



PPL Electric Utilities

The presentation will begin shortly!

AIR SEALING FIRST

Why you should air seal before you insulate and before you upgrade your mechanical systems.



Hap Haven
PPL Pilot Manager

OVERVIEW FOR TODAY

Thank you for coming today. Remember, this is an overview!

- 60 second summary of today's topic.

- Understanding the basic science
- Shell work is all about control of heat, air and moisture
- DIY or professional: Finding the leaks and sealing the leaks

- What is the PPL Residential Energy Efficiency program? Incentives?

- Q and A at the end – please type into the box
- No need to take notes – we'll send you the PDF

60 SECOND REVIEW

TOP 3+ REASONS WHY you might upgrade your home's efficiency:

- Greater comfort
- Lower usage / utility bills
- Health / air quality
- Current system is broken

TOP 3+ REASONS HOW you might upgrade the energy performance of your home:

- Shell work (air sealing and insulation)
- Mechanical work (upgrade heater, AC, water heater)
- Appliances (upgrade refrigerator, dish washer, clothes washer, dryer)
- Behavior (turning appliances off when not in use, turning thermostat down, etc.)

60 SECOND REVIEW

#1 SHELL WORK is usually first because:

- Is relatively inexpensive
- Usually improves your comfort the most
- Usually improves the quality of your indoor air
- Usually keeps rodents and critters out of the house.
- Usually allows you to down-size your mechanical equipment when you do upgrade.

#1 BEHAVIOR is also first, last and in between

- Because it's free

BUILDING SCIENCE – THE CONCEPT

In SIMPLE terms, Building Science looks at the movement of:



The heat and moisture go wherever the air goes

Understanding this movement gives you important information about how to increase system performance as well as:



BUILDING SCIENCE – APPLIED TO A HOME

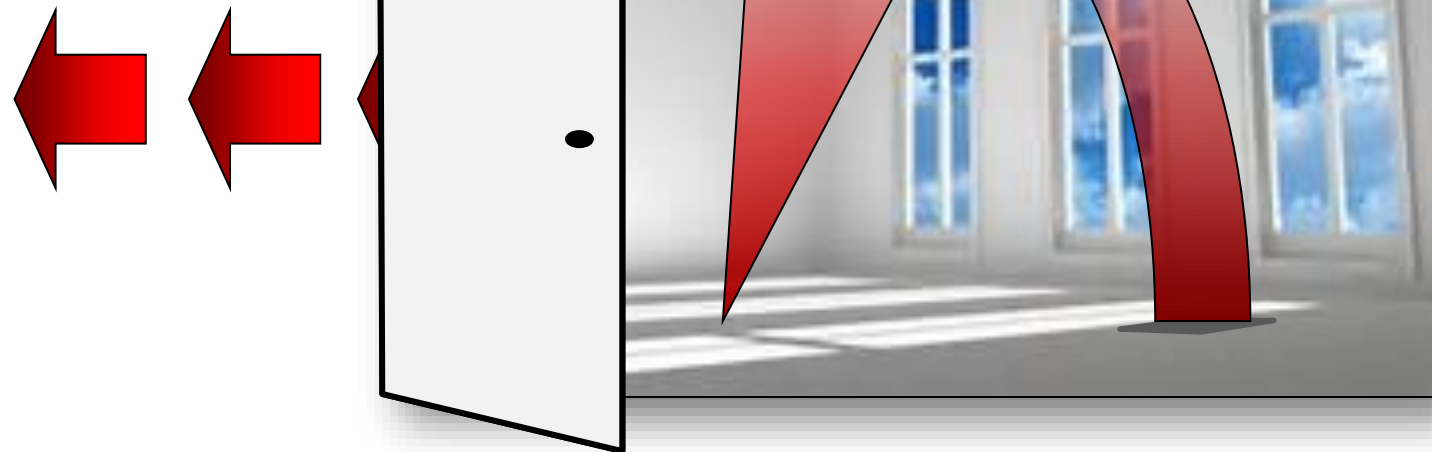
The mechanical and structural (shell) systems work together to create comfort

Is the room getting heat or cold? = Distribution through ducts or pipes

Is the room keeping the heat in or out? = Insulation + Air Sealing

Let's talk about your heater

- 1) Should create the heat/cold efficiently,
- 2) Should deliver the heat/cold efficiently,
- 3) Should return the heat/cold efficiently



