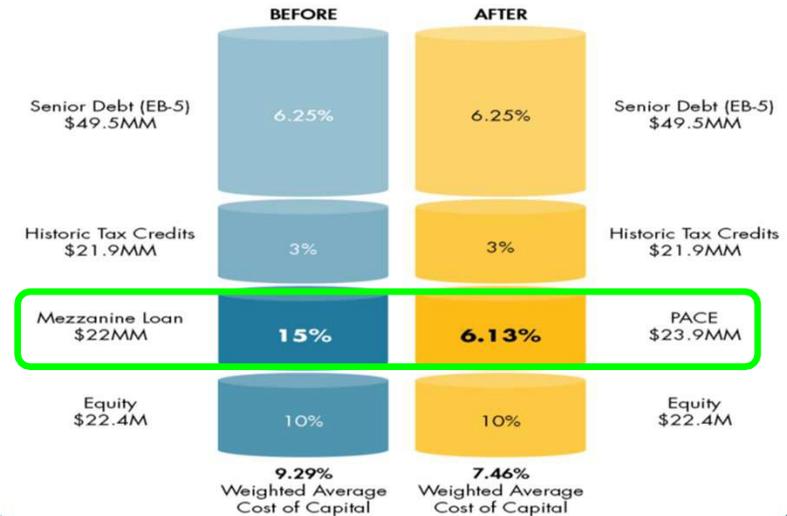
RESIDENTIAL & MIXED USE



Market-based Affordable Housing • Travis County
HVAC • Roof • Interior & Exterior Lighting
Assessment: \$1.6M •



Butler Brothers Building • City of Dallas
HVAC • Lighting • Insulation • Roofing • Glazing •
Plumbing • Irrigation • Envelope
Assessment: \$24M



1225 NORTH LOOP WEST

Houston



FINANCING SCENARIO COMPARISON SUMMARY

	Self-Funded	Conventional Loan	TX-PACE Loan
Out-of-Pocket Investment	(\$1,300,000)	(\$260,000)	\$0
Savings (First Year)	\$200,000	\$200,000	\$200,000
Annual Payment	\$0	(\$282,803)	(\$118,437)
Cash Flow Impact Year 1	(\$1,100,000)	(\$342,803)	\$81,563
Net Project Cash Flow Year 2	(\$900,000)	(\$425,607)	\$163,126
Years to Positive Project Cashflow	6.5	8.4	IMMEDIATE
Debt Service Over Finance Term	0	(1,414,017)	(2,368,742)
10-Year Project NPV	\$172,017	\$20,747	\$600,310
Property Value Increase (20-Year NPV)	\$993,984	\$842,714	\$935,520

Measures:

- HVAC
- BAS
- LED lighting

Utility Incentives:

\$30,000

Assessment Total:

\$1,304,352

Utility Savings:

38% Annually



COMMERCIAL



Continental Gin Building • City of Dallas
Roofing • Glass/Glazing • Mechanical/HVAC • Lighting
Solar • Ext. Walls • Elevators • Utilities • Assessment: \$5M



Softex Headquarters • Travis County
HVAC • Roof • Thermostats • Solar PV
Assessment: \$291,000



Elgin General Store • Bastrop County
Solar PV • Assessment: \$120,000 • USDA REAP Grant
& Oncor Incentives: \$62,000

NON-PROFIT



Family Eldercare • Travis County
Solar PV • Cool Roof
Assessment: \$260,000 • Annual Savings: \$20,000



Congregation Beth Israel • Travis County
Boilers • Chillers • Window Film • BAS Controls
Assessment: \$450,000 • Annual Savings: \$40,000



New Isis Theater • Tarrant County
HVAC • Building Envelope • Water
Assessment: \$2.3 Million • Annual Savings:

**Plaza Hotel • El Paso County
HVAC • Elevator • Lighting • Windows •
Plumbing
Assessment: \$9.2M • HTC: \$9.2M**

HOSPITALITY



**Kimpton Hotel • Tarrant County
HVAC • Lighting • Water Heater
Assessment: \$5.8 M**



R.J. LIEBE COMPANY

Corsicana / Navarro County



Measures:

