



PPL Electric Utilities

The presentation will begin shortly!

CREATING A HEALTHY HOME



Hap Haven
PPL Pilot Manager

CREATING A HEALTHY HOME

Thank you for coming today!

- 60 second summary of today's topic.

- **WHAT KEEPS YOU HEALTHY?** – Some background
- **THE 5 HOME QUESTIONS** – Exploring each question

- What is the PPL Residential Energy Retrofit 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 Overview

Is this a Healthy Home?



We can't tell until we answer these 5 questions:

- 1) Is it Clean and Maintained?
- 2) Is it Hazard free?
- 3) Is it Poison free?
- 4) Is it Dry and Mold free? and
- 5) Is it Pest free?

The answers can help you create an **Action Plan** with real steps to achieve a healthier home.

BEFORE LOOKING AT THOSE QUESTIONS

Let's ask: What keeps you healthy?

- **DNA** - What you were born with
- **DIET** – What you eat and drink
- **EXERCISE** – Aerobic, non-aerobic
- **MENTAL STATE** – Meditation, affirmation, counselling
- **ENVIRONMENT** – How clean (healthy) things are around you.

“Unhealthy homes are the root to many problems.”

Office of Housing and Urban Development



Chronic
Asthma



Mental
Stress



Increased
Emergency
Dept. Visits



Increased
Incidents
of Illness

THE ROUGH NUMBERS – FOR PERSPECTIVE

Deaths at Home

Total reported incidents

- ~ 3,800 HOUSE FIRES (~1.3 million fires)
- ~21,000 FALLS AT HOME (~2.8 million senior falls)
- ~39,000 ALL POISONING (~48 million food poisonings)
- ~148,000 STROKE
- ~303,000 RESPRITORY DISEASES (~13 million reported)
COPD* + ASTHMA COMBINED (Significant #s from Lead)
- ~500,000 RESPRITORY DISEASES (Amplified by COVID)
- ~600,000 CANCER (~21,000 deaths from Radon)
- ~660,000 HEART DISEASE (Significant #s from Lead)

*COPD = Chronic obstructive pulmonary disease
The red numbers indicate the reported cases.

MANAGING THE DANGERS

MORE ABOUT ILLNESS OR REDUCED FUNCTION – NOT DEATHS?

~450 people die every year from Carbon Monoxide exposure.

~50,000 people are treated for CO poisoning every year.

~Millions of people are exposed to low levels of CO from their gas ovens, ranges, and other common combustion appliances.



Standard CO detectors alarm at 70ppm after 3 hours.

POLLUTANTS CAN BE MANAGED

If you know the numbers (Example with a Sharpie)

TEMPERATURE

68° (65° - 70° desired)

HUMIDITY

46% (35% - 45% desired)

CO2 (People, combustion)

600 (< 650ppm desired)

CHEMICALS / TVOCs

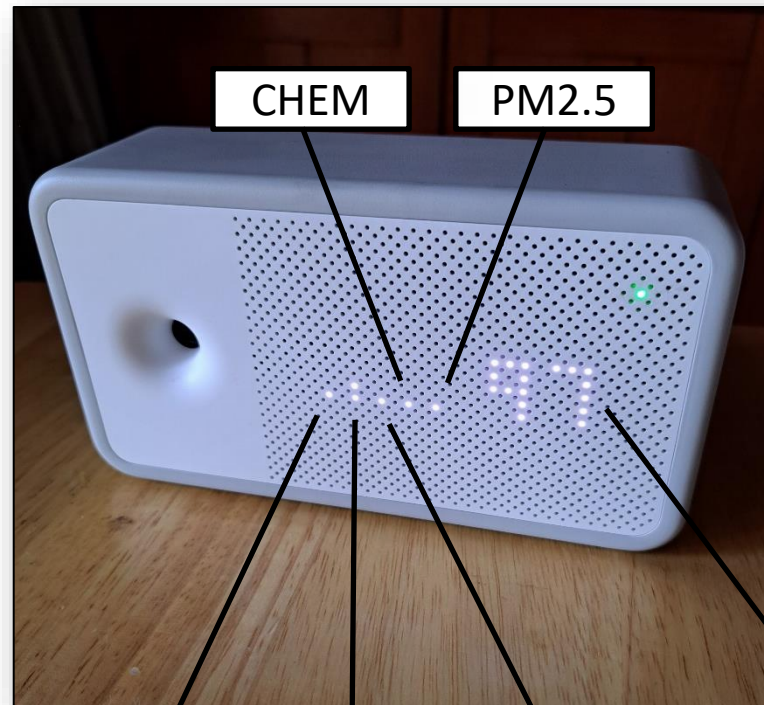
849 (< 500 Ug/m3 desired)

