NHSAVES 2023
Button Up NH
for Landlords

NHsaves
Your Source for Energy Efficiency

EVERSOURCE

Liberty

New Hampshire Electric Co-op

Unitil

How to Improve the Energy Efficiency of Your Rental Properties

230227

NHSAVES Button Up Overview

- Energy Use and Savings Tips
- Air Sealing and Insulation A-B-Cs
- What to Do?
- NHSAVES and Other Incentives

What is the “greenest” energy?

The energy that you don't use!

BUTTON UP NH

Major Household Electricity Uses

Residential Electricity Use	Approximate Annual Kilowatt-hours	Potential for saving energy
Lighting	1,200	***
Electric Water Heater	*2,100*	***
Refrigerators & Freezers	1,050	***
Dehumidifiers	900	***
Electric Clothes Dryer	*800*	**
Entertainment Centers	650	*
Furnace Fans & Boiler Pumps	400	*
Dishwasher & Clothes Washer	350	**
Cooking	300	*

Electricity consumption varies widely from household to household. Energy savings come from efficiency and/or conservation.

Lighting Efficiency

The LED Lighting Revolution!

- Any existing 60+ watt light bulbs?
  - *Easy $$ savings per year with LED bulbs*
- Lots of opportunities
  - Screw-in light bulbs
  - Outdoor lighting
  - Holidays lights
  - Can lights and linear lighting

- Look for:
  - Light color (2700° K = “warm white” is what most people like)
  - Dimming and dimmer capability
  - “Suitable for enclosed fixtures”
  - “Suitable for damp locations”

BUTTON UP NH

NHSAVES Rebates on ENERGY STAR Appliances

Rebates include:

Electric Clothes Dryers	$40 - $200
Clothes Washers	$25 - $50
LED light bulbs	instant rebates
Refrigerators	$40 - $50
Room Air Conditioners	$20

Also pool pumps, room air purifiers & dehumidifiers

And free haul-away + $30 for recycling an **OLD refrigerator or freezer**

www.energystar.gov lists appliance efficiency

NHSAVES.com/nh-rebates for appliance rebate forms & updates

BUTTON UP NH

NHsaves Your Source for Energy Efficiency

Other Energy Efficiency Tips

Saving electricity and other fuels

- Low-flow showerheads and faucet aerators

- Hot water and heating pipe insulation: R-3+

- Smart strips, plugs and switches
- Set dehumidifiers appropriately
  - Target +/-60% max humidity

ENERGY STAR

BUTTON UP NH

Staying Warm in Your Home

Fact: We have to heat our homes to live in New Hampshire and stay warm

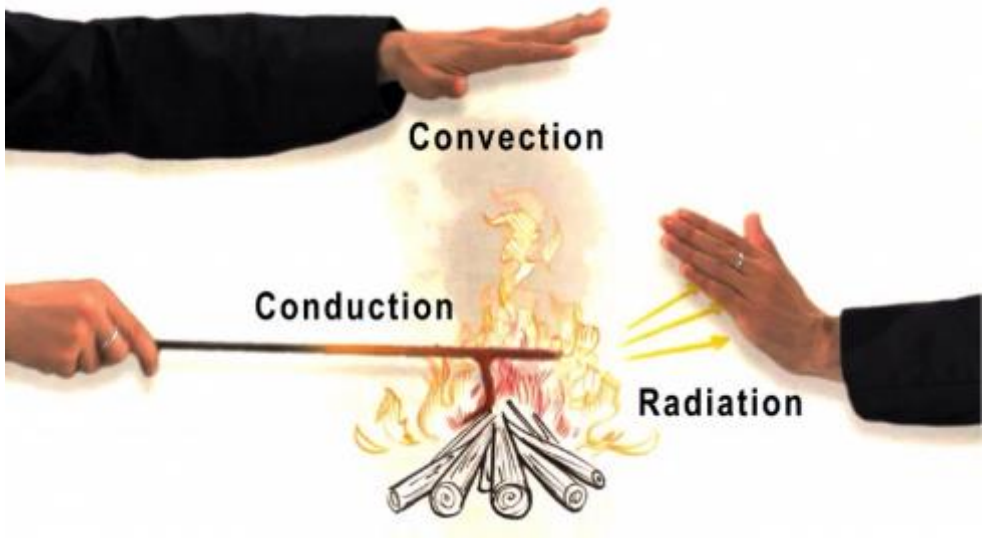
Goal: Use less energy to heat our homes **and still stay warm and comfortable**
(not just turn down thermostat!)

