



**Community
Preservation
Corporation**

**OPTIMIZING BUILDING
ENVELOPES AND VENTILATION**

DANIELLE DONNELLY

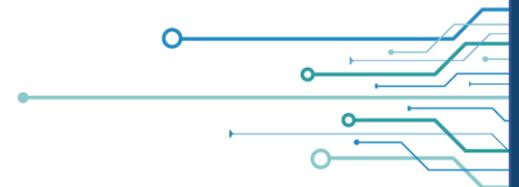
AVP, SUSTAINABILITY PROGRAMS

CPC

Danielle Donnelly is the AVP of Sustainability Programs, leading the company's efforts to improve the built environment and mitigate the effects of climate change on our communities. She is responsible for working with CPC's internal originations and equity staff, as well as its borrowers and external partners to advocate for, and implement financing solutions to improve the built environment and support the development of high-performance housing.

Since joining CPC in March 2018, Danielle has played a key role in developing and implementing the company's sustainability initiatives and practices to encourage adoption of high-performance retrofits and new construction practices as part of its strategic loan offerings and equity investments. Danielle works with CPC's customers, community partners, and housing agency partners to advocate for common-sense climate and energy policies, develop resources highlighting new technologies and programs to support decarbonization, and provides technical assistance to CPC borrowers pursuing energy efficiency and high-performance design projects.

CPC WEBINAR



TODAY'S AGENDA

Welcome and Setting the Stage

Danielle Donnelly, CPC

Envelope Construction

Alisia Colon, Steven Winter Associates

Ventilation Systems

Leia Sims, BlocPower

Building Health and Maintenance

Open Q&A

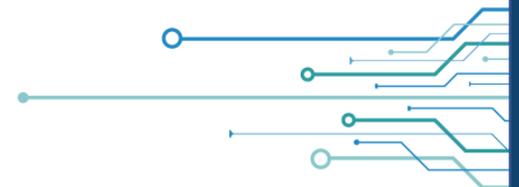
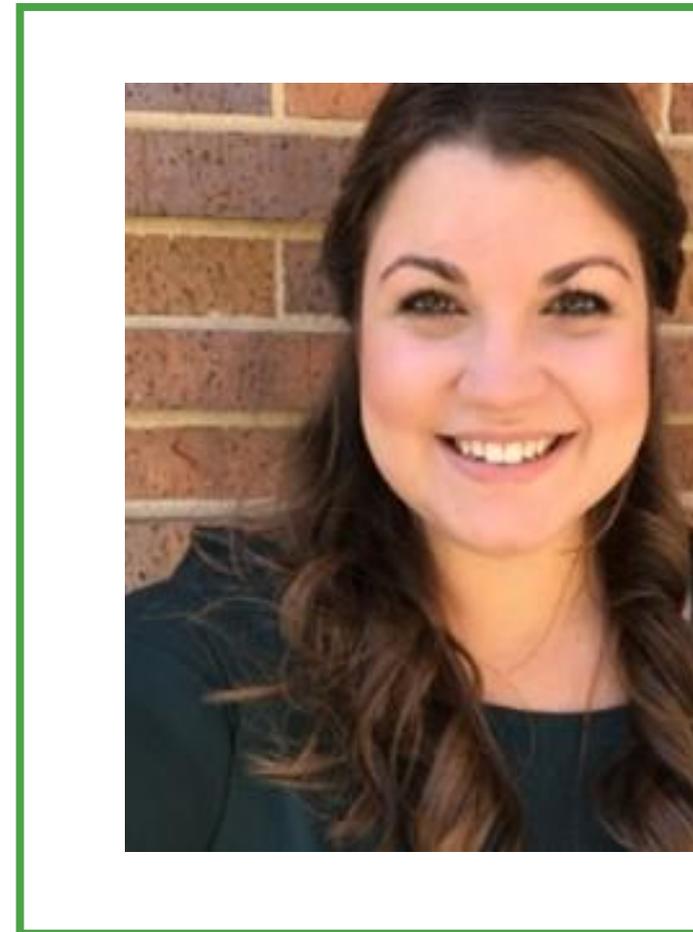
ALISIA COLON

BUILDING SYSTEMS ANALYST

Steven Winter Associates

Alisia Colon is a Building System's Analysts at Steven Winter Associates where she specializes in field inspections and performance testing for projects pursuing Passive House certification. She currently holds the Phius+ Verifier certification and is working towards certification to verify projects pursuing the new Energy Star Multifamily New Construction (MFNC) program. She primarily works on multifamily affordable housing projects in New York City but has experience with both residential and commercial projects across the Northeast region. She consults with project teams throughout design and construction, with early involvement in plan reviews and later final testing to ensure actual performance meets design specifications.