Micro Grams per cubic meter

FINE DUST / PM2.5

10 (< 12 Ug/m3 desired)

Micro Grams per cubic meter



TEMP

HUMD

CO2

SCORE OUT OF 100

*Residential monitors are estimating tools best used for comparison purposes.

PARTICULATES CAN BE MANAGED

If you know the numbers (Example with a single candle)

TEMPERATURE

74° (65° - 70° desired)

HUMIDITY

43% (35% - 45% desired)

CO2 (People, combustion)

919 (< 650ppm desired)

CHEMICALS / TVOCs

489 (< 500 Ug/m3 desired)

Micro Grams per cubic meter

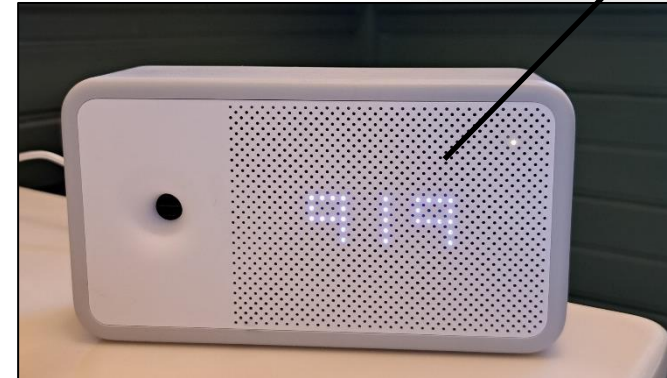
FINE DUST / PM2.5

94 (< 12 Ug/m3 desired)

Micro Grams per cubic meter



SCORE 66 / 100



CO2 - 2 Lights



PM2.5 - 4 Lights

OK - HERE'S THE LIST:

CLEAN and MAINTAINED

HAZARD FREE

POISON FREE

DRY and MOLD FREE

PEST FREE

LET'S GET TO IT !

1) CLEAN and MAINTAINED

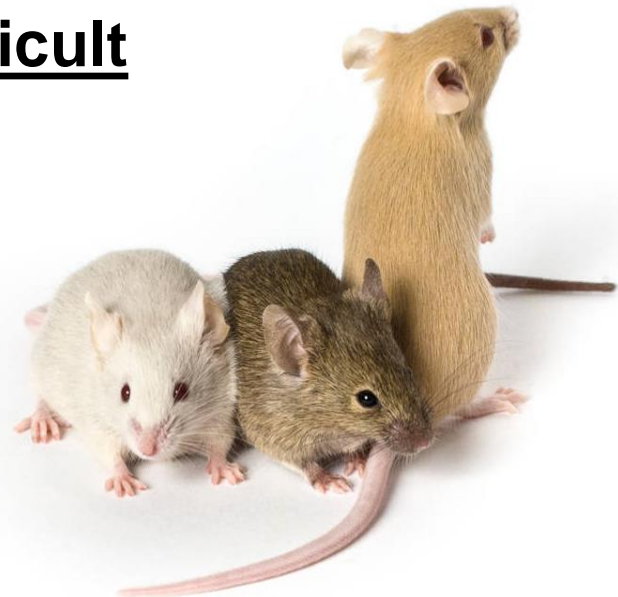
REDUCING CLUTTER WILL HELP

Decluttering has been a thriving industry for the past few decades now. That's because keeping the old junk you have doesn't contribute to your quality of life.

