Better Buildings®
U.S. DEPARTMENT OF ENERGY

# 2019 Better Buildings Summit

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

U.S. DEPARTMENT OF ENERGY

# Multifamily Meet-Up

Part 1

# Multifamily Meet-Up Agenda

- Part 1
  - Welcome!
  - Update from HUD's Office of Multifamily Housing Programs
  - The Year Behind and 2019 Data Drive Results
  - Multifamily Sector Partner Recognition and Awards
  - Goal Achiever Showcase: Cambridge Housing Authority
  - Goal Achiever Showcase: Tenderloin Neighborhood Development Corporation

# Multifamily Meet-Up Agenda

- Part 2
  - Multifamily Housing Resilience Panel:
    - The DC Multifamily Resilience and Solar Assessment Tool (Enterprise Community Partners)
    - Opportunities for Combined Heat and Power (CHP) in the Multifamily Sector (U.S. Environmental Protection Agency)
    - Stormwater Management Pilot in Queens, New York (NYCHA)
    - Q&A: Small group discussion
  - Closing Announcements: Better Buildings Healthy Housing Accelerator

# Ask an Expert Lounge

## Wednesday 3:00-3:30pm

- **Building Data Analytics *(Eliot Crowe, LBNL)***
- Data Centers *(Dale Sartor, LBNL)*
- **Energy Data *(Hanaa Rohman, ICF)***
- **Residential Data Tools *(Maddy Salzman, DOE)***
- Smart Labs *(Rachel Romero & Otto VanGeet, NREL)*
- **Zero Energy *(Shanti Pless, NREL)***

## Thursday 10:30-11:00am

- 50001 Ready/ISO 50001 *(Peter Therkelsen, LBNL)*
- Energy Assessment: Approaches, Equipment, and Software *(Thomas Wenning, ORNL)*
- Smart Labs *(Monica Witt, LANL)*
- **Utility Incentive Programs *(Miles Hayes, NREL)***

## Thursday 3:30-4:00pm

- City/Utility-Scale Modeling *(Eric Wilson, NREL)*
- Energy Assessment: Approaches, Equipment, and Software *(Thomas Wenning, ORNL)*
- **Energy Data *(Hanaa Rohman, ICF)***
- Industrial Processes Heating and Waste Heat Recovery *(Sachin Nimbalker, ORNL)*
- Lighting *(Michael Meyer, PNNL)*
- **Zero Energy *(Paul Torcellini, NREL)***

# Don’t Miss Wednesday’s Multifamily Events

- 12:30-1:30pm *Lunch*
- 1:30-3:00pm Getting Your Money's Worth: Making Sure Retrofits Reach Expected Savings
- 3:30-5:00pm Healthy Housing: Quantifying the Non-Energy Benefits of Energy Efficiency Upgrades
- 6:00-7:00pm *Summit Reception*
- 7:15pm Multifamily Sector Dinner at Federico Ristorante Italiano (see sign-up sheet)

# Thursday's Multifamily Events

- 9:00-10:30am — Resilience Applications for Low-income Communities
- 11:00am-12:30pm — New Tools for Your Multifamily Retrofit Toolbox
- 12:30-2:00pm — *Lunch Plenary & Goal Achiever Recognition - Hearing from the Experts: Emerging Technologies & Things to Watch*
- 2:00-3:30pm — Getting to 100%: Overcoming Barriers to Tenant Data Collection

# Update from HUD's Office of Multifamily Housing Programs

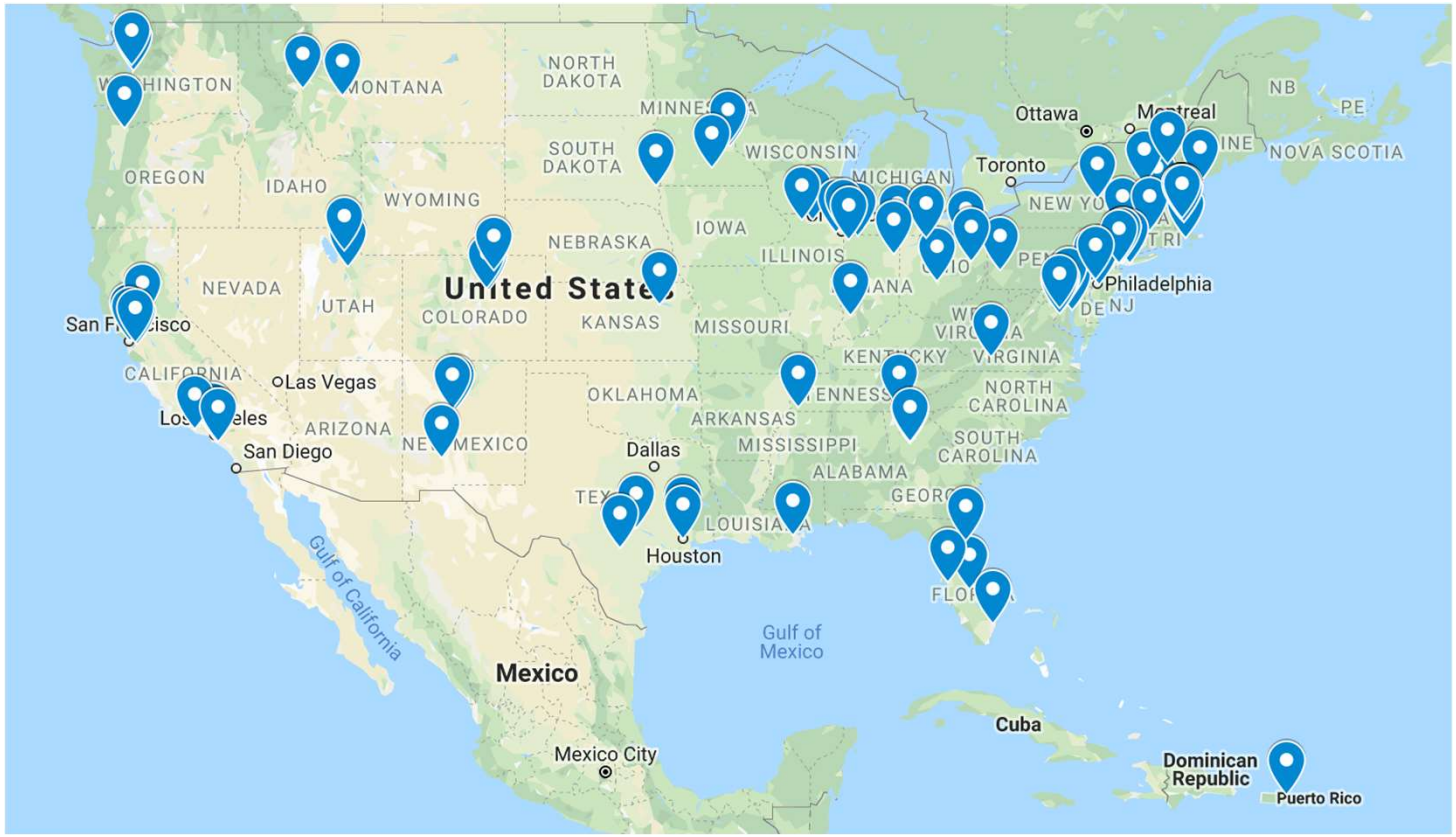
By: Robert Iber, Senior Advisor

# The Year Behind and 2019 Data Drive Results: Multifamily Sector Update

By: Josh Geyer, HUD

# Multifamily Sector Partners

## 105 Multifamily Partners



# Multifamily Sector Partners

# Highlighted Partners

## 8 Nationwide Partners

Mercy Housing
Jonathan Rose Companies
National Church Residences
Retirement Housing Foundation
The EL Good Samaritan Society
Volunteers of America
WinnCompanies
Wishrock Investment Group

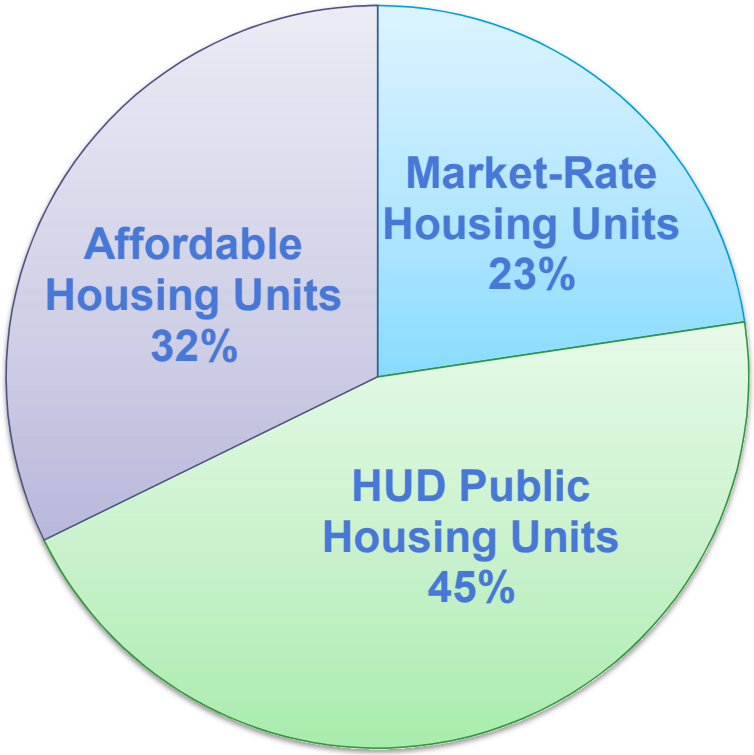
## 8 of the Top 10 PHAs

New York City
Puerto Rico
Newark
Cuyahoga
Washington DC
Philadelphia
Baltimore
Boston

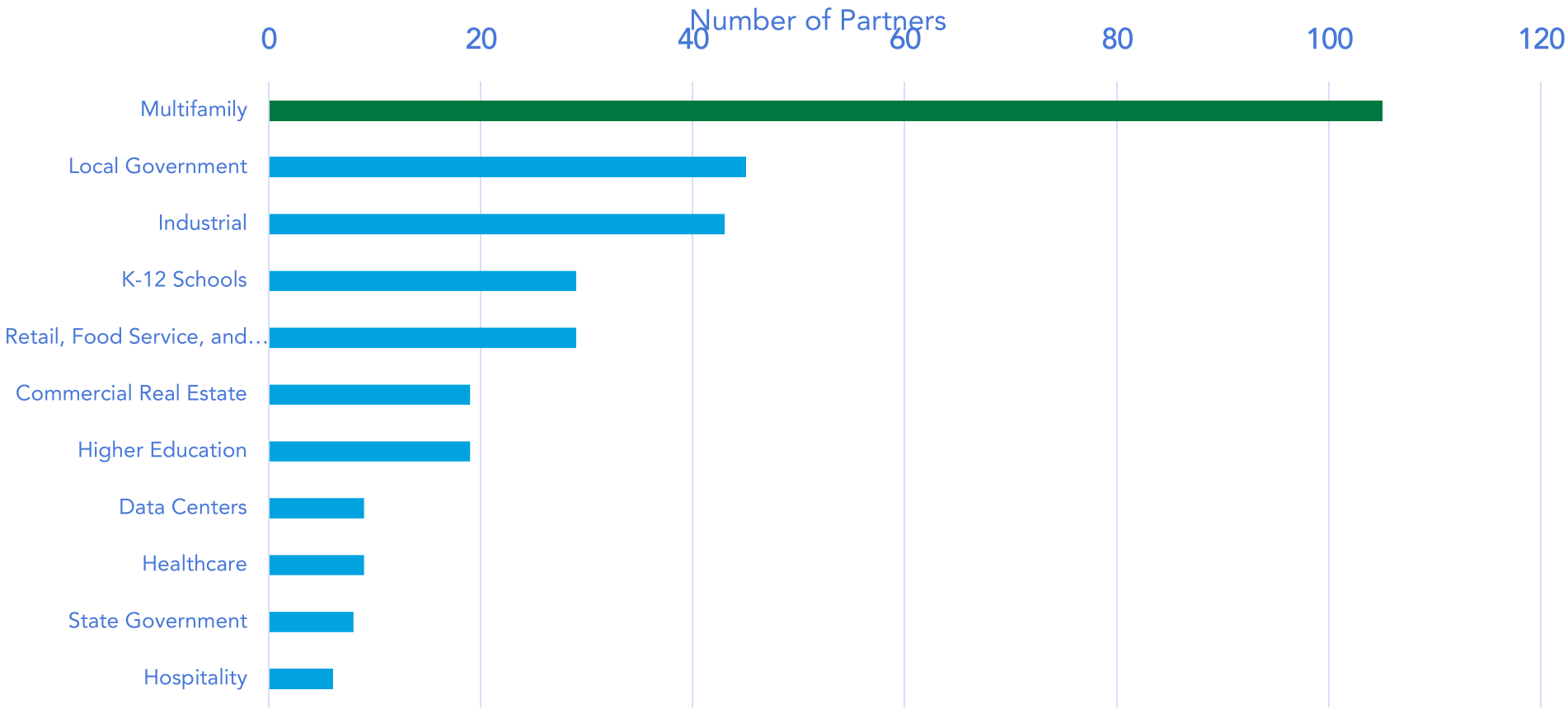
## All 13 Stewards of Affordable Housing (SAHF) Partners

Bridge Housing
CommonBond Communities
Community Housing Partners
Homes for America
Mercy Housing
National Church Residences
National Housing Trust
Preservation of Affordable Housing
Retirement Housing Foundation
The Community Builders
The EL Good Samaritan Society
The NHP Foundation
Volunteers of America

# BBC Housing Units by Subsector



# BBC Partners by Sector



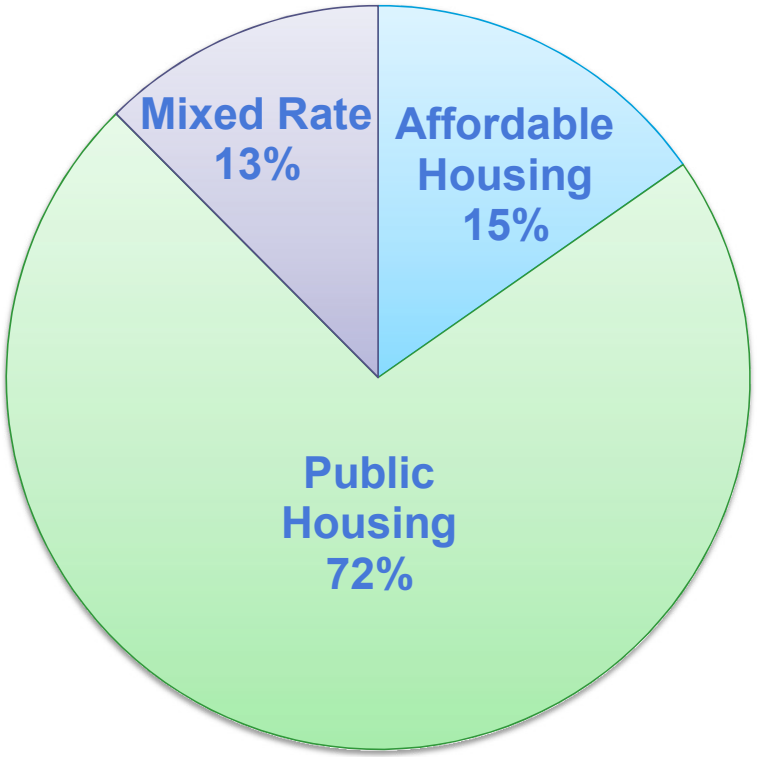
# Multifamily Sector Partner Statistics

- **750,000** Housing Units
- **620 Million** Square Feet
- **10 Trillion+** BTUs Saved
- **$144 Million** Cumulative Cost Savings

