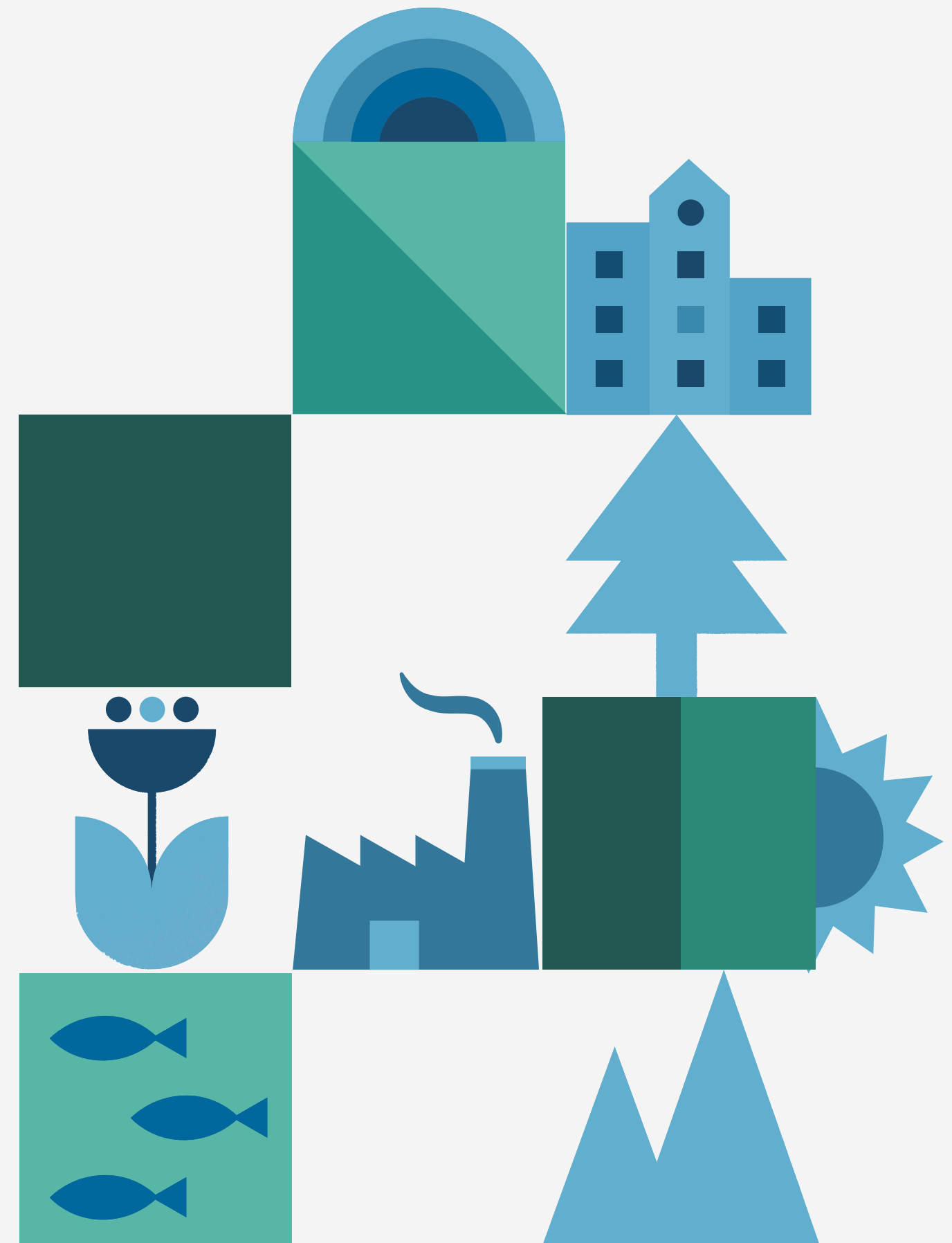




# Deploying Sustainable Energy for LMI Texans

Training for Multifamily Housing Providers



Made possible with generous support from:



# Presenters



**Margo Weisz**

**Executive Director**  
Texas Energy Poverty  
Research Institute (TEPRI)  
*Austin, TX*



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**Research Analyst**  
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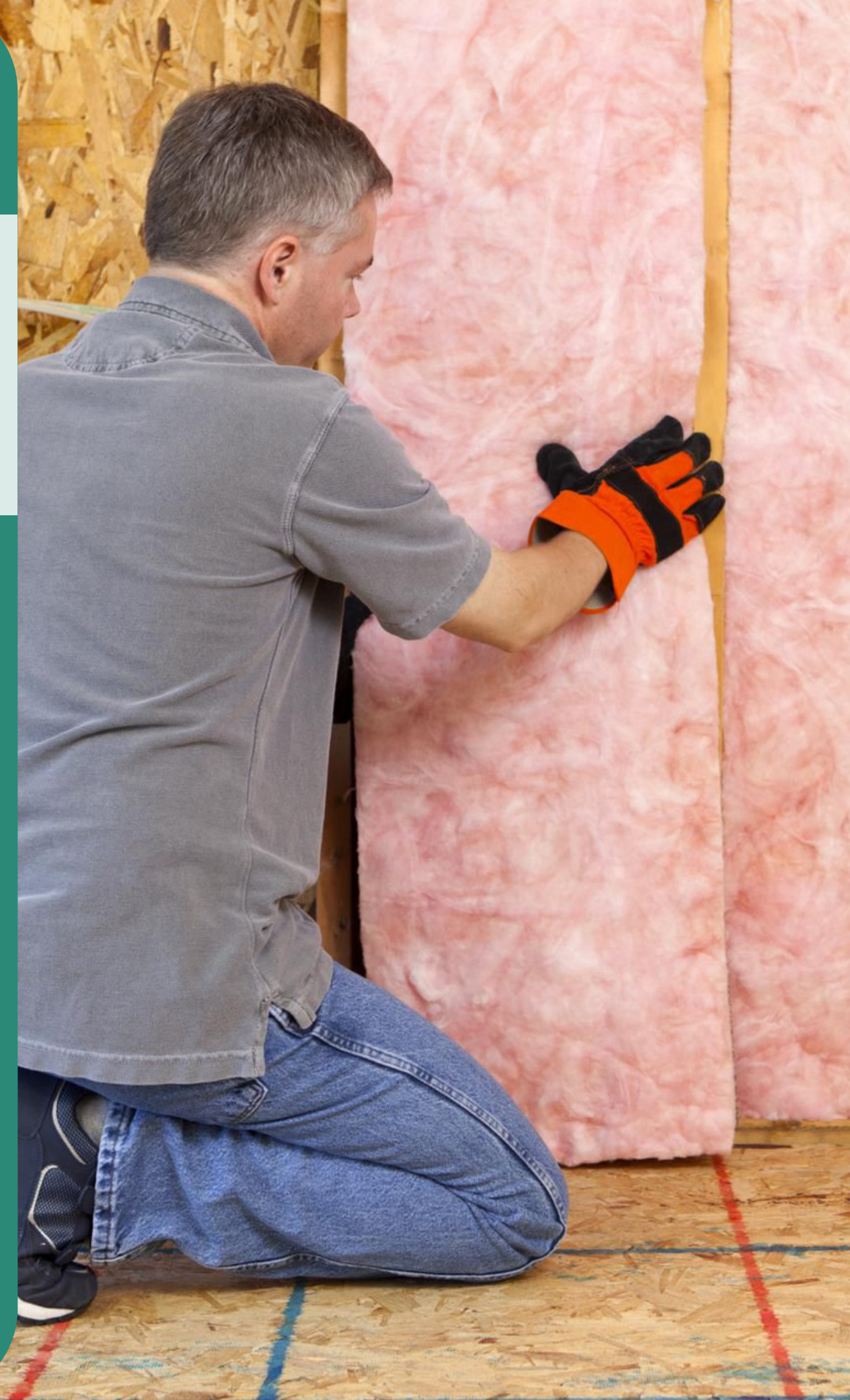


**Katelynn Essig**

**Director of Sustainability**  
Foundation Communities  
*Austin, TX*



*Our mission is to advance affordable, reliable, and sustainable energy solutions for low-income communities in Texas.*



# Presentation objectives

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Plan for energy efficiency and solar installations **in the building phase.**

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Monitor and pay for energy use **in the management phase.**