It also doesn't contribute to a healthy home.

That's because all the clutter makes it difficult to clean your home.

Clutter also provides good housing for the cockroaches and mice of the world.



1) CLEAN and MAINTAINED

A WORD ABOUT RESPIRATORY ILLNESS

Flare-ups of Asthma and COPD are often triggered by allergens. This includes tobacco smoke, mold, pests, dust mites, pets and other pollutants.

Keeping your house clean and well-maintained removes many of these respiratory triggers.



“There’s lots more where that came from.”

1) SUMMARY - CLEAN and MAINTAINED

Rethink how you've cleaned in the past:

- EASE - Hardwood floors and rugs vs wall to wall carpeting? Clutter?
- NO POISONS - Natural cleaning products?

- **Clean as often as you can.**
- **Use natural not harsh chemical cleaners**
- **Identify the pollutants that stress your immune system.**
- **Remove or reduce these triggers in your home or,**
- **Limit your exposure to the pollutants.**

2) HAZARD FREE – “SAFE and SOUND”

YOUR MAINTENANCE LIST SHOULD INCLUDE HAZARDS

More than 40 million people are injured every year in this country.
~170,000 ACCIDENTS RESULT IN DEATHS.

FALLS, FIRES AND POISONING are the big 3

We'll look at poisoning in the next section.

**It's easy to understand this goal of “safe and sound”.
Ask yourself if there is anything in your home that is not
safe - like the stairs.**

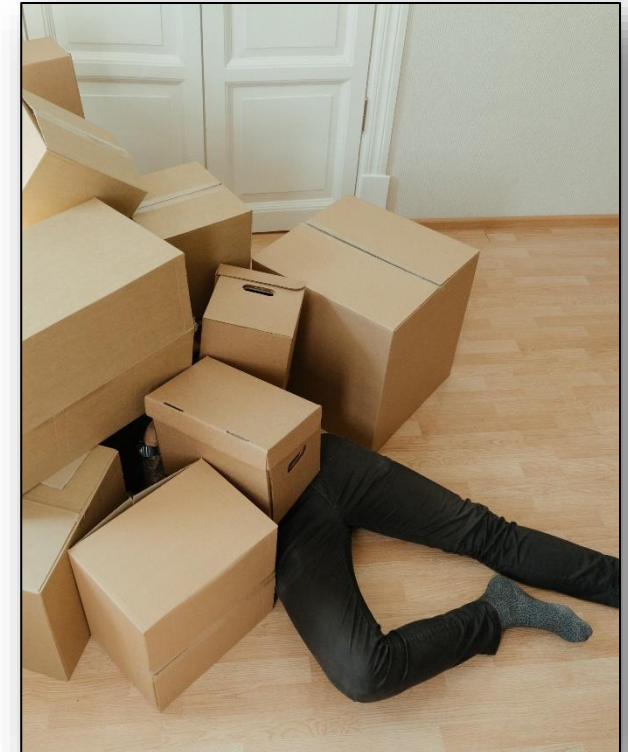
2) HAZARD FREE - Falls

Falls kill 20,000+ people each year.

Most falls can be prevented – It's the same for falling objects.

For example, let's check the stairs.

- Loose rugs?
- Loose stairs?
- No handrail?
- Too steep?



2) HAZARD FREE - FIRES

FIRES ARE PREVENTABLE and SURVIVABLE

Keep all mechanical and combustion appliances in good working order. As you saw from our list earlier, there are more than a million house fires each year but only ~4,000 deaths.