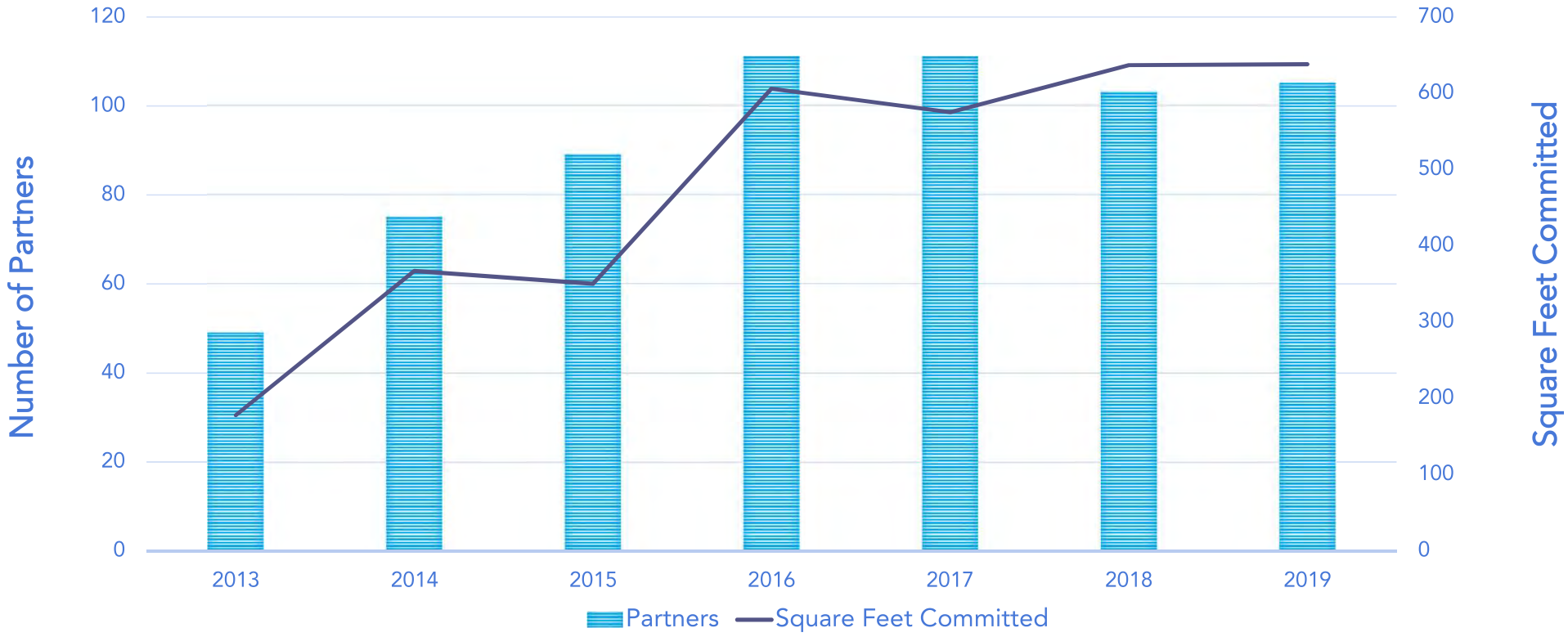
# Multifamily Sector Cumulative Cost Savings

**$144 million Reported Cost Savings since 2013**

72 partners reporting in 2018 showed $143.8 million cost savings



# BBC Multifamily Sector Growth by Year



# 2019 Data Drive Update

## Goal Achievers

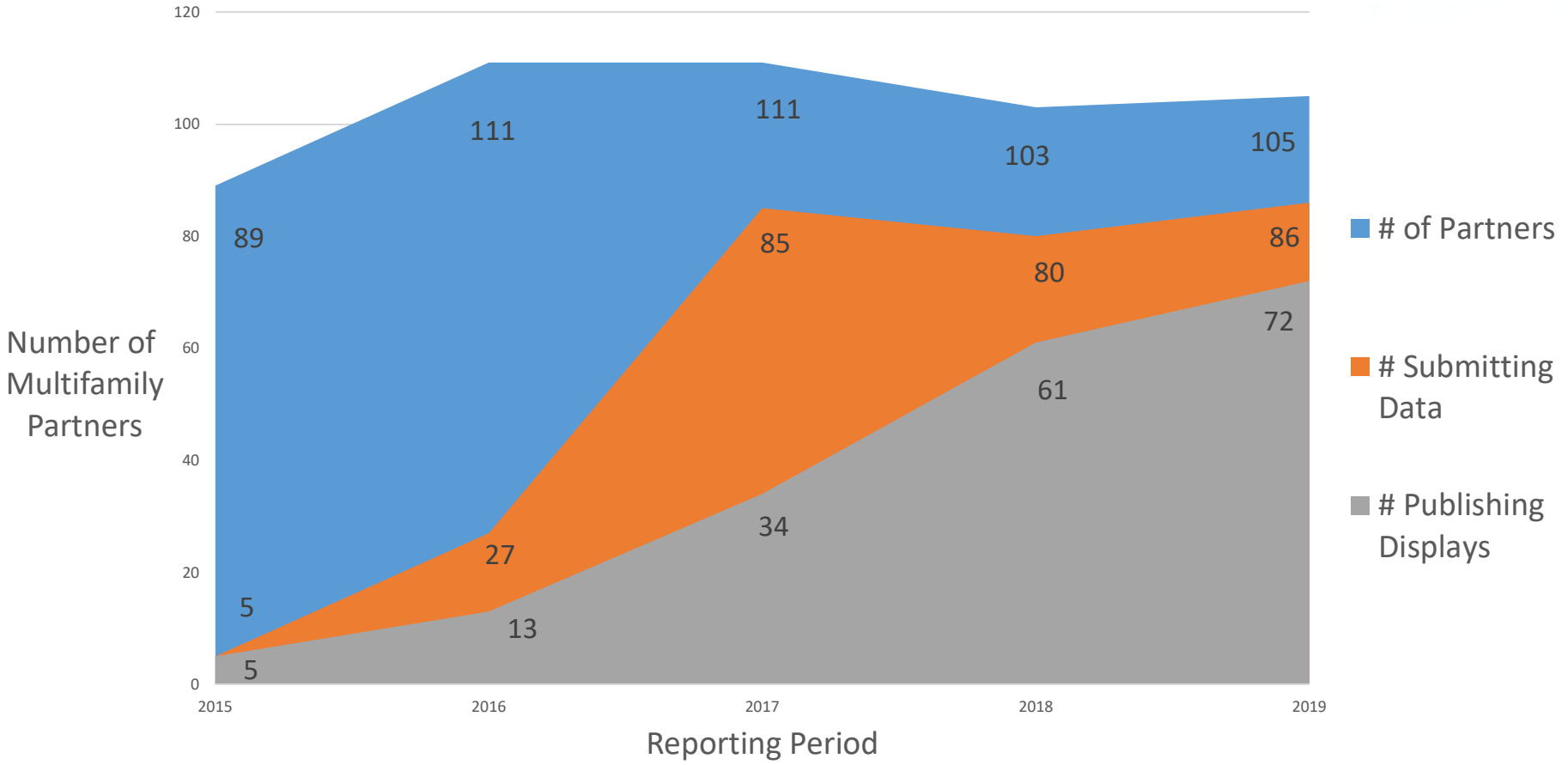
**(≥ 95% Whole Building data & > 20% energy savings, Implementation Model, and Showcase)**

- **Cambridge, MA Housing Authority** – 23% energy (2019)
- **Keene Housing** – 29% water (2019)
- **Tenderloin Neighborhood Development Corporation** – 21% energy and 21% water (2019)
- Jersey City Housing Authority – 26% energy (2018)
- 2LifeCommunities – 24% energy (2017)

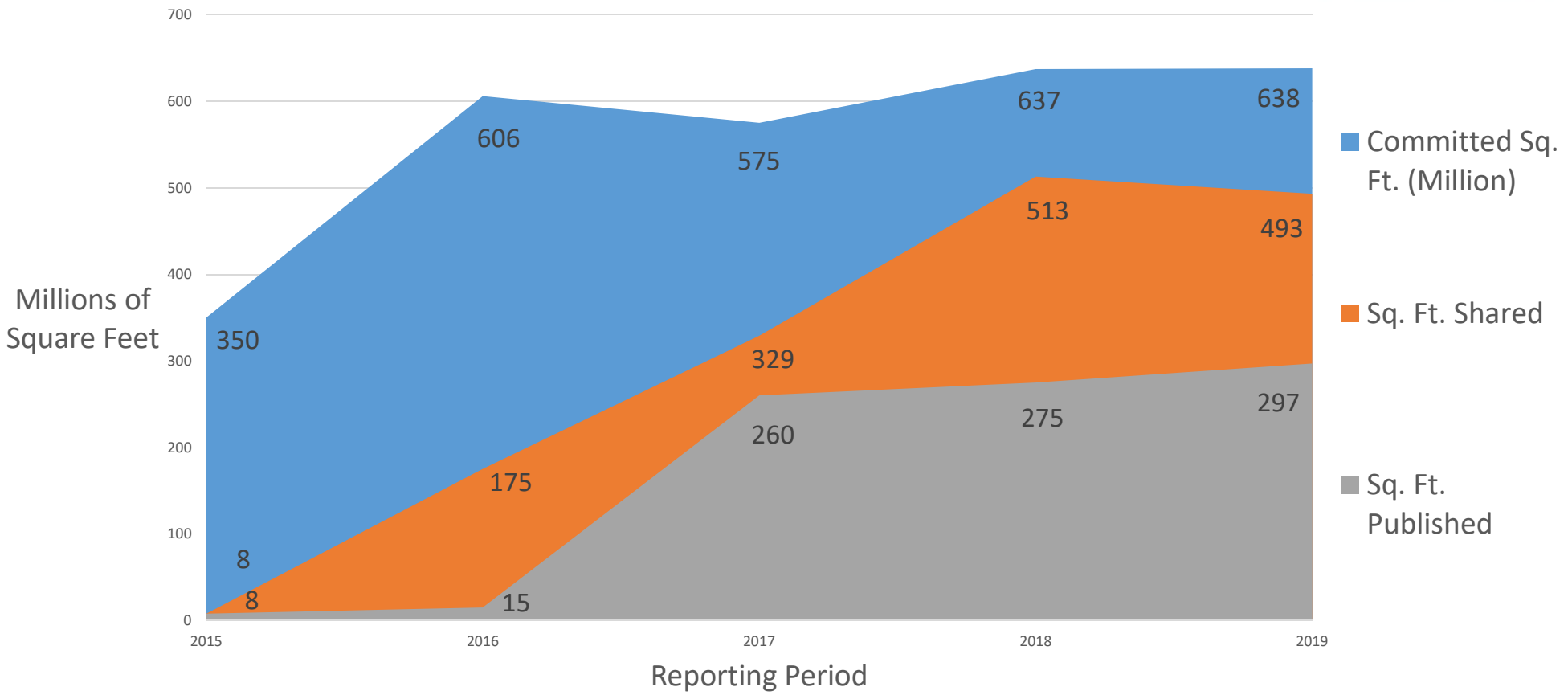
## Near Goal Achievers

- Caritas Communities, Inc. – 15% energy
- Trinity Housing Corporation of Greeley, Colorado – 15% energy
- San Buenaventura, CA, Housing Authority – 13% energy
- Denver Housing Authority, CO – 12% energy
- Foundation Communities – 12% energy

# 2019 Partner Reporting Progress



# Square Footage Reporting Progress (millions of sq. ft.)



# Multifamily Sector – Case Studies

**65** Showcase Projects have been published by current partners to date


2019 Codman Square Neighborhood Development Corporation Showcase Project

**24** Implementation Models have been published by current partners to date

The portion of current partners that have already written at least 1 case study is **56%**

# Better Buildings Showcase Project

## 205 JONES STREET APARTMENTS

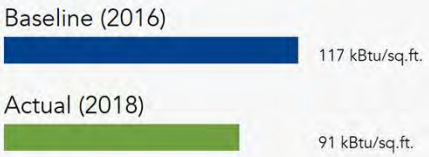
**SECTOR TYPE**
Multifamily

**LOCATION**
San Francisco, California

**PROJECT SIZE**
29,000 Square Feet

mercy HOUSING

**ANNUAL ENERGY USE**
(Source EUI)




**ENERGY SAVINGS:**
22%

**ANNUAL ENERGY COST**


**COST SAVINGS:**
$6,000



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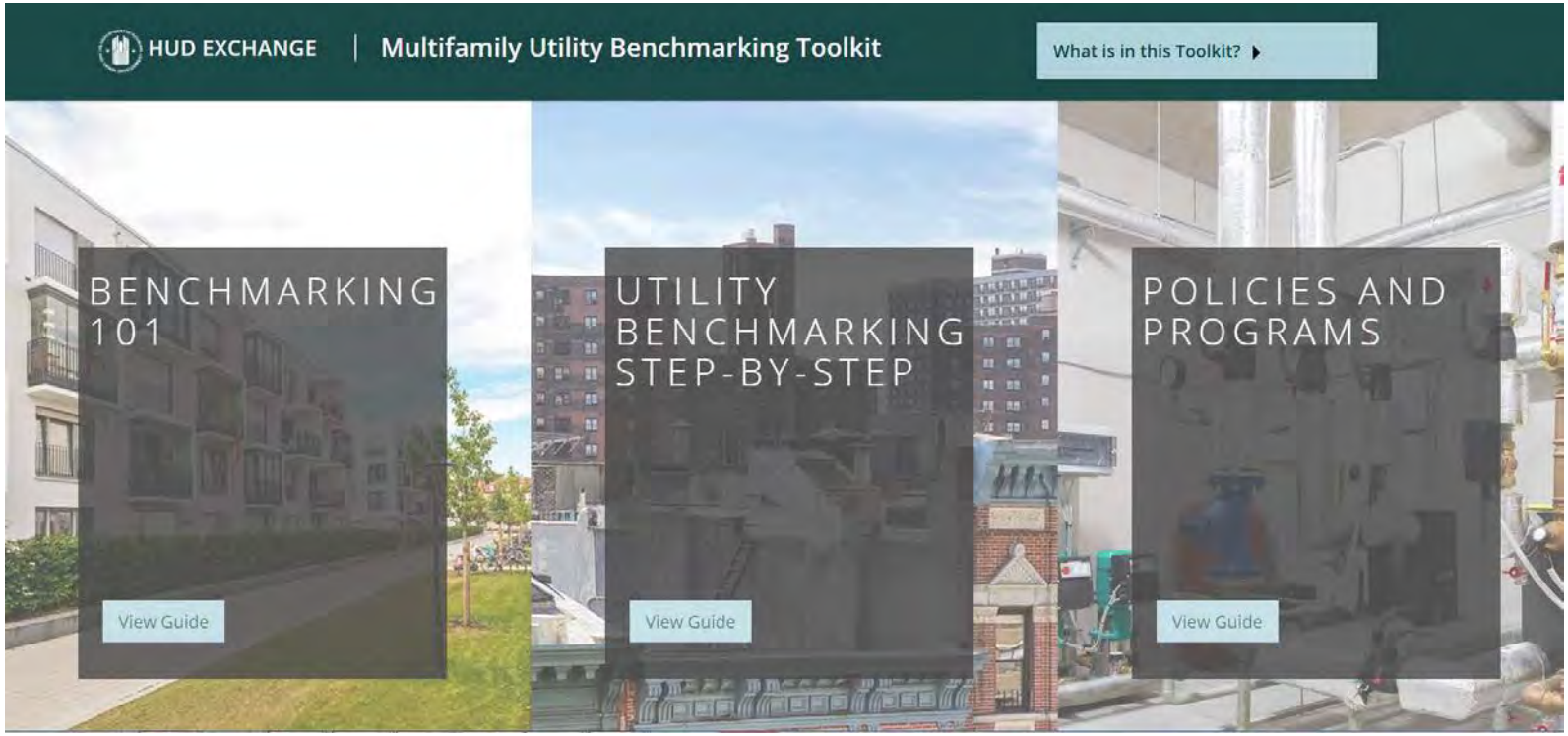
# Multifamily Utility Benchmarking Toolkit



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# BBC Multifamily Energy & Water Efficiency Resources at HUD Exchange


Utility Benchmarking

Building and Product Standards

Retrofit Planning

Operations and Maintenance

Resident Engagement

Retrofit Finance

# Multifamily Sector Recognition

2019 Better Buildings Summit

# New BBC Multifamily Partner

## Christian Church Homes

- Builds affordable housing for the growing senior population.
- Served over 100,000 residents in the course of 50 years.
- Manages over 50 communities housing over 5,000 residents in six states.