BUILDING SCIENCE – APPLIED TO A HOME

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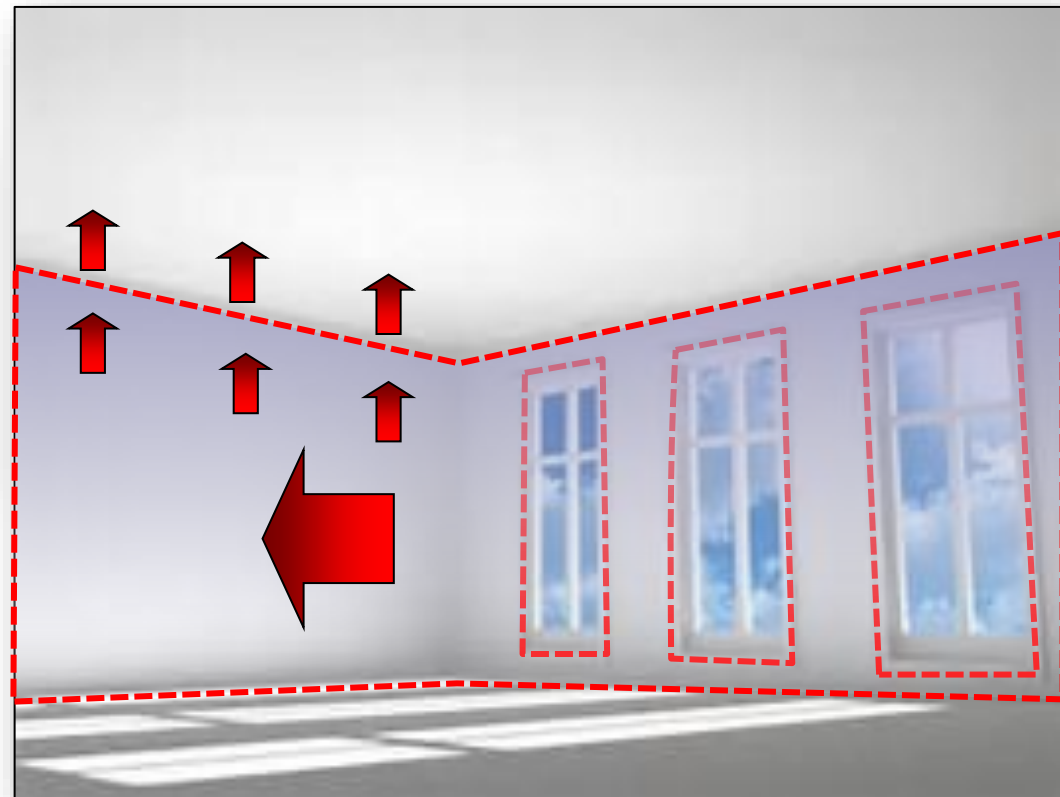
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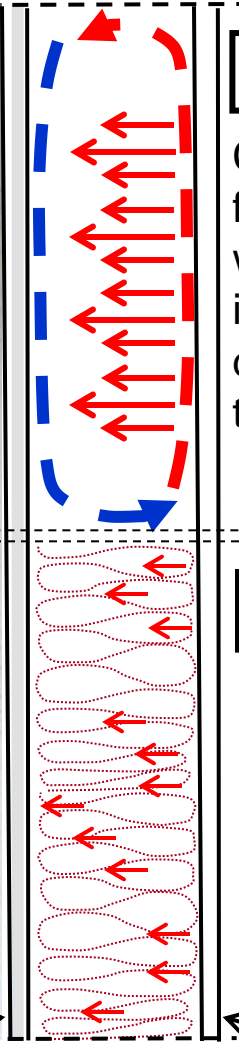
Where are the leaks? How do I seal them?

Obvious holes:
Window and door openings.

Ceiling holes:
Pull-down stairs,
Attic hatches,
Recessed lights,
Moldings,



HEAT MOVES IN YOUR WALLS TOO!