Fires are the 3rd leading cause of child deaths. (National Safety Council)

Fires increase at holidays. Why?

- **Cooking ~51%** (US Fire Administration)
- Heating ~9%
- Electrical malfunctions ~7%
- Open flames ~4%



2) SUMMARY - HAZARD FREE

- **“Child-proof your house” They are the most vulnerable.**
- **Smoke alarms and fire extinguishers are a must.**
- **CO alarms are key if you have any combustion appliances.**
- **Schedule time to repair or install items.**

3) POISON FREE - AIR

MAJOR STAND-ALONE POISONS

- **Radon** From bedrock + soil
- **Lead** Pre 1978 Paint
- **Tobacco smoke** Your smoking or 2nd hand smoke
- **CO** From combustion including cooking



POISONOUS AIR COCKTAIL

- **VOCs** - Come from incomplete combustion and the vaporization of chemical compounds like cleaners, glues, paints solvents, carpets, carpet pads, plastics
- **Pesticides** Bug poison
- **Herbicides** Plant poison
- **Termiticides** Termite poison
- **Fungicides** Fungus poison
- **Chlorine** Cleaners
- **Arsenic** From treated lumber
- **Cyanide** From foam board
- **Asbestos** 1,300 other products

3) POISON FREE - AIR

INDOOR AIR QUALITY HAS THREE STEPS:

- 1) Cleaning and maintaining your home
- 2) Removing all the poisons from your home. This includes using exhaust fans and filtering the air
- 3) Adding fresh air to your home especially for cleaning or projects

BUT DILUTION IS NOT THE SOLUTION TO POLLUTION

It's much more important to remove the poison!

Here just one of the hundreds of chemical poisons you have in your house:

Perchloroethylene (perc) – This is a solvent used for dry-cleaning. It's also found in adhesives, sealants and lubricants. It off-gasses in the home from dry cleaning.

Low levels may cause irritated eyes, skin, nose and throat. **High levels** can cause unconsciousness and death.



3) POISON FREE with EXHAUST FANS

Particulate Matter (PM)

Chronic heart and lung diseases, heart attack and premature death

PM 0.1 particles (Viruses, smog, tobacco smoke, soot)

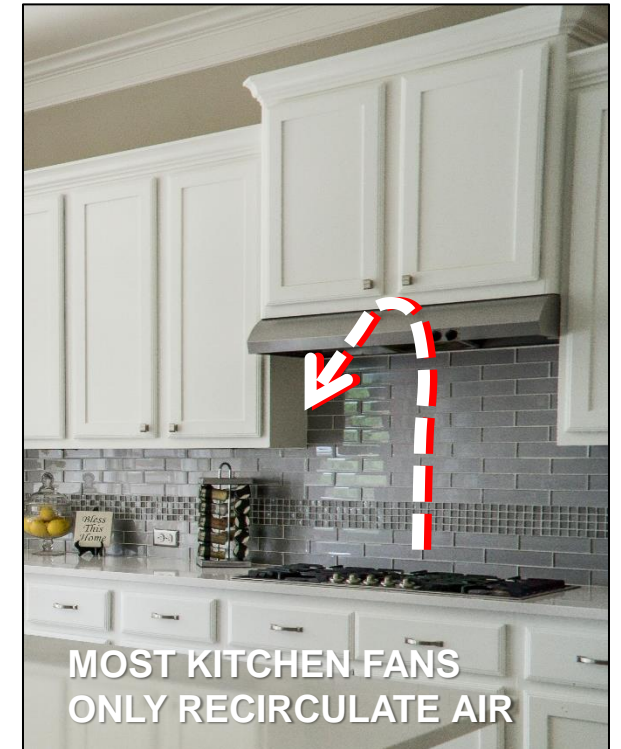
These ultra fine particles can penetrate deep into your lungs and into your blood stream. We have no natural defenses against them.