BUTTON UP NH

Staying Warm in Your Home: Building Science and Energy Efficiency

- **Heat always moves from Hot to Cold**
  - ***Fact:*** The heat inside our homes is always making its way through the building's 6 sides and heating the outdoors.
  - ***Goal:*** Slow this process down

- **Heat moves via three methods:**
  - **Conduction**
  - **Convection**
  - **Radiation**



BUTTON UP NH

Insulation & Building Materials R-Values

Insulation is a poor thermal conductor: GOOD!

R-Values The higher the R-value the better the insulation

Approximate R-values: *(per inch, if installed properly)*

• Fiberglass	R-3.7
• Cellulose	R-3.6
• Rigid foam board	R-4 - R-7
• Spray foam	R-6 - R-7
• New double pane window	R-3.5 (whole window)
• Softwood	R-1.3
• 8” concrete wall	R-1 (for 8”!)

Functional R-values may be affected more by install quality than the material used.

BUTTON UP NH

Insulating Thermal Barriers May Be:

Insufficient (not enough R value)

Incomplete (no R value in spots)

Misaligned (R value there, but not working)

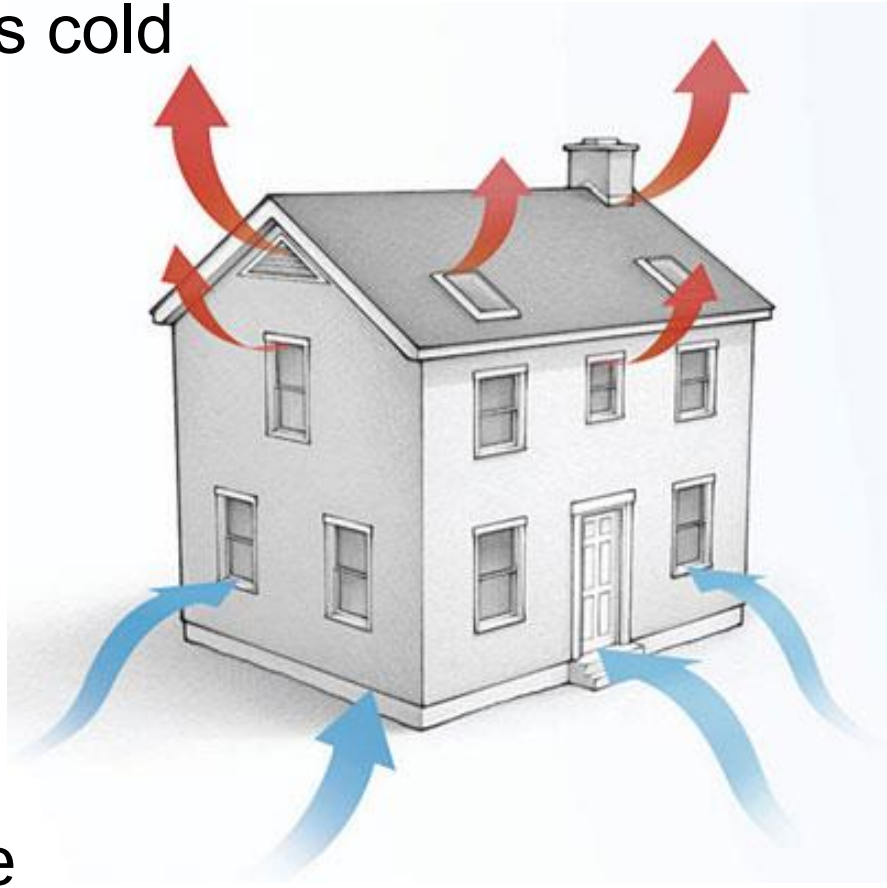
BUTTON UP NH

Convection Causes Air Leakage

Heat rises? Not really… Heat **conducts** through materials in any direction that's cold

Warm air rises and leaks <u>out</u> the top of a building…

…Causing **cold air** to leak <u>in</u> down low



"Stack Effect"
Stronger when colder outside

Goal: keep "expensive air" inside!