Her engineering education, along with hands-on experience, allows her to collaborate and problem-solve with project teams to ensure that the design intent is carried out in construction and continues in the operation and maintenance of these high-performance buildings.



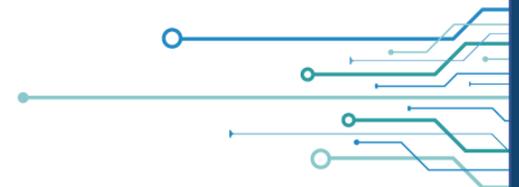
LEIA SIMS

VP OF ENGINEERING SERVICES

BlocPower

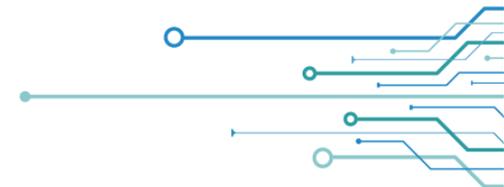
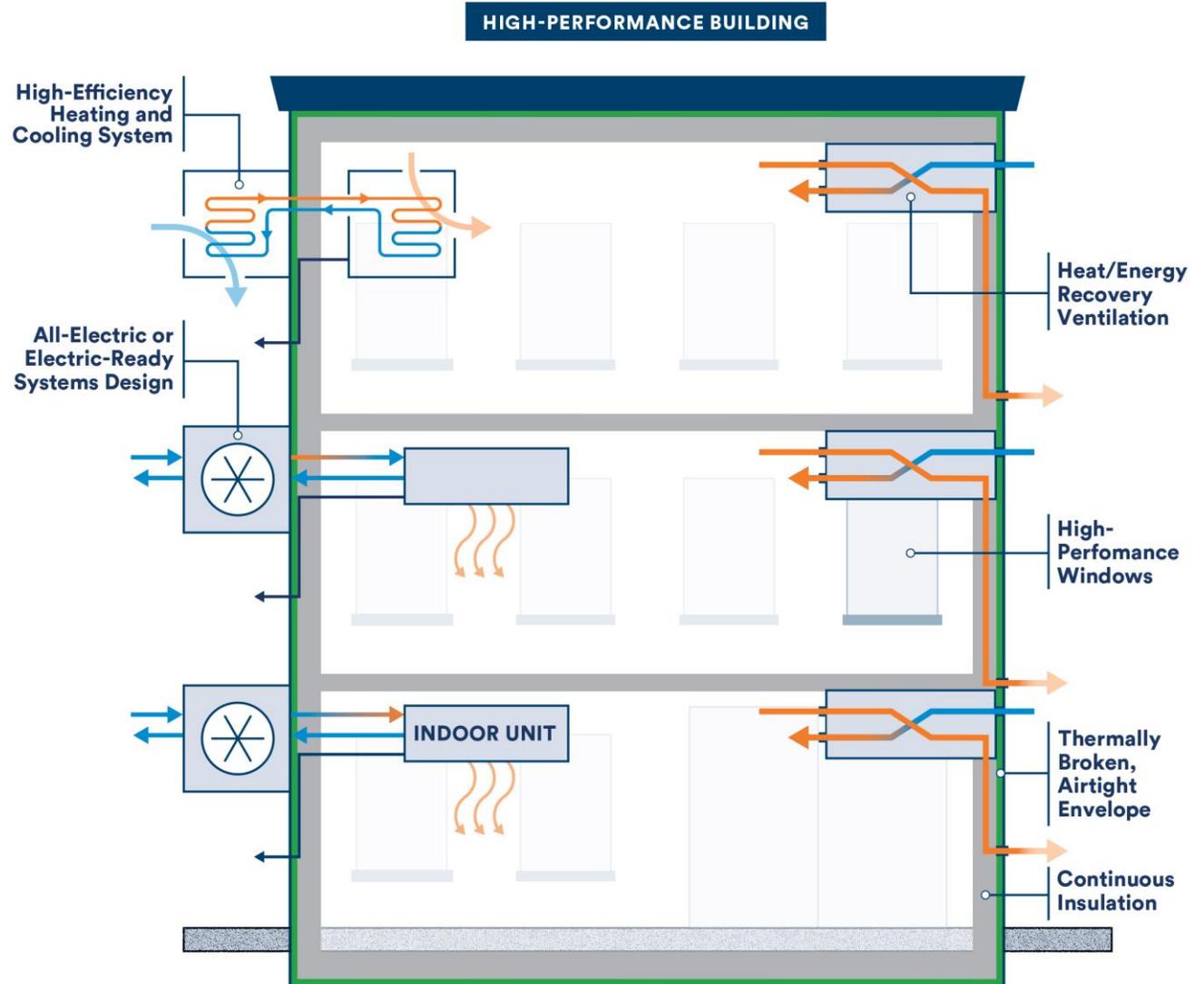
Leia grew up as part of a renewable energy family business; it was this upbringing that helped pave her passion for making buildings more energy efficient. She has held numerous certifications from the Building Performance Institute since 2006 and has dedicated her career to assessing buildings as a system and taking a holistic approach to retrofits. Leia uses these fundamental concepts when educating owners, operators and tradespeople, diagnosing buildings of all sizes and implementing the most cost-effective solutions to reduce energy use in buildings.