PM 2.5 particles (Combustion gasses, cooking oils and fats, common dust, bacteria, dust mites and cat allergens)

- These fine particles can enter the cardiopulmonary system and be circulated around the body

PM 10 particles (Dust, pollen, mold, cement dust)

- These coarse particles can irritate your eyes, nose, and throat



3) CLEAN AIR WITH FILTERS

All these particles can be inhaled into your lungs .

N95 masks work well because viruses are usually airborne on water droplets

	MERV* RATING	FPR* RATING	MPR* RATING	PARTICLE SIZES 0.3 to 1.0 Microns	PARTICLE SIZES 1.0 to 3.0 Microns	PARTICLE SIZES 3.0 to 10.0 Microns	What kind of particles will this filter remove?
BEST (True HEPA*)	MERV 20			> 99.99997%	99% or Better	99% or Better	Viruses (0.05 to 0.2 microns) Carbon dust from motors, Smoke Radioactive materials
	(True HEPA) MERV 19			> 99.997%	99% or Better	99% or Better	
	(HEPA - H14) MERV 18			> 99.997%	99% or Better	99% or Better	
	(HEPA - H13) MERV 17			> 99.97%	99% or Better	99% or Better	
BETTER	MERV 16			95% or Better	90% or Better	90% or Better	Bacteria (0.15 to 0.3 microns) Most tobacco smoke, Sneeze droplets
	MERV 15		2900	85% - 94%	90% or Better	90% or Better	
	MERV 14		2200	75% - 84%	90% or Better	90% or Better	
	MERV 13	10	1900	Less than 75%	90% or Better	90% or Better	
GOOD	MERV 12		1500		80% - 89%	90% or Better	Humidifier dust, Lead dust, Auto emissions, Milled flour
	MERV 11	7	1000		65% - 79%	85% or Better	
	MERV 10				50% - 64%	85% or Better	
	MERV 9				Less than 50%	85% or Better	
BASIC	MERV 8	5	600			70% - 85%	Mold spores, Hair spray, Fabric proector, Cement dust
	MERV 7		600			50% - 69%	
	MERV 6	na	300			35% - 49%	
	MERV 5					20% - 34%	
PRE-FILTER	MERV 4					Less than 20%	Pollen, Dust mites, Sanding dust, Spray paint, Carpet fibers
	MERV 3					Less than 20%	
	MERV 2					Less than 20%	
	MERV 1					Less than 20%	

Colds, flu and covid are all viruses and can be absorbed into your blood.

Minimum Home HVAC Filter recommended for viruses by ASHRAE, because the capture rate approaches 100% on multiple passes through the filter.**

MERV* = Minimum Efficiency Reporting Value (Industry Standard)
 FPR* = Filter Performance Rating (The Home Depot)
 MPR* = Micro-particle Performance Rating (3M)

HEPA* = High Efficiency Particulate Air (filter) used mostly for vacuums and stand alone air purifiers

**High efficiency filters cause friction - Don't install a MERV 13 filter in your HVAC system without consulting with a licensed HVAC contractor first.

3) SUMMARY - POISON FREE

2+ million people report poisoning events each year to Poison Control Centers.
~9% of adult poisoning events (~75,000) come from household products such as cleaning products and pesticides. More for children!

SOME STEPS TO BECOME POISON FREE

- **Keep only essential chemicals and medicines around.**
- **Clearly label any necessary chemicals and medicines.**
- **Store any necessary chemicals and medicines safely – outside if possible**
- **Run your kitchen fan whenever you cook**
- **Filter the house air.**
- **Provide fresh air into the house when possible.**