- HVAC
- LED lighting

Assessment Total:

\$325,000

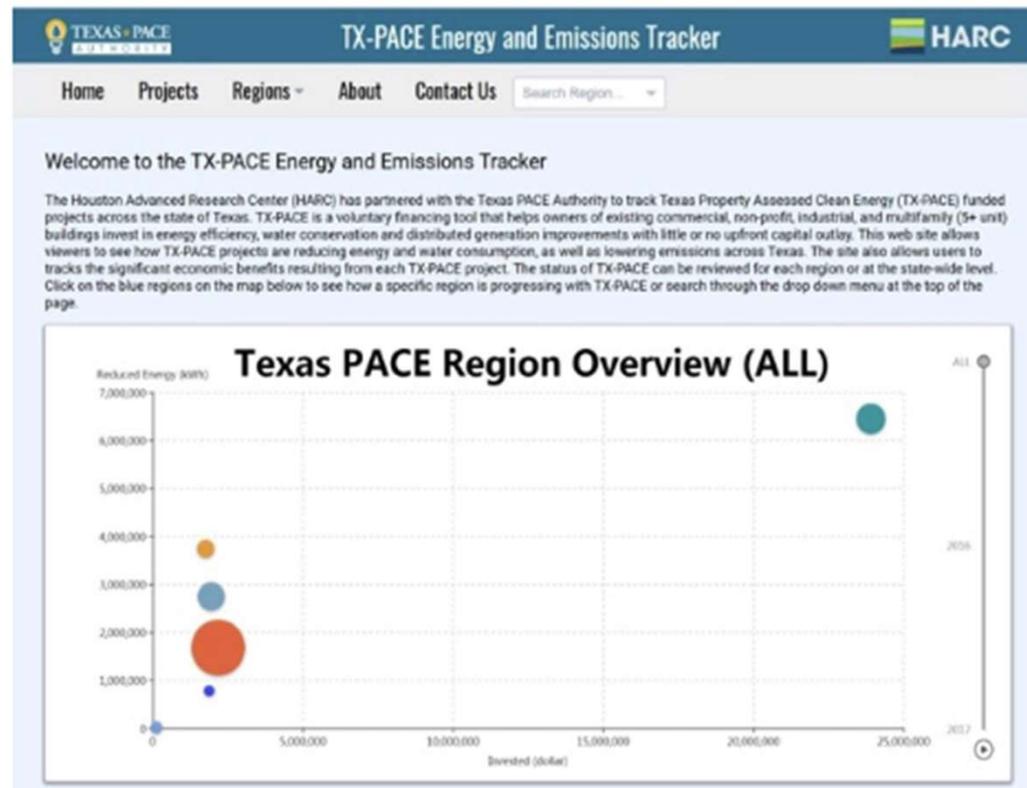
Utility Savings:

30% Annually



- ~75 new, permanent manufacturing jobs

Houston Advanced Research Center's TX-PACE Energy and Emissions Tracker



<http://www.harcresearch.org>



PACE is a WIN-WIN-WIN

- ✓ **Property Owners** – lower utility bills, energy independence, energy efficiency, property value increase
- ✓ **Contractors** – source of increase in business, more local hiring, best practices, keeping up with technology advancements
- ✓ **Lenders** – new loans, steady & stable process, fully collateralized, Tax Assessment lien position, improved asset value
- ✓ **State of Texas** – reduced peak demand, improved grid loading, distributed generation as resilient power source, improved air quality, better water conservation
- ✓ **Communities** – increased economic development and jobs, improved building infrastructure, more appealing building stock

RESOURCES:

- **Texas PACE Authority:**
www.TexasPACEAuthority.org
- **Keeping PACE in Texas:**
www.KeepingPACEinTexas.org
- **Energy and Emissions Tool:**
<https://pace.harcresearch.org>
- **Texas State Energy Conservation Office:**
<https://comptroller.texas.gov/programs/seco/funding/pace.php>
- **PACE Nation:**
www.PACENation.org



