innova
BUILDING ADVISORS

Step2Savings Energy Challenge

Identifying Savings: Common Sustainability Opportunities

innova
BUILDING ADVISORS

Energy Services and Building Analytics for the Affordable Housing Sector

- Founded 1997
- Roots in multifamily building maintenance and construction
- Capital Needs Assessments and Energy Audits
- New Construction Certification Services: ENERGY STAR, DOE Efficient New Homes, Passive House
- LIHTC Experts
- BPI Certified and HUD Approved Analysts/Assessors
- ENERGY STAR and ENH Partner, HERS Raters, CPHCs, PHIUS Verifiers

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1. Understanding Retrofits
2. Types of Retrofits
3. Conclusions and Next Steps

Understanding Retrofits

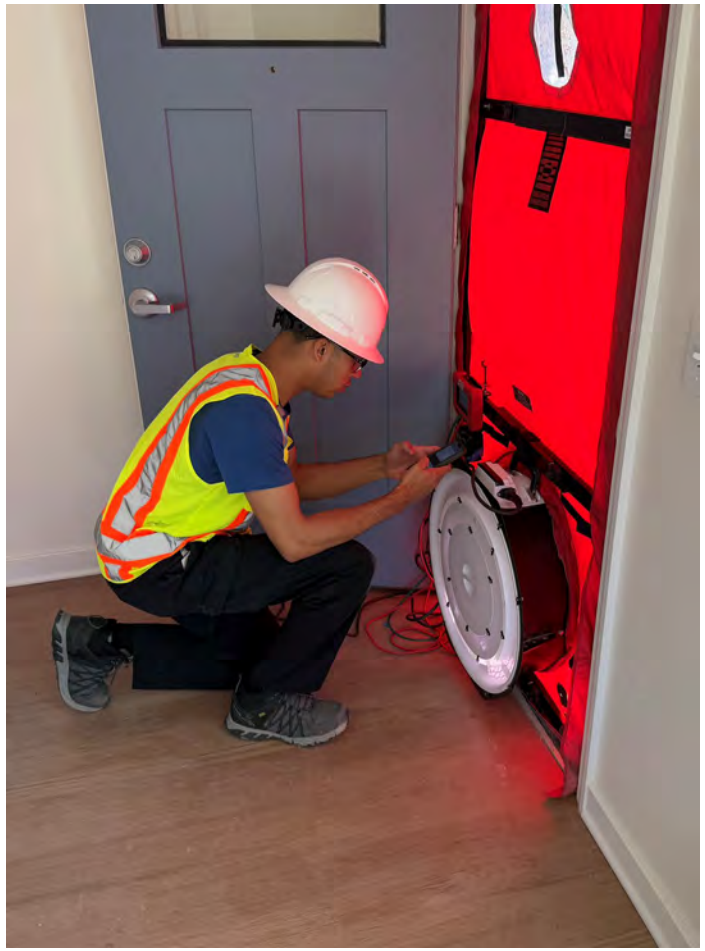
- What is a retrofit?
- Benefits of retrofits
  - Energy
  - Maintenance
  - Health & Safety

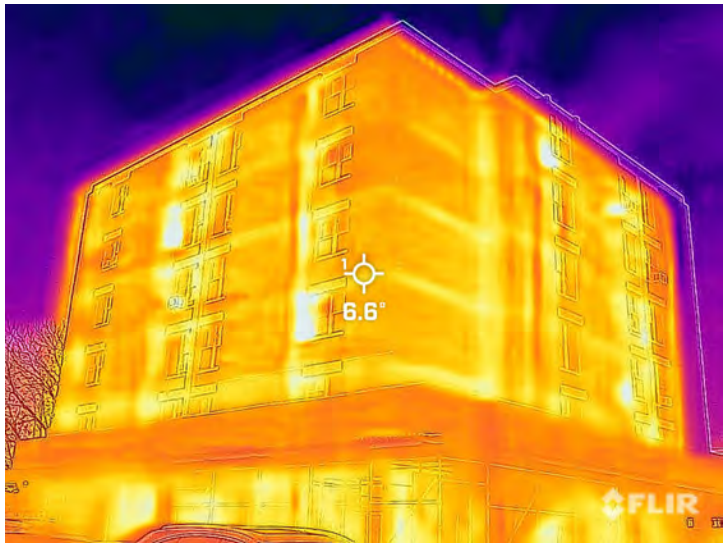
Understanding Retrofits

- What kind of building do you have?
- Systems
  - Enclosure (“Envelope,” “Shell”)
  - Electrical
  - Mechanical
  - Hot water
- What is it used for?
  - Population/program/services
- Central vs unitized systems
- Metering: who pays?