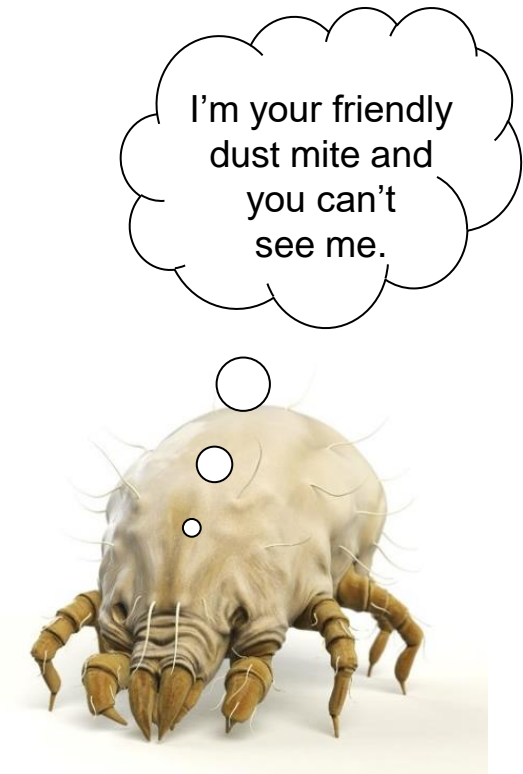
4) DRY and MOLD FREE

MOLD SPORES AND MOLD ARE LITERALLY EVERYWHERE AND GENERALLY DON'T CAUSE HEALTH ISSUES

If mold was such a big problem, we'd all be sick, all the time.

However, large amounts can create a sensitivity or trigger for your immune system. You can become allergic to mold just like any other substance.

- **Moisture and higher humidity creates a favorable environment for mites, rodents, and roaches.**
- **Water can create the right conditions for mold.**
- **Both are associated with ALLERGIES and ASTHMA.**



4) DRY and MOLD FREE

CRAWLSPACES AND BASEMENTS are usually the biggest sources of moisture in your house

These spaces often create pathways for both liquid water and vapor to enter the house. The photos below show you typical problems.



4) SUMMARY - DRY and MOLD FREE



There are solutions for every problem – many are outside the house.

FIND THE SOURCE

(Rainwater, groundwater, plumbing, cooking, etc.)

- Remove the source
- Or separate yourself from the source
- Identify and control the pathway

CLEAN UP

- Clean or remove mold-contaminated materials.
- Remove materials with severe mold growth
- Use dehumidifiers and/or fans to dry out the area

5) PEST FREE

Studies show that there is a causal relationship between mice and cockroach exposure and asthma episodes in children with asthma.

Integrated Pest Management (IPM) addresses the issue of pests holistically by understanding how the pest lives and without using toxic pesticides.

The first steps include #1 and #4:

CLEAN and
MAINTAINED

DRY and MOLD
FREE



5) SUMMARY - PEST FREE

KEY STEPS TO BECOME PEST FREE

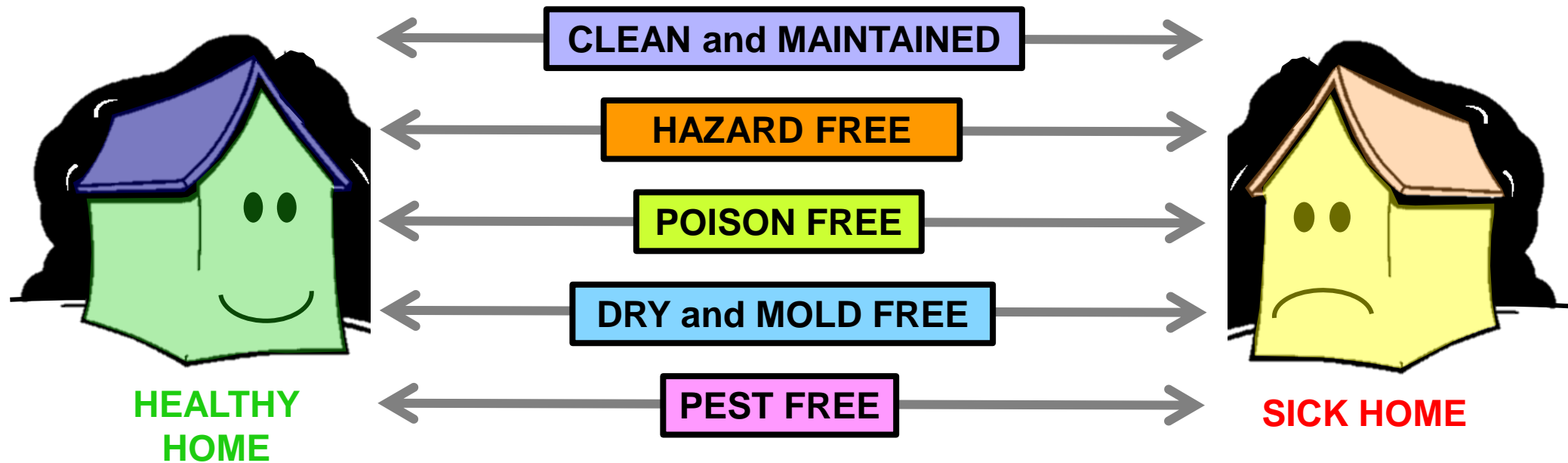
- Regular cleaning: HEPA vacuums; damp cloth dusting.
- Eliminate carpet, when possible, hard floors and rugs are better because it's easier to clean well.
- Store food (including pet food) in pest-resistant containers.
- Air seal cracks in floors, walls and ceilings.
- Reducing the amount of clutter in your home
- Storing garbage outside in a can with a lid. Better yet, use a Green Cone™.
- Use sticky-traps and baits in closed containers or try other types of non-chemical management. If you need to use a pesticide.

**Close the doors
to the pest
FOOD COURT**

**And remove the
food and drink.**

HEALTHY HOME WRAP-UP

A healthy home is a process that you control –
Start your action plan today!



Your goal is to shift as much as you can to
the healthy side.

IN-HOME ENERGY AUDITING

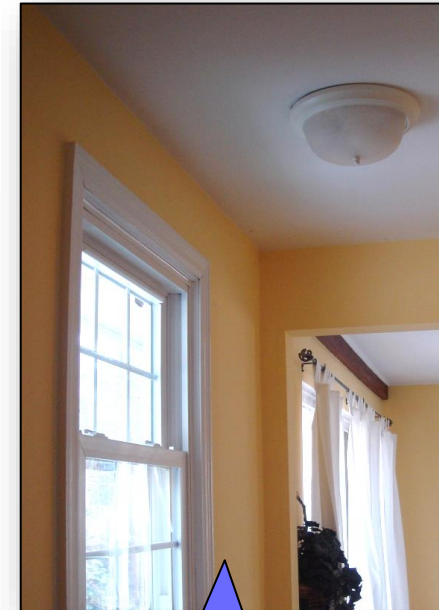
Home Energy Assessments		
In-Home Audit (for a home with electric heating and central A/C)	\$350	Auditor must be a Building Performance Institute certified Building Analyst. Must be administered by a PPL Electric Utilities Trade Ally. Visit ppl electric.com/contractor to find a participating contractor.
In-Home Audit (for a home with either electric heating or central A/C)	\$200	Auditor must be a Building Performance Institute certified Building Analyst. Must be administered by a PPL Electric Utilities Trade Ally. Visit ppl electric.com/contractor to find a participating contractor.
Virtual Home Energy Assessment (for a home with electric heating and/or central A/C)	Free	Virtual Assessment appointments are over the phone. Assessment comes with a free energy savings kit mailed to your home. Call 1-877-486-9204 to schedule.

Auditing isn't about typical problems:

- Broken heaters, AC, etc.
- Kitchens over vented crawlspaces
- Drafty homes
- Etc. . . Etc. . .

Auditing can find hidden problems and show you a solution.

Infrared shows you the problem



No problem here.