CCH
More Than A Home

# BBC Multifamily Partners that Published a Showcase Project this Year

- Boston Housing Authority
- Cambridge, MA Housing Authority
- Caritas Communities
- Codman Square Neighborhood Development Corporation
- Danville Development
- East Bay Asian Local Development Corporation
- Eden Housing
- Jonathan Rose Companies
- Mercy Housing, Inc.
- Philadelphia Housing Authority
- REACH CDC
- Tenderloin Neighborhood Development Corporation
- WinnCompanies









# BBC Multifamily Partners that Published an Implementation Model this Year





- Jamaica Plain Neighborhood Development Corporation
- Lucas Metropolitan Housing Authority
- Trinity Management

# BBC Multifamily Partners with a Published Showcase Project AND Implementation Model

- Aeon
- Balfour Beatty Communities
- Corcoran Management
- Cuyahoga Metropolitan Housing Authority
- **Jamaica Plain Neighborhood Development Corporation**
- Jersey City Housing Authority
- LINC Housing Corporation
- Mercy Housing
- New York City Housing Authority
- National Housing Trust Communities
- Preservation of Affordable Housing
- **REACH CDC**
- Rockford Housing Authority
- Tampa Housing Authority
- Tenderloin Neighborhood Development Corporation
- The Economic Development Authority of the City of Mankato, MN
- The Housing Authority of the City and County of Denver
- **Trinity Management**
- Village of Hempstead Housing Authority

Total = 19 partners

**Bold** = Accomplished for the first time this year

# BBC Multifamily partners who shared data and achieved a partial display this year

- Aeon
- Beacon Communities
- **Boston Housing Authority**
- BRIDGE Housing Corporation
- CommonBond Communities
- **Community Housing Partners**
- Corcoran Management
- Cuyahoga Metropolitan Housing Authority
- East Bay Asian Local Development Corporation
- Fort Wayne Housing Authority
- Gary Housing Authority
- **Highland Commercial Properties**
- **Homes for America**
- Housing Authority of Baltimore City
- **Housing Authority of Knox County, IN**
- **Jamaica Plain Neighborhood Development Corporation**
- Jonathan Rose Companies
- **Kier Property Management**
- Korman Residential Properties
- Lucas Metropolitan Housing Authority
- Mercy Housing
- National Church Residences
- NHT Communities
- Peabody Properties, Inc.
- Preservation of Affordable Housing
- Retirement Housing Foundation
- Satellite Affordable Housing Associates
- Tampa Housing Authority
- The Community Builders, Inc.
- The Evangelical Lutheran Good Samaritan Society
- The NHP Foundation
- The Renaissance Collaborative
- The Silver Street Group and Housing Management Resources
- Trinity Management
- **Truth or Consequences Housing Authority**
- Utica Municipal Housing Authority
- Windsor Locks Housing Authority
- Wishrock Investment Group

Total = 38
**Bold** = Achieved for the first time this year

# BBC Multifamily partners who shared a full data display this year

- 2Life Communities
- AHEAD, Inc.
- Angola (IN) Housing Authority
- Atlanta Housing Authority
- Cambridge, MA Housing Authority
- Capitol Hill Housing
- Caritas Communities, Inc.
- Cascap, Inc.
- Cion Housing Services
- Cleveland Housing Authority
- **Codman Square Neighborhood Development Corporation**
- Danville Development
- Foundation Communities
- Gateway Management Services, LLC
- Helena (MT) Housing Authority
- **Housing Authority of the City of San Buenaventura**
- Jersey City Housing Authority
- Keene Housing
- King County Housing Authority
- **Michigan City Housing Authority**
- Minneapolis Public Housing Authority
- **Multi-Family Mission Ministries**
- New Bedford Housing Authority
- New York City Housing Authority
- Palatka (FL) Housing Authority
- Schochet Companies
- Tenderloin Neighborhood Development Corporation
- The Economic Development Authority of the City of Mankato, MN
- The Housing Authority of the City and County of Denver
- Trinity Housing Corporation of Greeley, Colorado
- Village of Hempstead Housing Authority
- Vistula Management Company
- Washington, DC Housing Authority
- **Wesley Housing Corporation**

Total = 34
**Bold** = Achieved for the first time this year

# BBC Multifamily Goal Achiever

CHA

Cambridge **Housing** Authority

Met the BBC goal of 20% reduction in portfolio-wide energy consumption, achieving 23% savings in four years.

# BBC Multifamily Goal Achiever

TENDERLOIN NEIGHBORHOOD DEVELOPMENT


Met the BBC goal of 20% reduction in portfolio-wide energy and water consumption, achieving 21% savings in energy and 21% in water in six years.



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# BBC Multifamily Goal Achiever

Keene Housing

Met the BBC goal of 20% reduction in portfolio-wide water consumption, achieving 29% savings in four years.



# Thank You!

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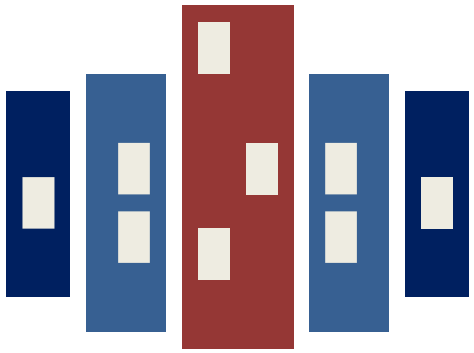
# Goal Achiever: Cambridge Housing Authority

Tina Miller, Energy Manager



# Cambridge Housing Authority

Multifamily Goal Achiever
Better Buildings Summit
July 2019

CHA
Cambridge Housing Authority

# CHA Mission Statement

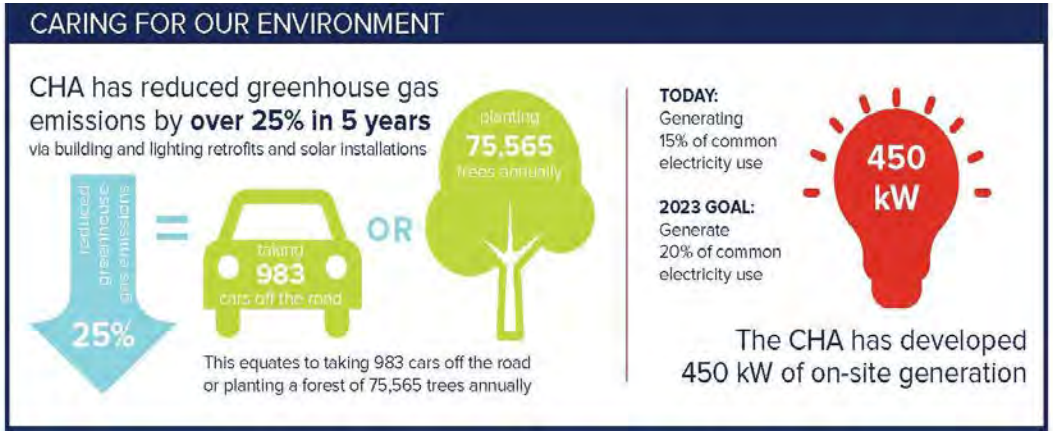
- Cambridge Housing Authority (CHA) provides long-term rental housing and rental assistance to more than 7,000 low-income families, elders and disabled individuals, or 12% of the city population.
- CHA's mission is to develop and manage, safe, good quality, affordable, housing for low-income individuals and families in a manner which promotes citizenship, community and self-reliance in one of the most expensive housing markets in the country.
- CHA's built housing portfolio includes a range of low rise family developments and high rise housing primarily for elders and disabled individuals in a range of configurations from hundreds of units on a site to individual condo settings through out the City.

# CHA meets the Challenge

Better Buildings CHALLENGE
U.S. DEPARTMENT OF ENERGY

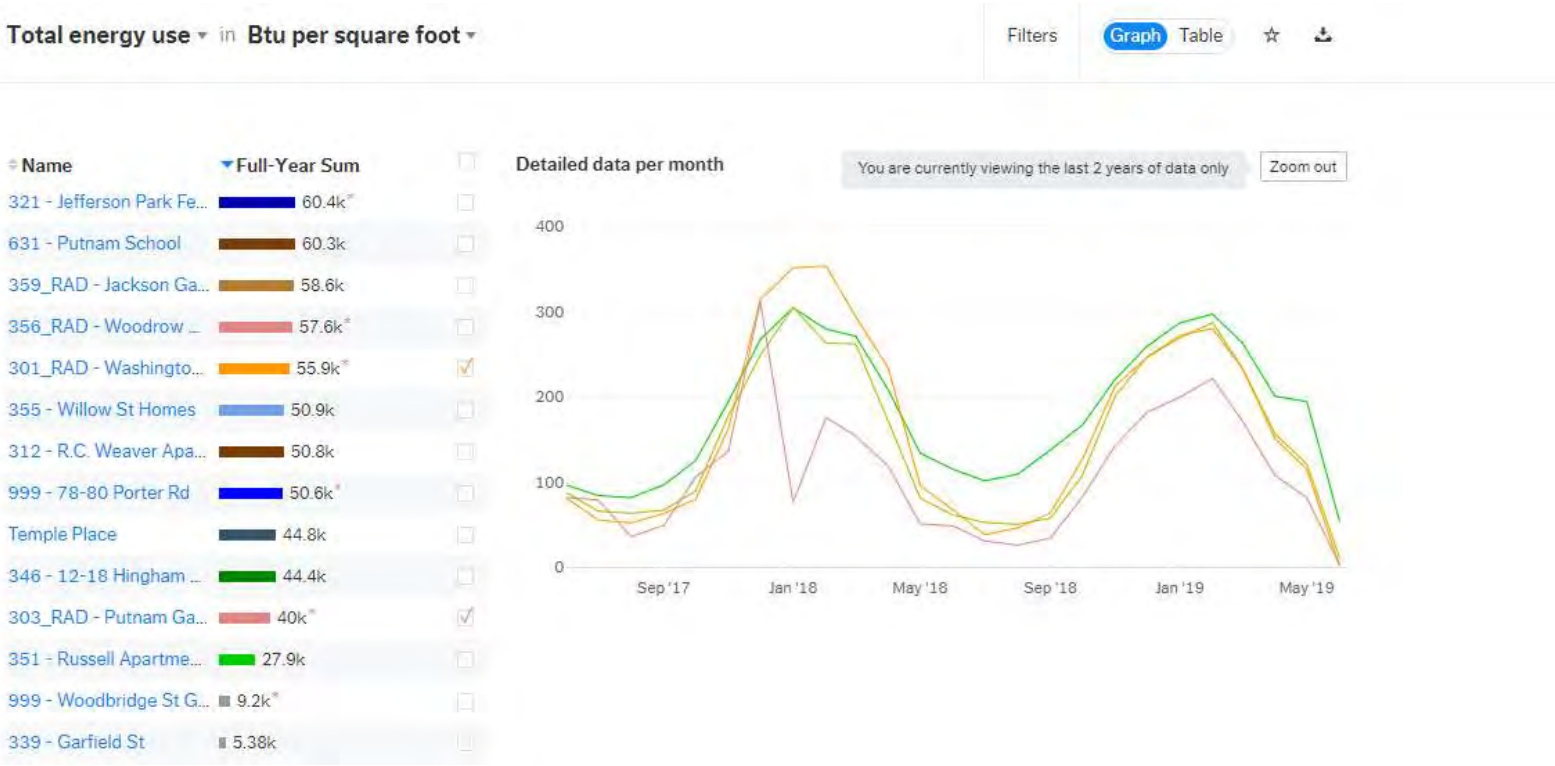
*CHA joined the Better Buildings Challenge in 2014 and has successfully reduced energy intensity by 23% within four years. This success is largely attributable to CHA's MTW status, track record of successful energy retrofits and the infusion of capital provided by the transition from public housing to the RAD program.*

***CHA achieved a 23% reduction in just 4 years largely thanks to the RAD modernization work in addition to comprehensive LED lighting retrofits.***



# Enterprise Green Communities Certification for all substantial renovation and new construction

# CHA employs three Energy Tracking systems to monitor progress and track building performance



# Tracking Progress via Portfolio Manager

| Property Name | Property GFA | 2014 ENERGY STAR Score | 2014 Site EUI (kBtu/ft²) | 2014 Source EUI (kBtu/ft²) | 2018 ENERGY STAR Score | 2018 Site EUI (kBtu/ft²) | 2018 Source EUI (kBtu/ft²) |
|---|---|---|---|---|---|---|---|
| Manning Apartments | 160,580 | 3 | 72.3 | 202.5 | 95 | 54.7 | 83.1 |
| | | | | | + 92 | 24% | 59% |
| Washington Elms | 200,075 | 23 | 112.4 | 153.6 | 62 | 80.6 | 119.8 |
| | | | | | + 39 | 28% | 22% |
| Putnam Gardens | 126,002 | 15 | 124.4 | 162.2 | 98 | 43.8 | 71.2 |
| | | | | | + 83 | 65% | 56% |
| Newtowne Court | 275,666 | 34 | 102.6 | 136.7 | 90 | 62.1 | 88.5 |
| | | | | | + 56 | 39% | 35% |
| Total | 762,323 | NA | 102.4 | 159.2 | NA | 62.4 | 92.7 |
| | | | | | | 39% | 42% |

# The Results at Manning Apartments


**Reducing annual utility costs by $350,000 annually.**

**Adding a 60 kwh co-generation unit to generate of electricity.**

**Providing central A/C to residents and a new ventilation system significantly improving resident comfort.**

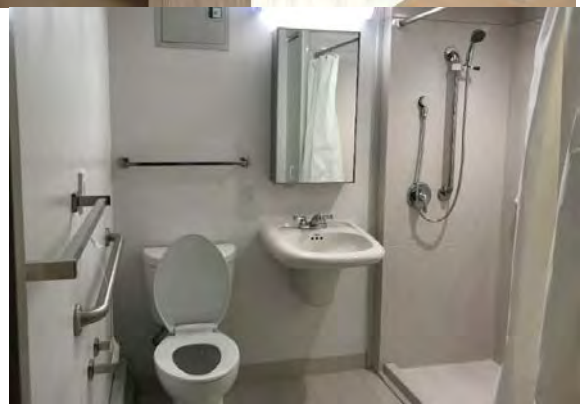
**Funded over $66M in improvements:**

- New building envelope eliminating significant and water infiltration and adding insulation to the building
- Replace electric resistance baseboard heat and domestic hot water system with gas hydronic system
- Replace brittle, failing portable, sanitary and storm water piping in the building
- New kitchen and bathrooms and other interior refurbishments
- Add 6 new units to the building

# The Results at Manning

Before

After



# The Results at Manning Apartments

Pre-retrofit concrete exterior

Completed metal clad exterior

# On-site generation, Solar and Co-gen

Co-gen plants -- CHA has 420 kw of co-gen at 4 properties with 3 additional properties in planning. Savings from co-gen have help CHA offset electrical consumption from central AC and increased ventilation.