Understanding Retrofits

- Diving Deeper: Energy Audits and Capital Needs Assessments
  - Sometimes required by funding sources
- What hurts?
- What does benchmarking tell us?
- Billing data
- Health & safety
- Ask the maintenance guy!





Types of Retrofits

- Enclosure
- Electrical
- Plumbing
- Mechanical
- Low Hanging Fruit, Get The Ladder, Up In Treetops

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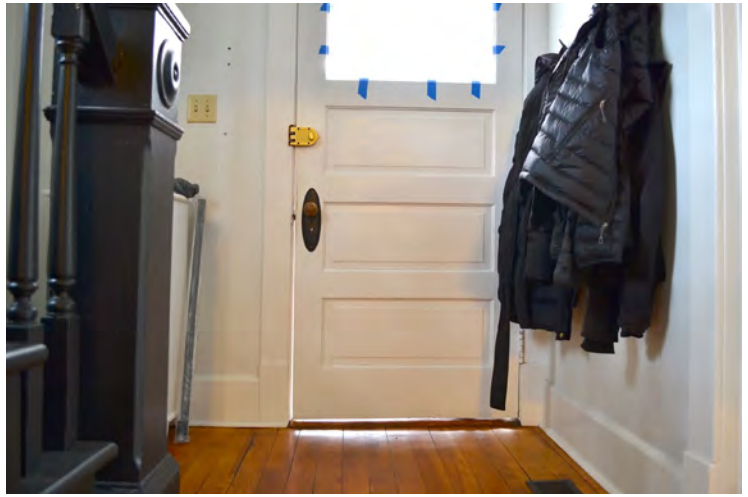