Ranking of Air Leakage Areas: “A - B – C”

- **A – Attic** (top of the building)
- **B – Basement** (bottom of the building)
- **C – Center** of the building

BUTTON UP NH

A – Lots of Air Leaks in the Attic
(and insulation opportunities)

Common air leaks at the top of a building:

- Attic hatches / stairs
- Chimney chases
- Pipe / electrical penetrations
- Ceiling lights / bath fans
- Electrical boxes in the ceiling

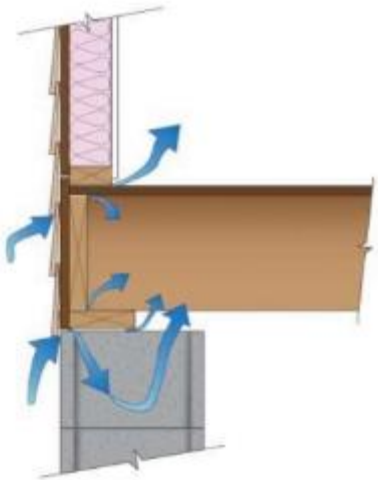
This pegboard attic hatch w- 16” of fiberglass insulation: Good?

BUTTON UP NH

B - Basement Air Leakage & Air Sealing

Air Sealing Opportunities in Basements and Crawl Spaces

- Exterior doors
- Electrical, plumbing and other penetrations
- Box sill (rim joist) area
- Around old basement windows



BUTTON UP NH

C – Center of the House Air Leakage

More visible, but <u>fewer</u> air sealing opportunities

- Cracks around exterior doors
- Fireplace flues can be huge leakers
- Old pulley-hung windows
- Most windows *<u>don't</u>* leak much air

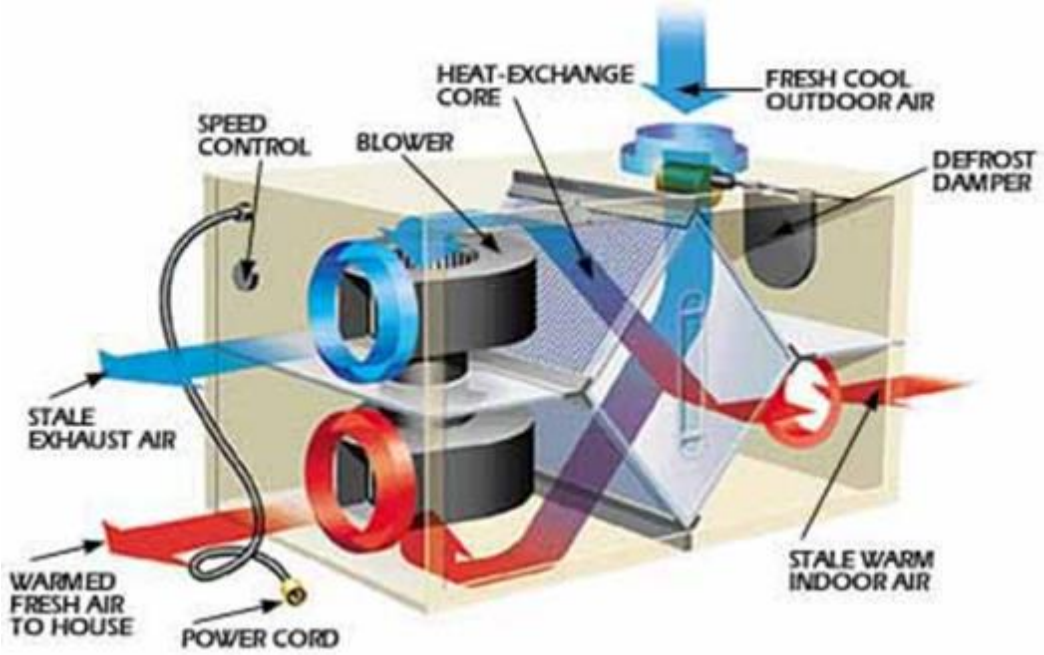
Air Sealing and Fresh Air

Fresh Air is needed for a healthy home

- For a typical home, about 1/3 of the home's air should be exchanged every hour
- Many NH homes are 2 – 4 times too leaky!
  - Leaky homes are "nosebleed dry" in winter

BUTTON UP NH

"Seal Tight and Ventilate Right"
Mechanical Ventilation



Control air leakage, and…

Provide measured fresh air & stale air exhaust

- As simple as a high quality bathroom fan
- Or a heat recovery ventilator (HRV)

With controllability

- Timers, occupancy sensors, CO_2 sensors, etc.