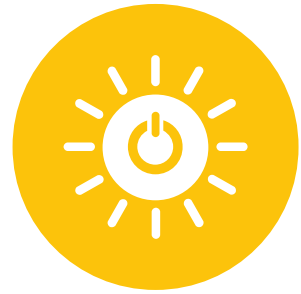
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Invest in energy efficiency retrofits and solar installations **in existing buildings.**

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Explore cutting-edge technologies and trends to **plan for an energy-efficient future.**

# Benefits of Energy Efficiency Measures – Affordable Housing



Reduced utility costs for residents: electricity and water



Insulation and weatherization creates building resiliency; improves efficacy of other measures



Long-run cost savings and higher asset value for housing providers



Reduces carbon footprint, helps meet sustainability objectives



Adds higher-quality building amenities; reduces turnover



May improve funding opportunities for building improvements

# Common Barriers to Energy Efficiency



## Cost

Higher upfront costs for energy efficient equipment and appliances



## Uncertainty

Uncertainty about the benefits and reliability of certain energy efficient technologies



## Split Incentives

Split incentives when the developer or landlord does not have a stake in the home's eventual energy performance



## Awareness

Lack of awareness of financing opportunities



**Building** Phase –  
Funding Energy  
Efficient Affordable  
Homes

# Low Income Housing Tax Credit (LIHTC)

Applications for the very competitive 9% LIHTC funds can be enhanced by undertaking energy efficiency measures to earn Qualified Action Plan (QAP) "points". While QAP points are important to process, TDHCA considers whole application package.





TDHCA uses a point-based scoring system AND an evaluation of the development's:

- ▶ Cost and financial feasibility
- ▶ Geographic location
- ▶ Impact on the concentration of existing housing tax credit developments and other affordable housing developments within specific markets and sub-markets
- ▶ Site conditions and development team experience
- ▶ Consistency with the goal of awarding credits to as many different applicants as possible

## QAP and Sustainability:

- The LIHTC credits are now so competitive that virtually all applications have earned full points, even those who do not focus on the “green” points
- Four major green building standards that will earn the vast majority of the possible green QAP points:
  - Enterprise Green Communities
  - LEED
  - NGBS
  - International Green Construction Code



**Nonetheless, certain localities put major emphasis on green building. There are many opportunities to earn “green points.”**

# Texas Property Assessed Clean Energy (PACE)



TEXAS  PACE  
AUTHORITY

Texas PACE is a mechanism to finance energy efficiency investments through private funding that is secured by a special property assessment in place over the useful life of the proposed energy efficient improvements. Payments are made via an assessment on property tax bills.

**Multi-family housing eligible over 5 units**

**Municipalities  
Counties**



**TEXAS PACE  
AUTHORITY**

501(c)(3)

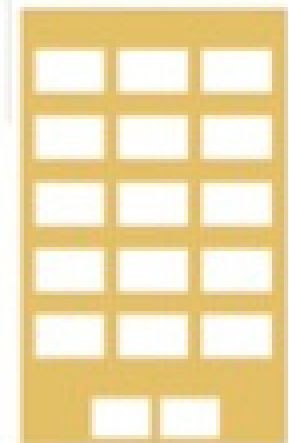
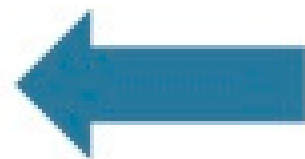


Governmental

Private



**Capital Providers**



**Property Owners**



**Service Providers**

# THE GROWING TEXAS PACE MARKET

72 local PACE programs    60% of Texas population covered



## CITIES THAT HAVE ADOPTED PACE PROGRAMS

- |                |                |             |                  |                |            |
|----------------|----------------|-------------|------------------|----------------|------------|
| Abilene        | Amarillo       | Anna        | Balcones Heights | Boerne         | Borger     |
| Cameron        | Castle Hills   | Celina      | Corinth          | Dallas         | Eagle Pass |
| Farmers Branch | Fredericksburg | Freeport    | Gainesville      | Hondo          | Houston    |
| Jacinto City   | Johnson City   | Laredo      | Leon Valley      | Live Oak       | Lubbock    |
| Mabank         | Panhandle      | Paris       | Poteet           | Princeton      | Prosper    |
| Rockdale       | Rowlett        | San Antonio | Snyder           | Universal City |            |