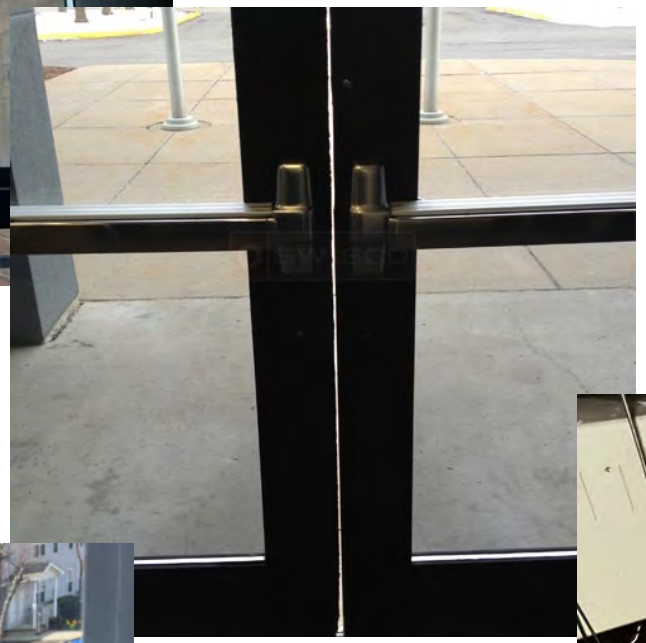


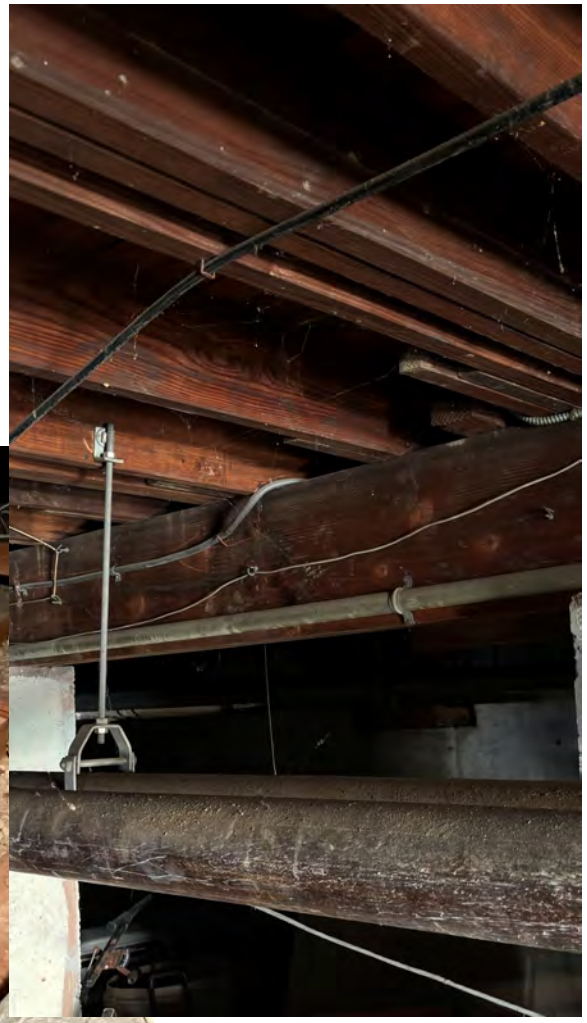


Types of Retrofits: Enclosure

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Types of Retrofits: Enclosure

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Low Hanging Fruit (Enclosure): Air Sealing

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Get The Ladder (Enclosure): Windows and Doors

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Up In Treetops (Enclosure): Insulation

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Types of Retrofits: Electrical

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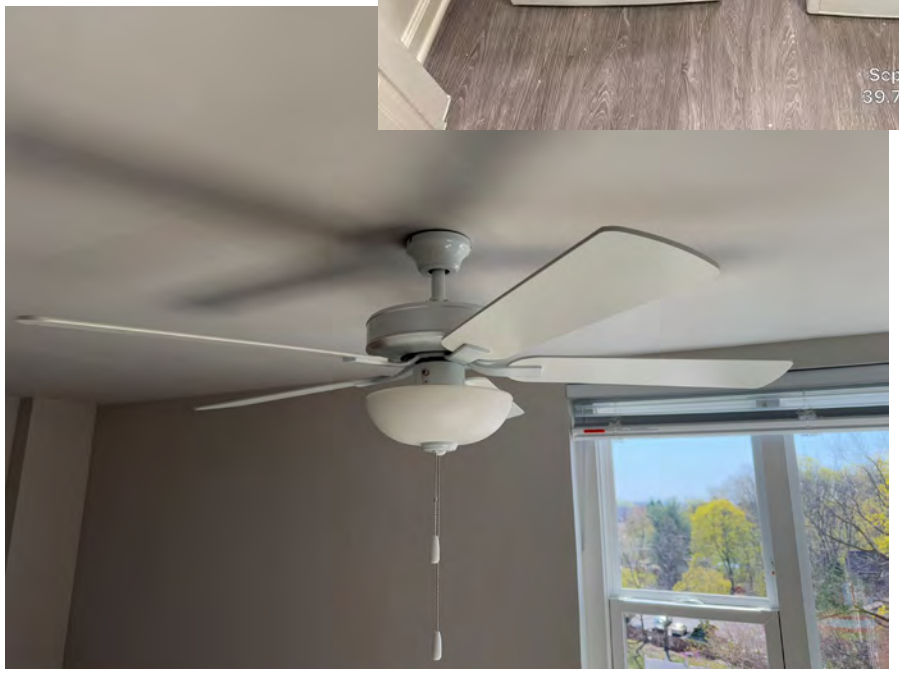
Low Hanging Fruit (Electrical): LED Lamping

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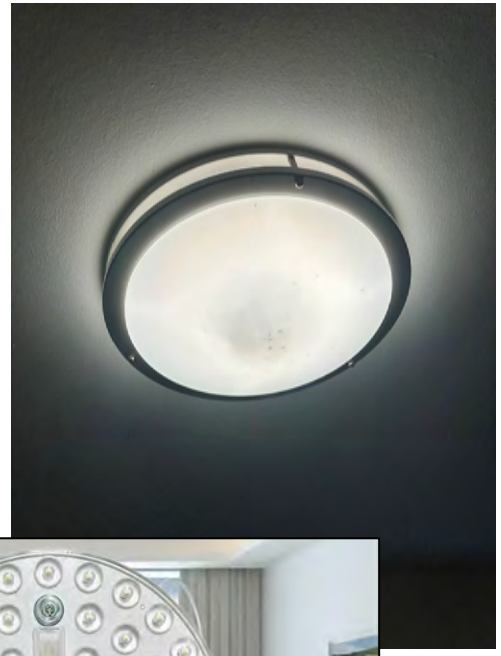