BUTTON UP NH

Health & Safety - Indoor Moisture

Sources of Indoor <u>Moisture</u>

- **Eliminate, Isolate or Control:**
  - Wet basements and crawl spaces
  - Dirt basements and crawl spaces
  - Bath fans venting into attics
  - Bathrooms without bath fans
  - Disconnected clothes dryer vents

Other indoor moisture sources: Plants, humans, pets, open sump pits, cooking, leaky pipes, new construction materials, open basement windows in summer

BUTTON UP NH

Quiz

Image courtesy of Efficiency Vermont

What is the biggest factor causing ice dams on this house?

The Solution?

BUTTON UP
NH

Home Performance Professionals (Energy Auditors and Contractors)

Comprehensive, whole-house energy assessment

- Building envelope inspection & tests
- Combustion equipment efficiency & safety tests
- Written report with prioritized list of cost-effective improvements

www.bpi.org

Tools of the Trade: Blower Door Test

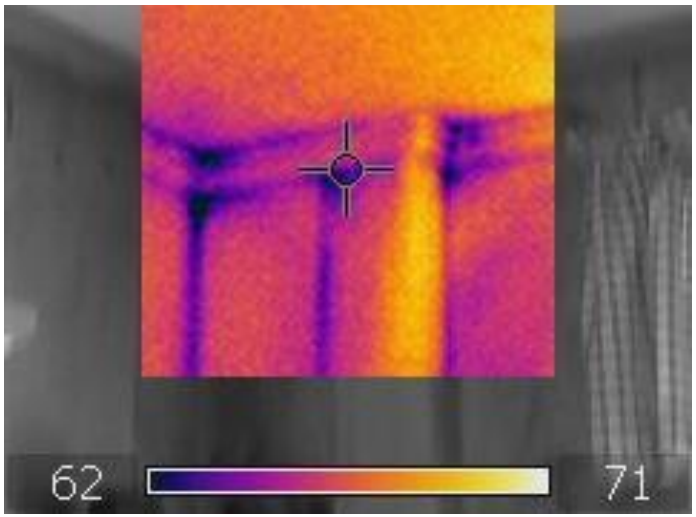
Blower door tests now ***Energy Code-required*** *for new homes in NH!*

- Measures *amount* of air leakage: CFM_{50}
- Identifies *sources* of air leakage
- Determines air ventilation rates
- Prioritizes air sealing opportunities
- Confirms amount of air sealing accomplished

BUTTON UP NH

Tools of the Trade: Infrared Camera

- Visual images of hot and cold areas
- Helps sleuth insulation issues
- Used with a blower door to show air leakage pathways



Remember “A-B-C”-- Attic, Basement, Center -- for Air Sealing & Insulation

If using blown insulation, cover attic with 12” – 16”
AFTER *air sealing!*

Photo: blown-in cellulose attic insulation

BUTTON UP NH

A: Attic Air Sealing

BUTTON UP NH

A: Attic Insulation and Hatches

BUTTON UP NH

B: Basement Air Sealing and Insulation

Uncovered foam needs a fire barrier. Professional installation advised.

Fix basement water issues first

BUTTON UP NH

C: Air Sealing in Center of House

chimney flue blocker

exterior door “Q-lon” style weatherstripping

Framed Wall Insulation- best after attic and basement are improved

Densepack cellulose air seals & insulates empty cavities

Image courtesy of Vermont Dept. of Children & Families

During installation, densepack tube is inserted into *each cavity.*

Professional installation recommended.

BUTTON UP NH

Window Options

What about windows?