## COUNTIES THAT HAVE ADOPTED PACE PROGRAMS

- |                  |                  |                   |                     |                   |                |
|------------------|------------------|-------------------|---------------------|-------------------|----------------|
| Aransas County   | Bastrop County   | Bell County       | Bowie County        | Brazos County     | Burnet County  |
| Cameron County   | Comal County     | Dawson County     | Dickens County      | El Paso County    | Erath 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    | Reeves County     | San Patricio County | Smith County      | Tarrant County |
| Tom Green County | Travis County    | Washington County | Willacy County      | Williamson County |                |



## Example: Pearl Point Apartments, Rockport, TX

### Project Financing:

- Lender: Stonehill PACE
- \$4 Million total assessment
- Term: 25 years

### Improvements above code:

- High-efficiency lighting
- Low-flow plumbing
- High efficiency windows, insulation

### Building:

- 3-story multifamily buildings (216 units)
- Built 2019–2020

### Annual impact:

- 926,000 kWh saved/year
- 3.2 million gallons of water saved/year
- 482 tons of avoided CO2 emissions

A row of modern townhouses with brick and siding exteriors. The houses have gabled roofs, some with solar panels. A person is sitting on the porch of one of the houses. The scene is set against a clear blue sky.

# Management Phase – Best Practices

# Important Step: Energy Auditing

1

## OUTSIDE INSPECTION

checking windows,  
walls, building for  
obvious issues

2

## ATTIC INSPECTION

Evaluate state of  
insulation and if  
leaks are present

3

## MAJOR APPLIANCE CHECK

Inspect age,  
functionality,  
EnergyStar rating,  
etc.

4

## BLOWER DOOR TEST

Depressurizes  
building to detect  
leaks.

5

## LIGHTING CHECK

Inspect lighting to  
determine if LEDs  
are in use

6

## EXPLORE FUNDING

Local governments  
and organizations  
may provide  
funding to perform  
energy audits



# Operational Best Practices

1

**Assess current practices**  
(owner + property manager)

2

**Develop strategic goals**  
(owner + property manager)

3

**Secure organizational  
commitment** (owner)

4

**Develop a portfolio-wide  
strategy**  
(owner + property manager )

5

**Pursue and Track Green and  
Healthy Practices**  
(owner + property manager)



**Energy Efficient  
Retrofits –  
Opportunities for  
Success**

# High Potential Energy-Efficient Technologies

1



## Replacing HVAC systems with efficient heat pumps

Potential to reduce energy use by up to 60%

- Higher upfront costs
- Payback period depends on location

2



## Attic/building insulation and sealing

Major energy efficiency investments will not be successful without weatherization and insulation

- Estimated 50% of Texans need better insulation

3



## Smart thermostats

Simplifies control of HVAC system and allows management when not at home. Programs to help reduce peak demand use.

- Potential for demand management at multifamily housing units

4



## Heat pump water heaters

Water heating is typically 2nd largest source of energy use.

- Current incentives in many locations in TX
- Up to 60% energy savings potential depending on location and current equipment

# High Potential Energy-Efficient Technologies

5



## EnergyStar Appliances

Can provide significant cost savings over life of product. Key appliances include:

- Induction stoves
- Washer/Dryer
- Dishwasher
- Refrigerator

6



## Efficient Windows

Provides greater insulation, reducing energy use.

- Potential energy savings of up to 12%
- Estimated payback period varies depending on location

7



## Solar

Cost of solar down significantly across US, still need for further price reduction to compete in areas with retail electric choice.

- Must be combined with weatherization
- Site-dependent

# Energy Savings and Payback Periods - Other



Technology	% Energy Savings Compared to Conventional Product	Payback Period
LED Lighting	80%	Less than one year
Ceiling Fan with Lighting	up to 60%	Less than two years
Furnaces	15%	Cost-effective over lifetime of equipment
Room air conditioners	10%	~ Five years

# Additional Financial Tools

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## Energy Savings Performance Contracts (ESPCs)

An energy service company (ESCO) coordinates installation and maintenance of efficiency improvements in a building (or bundle of buildings) and is paid from the associated energy savings.