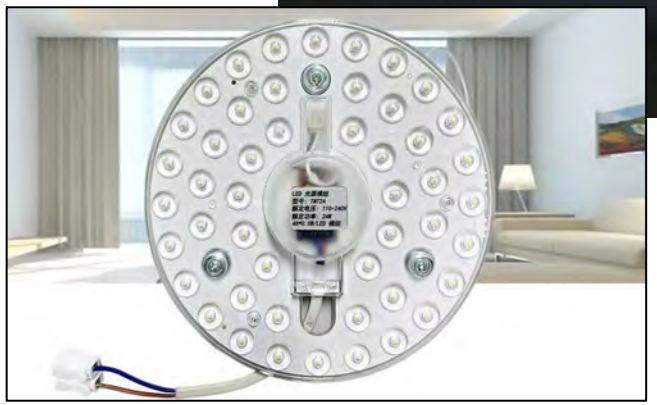




Low Hanging Fruit (Electrical): Appliances

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Get The Ladder (Electrical): Modular LED Fixtures;
Occupancy Sensors (integrated)

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Get The Ladder (Electrical): Exterior Lighting, Photocell Controls (integrated)

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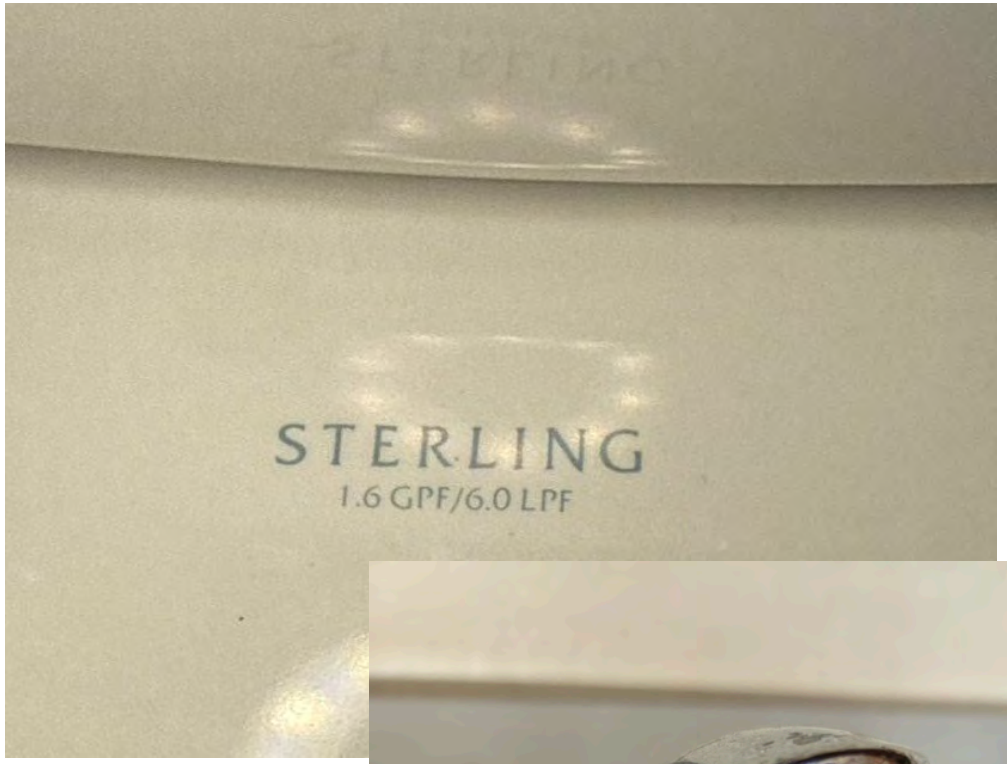
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Up In Treetops (Electrical): Fuel Switching









