OREGON HOUSING & COMMUNITY SERVICES

Multifamily Energy Program

PUSHING THE ENVELOPE IN EXISTING MULTIFAMILY

Comfort, Durability, and Energy Performance

Date: October 24, 2019

Presenter: Nick Young, Association for Energy Affordability

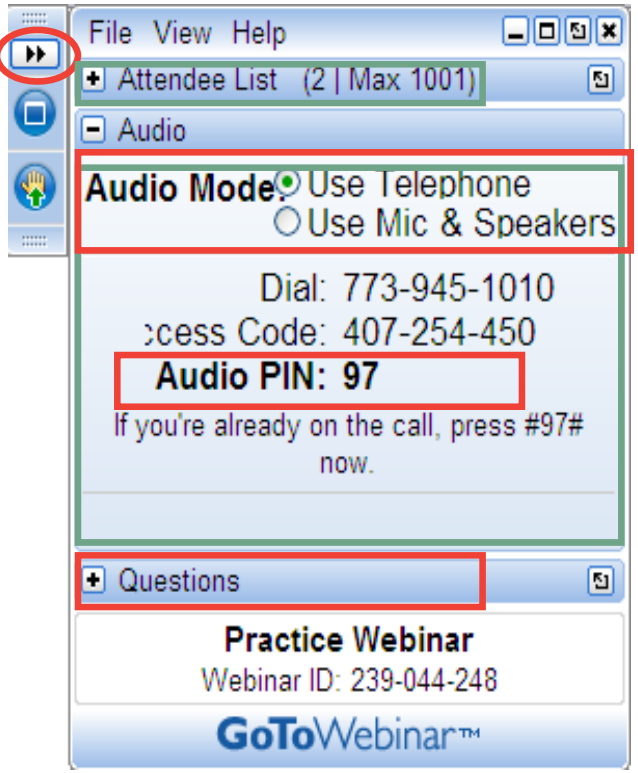
OREGON HOUSING and COMMUNITY SERVICES

TRC

ASSOCIATION FOR ENERGY AFFORDABILITY INC.

USING GOTOWEBINAR

Open and close your **control panel**



Choose **audio mode**

Enter your **audio pin**

Type **questions** in the chat box

Questions will be taken at the end of the presentation.

REGISTER FOR UPCOMING TRAININGS

- **Thursday, January 23rd, 2020, 12pm:**
  Ductless Heat Pumps + Controls | REGISTER NOW

REGISTER
for the monthly newsletter to stay updated on future trainings!

MEET THE TRAINER

Nick Young
Association for Energy Affordability

OR-MEP INCENTIVES

The OHCS Multifamily Energy Program (OR-MEP) provides incentives for energy efficiency measures that results in ELECTRIC SAVINGS

Qualifying Energy Efficiency Measures

The OHCS Multifamily Energy Program provides incentives for energy efficiency measures that results in electric savings, including the following:

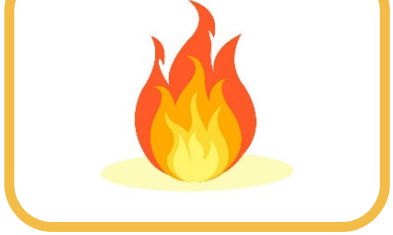
AGENDA

- Envelope Basics
- Air Sealing
- Insulation
- Windows
- Ventilation

ENVELOPE BASICS

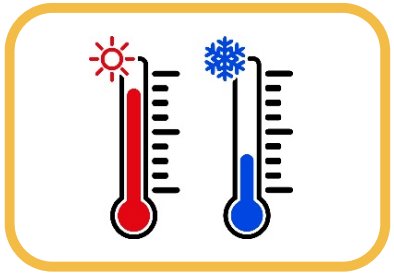
WHAT DOES THE BUILDING ENVELOPE CONTROL?

Water

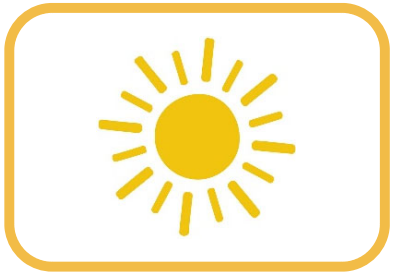


Fire

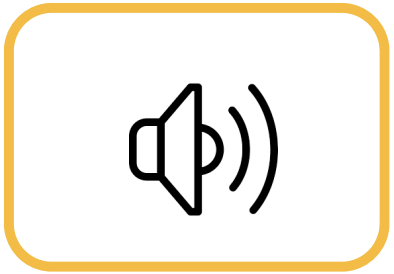
Air



Heat



Light



Sound

BUILDING ENVELOPES HAVE EVOLVED

1200 BCE

Today

Build tight.
Ventilate right.