Un-insulated exterior wall

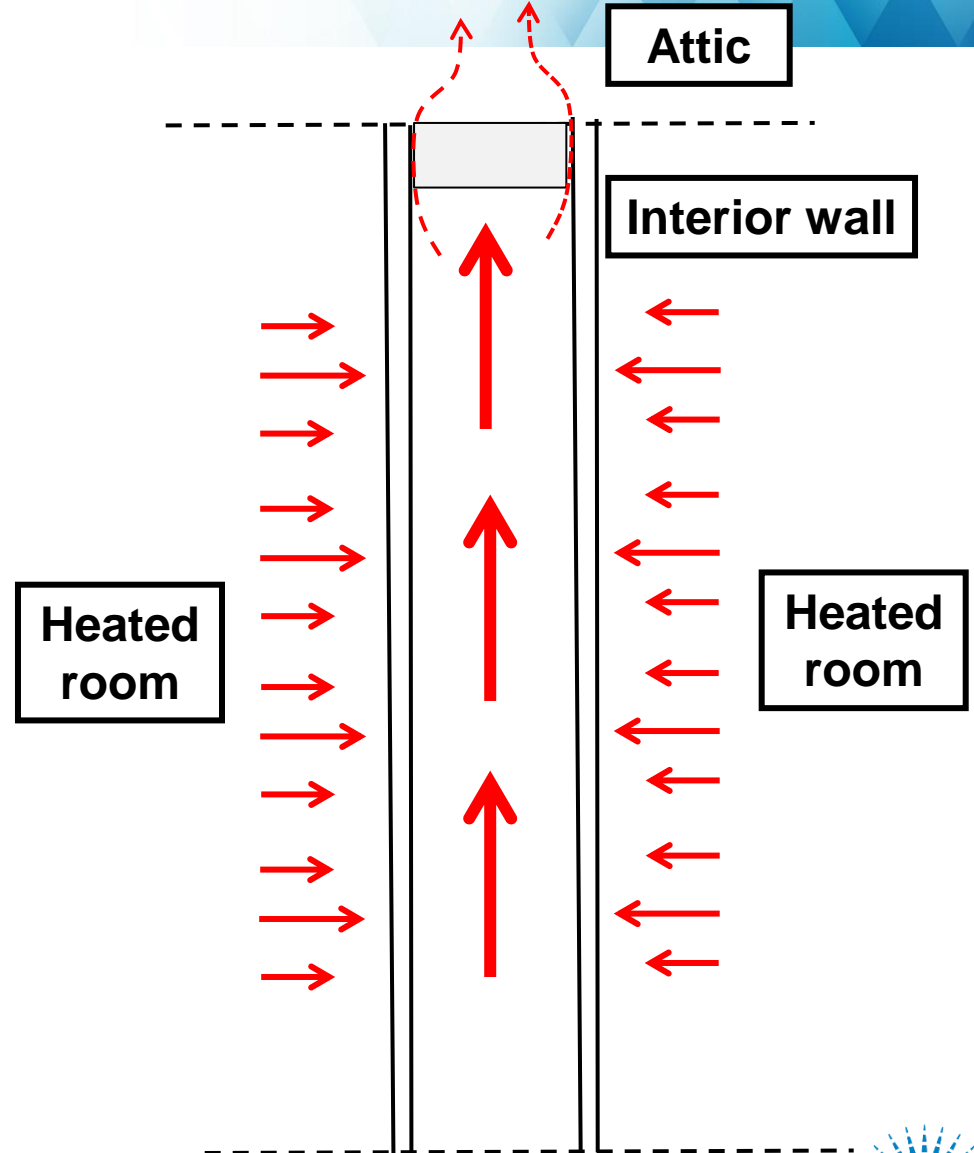
Convective loops transfer heat from the inside wall to the outside wall and radiation is un-interrupted. This is also true during the summer - Heat just travels the other direction.

Insulated wall

Convective loops and radiant heat transfer is interrupted by properly installed wall insulation. Conduction is the only heat transfer left.