PPL 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	800 cfm reduction in air leakage = \$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	Make sure you follow the specs!
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)

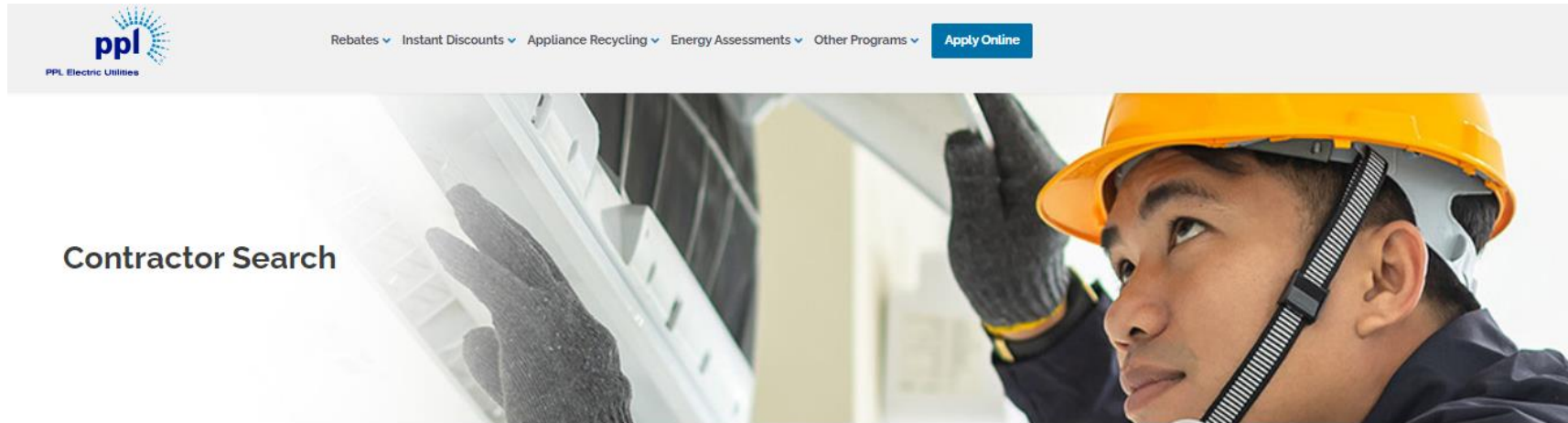
(Cannot be used with Bonus 1 or 2)

DER Bonus webpage: <https://www.pplelectric.com/retrofitpilot>

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 and the Deep Energy Retrofit Bonus.

**Advanced Efficiency Worx
Energy Services Group**

support@aeWORXpa.com
info@energysvc.com

QUESTIONS and COMMENTS ?

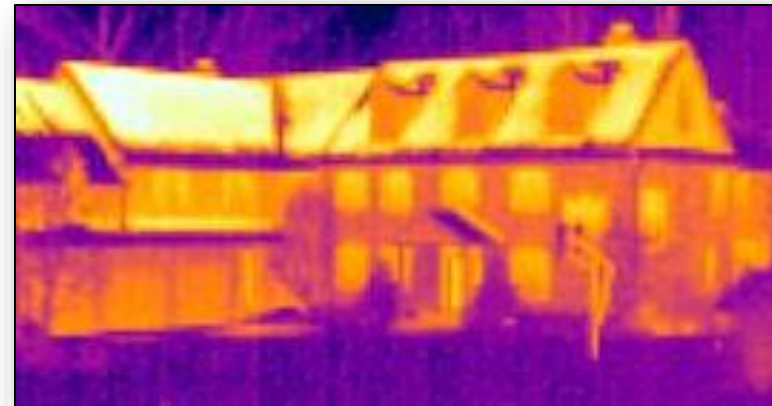
Please type them into the questions box





PPL Electric Utilities

Thank you for coming today



Hap Haven
Hap.Haven@CLEAResult.com