There are many reasons to replace windows…

…*Cost-effective* energy savings is rarely one of them

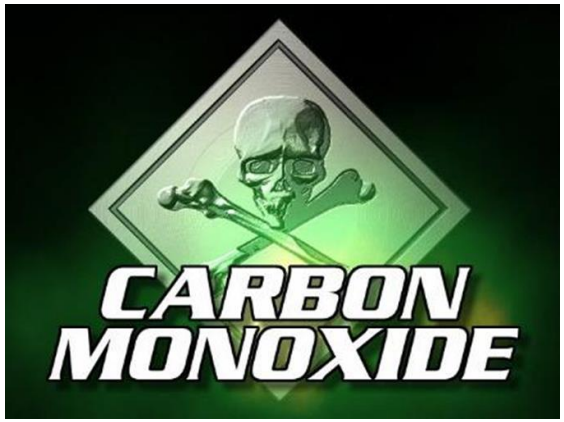
New windows ~R-3 – R-4

Old windows, with leaky sashes, can be replaced, *or…*

Other options include adding storm windows, indoor storms, cellular shades, or window quilts

BUTTON UP NH

Heating System Recommendations



- Combustion safety testing
- Seal and insulate ducts
- Consider a more energy efficient replacement

BUTTON UP NH

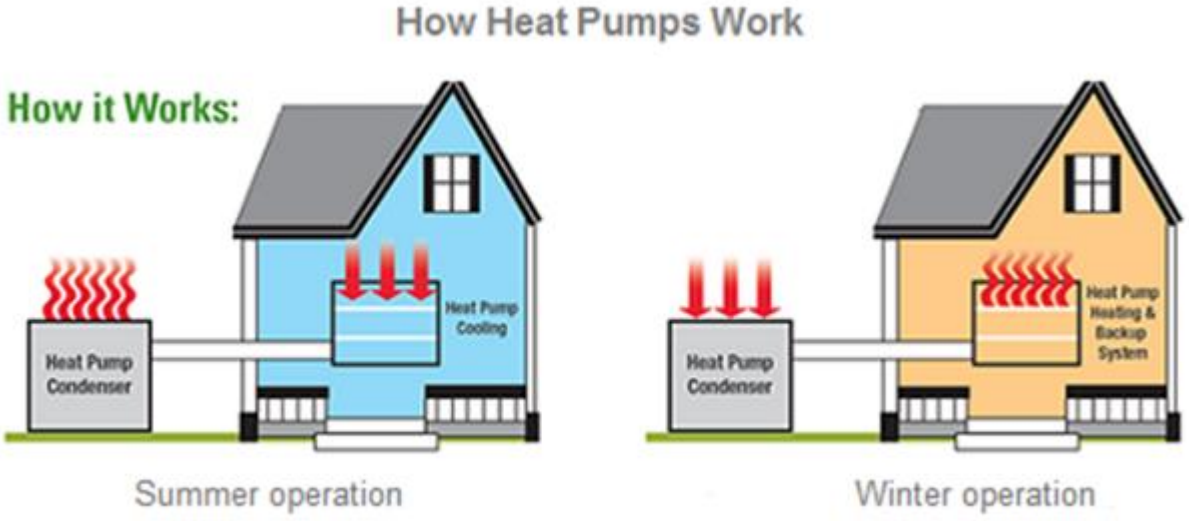
High Efficiency Heat Pumps

Ductless Cold Climate Heat Pumps for A/C & Heat

- "Mini splits" heat and cool air
- "Cold climate" models
  - Can extract heat from -20° air!

Heat Pump Hot Water Heaters

- More efficient than regular electric water heaters



BUTTON UP NH

NHSaves Rebates and Services

NHsaves
Your Source for Energy Efficiency

EVERSOURCE Liberty New Hampshire Electric Co-op Unitil

- Lighting and ENERGY STAR appliance rebates
- Heating, cooling and water heating incentives
- **Energy audits and weatherization**
  - **Home Performance with ENERGY STAR**
- Financing
- Income-qualified Home Energy Assistance

nhsaves.com

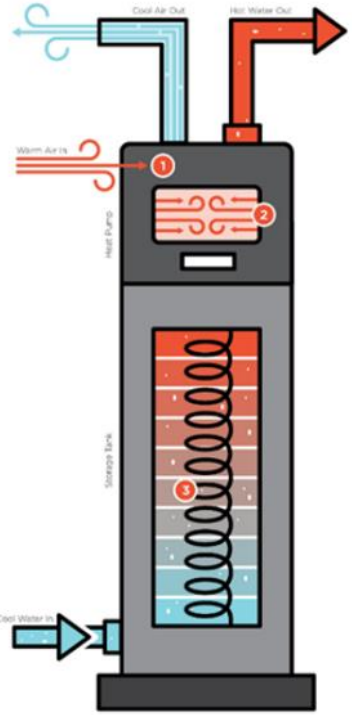
- Inflation Reduction Act and other programs