Cold Outside

Warm Inside



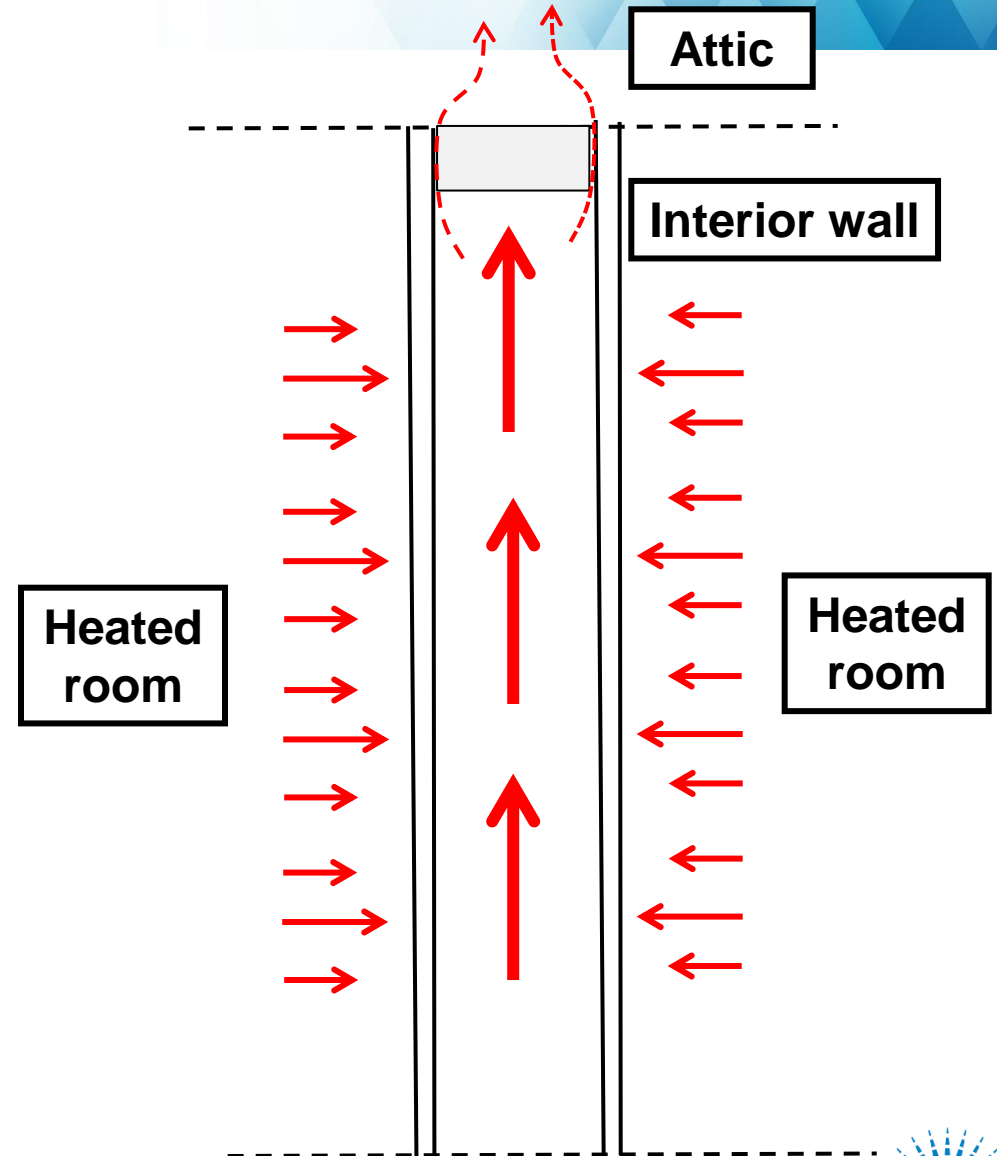
Attic

Interior wall

Heated room

Heated room

SEALING THE TOPS OF WALLS



AIR DOESN'T SIT STILL- ESPECIALLY IN THE WINTER:

Warm air RISES

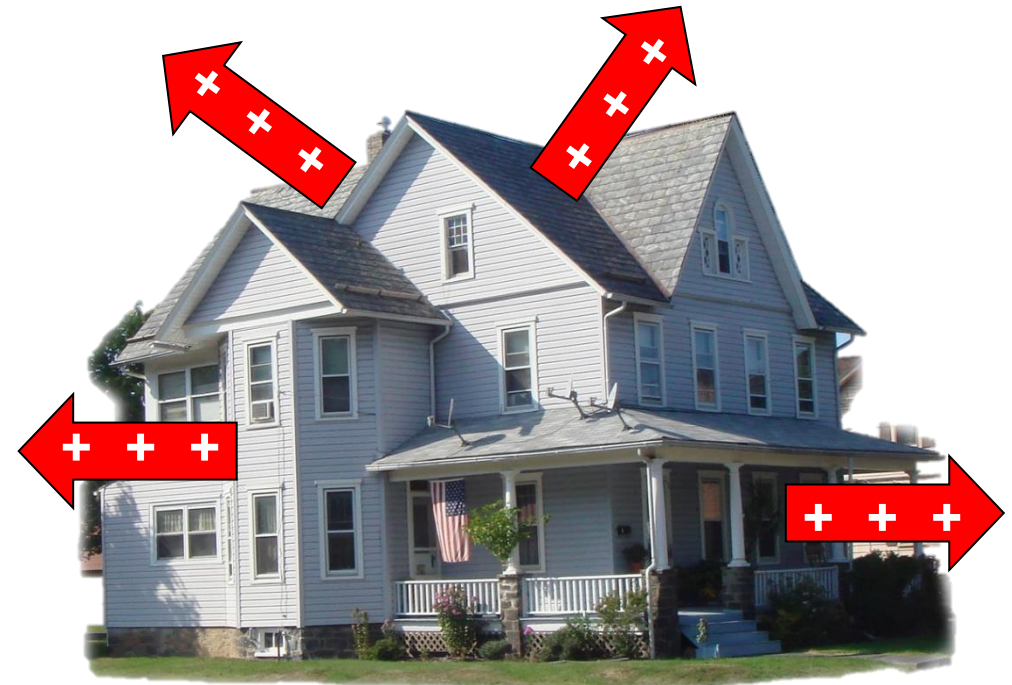
The inside air rises up and out.
Positive pressure at the top



Vapor travels with the rising air

Warm air EXPANDS

The inside air rises pushes out
Positive pressure everywhere.