Co-gen is generally sited at developments with central boiler plants delivering heat and hot water to a minimum of 120 units. Cogen runs in lead providing thermal energy for heat and hot water.. Cogen also relieves grid congestion, lowers local emissions and provides Alternative Energy Credits which offset maintenance costs.

Solar arrays provide lower cost renewable power while lowering local emissions. CHA has both direct ownership and power purchase agreements within our portfolio. 5% of CHA's electricity is provided by on site solar.

CHA enters into long term contracts for retail gas and electricity supply which provides a stable budget base as well as cost savings for the agency.

# Challenges Ahead:

- Managing complex financial transactions with multiple stakeholders.
- Preparing Operations and Maintenance staff for new technology and Building Management Systems.
- Preparing for electrification as we work to support the Cambridge City goal of net zero by 2050.
- Managing regulatory change in the Solar Industry and various incentive programs.

A rendering of the future Millers River Apartments currently undergoing a $100 million reconstruction

# Goal Achiever: Tenderloin Neighborhood Development Corporation

Ruchi Shah, Senior Sustainability Manager



# Thank You!

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# Multifamily Meet-Up

Part 2

T-Mobile LTE 8:39 PM 89%

< Top Stories

# *'I'm Cold and I'm Afraid': Across Midwest, Homeless Await Deep Freeze*

A man sat at the corner of Michigan Avenue and Wacker Drive in Chicago on Tuesday as temperatures fell.

Nolis Anderson for The New York Times

The New York Times

CALIFORNIA MUDSLIDES

Jim Wilson/The New York Times

## A Coastal Enclave Faces Unimaginable Tragedy. And Rain Is in the Forecast.

• Mudslides left Montecito, Calif., in ruins, and rescuers were racing on Sunday to find four people still missing.

T-Mobile LTE 7:47 PM 99%

# *The Polar Vortex: Cold Hard Facts*

You could get frostbite in as little as five minutes. It will be warmer in Antarctica than it is in Des Moines. It could feel like minus 65 in Minneapolis.

Commuters in Chicago braved snow and wind on Monday.

# Baked Alaska: It's beach time as a heat wave hits cities across the state

RICHARD READ
REPORTING FROM ANCHORAGE
July 5 at 7:40 PM ET

Bears and moose are seeking relief in garden sprinklers. Stores are out of ice. Kids are lamenting the cancellation of Independence Day fireworks — not that pyrotechnics show up all that well anyway under the midnight sun.

Anchorage, and much of Alaska, is shattering temperature records amid a heat wave accompanied by



# France records all-time highest temperature of 45.1C

**Record for mainland France falls in Provence as Europe swelters in heatwave**
**What is causing the European heatwave?**

Jon Henley *and* Angelique Chrisafis *in Paris and* Sam Jones *in Madrid*
11:02 Friday, 28 June 2019

France recorded its highest-ever temperatures and firefighters continued to battle historic wildfires in Spain as much of western Europe remained in the grip of an extreme early-summer heatwave on Friday.

Capital Weather Gang

# Extreme weather is pummeling the Midwest, and farmers are in deep trouble

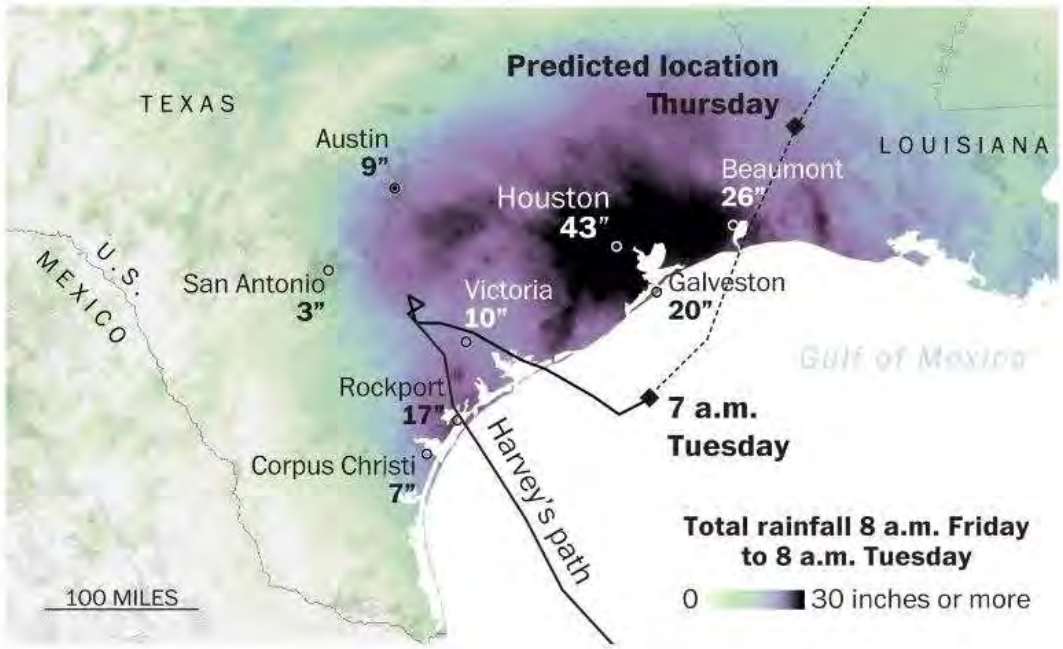
By Katie Mettler
May 30 at 10:52 AM ET

Missouri State Patrol did an aerial survey of the severe flooding along the Grand River near Brunswick on May 29. (Missouri State Highway Patrol Troop B via Storyful)

In Kendell Culp's corner of northwest Indiana, relentless rain began falling

# Harvey marks the most extreme rain event in U.S. history

By Jason Samenow August 29 at 2:09 PM




The rain from Harvey is in a class of its own. The storm has unloaded over 50 inches of rain east of Houston, the greatest amount ever recorded in the Lower 48 states from a single storm. And it's still raining.

John Nielsen-Gammon, Texas state climatologist, said a rain gauge in Mont Belvieu, about 40 miles east of Houston, had registered 51.1 inches of rain through early Tuesday afternoon. This total exceeds the previous record of 48 inches set during tropical cyclone Amelia in Medina, Texas in 1978.


**Most Read**

1 Harvey marks the most extreme rain event in U.S. history

2 'We were never closed': Joel Osteen's Houston megachurch disputes claims it shut its doors

3 Analysis
Texas flood disaster: Harvey has unloaded 9 trillion gallons of water

4 Sean Spicer finally got to meet Pope Francis

5 A 7-year-old girl was kidnapped and thrown off a bridge. She survived and swam to shore.


**At a Glance**

| Tue. | Wed. | Thu. |
|---|---|---|
| –/69° | 59°/79° | 65°/84° |
| 100% | | 20% |

| Fri. | Sat. | Sun. |
|---|---|---|
| 60°/75° | 59°/75° | 64°/81° |
| | 40% | 30% |

# ‘This is the new abnormal’

## Air attack saves homes near Malibu Canyon, but winds pose a threat

BY SARAH PARVINI, BENJAMIN ORESKES, JAMES QUEALLY, ALENE TCHEKMEDYIAN AND JACK DOLAN

Los Angeles County fire engineer Scott Pishe stood guard outside several multimillion-dollar homes Sunday as air tankers and helicopters bombarded the fire-ravaged slopes of nearby Malibu Canyon with fire retardant and water.

Earlier in the day, flames threatened to make a run into a chute by the canyon, but the aggressive air attack kept the fire there at bay.

“If it had gotten into that chute, we would’ve been in trouble,” Pishe said from the southeastern flank of the blaze, which had claimed two lives and forced

### Forecast wind gusts

Officials warn that strong wind gusts are expected in some fire zones Monday afternoon.

Up to 30 mph — 30-40 mph — More than 40 mph


## More bodies are found in Butte County; over 200 people still missing

BY LOUIS SAHAGUN, JOSEPH SERNA AND HAILEY BRANSON-POTTS

PARADISE, Calif. — The death toll from the Camp fire raging in Butte County rose to 29 on Sunday as authorities continued their search for victims amid the ruins of the Sierra foothills town of Paradise.

Five additional victims were found in their homes, said Butte County Sheriff-Coroner Kory Honea. Another was found in a vehicle.

The number could continue to grow. On Sunday, authorities said, there were 228 people whose whereabouts were unknown. The search has been hampered by the active fire still burning in the area. Through much of the weekend, the ground remained too hot for cadaver



# The DC Multifamily Resilience and Solar Assessment Tool

Laurie Schoeman, Enterprise Community Partners, Inc.

# Better Building Summit
# Multifamily Meetup
# July 10 10:30

# Enterprise: Who We Are

*Create opportunity for low- and moderate-income people through fit, affordable housing in diverse, thriving communities.*

# How Enterprise Supports Communities

## Policy

- CDBG-DR Standing Allocation
- National Flood Insurance Program
- Local Advocacy
- Code

## Solutions

- Technical Assistance
- Developing Guidance Tools for Resilient Housing
- Piloting Housing Innovation models

## Capital

- Grants for Recovery
- Grants for Resilience
- Loan Capital
- Investment




“People who are already vulnerable, including lower-income and other marginalized communities, have lower capacity to prepare for and cope with extreme weather and climate-related events and are expected to experience greater impacts”

-National Climate Assessment 2019

What is at Stake if we Stand still?


FEMA

# Faces of Resilience

| | |
|---|---|
|  People | The extent of personal discomfort, harm, injury, or loss of life. |
|  Physical Assets | Loss or damage to structural and architectural building components, MEP and IT equipment, utilities, landscaping, contents. |
|  Operations | Disruption to building operations and functionality, occupancy, egress/ingress, critical systems, or lab activities. |
|  Revenue | Loss of revenue due to business interruption, specifically in relation to tenants. |
|  Reputation | Negative media attention or impact on industry reputation in the aftermath of an impactful shock or stress. |

# Resilience Tools

Multifamily Housing Resiliency Toolkit

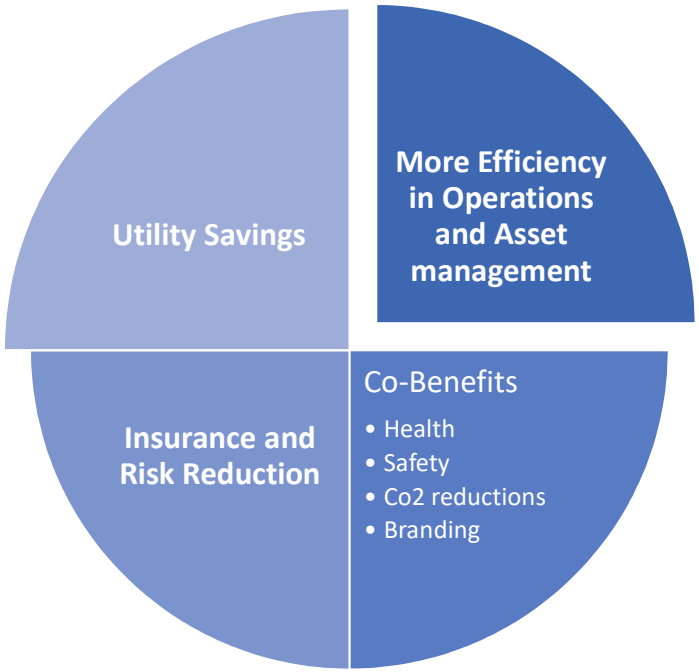
**DC Resilience Capital Needs Assessment**

Financial Lender Resiliency Toolkit

Keep Safe Resilience Guide For Island Communities

Participatory Planning Mitigation Tool

# Framework for Resilient Investments and Return Opportunities



# Strategies for Multifamily Housing Resilience

## Community

Strategies that encourage behavior which enhances resilience.

## Adaptation

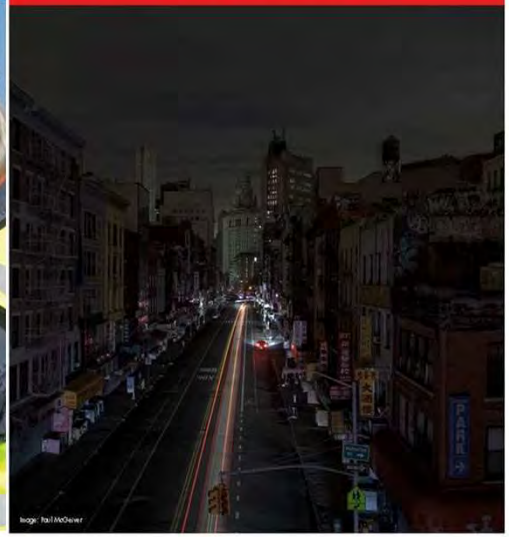
Strategies that improve a facility's ability to adapt to changing climate conditions.

## Protection

Strategies to reduce a building's vulnerability to extreme weather.

## Backup

Strategies that provide critical needs when a facility loses power or other services.