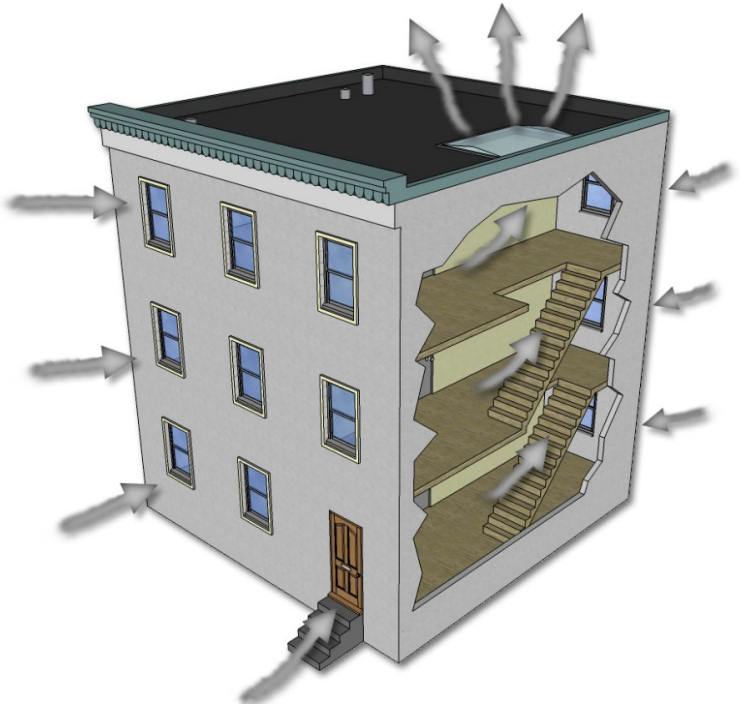
Let's talk about building tight.

AIR SEALING

WHY BUILD AIR-TIGHT?

Comfort	Durability	Energy Efficiency
Reduced drafts and cold/hot spots in home.	Air-tight, vapor-permeable envelopes reduce potential for unwanted moisture build-up .	Save energy and money.

LOCATING AIR LEAKAGE: *VISUAL INSPECTION*



- **Air leakage most likely around penetrations such as:**
  - Doors
  - Windows
  - Ductwork
  - Electrical outlets/switches
  - Pipe penetrations (under sinks)
- **NOTE: (Most) insulation does not stop air movement.**
  - Gaps stuffed with insulation for firestopping will still allow air leakage.
- **Air tight materials: wood, drywall, caulk, foam sealant, some tapes**

MEASURING AIR TIGHTNESS: *BLOWER DOOR TEST*

- Performed by HERS Rater or BPI Building Analyst
- Establishes baseline against which to measure improvement
- Used to locate leaks to seal
- Can test whole building or compartmentalization of individual units

AIR SEALING & EXISTING BUILDING REHABS

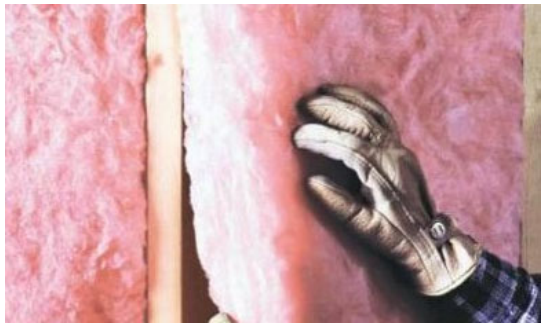
- ❑ **Many envelope upgrades will tighten envelope.**
  - Windows
  - Insulation (densepack)
- ❑ **Should include air sealing in any insulation scope.**
- ❑ **Can be challenging because many trades are involved in sealing of penetrations.**

BEST PRACTICE: Start by blower door testing rehab projects BEFORE and AFTER work is completed to understand impacts of standard scope.

QUESTION BREAK

INSULATION

INSULATION MATERIALS



Fiberglass

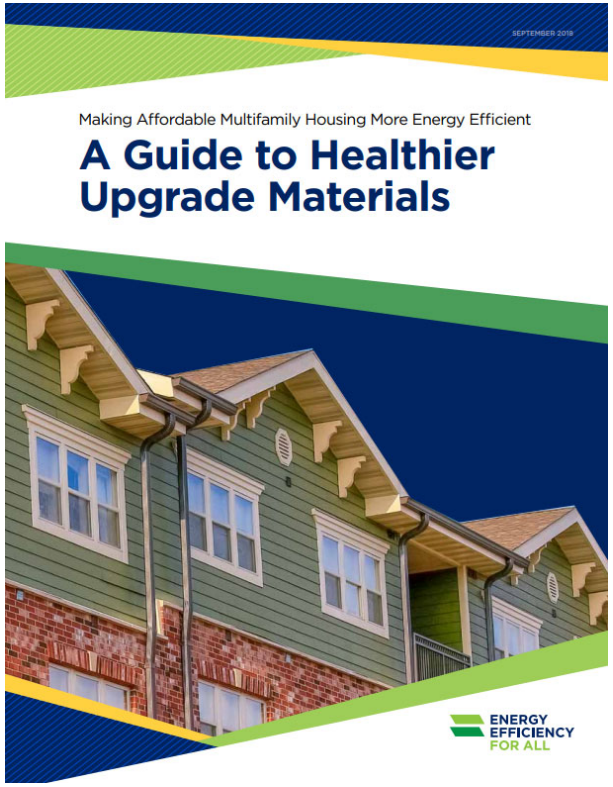
Cellulose

Rock Wool

Foam Board
(EPS, XPS, Polyiso)

Spray Foam
(Open- & Closed-Cell)

CHOOSE HEALTHY BUILDING MATERIALS



- Air sealing and insulation products can have widely varying chemical properties
- Some are benign, others have been linked to negative health outcomes.