Vapor travels with the heat

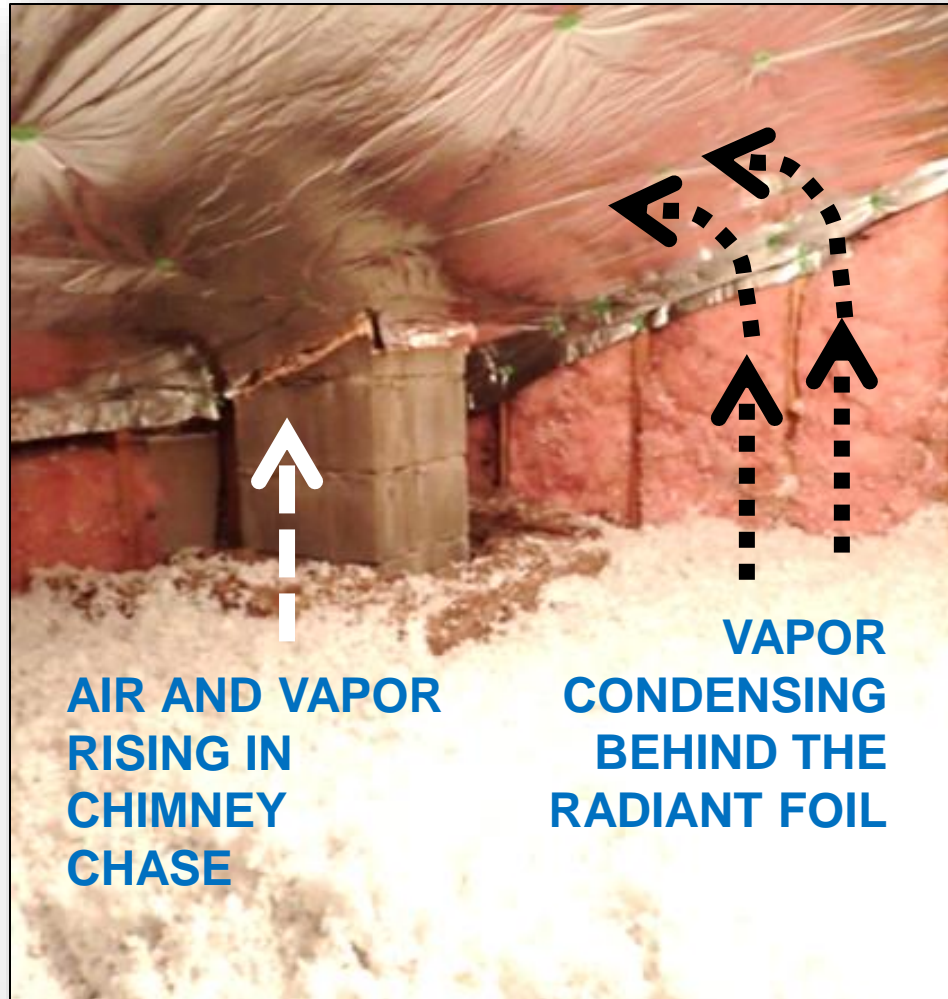
YOU CAN SEE THIS WITH AN IR CAMERA

Rising air escapes through holes where the mechanical systems are framed-in.

This is a major source of heat loss in the winter.



HOW AIR SEALING HELPS INSULATION



Insulation slows heat loss/gain by trapping still air in small pockets within the insulating material.

The trapped air within the material is actually the insulator.

Important: Fibrous insulation does not stop air movement. Only foam insulation stops air movement! But even foam board needs to be air sealed around the edges.

WHY HIRE A PROFESSIONAL?

The work can be difficult, dirty and dangerous



There is a learning curve for each air sealing product

1-Part Urethane



2-Part Urethane



WHY HIRE A PROFESSIONAL?

Here are metal flues in an attic with chaseways covered with metal and sealed with foam and high-temperature foam.



Here is a cast iron vent pipe and looking down a plumbing chaseway from an attic.



Here is a PVC vent pipe in an attic with the plumbing chaseway covered and then cracks foamed .



WHY GET AN ENERGY AUDIT

It's an assessment of equipment and home systems -
How you use them, and which ones are underperforming.

It's an assessment that becomes the foundation for
a report listing the major issues found and what it takes to solve those problems.

It's a report you can use as an **Action Plan**
for scheduling work and maximizing the IRA tax credits.