# Determine your Resilience Strategies

**Resilience Strategies**
Decision Matrix

| | Low to Mid-Rise walk up's | Small-Rise contemporary | Mid-rise contemporary | High-Rise contemporary | Estimated Cost | Related Strategies |
|---|---|---|---|---|---|---|
| **Protection** | | | | | Protection | |
| 1 Wet Floodproofing | ● | ● | ● | ● | $$-$$$ | 6, 8, 9, 10 |
| 2 Dry Floodproofing | ◉ | ◉ | ◉ | ◉ | $$-$$$ | 3, 5, 6, 14 |
| 3 Site Perimeter Floodproofing | ○ | ◉ | ◉ | ◉ | $$-$$$ | 2, 6, 10 |
| 4 Resilient Elevators | ◉ | ○ | ● | ● | $$-$$$ | 2, 3, 6, 8, 13, 18 |
| 5 Backwater Valves | ● | ● | ● | ● | $ | 2, 6, 10 |
| 6 Sump Pumps | ● | ● | ● | ● | $ | 1, 2, 5, 8, 10, 13 |
| **Adaptation** | | | | | Adaptation | |
| 7 Envelope Efficiency | ● | ● | ● | ● | $$$-$$$$ | 11, 12 |
| 8 Elevated Equipment | ◉ | ◉ | ● | ● | $$$-$$$$ | 1, 7, 9, 12 |
| 9 Elevated Living Space | ◉ | ◉ | ◉ | ◉ | $$$-$$$$ | 1, 2, 8 |
| 10 Surface Stormwater Management | ◉ | ◉ | ● | ● | $$-$$$ | 2, 3, 5 |
| 11 Window Shading | ● | ● | ● | ● | $ | 7 |
| 12 Distributed Heating and Cooling | ● | ● | ◉ | ○ | $$ | 7, 8, 11 |
| **Backup** | | | | | Backup | |
| 13 Maintaining Backup Power to Critical Systems | ● | ● | ● | ● | $$-$$$ | 4, 6, 8, 15, 18 |
| 14 Emergency Lighting | ● | ● | ● | ● | $ | 13 |
| 15 Access to Potable Water | ● | ● | ● | ● | $ | 13 |
| **Community** | | | | | Community | |
| 16 Building Community Ties | ● | ● | ● | ● | $ | 17, 18, 19 |
| 17 Creating Community Resilience Spaces | ◉ | ◉ | ● | ● | $-$$ | 13, 15, 16, 18, 19 |
| 18 Developing an Emergency Management Manual | ● | ● | ● | ● | $ | 16, 17, 19 |
| 19 Organization for Community Resilience | ● | ● | ● | ● | $ | 16, 17, 18 |

Strategies for Multifamily Building Resilience, Vol. 1 18

Strategies for Multifamily Building Resilience, Vol. 1 19

Legend

Building Types*

| | Units | Floors | Year Built | Typical Building Construction | Elevator |
|---|---|---|---|---|---|
| Low to Mid-Rise walk up's | 8-50 | 3-6 | pre-1929 | Masonry structural walls, brick envelope, rubblestone or concrete foundation, wood roof, and wood joist floors | Y / N |
| Small-Rise contemporary | 4-8 | 2-3 | 1920-Present | Wood Frame, concrete block foundation, and shingled roof | N |
| Mid-rise contemporary | 10-250 | 4-12 | 1920-Present | Masonry bearing wall with wood joists or concrete, concrete foundation, brick, or wood-framed envelope, and tar roof membrane or shingled roof | Y |
| High-Rise contemporary | 50-400 | 12-40 | 1950-Current | Concrete masonry structure, CMU or slab on grade foundation, brick envelope, and tar roof membrane | Y |

Applicability

○ Minimally applicable ◉ Potentially applicable ● Applicable

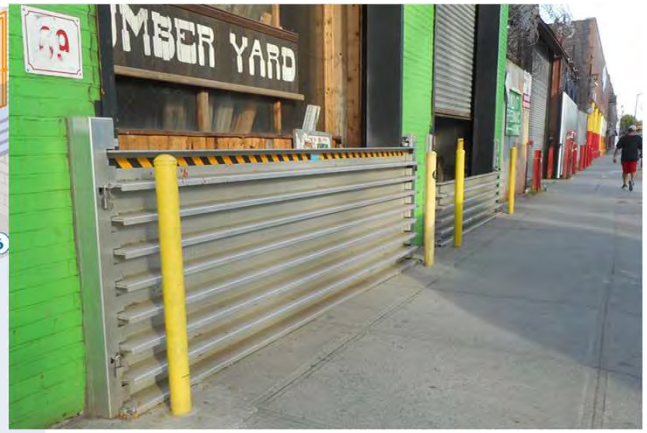

**Resilience Strategies**
Decision Matrix

Strategies for Multifamily Building Resilience, Vol. 1 18

Strategies for Multifamily Building Resilience, Vol. 1 19

# Flood Prevention – High Cost

## Dry Floodproofing


1. Seal cracks or openings in walls and foundation.
2. Install flood gates to prevent water from coming through entryways.
3. Install backflow preventers in floor drains.
4. Install a waterproof sidewalk hatch.
5. Protect against seepage by installing a sump pump.
6. Flood-proof equipment which cannot be elevated.
7. Flood doors are engineered to keep water out.

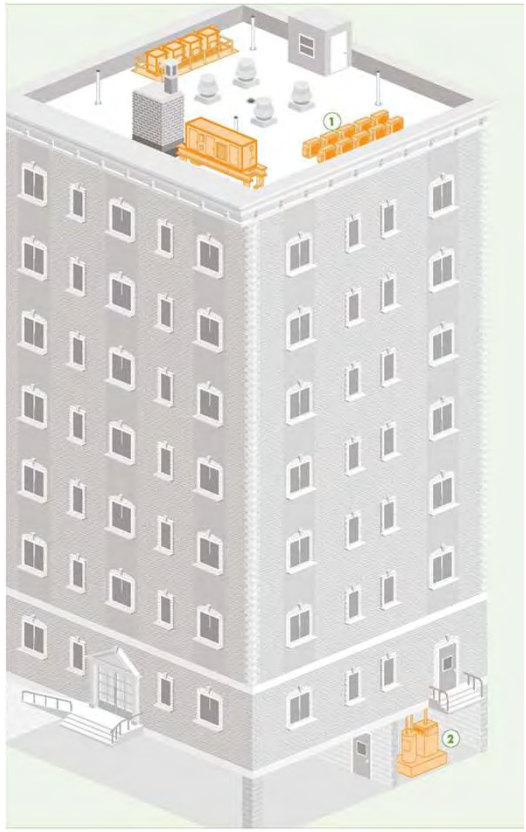
\+ *Strategies not pictured:*

Protect any electrical equipment with waterproof enclosures.

**Only permitted in residential buildings with commercial on the first floor or non residential buildings. Egress must be maintained to the public way. Appendix G requires a flood emergency plan when dry floodproofing is installed in for a building. See Floodplain Zoning Regulations in the appendix of this presentation and Building Code Appendix G for additional requirements.**

# Flood Prevention – High Cost

## Elevated Equipment




# TECHNICAL ASSISTANCE MODEL
# FLOOD HELP NYC

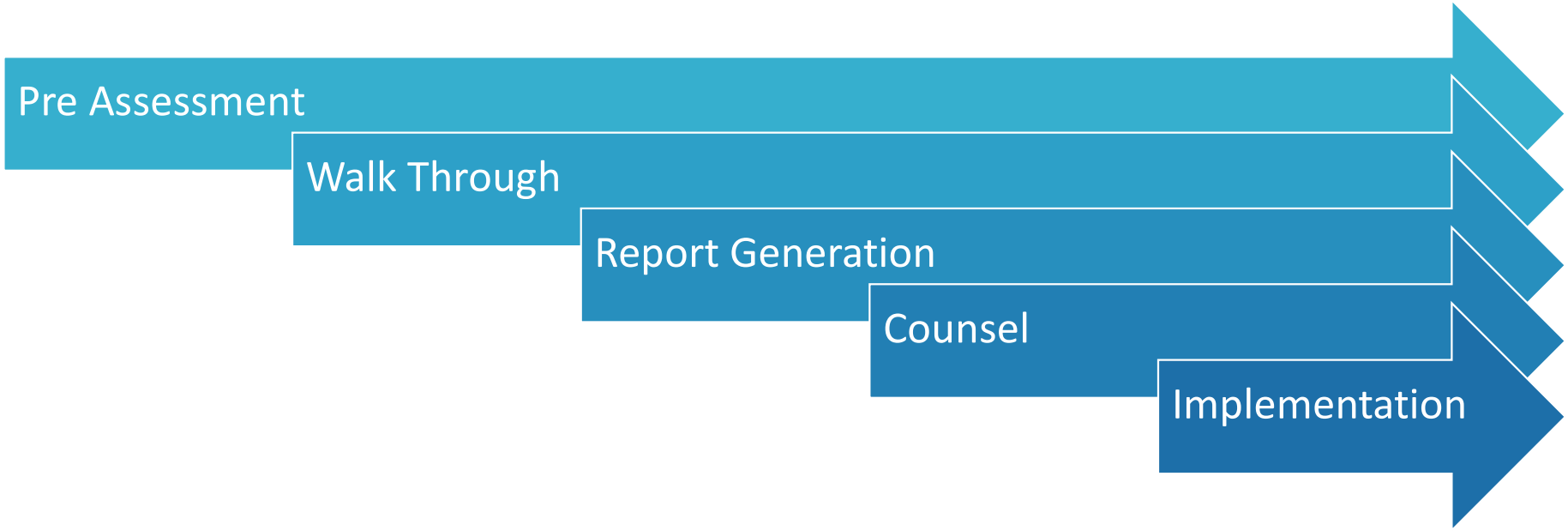






# Multifamily Housing Resilience Tool to Support Preservation of Capital's Affordable Housing Stock

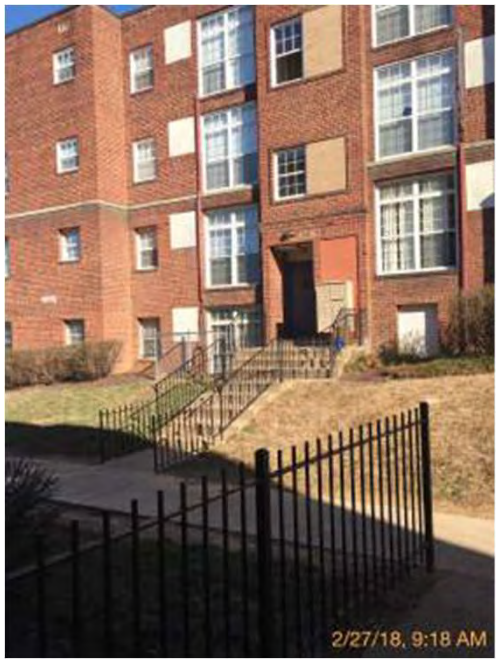
# The Tool


Pre Assessment
Walk Through
Report Generation
Counsel
Implementation

# Existing Building Case Study

Washington, DC

**Year Built:** 1963
**Most Recent Year Rehabbed**: 2000
**Total Square Feet:** 118,716
**Total # Apartments:** 202
**Total # Bedrooms:** 329
**Total # Stories:** 2 and 3
**Basement? Conditioned?:** Yes, yes
**Water Meter Configuration:** 1 meter per building
**Electric Meter Configuration:** 220 tenant, 16 common meters



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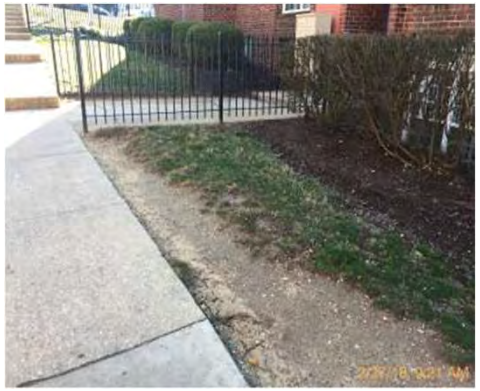
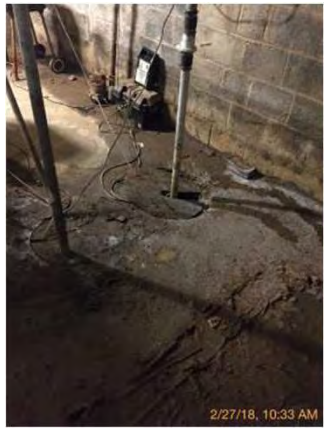
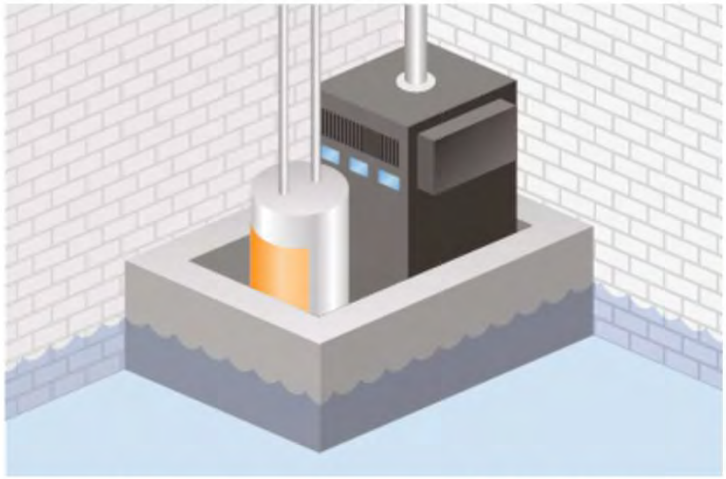
Washington, DC







Because of hydrostatic pressure, component floodproofing barriers should designed to a maximum of 3 ft.

Image: Colin Hayes.

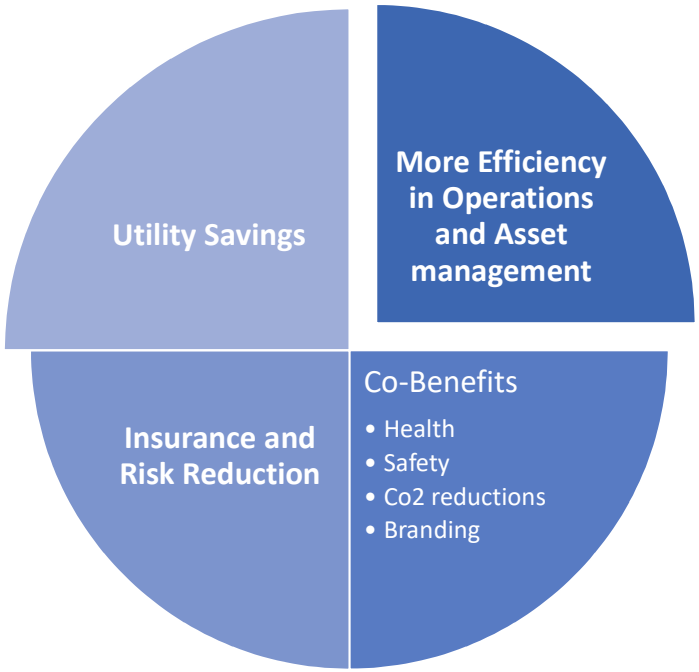
Dry component floodproofing is often an effective solution for equipment that cannot be elevated or relocated out of basements.

Image: MAP Architects, New York Engineers.