Currently, Leia is the VP of Engineering Services at BlocPower where she works with a dedicated team, to decarbonize and electrify buildings across the country.

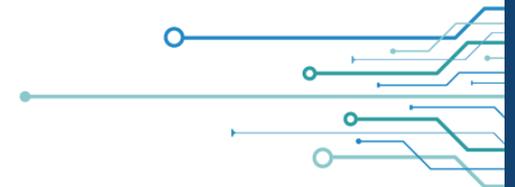


• High-Performance Building Principles

- Continuous insulation
- Minimize thermal bridging
- Airtightness
- Mechanical ventilation systems

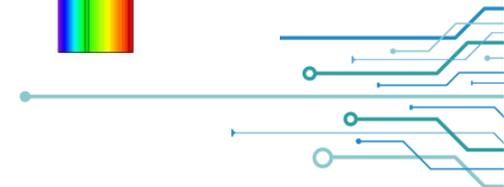
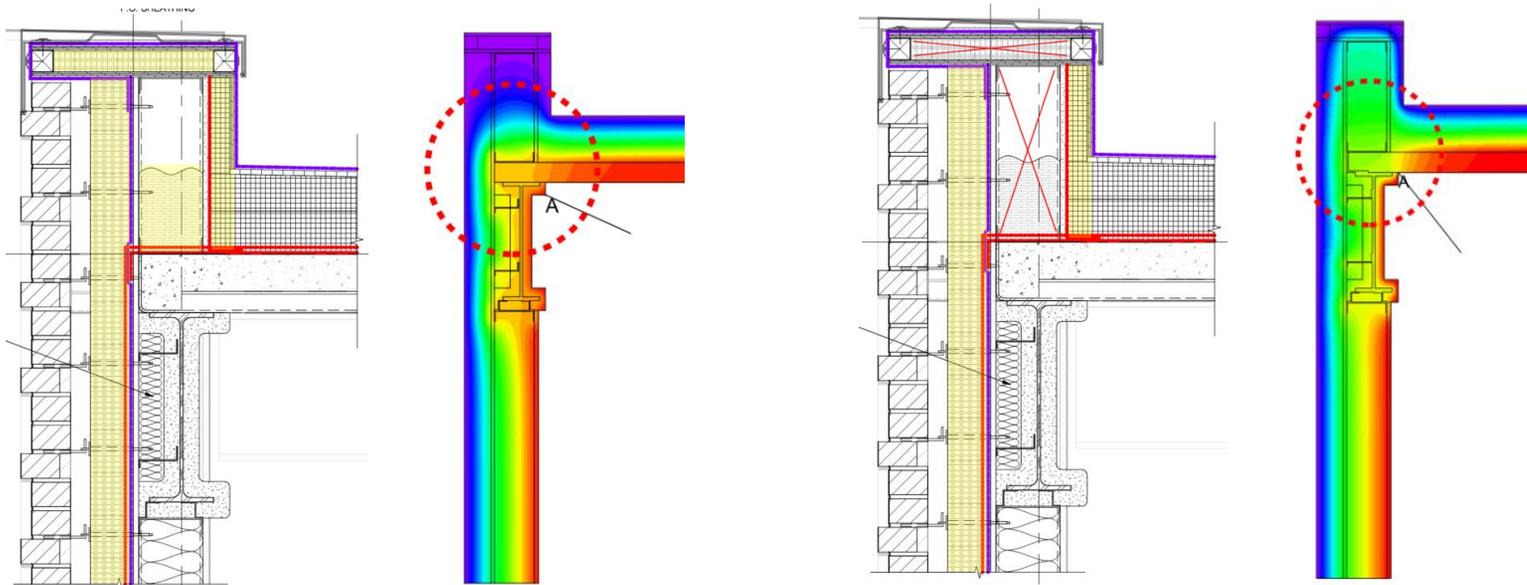