1ST STEP TO GETTING ANSWERS

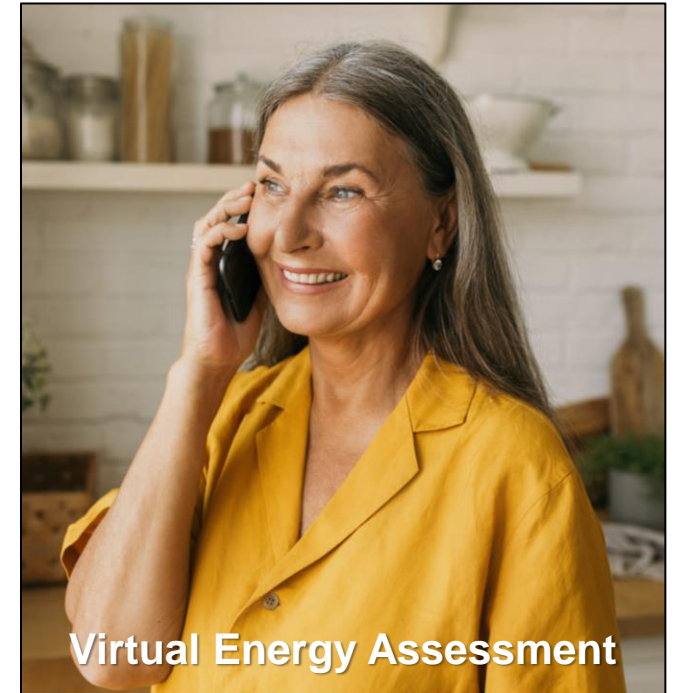
VIRTUAL ENERGY ASSESSMENT

Your choice –

A voice or video call with an Energy Advisor

FREE for electric heating or central air customers and comes with a free energy savings kit mailed to your home.

Call 877-486-9204 to schedule



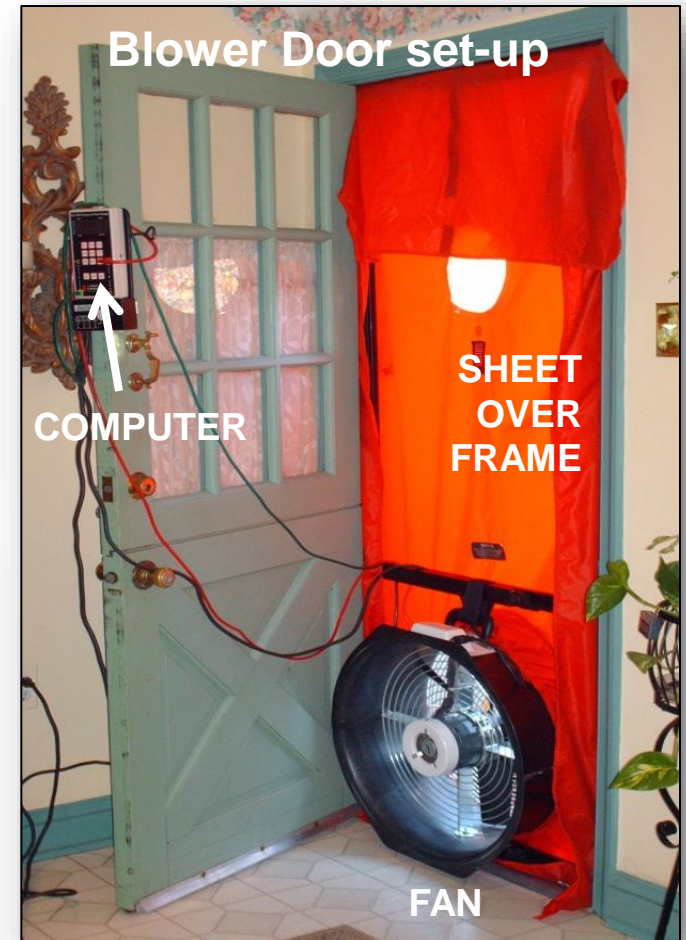
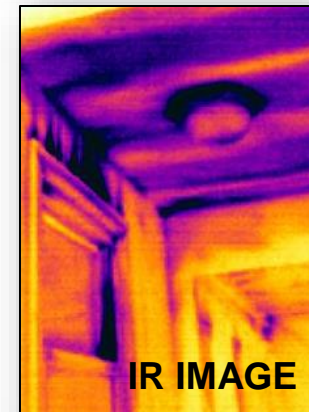
1ST STEP TO GETTING ANSWERS

IN-HOME ENERGY AUDIT

Most in-home audits are free if you assign the rebate to the contractor. Check with your independent auditor if the assessment is free before you schedule an appointment.