BUTTON UP NH

Efficient Heating, Cooling & Hot Water

Plenty of high efficiency options

- Mini-split cold climate heat pumps
- High efficiency gas boilers and furnaces
- Heat pump electric hot water heaters →
- EPA 2020 certified wood and pellet stoves
- Wi-Fi smart thermostats



Go to NHSaves.com for specific incentives

Focus on weatherization first, then heating and cooling systems

- An efficient heating or cooling system in a leaky envelope still wastes a lot of energy!
- Seal & insulate ducts and distribution pipes

BUTTON UP NH

NHSaves Existing Homes- Home Performance with ENERGY STAR

NHSaves.com/programs/energy-audits-weatherization

- Qualify with online “Test Your Home” calculator
  - *For homes and multi-family buildings up to 4 units*
  - Input: *at least 12 months heating fuel usage, heated sq.ft. area & zip code*
- Comprehensive home energy audit for $100
  - *Credited towards improvement work -- **net cost: $0***
- NHSaves pays for ***75%*** of eligible energy improvements **up to *$6,000!***
- Low or no interest financing may be available

HOME PERFORMANCE WITH ENERGY STAR

BUTTON UP NH

NHsaves Your Source for Energy Efficiency | EVERSOURCE | Liberty | New Hampshire Electric Co-op | Unitil

If Home Heating Index Results Are High Enough – Your Home Qualifies!

YOUR RESULTS

Basic Information

Electric Utility	Eversource
Zip Code	03246
Conditioned Square Footage	2000

Annual Heating Fuel Usage

Fuel Types	Heating Oil,Wood
Heating Oil	800 Gallons
Wood	2 Full Cords

Heating Index

Your home may be a good candidate for weatherization services.

0 - 4 Low Energy Use

4 - 7

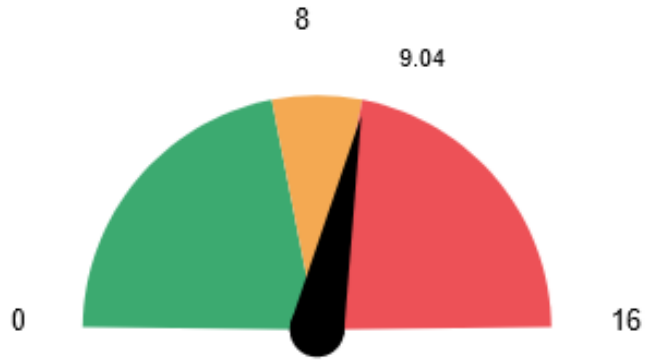
Moderate Energy Use

7 - 9

High Energy Use

9+

Very High Energy Use



Enroll For Home Efficiency Audit

Complete and submit your enrollment form.

PROCEED TO ENROLLMENT FORM

BUTTON UP NH

**Qualifying HHI values may vary by utility and over time*

Sample NHSaves HPwES Report (@ 75%)

Proposed Improvement	Total Cost	Utility Rebate	Customer Co-Pay	ESTIMATED VALUES **		
				Pay Back Period (years)	Customer Cost Savings ($/year)	Customer Accepts
Improve 1,150 sq ft of attic floor insulation from 6 inches to 15 inches.	$3,409.31	$558.61	$2,850.70	21.9	$129.95	
Reduce the house air leakage from 1905 CFM50 to 1705 CFM50.	$800.00	$800.00	$0.00	0.0	$86.01	
Improve 15 sq ft of rim joist from No insulation to High insulation	$292.00	$219.00	$73.00	3.6	$20.42	
Improve 673 sq ft of basement wall from No insulation to High insulation	$4,745.00	$3,558.75	$1,186.25	4.0	$298.14	
Ancillary Savings - Central A/C (1.0)		$0.00	$0.00	0.0	$10.05	
Program Delivery/Audit Fee	$863.64	$863.64	0.00			
Customer Co-Pay Pre-Payment						
Totals	$10,109.95	$6,000.00	$4,109.95	7.5	$544.57	

Total Eversource Rebate: $6,000.00

Total Rebate: $0.00

Customer Co-Pay Balance: $4,109.95

Home Doesn't Qualify for HPwES?
Visual Audit Program

Minimum Home Heating Index (HHI) values to qualify for HPwES program: *(as of 2/23)*