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## Federal home loans

Targeted grants and interest rate subsidies to developers through district banks. Can be used to pay for reconstruction or rehabilitation costs. Encourage energy-efficient housing design.

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## On-bill financing

Helps building owners overcome high[er] upfront capital costs of making energy efficiency upgrades. Capital is raised through bond issues, public funds, utilities, or other private funds – not credit lines to residents.

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## HUD Program Grants

Such as mortgage incentives (energy-efficient mortgages, etc.) Depends on unique housing needs.

# Developing Sustainable Living at Foundation Communities

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HOUSING



EDUCATION



FINANCIAL STABILITY



HEALTH



# Who we are

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- A 30 year old affordable housing nonprofit
- 26 properties = 23 in Austin and 3 in North Texas
- Housing + Services model
  - Education, financial stability, and health
- Single adult and multifamily properties
- Two prosper centers = college, financial, and healthcare support





# Sustainability Outlook

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We're forever owners of our communities and will never sell.

We want to be good stewards of our natural resources and materials.

We want healthy indoor air quality.

We appreciate the positive impact to our bottom line.

*We just believe developing sustainably is the right thing to do...*



# Sustainability Goals

1. Build Green for efficiency and resilience
2. \*Decrease energy and water consumption by 2% each year from 2013 baseline
3. Own and operate 1.5 MW of solar by 2022
4. Engage with **every** resident and staff, once a year



# Sustainable Design – New Construction

## 1. Site Selection and Feasibility

- Connectivity

## 2. Design

- Integrated Team Approach
- Certifications

## 3. Construction

- Commissioning



# How do we afford green building certs?

---

1. Less high-end amenities (like fitness centers, pools, fire pits, etc.)
2. More space for resident services
  - Offices for case managers
  - Learning Centers, food pantries, financial coaching, etc.
3. It is built into our model
4. We get \$\$\$



# How green building makes an impact in AFH

- Participate in the Qualified Allocation Plan (QAP) criteria creation process (tax credit scoring)
- Utility Allowances

Only 30% of income can go towards rent & utilities



Green building reduces utilities



Increase rent, decrease utilities



More money in our pocket, less in utilities



# Case Study – The Jordan at Mueller

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## Key Facts

- Located at the corner of Tilley and Philomena in the Mueller re-development
- 132 units of 1-, 2-, and 3-bedroom units
- Targeting Austin Energy Green Building 4-star and LEED Gold certification
- Expect to see a 31.4% reduction in energy from baseline and 42.5% reduction in water consumption from baseline
- Rents ranging from \$480 to \$1,340 per month, compared to average rents in Mueller of \$1,182 to \$2,228 per month





# Sustainable Design – Existing Properties

1. Staff and resident
2. Prioritize and have set standards for O&M
3. Compliance
4. Prioritize larger retrofits ahead of time
5. Take advantage of Austin Energy incentive program