\$350 rebate for electric heating and central AC customers

\$200 rebate for electric heating or central AC customers



<https://www.pplelectricsavings.com//ppl/homeequipment/contractor/>

ENERGY EFFICIENT HOME REBATES

<https://www.pplelectric.com/rebates>

Single Weatherization Upgrades	Rebate	Notes	SHELL SYSTEM
Attic Insulation (electric heat)	\$500	75% of cost up to a max of \$500	
Attic Insulation (central A/C, non-electric heat)	\$200	75% of cost up to a max of \$200	
Basement Wall Insulation (electric heat)	\$500	75% of cost up to a max of \$500	
Basement Wall Insulation (central A/C, non-electric heat)	\$200	75% of cost up to a max of \$200	
Air Sealing	\$200	Air infiltration reduction (@ CFM50) x \$0.25 up to a max of \$200	
Single Efficient Equipment Upgrades	Rebate	Notes	MECHANICAL SYSTEM
Smart Thermostat (self-install)	\$50	ENERGY STAR® certified	
Smart Thermostat (professional install)	\$100	ENERGY STAR certified. Must be installed by a PPL Electric Utilities qualified contractor.	
Heat Pump Water Heater	\$400	Universal Energy Factor (UEF) ≥ 3.3	
Air Source Heat Pump	\$350	≥ 15.2 HSPF2, ≥ 11.7 EER2, ≥ 7.8 HSPF2	
Air Source Heat Pump	\$450	≥ 16.3 SEER2, ≥ 12.9 EER2, ≥ 8.2 HSPF2	
Ductless Mini-Split Heat Pump	\$400 (per outdoor unit)	≥ 15.2 SEER2, ≥ 11.7 EER2, ≥ 7.8 HSPF2	
Central Air Conditioner	\$200	≥ 15.2 SEER2, ≥ 12 EER2	
Central Air Conditioner	\$300	≥ 16.3 SEER2, ≥ 12.9 EER2	

PPL BONUS REBATES

Comprehensive Retrofit Bonus 1 (\$250)

(2 major treatments installed within 12 months) (1 weatherization upgrade + 1 other major upgrade)

Comprehensive Retrofit Bonus 2 (+\$100 or \$350 total)

(3 major treatments installed within 12 months) (Bonus Tier 1 + 1 or more additional major upgrades)

Deep Energy Retrofit Bonus (\$500)

(3 major treatments installed at the same time)

(In-Home audit + 3 treatments with at least 1 shell and 1 mechanical treatments)

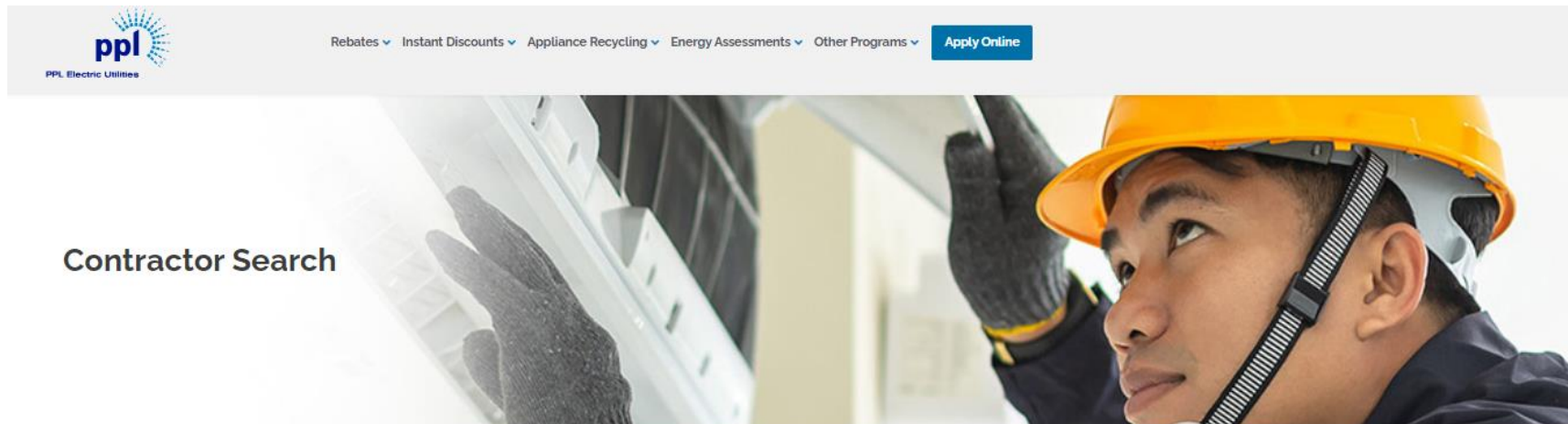
(Cannot be used with Bonus 1 or 2)

DER Bonus webpage: <https://pplelectric.com/retrofit>

CONTRACTORS

Log onto the PPL Electric Utilities website for more program information or to identify a Trade Ally you'd like to hire.

<https://www.pplelectricsavings.com//ppl/homeequipment/contractor/>



The Trade Allies below are qualified to provide In-home Energy Audits with the Deep Energy Retrofit BONUS.