# Recommendations


| Recommended Measure | Estimated Cost |
|---|---|
| Elevated Electrical Equipment | $50,000 |
| Mold Remediation | $75,000 |
| Sump Pumps | $3,000 |
| Backwater Valves | $55,000 |
| Building Floodproofing | $640,000 |
| Cool Roof | $225,000 |
| Surface Stormwater Management | $165,000 |
| High Efficiency Ventilation | $1,315,000 |
| Develop Emergency Management Manual | O&M |

# Framework for Resilient Investments and Return Opportunities



# Giving Power and Teeth to the Tool

- Carrot V. Stick
  - Funding Incentives
  - Regulation
  - Waiver of Administrative Burden
  - Assurance of Importance and Risk Reduction

# KEEP SAFE

## A GUIDE TO RESILIENT HOUSING DESIGN IN ISLAND COMMUNITIES

STATEGY 01

# REINFORCE SITE WITH INFRASTRUCTURE

## STEP 3 - IMPLEMENT GREY INFRASTRUCTURE ON SITE

- Consult a contractor, civil engineer, agronomist or the Agricultural Extension Service (SEA, by its Spanish acronym) to design gray infrastructure systems as outlined below.
- Be cautious when choosing where to deposit water. If water is contaminated with debris, do not deposit into a lake, river, or sea.
- Gray infrastructure may require special permits and a larger and more specialized professional team, can be more costly, and can be disruptive to the site if not properly designed and built.

### RETAINING WALLS

Retaining walls are permanent barriers that prevent water from infiltrating the site. They are designed to contain the weight of the terrain on a steep slope that otherwise would collapse. Without a retaining wall, extreme rain might destabilize the exposed terrain and cause a landslide. These structures are beneficial in areas where erosion is inevitable or where critical infrastructure needs to be protected.

NATURAL HAZARDS IT PREVENTS

- Flooding
- Landslides
- Erosion
- Heat

WHAT YOU NEED TO KNOW

- - Built with reinforced concrete.
- - Usually shaped as an inverted T.
- - On the side of the terrain being stabilized, use a drain along the wall to keep water away from the structure.
- - The drain consists of a PVC pipe surrounded by gravel and fabric that

### DRY WELLS

Dry wells are underground tanks, usually made of concrete, that store water to percolate or drain slowly to another site or sewer. Their design is similar to a pool

NATURAL HAZARDS IT PREVENTS

- Flooding
- Erosion

WHAT YOU NEED TO KNOW

- A simple dry well is a 4'-6" deep and 3' diameter pit filled with gravel or aggregate covered with topsoil.

### FRENCH DRAIN

A French Drain system slowly drains surface water and can consist of a PVC tube with holes, different grades of rock or similar materials that allow percolation of water through the soil and out to a desired area.

NATURAL HAZARDS IT PREVENTS

- Flooding
- Erosion

WHAT YOU NEED TO KNOW

- - Perforate a PVC tube and place into a trench.
- - Surround the tube with gravel and then cover with a permeable fabric.
- - Direct water to a sewer, dry well, or other method of disposal.

### DITCH

Ditches are channels that are used to redirect water flow. Historically, common practice has been to "re-canalize" or "re-channel" rivers to avoid flooding but in recent years communities are adapting to "living with water," rather than channeling it off site, by allowing water to flow through sites.

NATURAL HAZARDS IT PREVENTS

- Flooding
- Erosion

WHAT YOU NEED TO KNOW

- A simple dry well is a 4'-6" deep and 3' diameter pit filled with gravel or aggregate covered with topsoil.

### PERMEABLE SURFACES

Permeable surfaces consist of a paver, porous concrete, or other flooring system that allows water to pass through and percolate slowly into the soil, instead of solid pavement that reduces the area of the terrain that naturally percolates water.

- Usually made of asphalt, concrete, or planted surfaces.

- Areas with permeable pavement are usually utilized as an amenity for non-essential services like recreation.

NATURAL HAZARDS IT PREVENTS

- Flooding
- Heat

WHAT YOU NEED TO KNOW

- - For pavers, the terrain is flattened and prepared prior to placement.
- - The porous pavement or surface material is poured in place like regular concrete. Its porosity is a result of the permeable sub-like surface.
- - If pavement needs to bear "loads" such as vehicles, it will need to be validated for load bearing capacity in advance of placement.

Laurie Schoeman
Senior Program Director Resilience and Recovery
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# Opportunities for Combined Heat and Power (CHP) in the Multifamily Sector

Neeharika Naik-Dhungel, EPA CHP Partnership

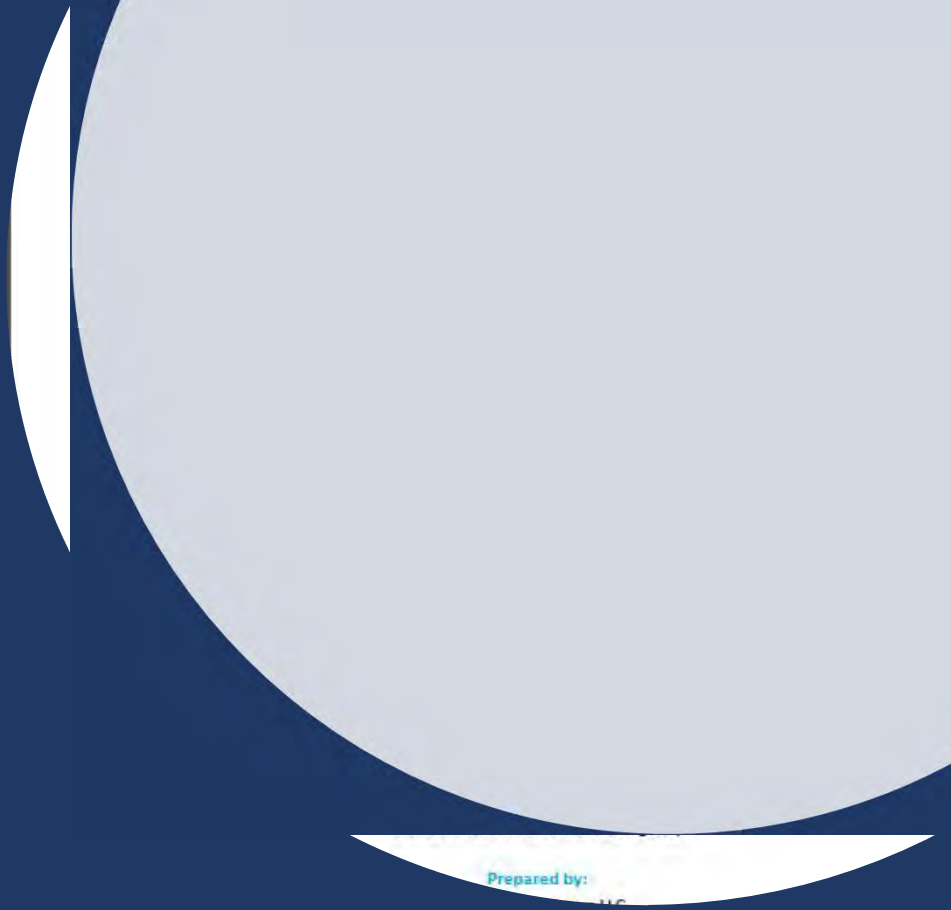
# Opportunities for Combined Heat and Power (CHP) in the Multifamily Sector

Neeharika Naik-Dhungel,
EPA CHP Partnership

July 10, 2019

# Overview

- Multifamily Report Overview and Key Takeaways
  - CHP MF Statistics
  - Opportunities for CHP in the Multifamily Housing Sector
- CHP Resiliency Value
  - Owners
  - Low Income Multifamily
  - Resources




CHP
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# Report Overview

## Purpose

1. Identify and communicate the benefits, opportunities, and challenges of multifamily CHP to owners, developers, policy makers, and all other relevant stakeholders.
2. Quantify the opportunities for multifamily CHP from both a technical and economic perspective

| Multifamily CHP Report Format | |
|---|---|
| **Introduction** | Report purpose and organization |
| **CHP in the Multifamily Housing Sector** | Multifamily building characteristics conducive to CHP |
| **Energy Use and CHP Sizing in Multifamily Buildings** | Energy-use characteristics of CHP in multifamily buildings |
| **Quantifying the Opportunities for Multifamily CHP** | Overall CHP market potential in multifamily buildings |
| **Opportunities and Challenges for Multifamily CHP** | Stakeholder perspectives |

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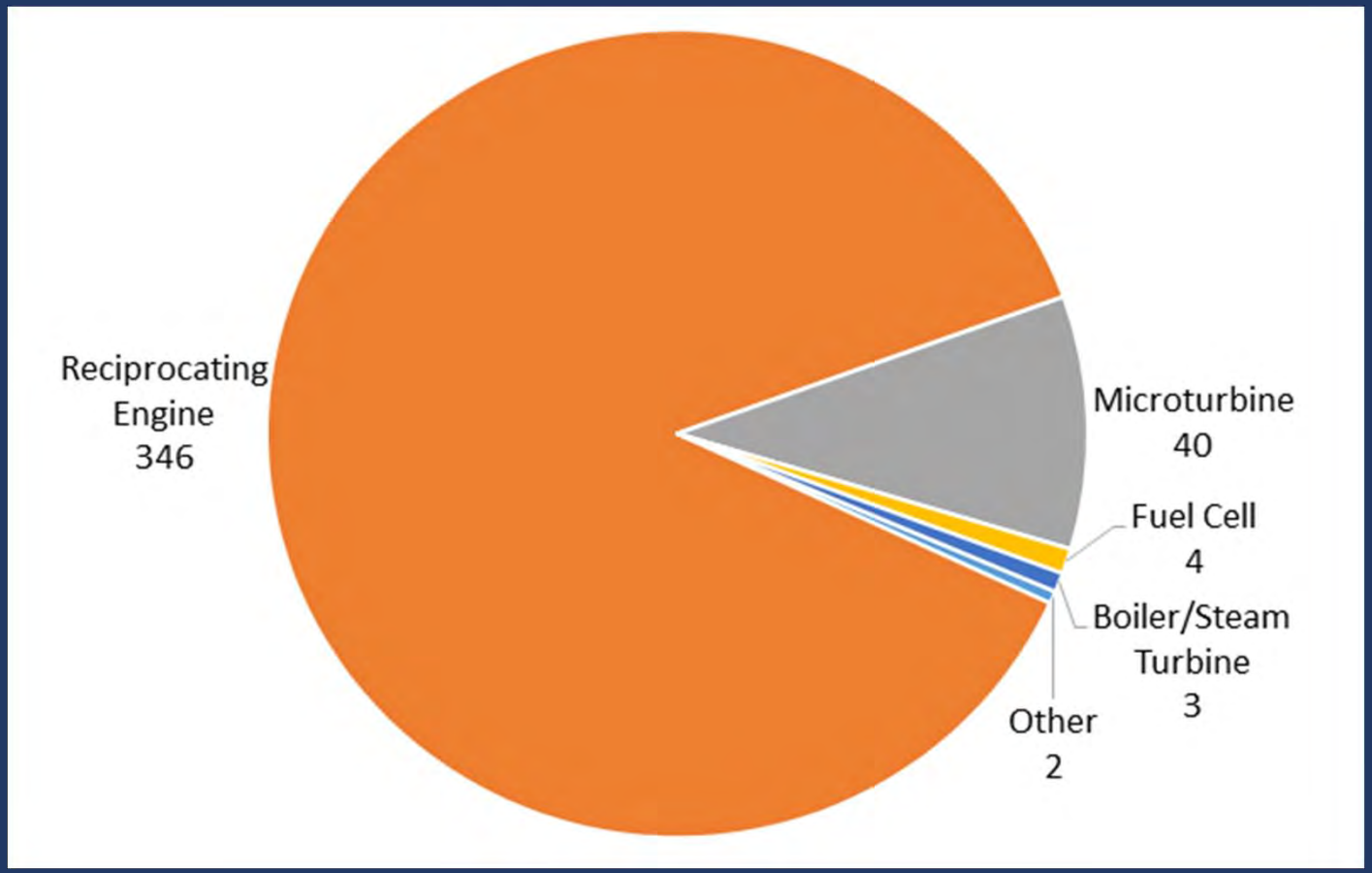
# Current Trends in Multifamily CHP

## CHP Installations by Prime Mover Type

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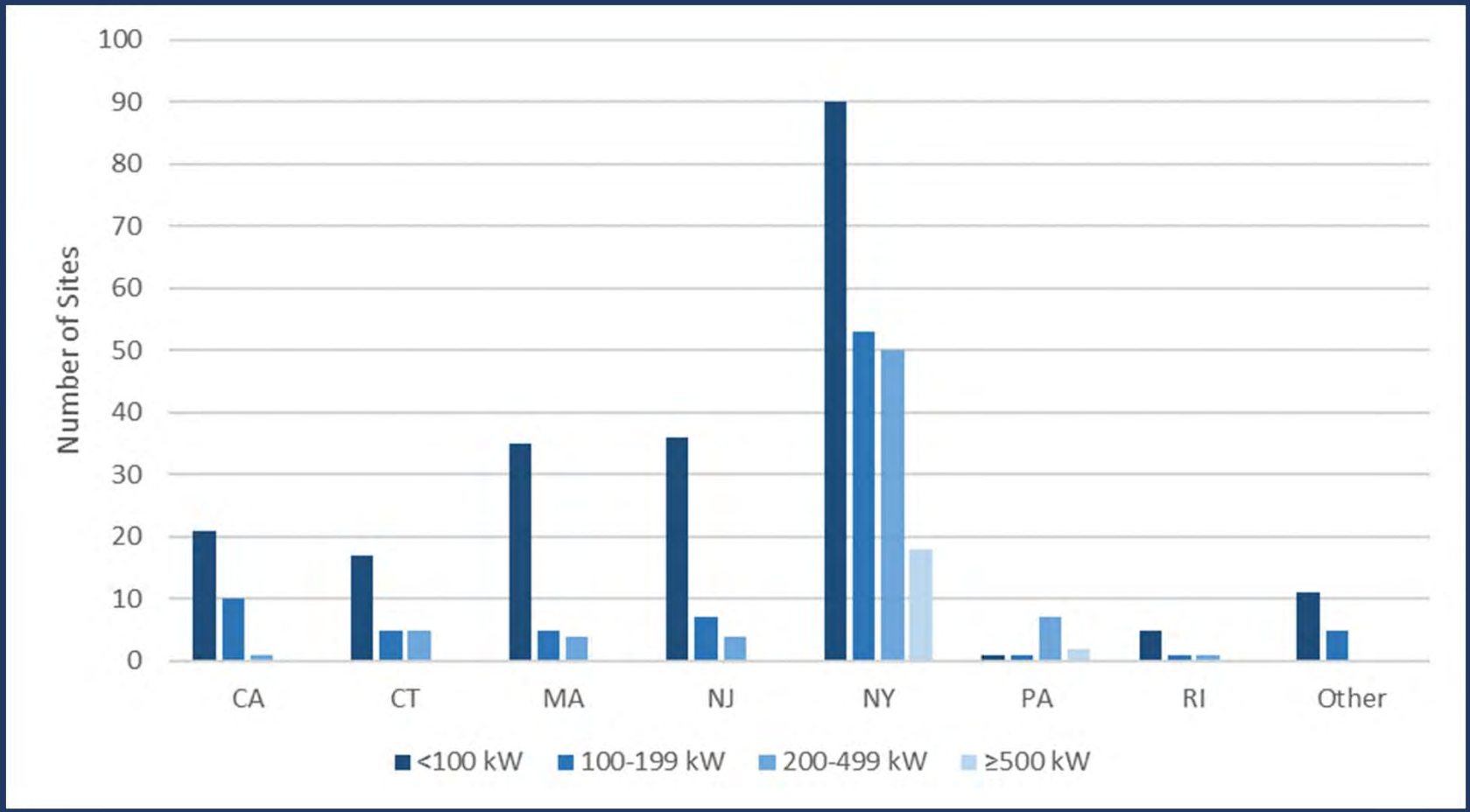
# Multifamily CHP Installations by State