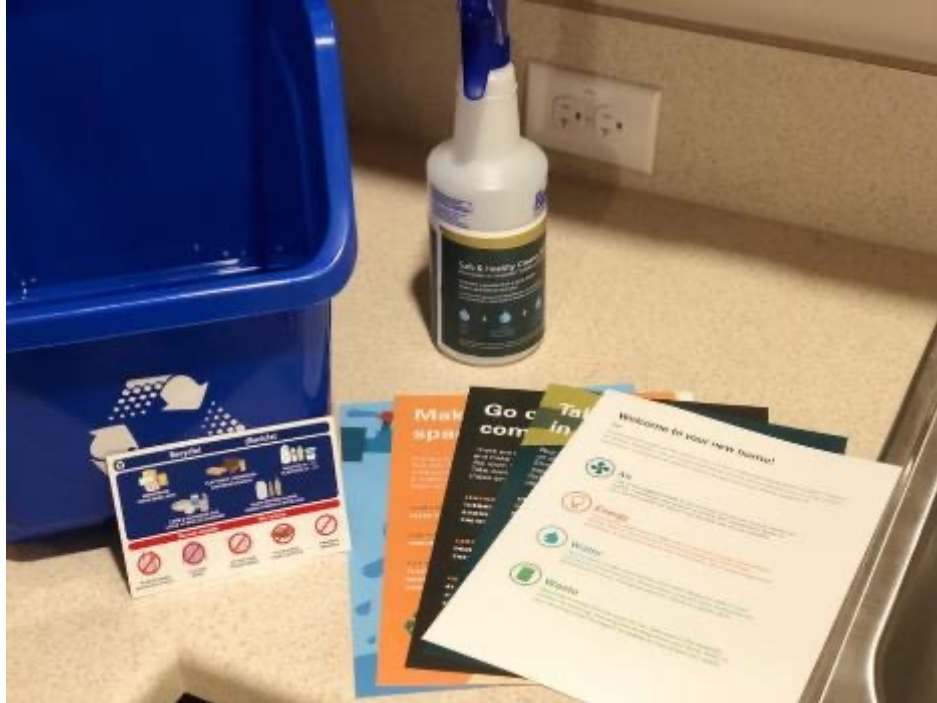
# Staff Education

1. National Affordable Housing Management Association Certified Green Property Manager training
  - 16 hour training for any new property manager and maintenance lead
  - ~60 full time staff 4-hours of retraining each year
2. Teach the basics
  - Utility bill reading 101
  - Energy and water
  - Calculate energy use index and water index
  - Payback exercise
3. Training on utility benchmarking platform
4. Home Depot scavenger hunt



# Set standards for O&M

1. Sustainability Chapter in operations and maintenance manual
  - EnergyStar appliances
  - LED lighting
  - low flow toilets
  - faucet aerators and low-flow showerheads
  - solar shading
  - Formaldehyde free cabinets
  - Replace carpet with tile



# Ensuring Compliance

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1. Yearly green property walks
2. Utility benchmarking
3. Continuing education



# Green Property Walk Self-Inspection Checklist -- Common Areas

Fill out one sheet for each common area



Property \_\_\_\_\_ Common Area \_\_\_\_\_ Date \_\_\_\_\_

Item	Yes	No	N/A	?	Corrective Action & Location / Notes
1 Thermostat(s) appropriately set (Winter: 67-72; Summer: 75-80); setback when unoccupied (Winter: 55; Summer: 85)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2 HVAC in good condition: clean pleated filter, staff are comfortable, clean evaporator coils, no obvious issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 Proper air sealing: weatherstripped doors, caulked windows, sealed plumbing/electrical penetrations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Ceiling fans working properly and used appropriately (off when space is unoccupied)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5 Energy efficient lighting throughout (T8, CFL & LED)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6 No unnecessary plug loads (large/old televisions, personal fridges, unused computers, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7 Aerators meet FC standards (bathroom sink: 0.5 gpm, kitchen sink: 1.5 gpm) and properly installed/functioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8 Toilet free of leaks, flapper in good condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9 No air fresheners used except FC-approved Aura Cacia essential oil products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10 Only FC-approved Green Seal cleaning products used to clean space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11 Blue recycling bin next to every landfill bin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12 Recycling signage in at least 1 location in the space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



# Utility Benchmarking

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- 8 to 10 years worth of consumption data
- resident consumption added once a year
- resident's a part of our reduction goals
- Report out to our board, DOE Better Buildings Challenge



# Arbor Terrace

Built: 2002  
 Rehab: 2012  
 AEGB Rating 4; EGC Certified  
 Electric and gas master meter  
 Unit AC/Heat: PTACs  
 Hot water – 4 gas boilers  
 Unit AC/Heat: PTACs  
 Solar: 87KW



# Capital Studios

Built 2015  
 AEGB 4; LEED Platinum  
 AC/Heat: VRF system  
 Hot Water: 6x80 gallon electric  
 heat pumps on garage level



**Arbor Terrace**  
 2501 South IH 35, Austin, TX, 78741

Owner Energy Whole Building **A** 41 kBtu/ft<sup>2</sup>/yr Full Year 2019 - Owner Jan 2019 - Dec 2019

Water **A** 47.8 gal/bdrm/day 0 mmBTU

Electric	Gas	Water	Total Energy
565,020 kWh	3,738 Therms	2,093 kGal	2,302 mmBTU

**Capital Studios**  
 809 E. 11th St., Austin, TX, 78701

Owner Energy Whole Building **B** 47 kBtu/ft<sup>2</sup>/yr Most Recent Year - Owner Jan 2019 - Jan 2020