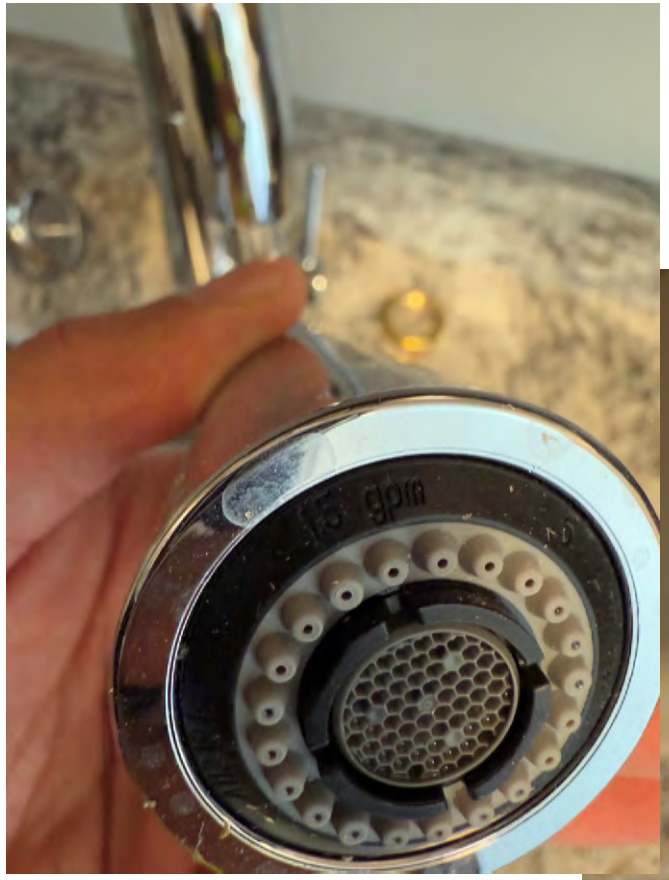
Types of Retrofits: Plumbing



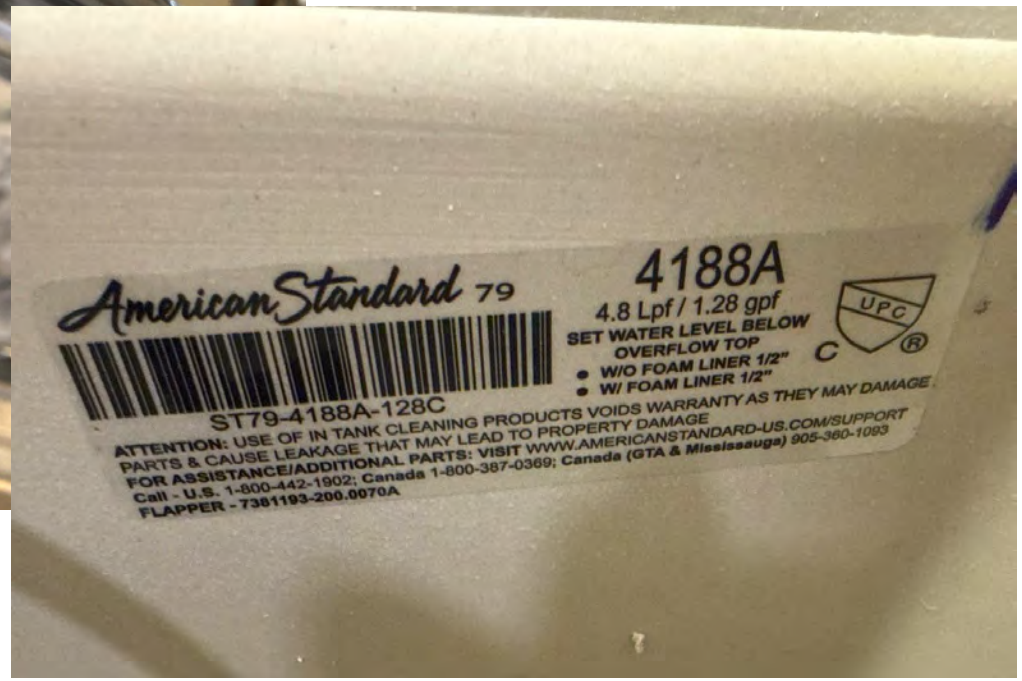
Types of Retrofits: Plumbing



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Low Hanging Fruit (Plumbing): Low Flow Devices, Repair Leaks