## CHP Systems by State and CHP Size Range

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# Identifying Opportunities for Multifamily CHP

## Building characteristics

- Building Size
- Electricity Metering
- Central Water Heating
- Additional Building Loads
- Unit Ownership
- Building Ownership


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# Multifamily Building Owner Perspective

- For owners, the following factors represent both a challenge and an opportunity when implementing CHP:
  - One of the main challenges when implementing CHP projects at multifamily buildings is the **knowledge of CHP and the decision-making process** in considering CHP
  - The **economics and financing** of CHP are a prime driver in pursuing CHP projects at multifamily buildings
  - **Resilience to extreme weather conditions** can be a leading driver in regions where storms and natural disasters pose a regular threat to the electric grid

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# Multifamily Building Owner Example

## The Brevoort – New York City

| | |
|---|---|
| **System Size** | 300 kW |
| **Installation Date** | April 2015 |
| **Heat Recovery** | Cooling, Heating, & DHW |
| **System Benefits** | Reduced energy costs, increased apartment affordability, enhanced resilience, reduced carbon footprint |

*"I know that if ConEdison fails, that this building will not. I know that I don't have to worry about people who are 80 or older climbing multiple stairs to get to their apartments. I don't have to worry about anybody not having water. So for me personally, the cogen system is really a safeguard and it gives me, as the president of this board, a tremendous piece of mind."*

- Diane Nardone, Board President, The Brevoort


*Two of the three CHP units at the Brevoort East complex*

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# Low Income Multifamily Perspective

## Beneficial Characteristics for Low Income Multifamily CHP

- Predominantly rental housing – Owners are the decision makers, and may be quicker at adopting CHP compared to tenant-run condominium or cooperative boards
- Typically larger buildings with higher electric and thermal requirements
- Many are master-metered, allowing for above average CHP sizing
- Can provide resilience and cost savings to critical buildings and vulnerable populations

## Additional drivers for CHP in affordable multifamily buildings

- Utility programs that promote clean energy, specifically in affordable and public housing
- Public sector-sponsored lending institutions for green retrofits, such as the Connecticut Green Bank
- Building operator training, a need that applies to all multifamily buildings, not just affordable developments

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# Low Income Multifamily Examples

## CHP in New York City Affordable Housing

| Affordable Housing Unit, NYSERDA sponsored New York City CHP | Year CHP implemented | Generation capacity | Estimated annual energy or carbon savings |
|---|---|---|---|
| Sea Park West | 2010 | 150 kW | $69,000 |
| Concord Court Apartments | 2012 | 100 kW | 50% energy savings |
| Roosevelt Landings | 2014 | 300 kW | 1600 tons CO2 |
| Times Square Apartments | 2017 | 200 kW | $116,000 projected |
| Grace Towers | 2017 | 70 kW | Data unavailable |
| Remeeder Houses Apartments | 2017 | 35 kW | Data unavailable |

*"Affordable multifamily housing providers are strapped, both in terms of funding and financing and staff time and capacity they can devote to thinking about making their buildings more efficient. The ones that do pay attention to upgrades tend to be on the larger side, with more resources, or they've been approached by an incentive program to help them incorporate CHP. This is one reason why people are more familiar with CHP in New York . . . state incentive programs like NYSERDA's can have a big impact."*

- Stefan Samarripas, American Council for an Energy-Efficient Economy

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# CHP Resiliency Attributes and Features

- Allows building to serve as a critical infrastructure that provides shelter in place
- Technology can integrate with renewables to create a local microgrid
- Features that create a resilient CHP system:
  - Black start capability
  - CHP electric generator capable of operating independently of the utility grid
  - Ample carrying capacity
  - Parallel utility interconnection and switchgear control:

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# Resources/Contact

**Combined Heat and Power (CHP) for Resiliency Accelerator**

**Guide to Using Combined Heat and Power for Enhancing Reliability and Resiliency in Buildings**

Neeharika Naik-Dhungel, U.S. EPA CHP Partnership

Naik-Dhungel.Neeharika@epa.gov

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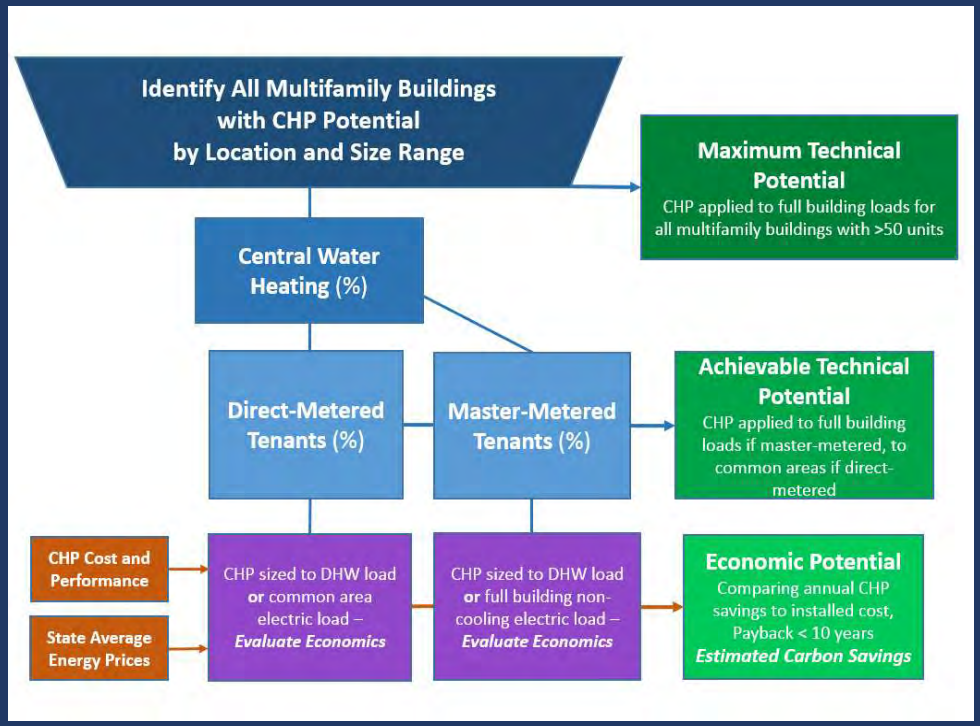
# Technical and Economic Potential for MF CHP

| Technical Potential Estimate Type | Potential (MW) |
|---|---|
| **Maximum Technical Potential:** Potential assuming that all multifamily buildings have the ability to size a CHP system to the full building, including tenant loads | **4.4 GW** |
| **Achievable Technical Potential:** Potential that is reasonably achieved with current multifamily building design limitations (central water heating, direct/master-metered) | **1.7 GW** |
| **Economic potential** estimates were calculated for all applicable building types using state average energy prices, with a <10 year payback period criteria, using state average energy prices | **0.5 GW** |

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# CHP Developer Perspective

- Key Challenges for Developers
  - Identifying building candidates with a strong technical fit and a good economic case
  - Educating building owners on the benefits (technical and economic) that CHP can provide
- Successful CHP Installations
  - Are typically led by engaged cooperative boards with technical and engineering experience
  - Involve educating and performing outreach to potential CHP hosts (site tours, expos, activities with other building managers, etc.)

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# CHP Policy Advocate Perspective

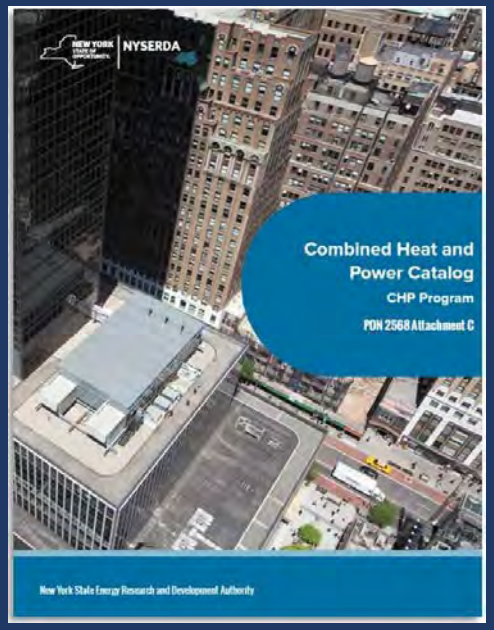
- Supportive policy environments for CHP are consistently found in areas of high multifamily CHP deployment
  - **State and local policies** can support CHP deployment through financial incentives and education – NYSERDA CHP Program
  - **Environmental policies** can contribute to the growth of CHP in multifamily buildings – Local Law 43 in NYC (oil to NG fuel switching)
  - **Utility policies and incentives** can assist multifamily customers in receiving grant funding (or similar) for projects – EmPower MD (PEPCO)

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

# CHP Program Example

## NYSERDA CHP Program: Outreach and Education

- Incentivized the installation of CHP and was one of the most successful programs in the country at encouraging CHP in the multifamily sector
- From 2014-2017, NYSERDA issued purchase orders in support of **129 CHP** projects, of which **102 were located at multifamily buildings** (or mixed-use buildings – ground-level commercial with upper-level multifamily residential) for an aggregated capacity of more than **25 MW**
- Created a **Packaged CHP Catalog**, allowing customers to easily select from a set of pre-engineered CHP modules supplied by approved vendors – also included educational materials and sizing strategies for end-users

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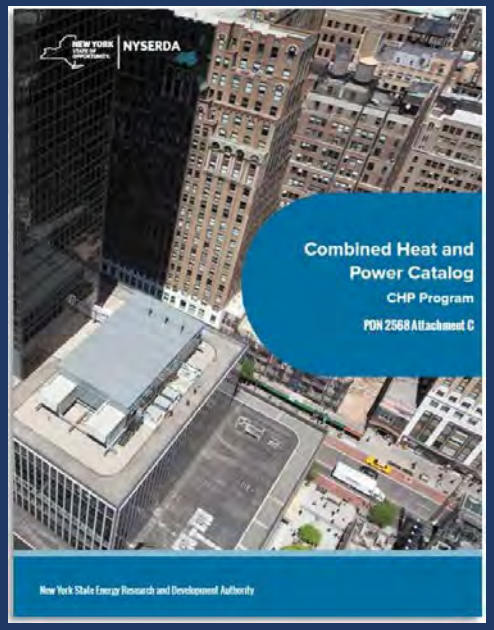


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# Stormwater Management Pilot in Queens, New York

Delma Palma, NYCHA

# Green Infrastructure at the New York City Housing Authority


Delma Palma, AIA

Design Innovation Fellow

NYCHA


NEW YORK CITY HOUSING AUTHORITY

OUR VISION FOR NEXTGENERATION NYCHA
SAFE, CLEAN, AND CONNECTED COMMUNITIES

# Introduction to NYCHA

## Who is NYCHA?

**79,000 SENIORS**
62 YEARS OLD OR OLDER

**107,000 CHILDREN**
UNDER 18 YEARS OLD

**$24,000**
AVERAGE HOUSEHOLD INCOME

**54%**
ARE EMPLOYED
(OF NON-DISABLED, WORKING AGE ADULTS)

**38%**
OF HEADS OF HOUSEHOLDS ARE 62 YEARS OLD OR OLDER


**25%**
OF NYCHA EMPLOYEES ARE RESIDENTS OF PUBLIC HOUSING

**41%**
ON FIXED INCOME
(SOC. SEC., SSI, PENSION, OTHER)

**13%**
RECEIVE PUBLIC ASSISTANCE

324 DEVELOPMENTS

MADE UP OF 2,400 BUILDINGS

THAT CONSIST OF 176,000 APARTMENTS

CONTAINING OVER 173 MILLION SQUARE FEET OF SPACE

**60%** OF NYCHA'S BUILDING ARE **50+ YEARS OLD**

**THE LARGEST DEVELOPMENT:** A **26-BUILDING APARTMENT COMPLEX** WITH **7,000 RESIDENTS**

**THE SMALLEST DEVELOPMENT:** A **SINGLE-STORY SENIOR BUILDING** WITH **13 RESIDENTS**

# NextGeneration NYCHA
## Comprehensive Sustainability Agenda

NYCHA's **commitment** as a landlord to create healthy and comfortable homes that will withstand the challenge of climate change

An **invitation** to residents and surrounding communities to work with NYCHA to realize a shared long-term vision of equity, sustainability, and resiliency

**Strategy S11: Build green infrastructure for stormwater management**

A September 2004 storm flooded 9th Street in Brooklyn.

Credit: Seth Wenig/The New York Times

# NYCHA HAS OVER 2,400 ACRES OF LAND

# 80% OF IT IS OPEN SPACE

Map of NYCHA Developments


Data Source: NYCHA Department of Research and Management Analysis

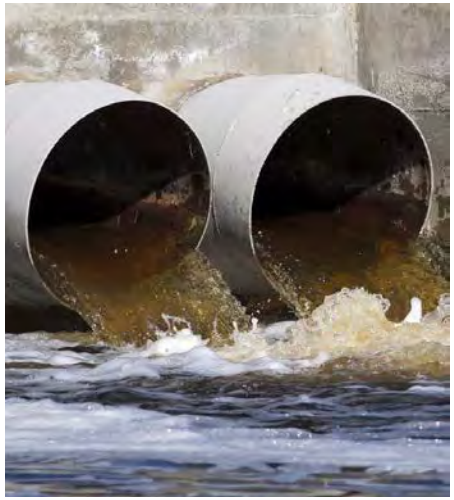
# Combined Sewer Overflow (CSO)

About 60% of NYC's sewers are combined, which means they carry both storm and sanitary flows. During stormy weather, the sewer system hits full capacity allowing a mixture of rain water and sewage to dump directly into our rivers and streams.