- Insulation is like the sweater that keeps you warm; air sealing is the shell that keeps the wind out. No gaps in either!
- Insulation continuity is critical at intersection points including:
 - Floor to wall connections
 - Wall to roof connections
 - Wall corners



MINIMIZE THERMAL BRIDGING

- Thermal bridging is the movement of heat across a conductive surface; can be a major source of heat (& energy) loss in buildings
- Typical thermal bridge locations include:
 - Floor to wall connections
 - Wall to roof connections
 - Exterior wall cladding attachment systems (brick ties/ anchors, panel clips etc.)
 - Windows & doors
 - Balconies & terraces

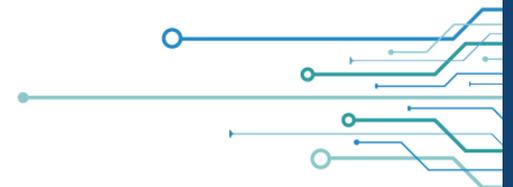


- How to minimize thermal bridging?
 - Continuous insulation
 - Use less conductive materials

Brick Veneer Systems: Ties			Cladding Finish Systems: Clips			
<p>Galvanized Steel Brick Ties</p> <p><u>Description</u></p> <p>Typical brick ties are galvanized steel. Most brick veneer projects use this type of product.</p> <p>Thermal efficiency per SWA: 75-84%</p> <p>75% for Steel backup 84% for CMU backup</p> <p>Standard Product</p>	<p>Stainless Steel Brick Ties</p> <p><u>Description</u></p> <p>Stainless steel ties are less conductive than galvanized steel ties.</p> <p>Thermal efficiency per SWA: 87-93%</p> <p>87% for Steel backup 93% for CMU backup</p> <p><u>Example Products:</u> 2 Seal Tie Thermal, Original Pos-I-Tie</p>	<p>Thermal Break Brick Ties</p> <p><u>Description</u></p> <p>This stainless steel brick tie has a plastic coating, which reduces thermal bridging.</p> <p>Thermal efficiency per SWA: 88-94%</p> <p>88% for Steel backup 94% for CMU backup</p> <p><u>Example Products:</u> 2 Seal Tie Thermal Wing Nut Anchor</p>	<p>Galvanized Metal Clips</p> <p><u>Description</u></p> <p>These clips are usually galvanized steel and are used to support rainscreen and panel cladding systems.</p> <p>Thermal efficiency per SWA: 46-59%</p> <p>46% for Steel backup 59% for CMU backup</p> <p>Standard Product</p>	<p>Stainless Steel Clips</p> <p><u>Description</u></p> <p>Replacing galvanized steel clips with stainless steel ones can greatly reduce the thermal conductivity.</p> <p>Thermal efficiency per SWA: 63-74%</p> <p>63% for Steel backup 74% for CMU backup</p> <p><u>Example Products:</u> A-Clip, MFSSCHAN</p>	<p>Aluminum Clips</p> <p><u>Description</u></p> <p>Aluminum clips are light weight and strong. They are a more elastic and non corrosive alternative to traditional metal clips.</p> <p>Thermal efficiency per SWA: 38-52%</p> <p>38% for Steel backup 52% for CMU backup</p> <p><u>Example Products:</u> Alpha Brackets</p>	<p>Fiberglass Clips</p> <p><u>Description</u></p> <p>Fiberglass clips have a much lower thermal transmittance coefficient than any metal equivalent.</p> <p>Thermal efficiency per SWA: 64-79%</p> <p>64% for Steel backup 79% for CMU backup</p> <p><u>Example Products:</u> Cascada Clip</p>