Water **A** 36.8 gal/bdrm/day 0 mmBTU

Electric	Water	Total Energy
1,082,954 kWh	1,813 kGal	3,695 mmBTU

**Arbor Terrace**  
 2501 South IH 35, Austin, TX, 78741

Total Energy	Full Year 2013 - Owner	Full Year 2019 - Owner	Difference	Units
Energy	1,952 <b>A</b>	2,302 <b>A</b>	↑ 18% 350	mmBTU
Water Usage	1,995 <b>A</b>	2,093 <b>A</b>	↑ 5% 98.0	kGal

**Capital Studios**  
 809 E. 11th St., Austin, TX, 78701

Total Energy	Full Year 2016 - Owner	Full Year 2019 - Owner	Difference	Units
Energy	3,704 <b>B</b>	4,055 <b>C</b>	↑ 9% 351	mmBTU
Water Usage	1,754 <b>A</b>	1,812 <b>A</b>	↑ 3% 58.0	kGal

# Prioritize larger retrofits

Skyline Terrace: installed low-flow toilets and showerheads + faucet aerators in bathroom and kitchen sink

	2013	2020		
 Water Index	110.7 <b>D</b>	44.2 <b>A</b>	 -60%	-66.5 gal/bdrm/day

Spring Terrace: installed low-flow toilets and showerheads + faucet aerators in bathroom and kitchen sink

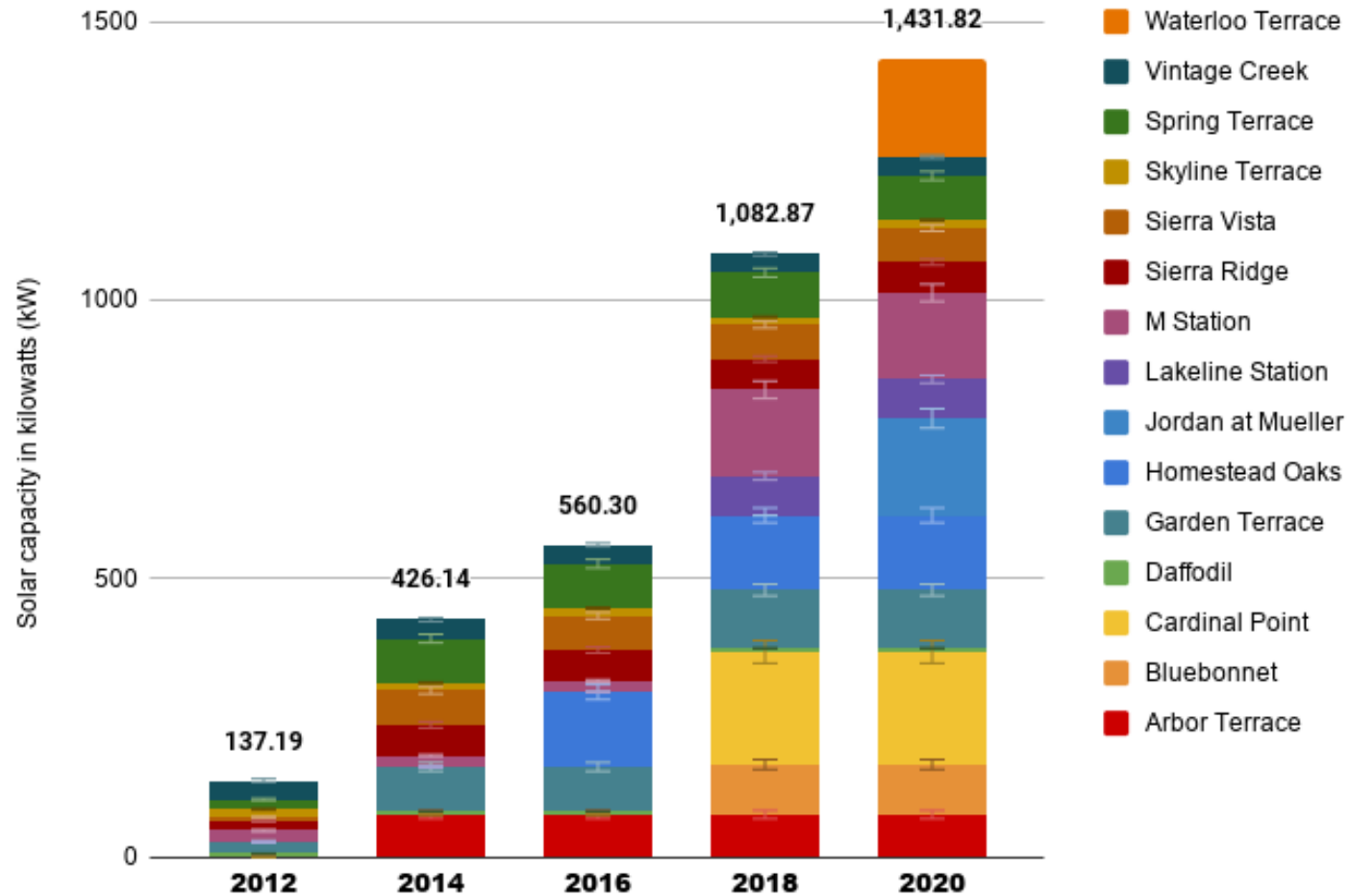
	2013	2020		
 Water Index	148.1 <b>D(!)</b>	45.2 <b>A</b>	 -69%	-103 gal/bdrm/day