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Low Hanging Fruit (Plumbing): Pipe Insulation

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Get The Ladder (Plumbing): replace electric water heaters with hybrid heat pump type



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Up In Treetops (Plumbing): Pump motors and controls, Fuel Switching







Types of Retrofits: Mechanical







Types of Retrofits: Mechanical





Types of Retrofits: Mechanical

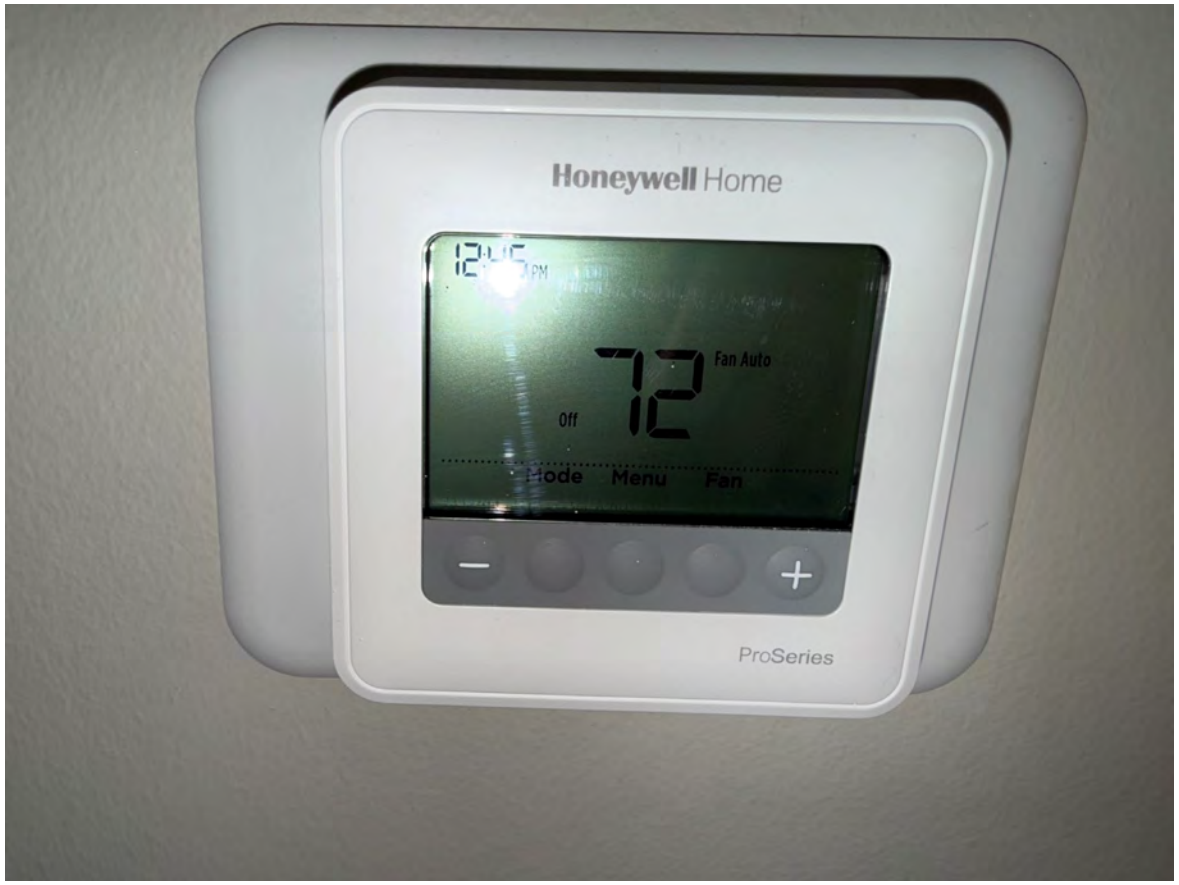




Types of Retrofits: Mechanical

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Low Hanging Fruit (Mechanical):
Clean/Replace filters; programmable thermostats

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Get The Ladder (Mechanical): packaged units; clean ductwork; split-system upgrade