Excerpts from Steven Winter Associate's High Performance Wall Guide

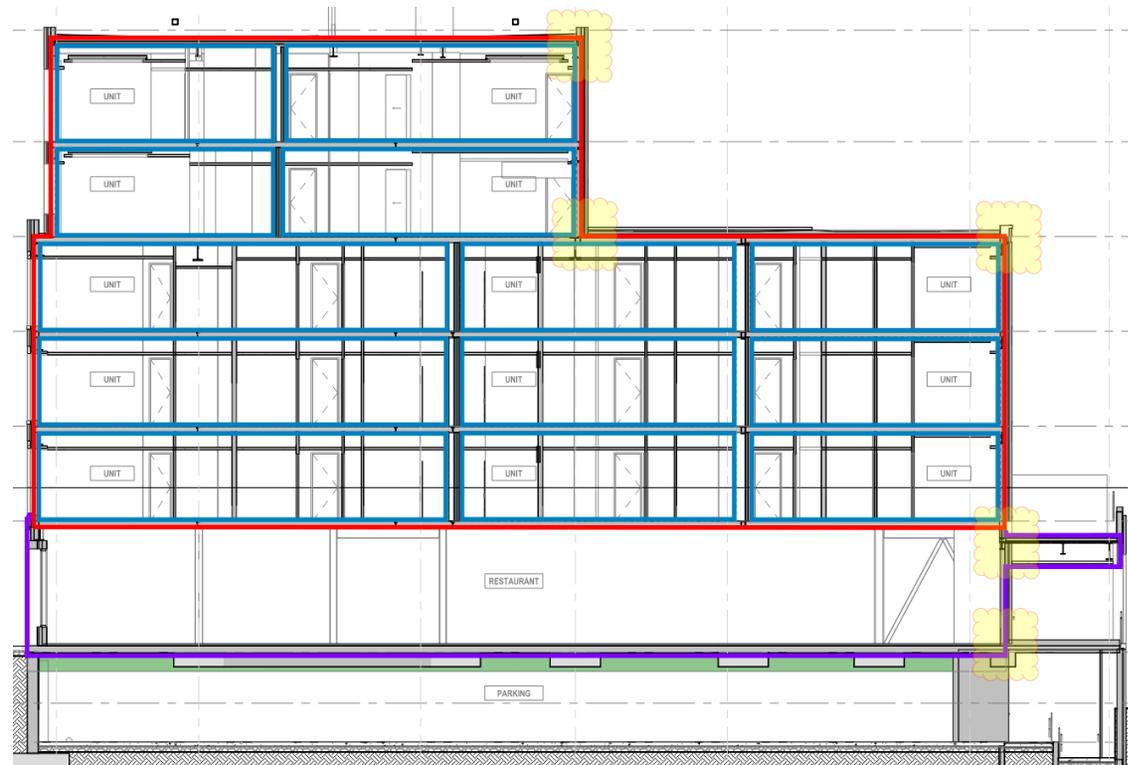
- Air leakage is uncontrolled air exchange via gaps and cracks between spaces (between the indoors & outdoors or between two rooms)
- What are the problems associated with air leakage?
 - Draughts & discomfort
 - Increased asthma, allergies & other health issues
 - Localized moisture & condensation problems
 - Heat (& energy) loss
 - Increased space heating & cooling demand
 - Increased total energy consumption



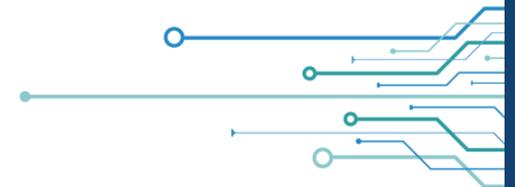
- **Airtightness is the process of eliminating gaps, cracks, and holes in the building envelope**
- **Air barrier continuity is critical at intersection points including:**
 - Floor to wall connections
 - Wall to roof connections
 - Windows & doors
 - Storefront canopies