Q & A

Submit Questions
www.slido.com event code #DOE

Additional Resources

- [Lessons in Commercial PACE Leadership: The Path from Legislation to Launch](#)
- [Commercial PACE Financing and the Special Assessment Process: Understanding Roles and Managing Risks for Local Governments](#)
- [Commercial PACE Working Group](#)
- [C-PACE Working Group Year in Review \(2018-2019\)](#)
- [Better Buildings Financing Navigator 2.0](#)
- [Toolkit: Commercial PACE Financing for Resiliency](#)

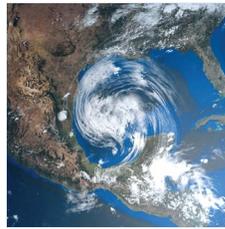
2020-2021 Better Buildings Webinar Series



BUILDING RESILIENT COMMUNITIES: STATE AND LOCAL PERSPECTIVES

Tue, Sep 15, 2020 | 3:00 - 4:00 PM ET

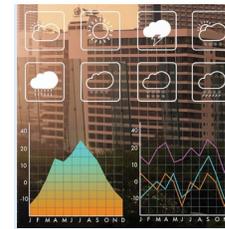
[WATCH RECORDING](#)



PLANNING FOR RESILIENCE IN MULTIFAMILY HOUSING: A PORTFOLIO-WIDE APPROACH

Tue, Nov 17, 2020 | 3:00 - 4:00 PM ET

[REGISTER TODAY >](#)



RISK ASSESSMENTS: EVALUATING BUILDING SITES FOR PORTFOLIO RESILIENCE

Tue, Feb 2, 2021 | 3:00 - 4:00 PM ET

[REGISTER TODAY >](#)



INNOVATIVE ENERGY EFFICIENCY FINANCING IN PUBLIC HOUSING

Tue, Sep 22, 2020 | 3:00 - 4:00 PM ET

[WATCH RECORDING](#)



SCALING IMPACT: MULTI-BUILDING APPROACHES TO ZERO ENERGY

Tue, Dec 1, 2020 | 3:00 - 4:30 PM ET

[REGISTER TODAY >](#)



PERSPECTIVES ON RESILIENCE: INSURANCE AND CREDIT UNDERWRITING

Tue, Feb 9, 2021 | 3:00 - 4:00 PM ET

[REGISTER TODAY >](#)



CPACE FINANCING TURNS 10: IMPACTS, CHALLENGES, AND WHAT COMES NEXT

Tue, Oct 6, 2020 | 3:00 - 4:00 PM ET



BEYOND ENERGY SAVINGS: QUANTIFYING THE ADDITIONAL BENEFITS OF ENERGY EFFICIENCY

Tue, Jan 12, 2021 | 11:00 AM - 12:00 PM ET

[REGISTER TODAY >](#)



SMART TOOLS FOR SMART LABS

Tue, Mar 2, 2021 | 3:00 - 4:00 PM ET

[REGISTER TODAY >](#)



WASTEWATER TREATMENT 2.0: THE NEXT PHASE OF ENERGY EFFICIENCY AND RECOVERY

Tue, Oct 20, 2020 | 3:00 - 4:00 PM ET

[REGISTER TODAY >](#)



DAVID & GOLIATH: FINANCING ENERGY RETROFITS FROM THE TINY TO THE GIANT

Tue, Jan 19, 2021 | 3:00 - 4:00 PM ET

[REGISTER TODAY >](#)



YOU HAVE A DATA CENTER – NOW WHAT?