**Advanced Efficiency Worx
Energy Services Group
King Conservation
MT Weatherization**

support@aeworxpa.com
info@energysvc.com
casey@kingconservationgroup.com
ACastles@tennygroup.com

BUNDLE YOUR SAVINGS

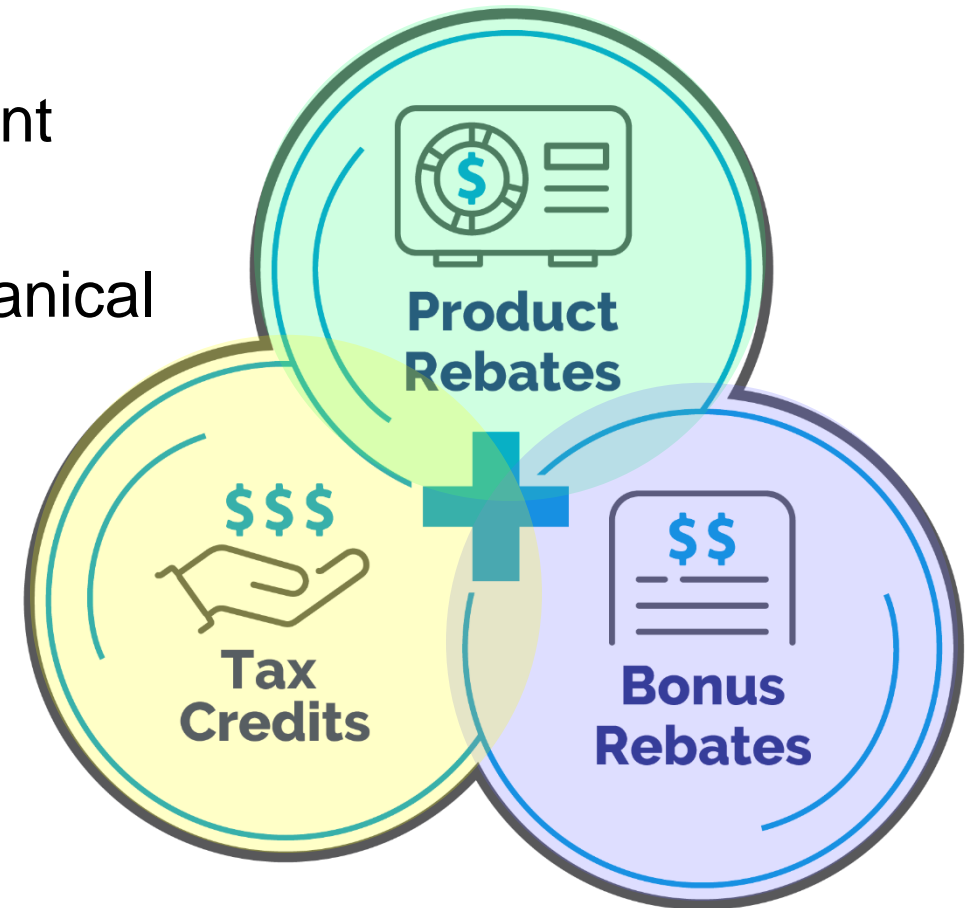
Final Note: Don't forget to bundle your savings.

You may qualify for federal tax credits. It's a maximum of \$3,200 per year from two different "buckets":

- Up to \$2,000 for higher performance mechanical improvements and
- Up to \$1,200 home improvements.

<https://www.EnergyStar.gov/about/federal-tax-credits>

Example: Air sealing and Insulation
(30% of cost up to \$1,200 for federal tax credit)
(Up to \$200 – PPL rebate)



QUESTIONS and COMMENTS ?

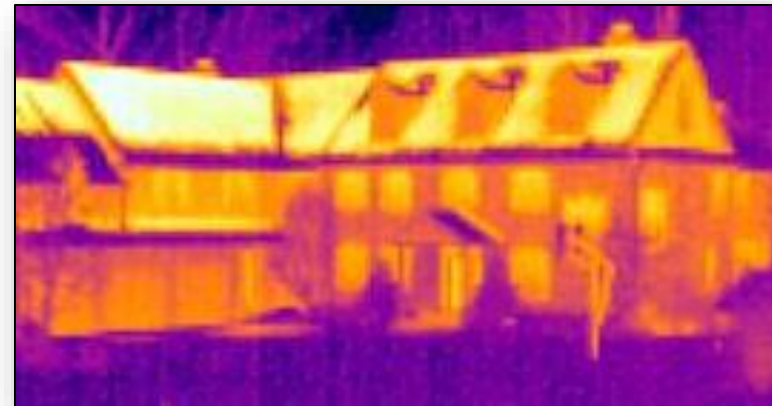
Please type them into the questions box





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Thank you for coming today



Hap Haven
Hap.Haven@CLEAResult.com