AIR SEALING AND INSULATION

- THERMAL ENVELOPE (AIR, VAPOR, & THERMAL)
- PH ENVELOPE
- COMPARTMENTALIZED SPACE



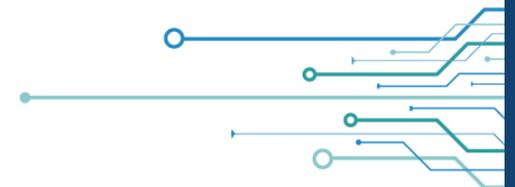
- To optimize building performance, you can't have one without the other!
- Now that the building is insulated and airtight, a ventilation system is needed to bring in fresh, filtered air and exhaust indoor pollutants, CO₂, odors, and moisture to the outdoors



- Remove moisture
 - Cooking, condensation, sweat, bathing
- Remove gases
 - Carbon Monoxide
 - Carbon Dioxide
 - Radon
- Remove smells
- Remove airborne pollutants
 - Dust, pollen and other allergens
- Provide fresh air



- Indoor Air Quality (IAQ) - the air quality within buildings
- IAQ affects the health, comfort and well-being within buildings
- Poor IAQ has been linked to:
 - Asthma and other respiratory diseases
 - Sick building syndrome
 - Impaired learning in schools
 - Reduced productivity
- Highly discussed with the spread of COVID-19



- No Ventilation
- Natural/Passive Ventilation
- Exhaust-only Mechanical Ventilation
- Supply-only Mechanical Ventilation
- Balanced ventilation
 - Essential for maintaining good indoor air quality (IAQ)

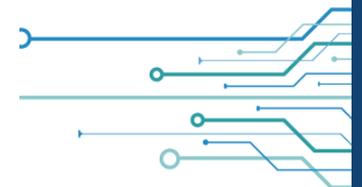


HRV – Heat Recovery Ventilator

- ✓ Saves energy
- ✓ Transfers heat
- ✓ Ensure adequate air changes per hour (ACH)
- ✓ Remove airborne pollutants, contaminants, and smells
- ✓ Remove excess moisture

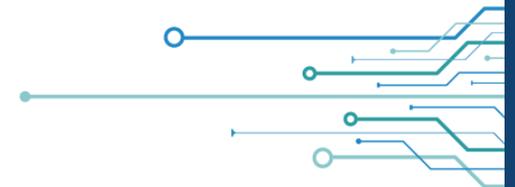
ERV – Energy Recovery Ventilator

- ✓ Saves energy
- ✓ Transfers heat
- ✓ Ensure adequate air changes per hour (ACH)
- ✓ Remove airborne pollutants, contaminants, and smells
- ✓ Remove excess moisture
- ✓ Maintains desired humidity levels



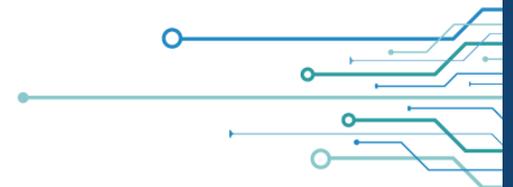
A Holistic Approach

Ventilation and insulation work together to create a healthy indoor environment



A Holistic Approach

- Tighten the envelope
 - Air seal
 - cracks and gaps around windows, seams and other building connections to outdoors
 - plumbing and electrical penetrations
 - Properly install continuous insulation, on all sides of the thermal envelope
- Install properly sized mechanicals
 - Heating
 - Ventilation
 - Air Conditioning
- Implement an effective maintenance plan



How to maintain building performance for years to come?

- O&M manual – why were the systems installed and how do they work?
- O&M staff training – how do you properly maintain systems?
 - Environmental factors
 - Filters and system maintenance
- Occupant/ residential manual – why pays for what and what do these systems do for tenants?



Questions?

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- **CPC Verifi:** Explore utility savings and financing options for energy upgrades. <https://www.Cpcverifi.com>
- **NYC ACCELERATOR:** Free, expert guidance to future-fit New York City. <https://www1.nyc.gov/site/nycaccelerator/index.page>
- **Climate Friendly Homes Fund:** Learn more and sign up for email updates. <https://bit.ly/climatefriendlyhomes>