STORIES FROM THE FIELD

Tue, Apr 6, 2021 | 3:00 - 4:00 PM ET

[REGISTER TODAY >](#)

2020-2021 Better Buildings Webinar Series



WASTEWATER TREATMENT 2.0:

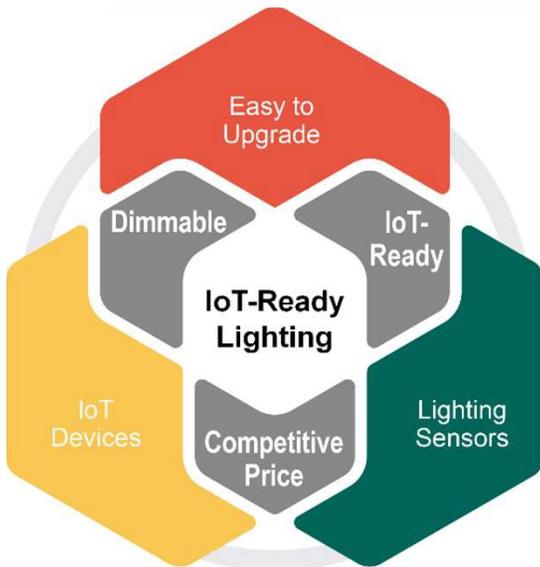
THE NEXT PHASE OF ENERGY EFFICIENCY AND
RECOVERY

Tue, Oct 20, 2020 | 3:00 - 4:00 PM ET

[REGISTER TODAY >](#)

Building off of the Better Buildings Accelerator of the same name, part two of the Sustainable Wastewater Infrastructure of the Future (SWIFt) Initiative brings wastewater facilities together with DOE experts to work towards both short-term and long-term energy savings. Attendees will learn about the types of technical assistance available through SWIFt 2.0, including energy data management, technology integration, and project financing and about the target goals for participants.

Technology Webinar



FUTURE-READY LIGHTING:

IOT-UPGRADEABLE LIGHTING
CHALLENGE

Thu, Oct 8, 2020 | 2:00 - 3:00 PM ET

REGISTER TODAY >

Imagine integrating your lighting system with other smart building aspects such as building management systems or HVAC, asset tracking, space utilization, or possibly COVID-19 contact tracing – there are many high-value opportunities with Internet of Things (IoT) applications. Join us as leading experts from the [IoT-Upgradeable Lighting Challenge](#) share their insights and discuss opportunities for greater energy efficiency and cost savings within IoT-Lighting applications.

ON-DEMAND BETTER BUILDINGS WEBINARS



Through Better Buildings webinars, experts discuss a variety of topics from Air Management to Zero Energy. These webinars are helpful resources on key subject areas in energy efficiency, water efficiency, resilience, and more. Below are webinars we have held over previous years. For each webinar, you can watch the video recording and follow along with the slide deck. To sign up for an upcoming live webinar, [click here](#).

EXPLORE BY TOPIC

[Building Envelope](#) | [Communications & Engagement](#) | [Data Centers](#) | [Energy Data Management](#) | [Financing](#) | [Green Leasing](#) | [Health & Wellness](#) | [Industrial](#) | [K-12 Schools](#) | [Lighting](#) | [Multifamily](#) | [Plug & Process Loads](#) | [Refrigeration](#) | [Renewables Integration](#) | [Resilience](#) | [Smart Labs](#) | [Space Conditioning](#) | [Treasure Hunts](#) | [Waste Reduction](#) | [Water & Wastewater](#) | [Workforce Development](#) | [Working with National Labs](#) | [Zero Energy Buildings](#)

■ Indicates the session was a part of the 2020 Virtual Summit. To view a full list of the Summit Sessions, [click here](#).

BUILDING ENVELOPE

A building's envelope (walls, windows, roof, and foundation) accounts for approximately 30% of the primary energy consumed in residential and commercial buildings. Explore all previously recorded webinars on this topic by pressing MORE.



- [Unsealed: The Building Envelope Campaign](#) (2020) ■
- [Sneak Peek of the Building Envelope Campaign](#) (2020)
- [Addressing the Envelope: Recognizing Building Enclosure Improvements](#) (2020)
- [Innovative Wall Technologies for Commercial Buildings](#) (2019)
- [Energy Savings Impact of Airtightness in U.S. Commercial Buildings](#) (2019)
- [Building Envelope/Enclosure Commissioning and Retro-commissioning](#) (2017)

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- Explore popular topics
- Watch recordings
- Follow along with slides

Additional Questions?

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<https://betterbuildingsolutioncenter.energy.gov/>



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