**This**

can help prevent

**That**



# NYC Green Infrastructure Program

## DEP's $1.5 Billion Program:

City Sidewalks

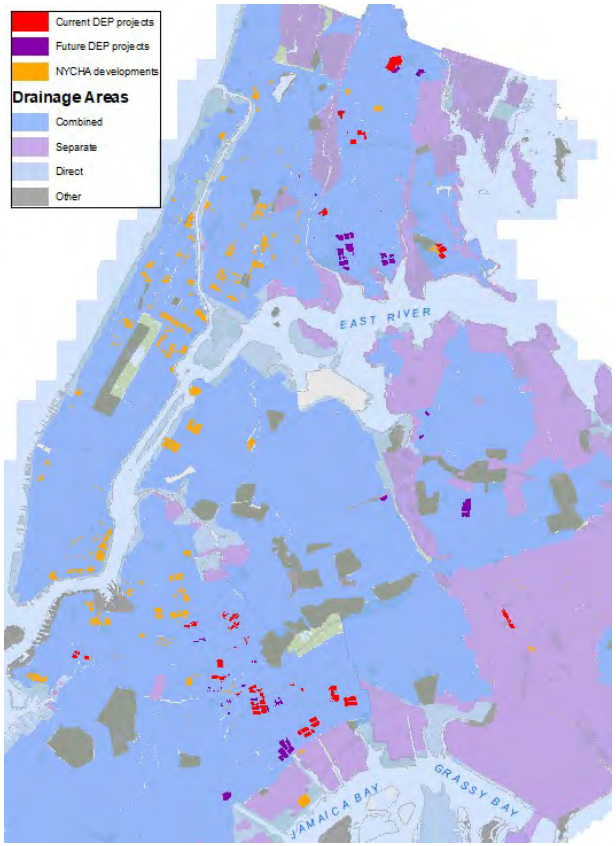

City Streets


Grant Program for Private Property Owners


Public Property Retrofits

(NYCHA)

# Green Infrastructure at NYCHA




**Phase 1:**

- **3 SITES COMPLETED**
- **1 Site IN CONSTRUCTION**

**Phase 2:**

- **20+ PROJECTS IN DESIGN**
- **Including South Jamaica Houses**

**Phase 3:**

- **30+ PROJECTS IN CONSIDERATION**

# “Cloudburst” Planning

“Multi-functional spaces are key elements in the plan, such as parks and playgrounds that can be flooded during heavy rainfall but in dry weather serve as recreational spaces for the citizens.”

-Ramboll Group






The New York Times

# *New York's Next Nickname: The Big Sponge?*


After rain flooded parts of Copenhagen in 2011, officials there developed a plan for fortifying the city against intense storms. The effort is being emulated by New York.
Mogens Flindt/Polfoto, via Associated Press

New York City has its nicknames: the Empire City, Fun City, the city that never sleeps. Now, because of a partnership between New York and Copenhagen, another might join the list: Sponge City.

New York, city officials said, needs to do better at dealing with weather phenomena that are becoming more common — cloudbursts, which are especially intense rainstorms that dump enormous amounts of water in a short time. Climate change means cloudbursts are likely to happen more frequently.

[*Climate change is complex. We've got answers to your questions.*]

So officials have spent three years studying how Copenhagen coped with heavy storm water runoff after a deluge in 2011. A Danish official called it a thousand-year weather event.

"In 2016, the second year of the partnership, New York began a cloudburst study in southeastern Queens, where storm water drains into Jamaica Bay. Now in the planning stages is a pilot program at the South Jamaica Houses, a public-housing project that dates to when Fiorello H. La Guardia was mayor."

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

- $700k Match grant to do stormwater management, water-metering, and waste management strategies at South Jamaica Houses
- $100k dedicated solely to Resident Engagement around the Green Infrastructure

CLEANER GREENER COMMUNITIES — The New NY WORKS for Business

# Why South Jamaica Houses?


NEW YORK CITY HOUSING AUTHORITY

OUR VISION FOR NEXTGENERATION NYCHA
SAFE, CLEAN, AND CONNECTED COMMUNITIES


# 1. CULTURE OF SUSTAINABILITY

# 2. ACTIVE NETWORK OF LOCAL RESOURCES


# 3. STRONG RESIDENT LEADERSHIP

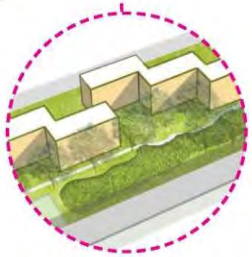

103rd Precinct | Positive Project 40 Day | Bridging The Gap
NYC Councilmember Adrienne Adams | Coalition Kids
AUGUST 25TH
11 AM - 3PM
BACK TO SCHOOL BASH
Ready
Set
Engage
COMMUNITY FUN DAY
Coalition Kids
Backpack & Supply Giveaways
Kids vs Cops Basketball Games
Free Food & Live Performances
PS4 & XBOX Game Trucks | Bouncy Houses/Water Slides
Giveaways, Music, Family Fun & MORE!
Jamaica Playground
160th St & 110th Ave
Bank of America
Walmart
DOLLAR TREE
WellCare
SHOWING HEARTS FOUNDATION


Please come out to discuss
potential changes to the
BASKETBALL COURT
& surrounding green areas
SATURDAY OCT. 20
12:00PM - 3:00PM
BASKETBALL COURT
AT SOUTH JAMAICA HOUSES
Food will be provided on a first come, first serve basis!
Pick Your Design for the New Court!
Your input is needed!
Your Vote Matters, Design Your Court


DESIGN CHARRETTE
JOIN US !
We want to hear your vision and ideas for the common outdoor space in the South Jamaica Houses!
Join us at the charrette to learn more about the stormwater strategies and concepts for the South Jamaica Houses. Help us figure out which new outdoor public amenities can be a part of this resiliency effort. Your input will directly impact the redesign of your outdoor common areas!
SATURDAY SEP. 22
12:00PM - 3:00PM
YORK COLLEGE
FACULTY & STAFF DINING ROOM
NYC Environmental Protection

# AREA 2, NEAR 109TH ST

Existing condition - Near 109th Street

Area 2

**Please use a sticky to indicate which option would you prefer for Area 2? Why?**

## OPTION A: SHALLOW GRASSY LANDSCAPE

A shallow landscape will hold less water. It can allow for grassy spaces with pathways.



## OPTION B: SUNKEN LANDSCAPE/CENTRAL PARK

A sunken landscape is deeper so can hold more water. In return, it can provide opportunities for more features. In this option, a portion of the community garden is relocated to allow for a large 'central park' type concept.

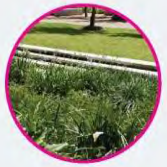

**Which features would you like to see in your preferred option? Pick any 3. Use a ● blue dot for Option A and a ● red dot for option B.**

PLANTING - FLOWERS

PLANTING - GRASSES

SEATING BENCH

PAVING/WALL



STEPS

NATURAL SEATING

NEW YORK CITY HOUSING AUTHORITY

OUR VISION FOR NEXTGENERATION NYCHA
SAFE, CLEAN, AND CONNECTED COMMUNITIES

## OPTION B: SUNKEN LANDSCAPE/CENTRAL PARK

A sunken landscape is deeper so can hold more water. In return, it can
opportunities for more features. In this option, a portion of the communit
garden is relocated to allow for a large 'central park' type concept.


n? P ... 3. Use a ● blue dot for Option A and a ● red
or option B.

URAL STEPS

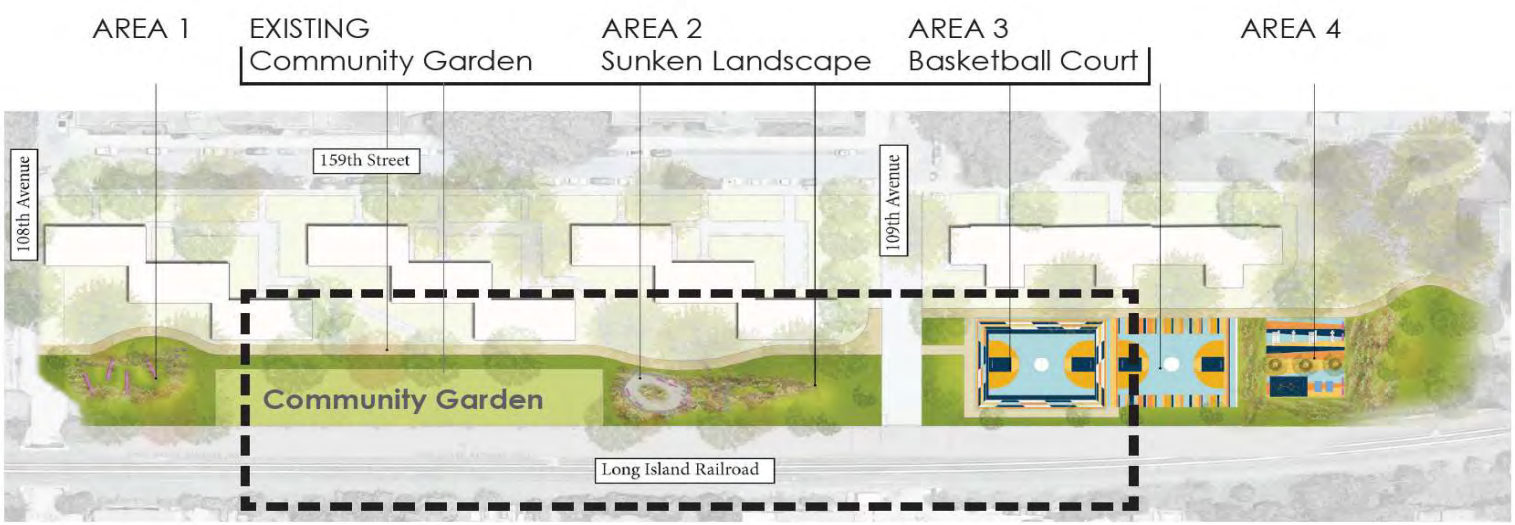
SCULPTURAL STEPS

● WOODEN PLATFORM

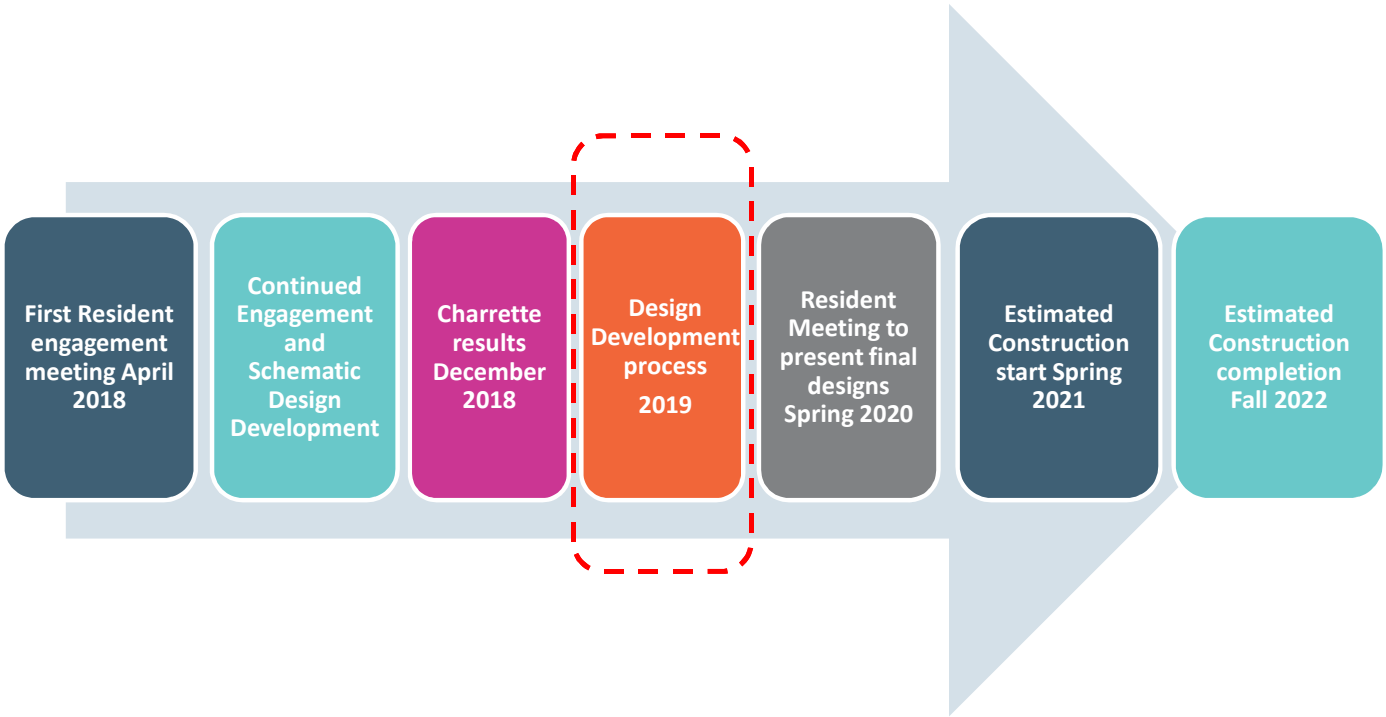
## OPTION C: SUNKEN; 18 INCH DEEP

A deeper basketball court can hold more water above grade. This opt
for a new basketball court with more seating and varying stepped feat
along the periphery. There will be an underground tank in this option to

# Schematic Design



# Timeline


First Resident engagement meeting April 2018
Continued Engagement and Schematic Design Development
Charrette results December 2018
Design Development process 2019
Resident Meeting to present final designs Spring 2020
Estimated Construction start Spring 2021
Estimated Construction completion Fall 2022

# Thank you! Questions?

Delma Palma, AIA
Design Innovation Fellow
Department of Design | Capital Projects Division
Email: Delma.Palma@nycha.nyc.gov

Better Buildings® CHALLENGE
U.S. DEPARTMENT OF ENERGY

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

# Q&A

# Q&A

- Housing providers:
  - To what extent are you addressing resilience in your housing portfolio?
  - What are the weather hazards you are dealing with?
  - How would you rate the organization on a scale of 1-10, being prepared for the next big weather event?
  - What are the barriers you've encountered/anticipate encountering to being better prepared?
  - What kind of support would be helpful through the BBC and/or from HUD/DOE?
- Stormwater management:
  - What are your biggest challenges in implementing stormwater management practices?
  - What resources do your locations provide to incentivize innovation in stormwater management?

# A Healthy Housing "Accelerator"

- We are considering launching a HH Accelerator over the next year.
- We would like a small planning group to help design the Accelerator.

# Why a Healthy Housing Accelerator?

- Strong evidence that indoor home environment is a significant factor in resident health
- IAQ especially important when tightening buildings due to energy upgrade
- 36% of renters, 24% report some healthy housing concerns
- Air quality issues most prevalent: dust, mold and moisture, lack of sufficient ventilation
- Other concerns include water quality, pests, concerns about phyisal structure.
- Good progress in new construction but continuing barriers to paying for and adopting healthy housing measures in existing structures

# Approach

- Convene 25 stakeholders to foster collaboration among state and local agencies, housing or home performance providers, hospitals, managed care providers, and other interested stakeholders.
- Host 1 to 2 one-day convenings of interested stakeholders
- Healthy Housing Accelerator workshop at next year's summit
- Hold up to 10 open calls and/or webinars between convenings

# Potential Outcomes

- Expand Medicaid financing for healthy housing assessments, and community benefits funding for healthy housing improvements.
- Improve coordination of lead hazard, affordable housing, weatherization and other resources to deliver comprehensive energy plus health building upgrades.
- Expand adoption of combined health housing and energy audit/assessment tools
- Expand partnerships of managed care providers, hospitals, and housing owners/operators to implement comprehensive energy plus healthy housing interventions.

# If Interested…

- If interested, let us know!
- Sign up for the Accelerator Planning Team.
- Contact: **Michael.freedberg@hud.gov** or **Leslie.Zarker@icf.com**



# Thank You!

U.S. DEPARTMENT OF ENERGY