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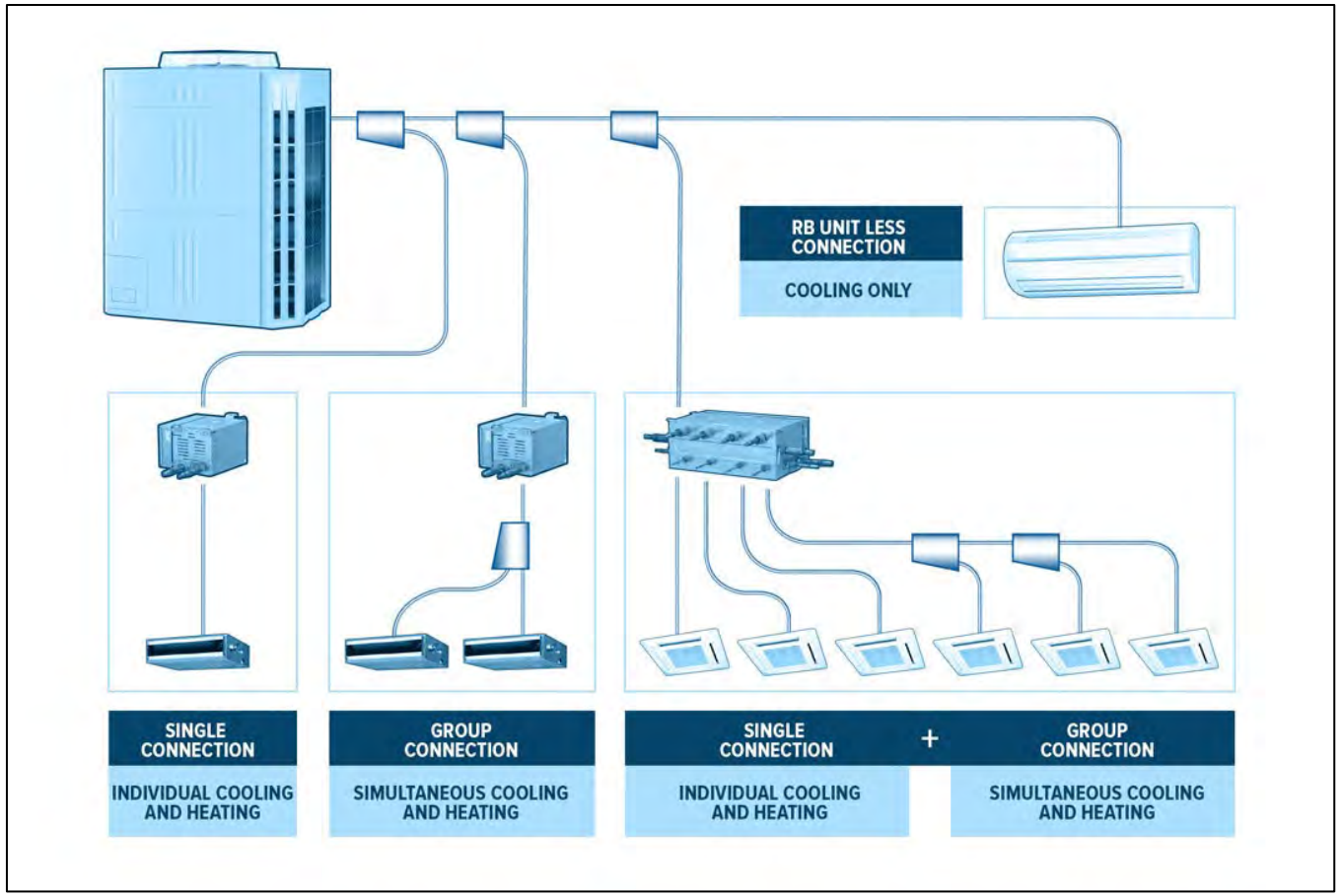


Up In Treetops (Mechanical): system switching – electric resistance to ductless heat pump; fuel switching (furnace to heat pump)

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Up In Treetops (Mechanical): central plant controls upgrades, fuel switching



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Up In Treetops (Mechanical): ventilation

Conclusions and Next Steps

- Learn about your building systems: what are they and what hurts?
- Occam's Razor: sometimes the simplest measures are the most effective; keep in mind:
  - It's Never One Thing
  - The Perfect vs. The Good
  - No Experimentation
  - The Next Question
- Q&A