A Guide to Healthier Upgrade Materials
(Energy Efficiency for All)

INSULATING EXISTING BUILDINGS: *TOP*

- **Attic**
  - Air seal attic, then blow in fiberglass or cellulose
  - Batts poor choice in attics

- **Cathedral/Flat Roof**
  - Add rigid insulation when replacing roof.
  - May need sloping for drainage.

INSULATING EXISTING BUILDINGS: *BOTTOM*

What works depends on floor framing…

- **16” OC**
  - Friction fit or stapled batts
  - Blown with netting
- **Post-&-Beam**
  - Long span (36”+) presents challenge
  - Netting + blown? Spray foam?
- **Concrete garage ceiling**
  - Usually fireproof foam; sometimes rockwool or rigid foam

INSULATING EXISTING BUILDINGS: *CAVITY WALLS*

- **Framed Walls**
  - If removing drywall: new batts or blown insulation
  - If keeping drywall: drill & fill (fiberglass or cellulose)

- **Masonry/Concrete Walls**
  - Challenging, but ideal location is on the outside

INSULATING EXISTING BUILDINGS: *EXTERIOR*

- **Why? Building science.**
  - Insulation on exterior improves continuity and reduces thermal bridging
- **When it makes sense**
  - Replacing sheathing or siding
- **Materials**
  - Best: rock/stone wool
    - Fireproof
    - Low embodied carbon
  - Acceptable: foam
    - Requires fire retardants
    - High embodied carbon

QUESTION BREAK

WINDOWS

WINDOWS

- **Frame Materials**
  - Choose non-conducting fiberglass, wood, or vinyl
  - Thermally-broken aluminum common, but performs poorly
- **Glazing**
  - Standard: Double-pane low-e
  - High-performance: Triple pane
  - Coming soon: Thin-triple with middle pane of non-structural glass

Build tight.
Ventilate right.

Let's talk about ventilation.

VENTILATION

VENTILATION IMPROVEMENTS

With a tighter envelope, care must be taken to provide adequate ventilation.

"Natural"	Conventional	Improved	High Performance
★☆☆☆	★★☆☆	★★★☆	★★★★
"Natural" ventilation is really just random & unreliable	Intermittent exhaust at bath and kitchen, passive makeup air	Filtered supply air (MERV 8 or 13), with exhaust	Balanced filtered supply (MERV 13) and exhaust with heat/energy recovery and summer bypass

Ventilating *right* means providing enough, but not too much, fresh air.

MORE INFO ON VENTILATION

OR-MEP Webinar Training
High Performance Ventilation

Thursday Feb 20, 2020

HOW DO WE TRULY PUSH THE ENVELOPE?

DEEP ENERGY RETROFITS FOR ZERO ENERGY PERFORMANCE

Energiesprong: A Dutch inspired approach for affordable deep energy retrofits.

DEEP ENERGY RETROFITS FOR ZERO ENERGY PERFORMANCE

Energiesprong project in Netherlands, before (right), after (left)

New exterior wall assembly seen over the existing wall

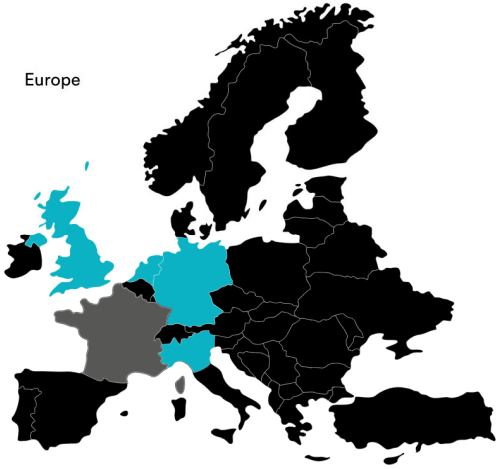
Exterior mechanical room

Report: Energiesprong: A Dutch Approach to Deep Energy Retrofits (NYSERDA)

DEEP ENERGY RETROFITS FOR ZERO ENERGY PERFORMANCE

Energiesprong

- **Europe - UK, Germany, Netherlands, France, Italy**
  - https://energiesprong.org/
- **New York: Retrofit NY**
  - https://energiesprong.org/country/new-york/
- **California: REALIZE**
  - https://energiesprong.org/country/california/



THANK YOU FOR ATTENDING

Oregon Housing and Community Services
Multifamily Energy Program

www.oregonmultifamilyenergy.com

Nick Young

nyoung@aea.us.org