Garden Terrace: installed low-flow toilets + replace shower valves + faucet aerators + boiler replacement

	2013	2020		
 Water Index	69.4 <b>B</b>	40.6 <b>A</b>	 -42%	-28.8 gal/bdrm/day



## Foundation Communities Solar Capacity





# Resident benefits

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83%

Say they live a more  
'green' lifestyle after  
living with FC



A photograph of a modern, single-story house with a dark grey solar panel roof. The house has white horizontal siding and large windows. In the foreground, a woman in a black top and yellow skirt is watering plants in a greenhouse. A young boy in a dark shirt and red shorts is walking up the steps of the greenhouse. In the background, a man and two children are sitting at a wooden picnic table on a deck. The scene is set during the day with soft lighting.

# The **Future** of Energy Efficiency

# Energy-Efficient Technologies on the Horizon

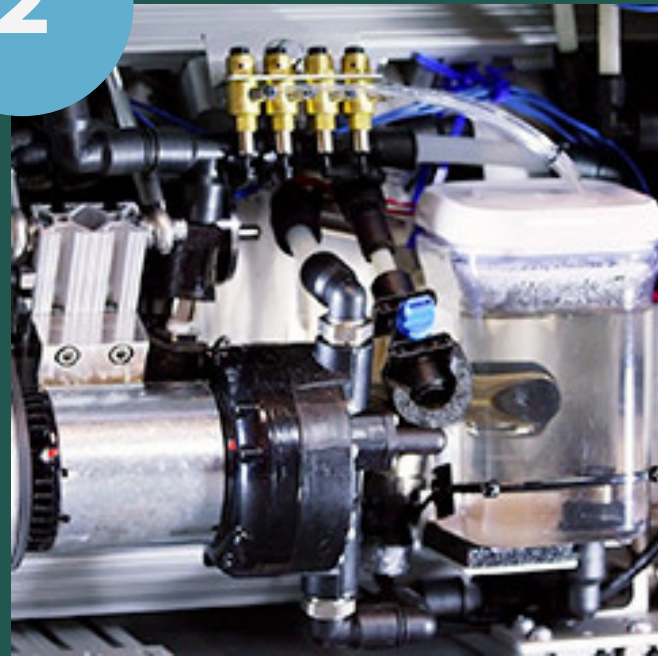
1



## Solar shingles/ perovskite solar

May help to reduce installation costs if combined with traditional roofing repair + maintenance. Perovskite technology may also help to provide a cheaper, more effective solar panel material compared to silicon

2



## Magnetized refrigerators

Current refrigerator technology has achieved energy savings of nearly 60% compared to twenty years ago. Refrigerators powered by the magnetocaloric effect could have the potential to reduce energy use by another 25%.

3



## Even more efficient home appliances

Cutting edge technologies being developed for:

- heat pumps
- dishwashers
- washer/dryers
- stoves

4



## Self-shading windows

Smart functionality would make it easier for people to manage home temperature that is affected by sunlight.