- Eversource: **9**
- Liberty Electric: **10**
- Liberty Natural Gas: **12**
- NH Electric Co-op: **9**
- Until Electric & Gas: **10**

NHSaves "Visual Audit" program

- If your home does Not qualify for HPwES, includes:
  - Quick walk-through energy assessment
  - *Free installation of:* Sense thermostat, LED light bulbs, low-flow devices, and up to 6' pipe insulation
- Apply through the NHSaves HHI calculator

BUTTON UP NH

Inflation Reduction Act Tax Credits

Lots of financial carrots! IRA has three main energy efficiency programs for existing homes:

1) 25C Energy Efficient Home Improvement Tax Credit

- 30% tax credit for 2023+, with limits, for example:

Heat pumps, incl. hot water: $2,000	Weatherization: $1,200
Biomass stoves & boilers: $2,000	Energy audits: $150
Fossil fuel heaters: $600	Windows: $600

- Equipment or installations must meet efficiency criteria
- For homeowners' principal residence or renters
- Claim in 2024 for 2023 federal taxes

BUTTON UP NH

IRA's Electrification Rebates (HEEHR)

2) Home Electrification Rebates (HEEHR)

- *Future program- to be administered by NH Dept. of Energy*
- Income-qualified occupants- using area median income (AMI)
  - Under 80% AMI: 100% rebates
  - 80% - 150% AMI: 50% rebates
- Total point-of-sale rebate up to $14,000 for qualified installations, with limits:

Heat pumps: $8,000	Weatherization: $1,600
Heat pump hot water: $1,750	Electric wiring: $2,500
Electric range or HP dryer: $840	Electric load center: $4,000

- For owned or rented residential units- using AMI of occupants
  - 50+% occupants LMI: building qualifies

BUTTON UP NH

IRA's Home Efficiency Rebates

3) Home Efficiency Rebates (HOMES)

- *Future program- to be administered by NH Dept. of Energy*
- Whole home retrofit program- weatherization, potentially HVAC, etc.
- Maximum rebate amount depends on income and % energy savings:

(assuming modeled energy savings)	*Rebate %*	*Max rebate w- 20-35% savings*	*Over 35% savings*
Under 80% AMI	80%	$4,000	$8,000
All higher incomes	50%	$2,000	$4,000

- For owned or rented residential units- using AMI of occupants
- *IRA rebate programs can be combined with IRA tax credits and NHSaves incentives!*

BUTTON UP NH

Income-Qualified Weatherization and Fuel Assistance Programs

- Weatherization Assistance Program & Home Energy Assistance
  - Financial assistance that pays for energy reduction measures in a home
  - Contact:
    - County-based Community Action Agencies (CAAs)
    - Your utility, or dial 211
- NH Electric and Fuel Assistance programs (EAP & LIHEAP)
  - Financial assistance with electricity and fuel bills
  - Same CAA, utility and 211 contacts

Weatherization Works

BUTTON UP NH

New Hampshire 2-1-1 Get Connected. Get Answers. An initiative of Granite United Way

Other Programs *(a sampling!)*

- State of NH Emergency Energy Assistance
  - 2023 program for 60% - 75% AMI households
  - One-time $450 heating and $200 electric assistance
- NH Housing (NHHFA)
  - Mostly for income-qualified occupants / workforce housing
  - Financing programs
  - Lead paint remediation program
- Energy Efficiency and Climate Resilience in Affordable Housing
  - IRA-based, to be administered by HUD
- ARPA's "NH Homeowner Assistance Fund"
  - For owner-occupied homes affected by COVID, <125% AMI
  - Funding for delinquent mortgage, taxes, energy bills, etc.

Summary

- Know about your energy use and savings opportunities
- Air seal first: A-B-C
- Add insulation where you can
- For expert work, work with a home performance professional
- Utilize NHSAVES and other energy efficiency programs

Thank You

Presenter:

Andy Duncan
Foster Sustainable Energy LLC / Lakes Region Community College
andy603fosterse@gmail.com

Button Up NH is coordinated by the Plymouth Area Renewable Energy Initiative with support from the NHSaves' utilities.

Visit **www.plymouthenergy.org** for a copy of the presentation

Support future workshops …let your utility know.

NHsaves
Your Source for Energy Efficiency

Button Up NH

EVERSOURCE

Liberty

New Hampshire Electric Co-op

Unitil