

# CREATING A HEALTHY HOME

## INDOOR AIR QUALITY

Wednesday, August 19, 2006, Noon



Chronic  
Asthma



Mental  
Stress



Increased  
Emergency  
Dept. Visits



Increased  
Incidents  
of Illness

***“Unhealthy homes are the root to many problems.”***

Office of Housing and Urban Development

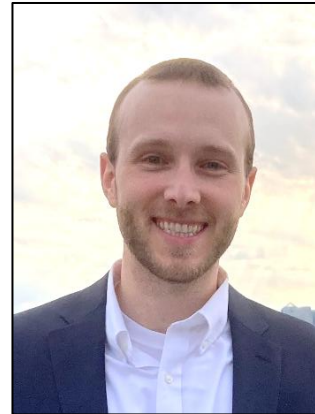
# CREATING A HEALTHY HOME

## INDOOR AIR QUALITY

The presentation will begin shortly!



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Senior Project Manager



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Marketing Manager

# CREATING A HEALTHY HOME

Thanks for joining us — here's today's overview

- What's healthy? – Some background
- 3 Questions to ask – Exploring each question
  - What is the PPL Residential Energy Retrofit program?  
Home check-ups, Incentives and contractors
  - Q and A at the end – please type into the chat box
  - No need to take notes – we'll send you the PDF

# THE ROUGH NUMBERS – for context

## # Deaths at home each year

**~450 CARBON MONOXIDE**  
(over 100,000 emergency department visits)

**~18,000 STROKE**  
(From indoor air)

**~300,000 RESPIRATORY DISEASE**  
(includes lead exposure)

**~21,000 from RADON**

**~170,000 HEART DISEASE**  
(Includes lead exposure)

**~3,000 HOUSE FIRES**  
(75% from smoke inhalation and toxic gas poisoning)

**~21,000 FALLS AT HOME**

## Total reported incidents

(~5 million CO poisonings)

(~795,000)

(~44 million reported) (Like Flu, Asthma, COPD, etc.)

(~600,000 Cancer)

(~700,000)

(~1.3 million fires)

(~2.8 million senior falls)

# WHAT IS UNHEALTHY TO BREATHE?

## Major stand-alone poisons

- **Radon** From bedrock + soil
- **Lead** Pre-1978 paint and many other products
- **Tobacco smoke** Smoking or secondhand smoke
- **CO** From combustion including cooking
- **Arsenic** From treated lumber
- **Cyanide** From foam board
- **Asbestos** found in 1,300+ products



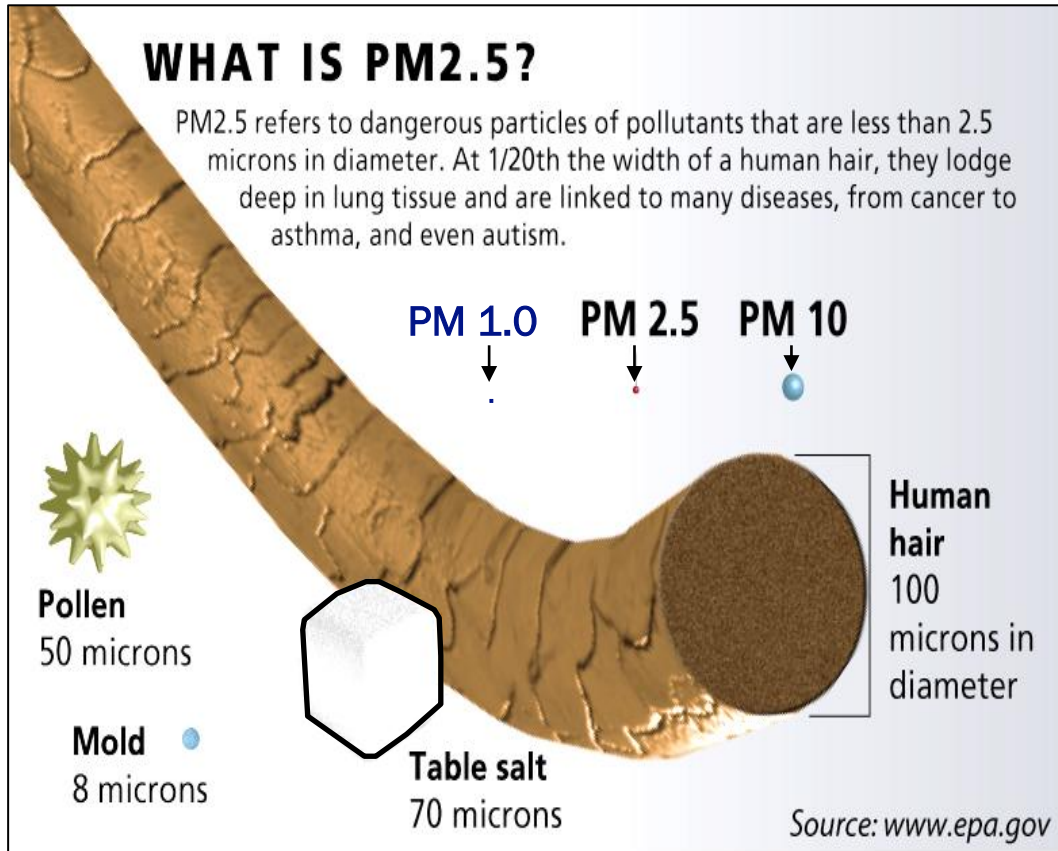
## Unhealthy air

- **Particles floating around in the air**  
Viruses, smoke, dust, pet dander, mold spores, etc.
- **VOCs (chemical fumes)** - Invisible fumes from fuel and everyday products like cleaners, glue, paint, and carpet

- |                       |                |
|-----------------------|----------------|
| • <b>Pesticides</b>   | Bug poison     |
| • <b>Herbicides</b>   | Plant poison   |
| • <b>Termiticides</b> | Termite poison |
| • <b>Fungicides</b>   | Fungus poison  |
| • <b>Chlorine</b>     | Cleaners       |

# HOW DO WE MEASURE PARTICLE SIZE?

Particulate Matter (PM): airborne particles linked to heart and lung disease



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

These ultra-fine particles penetrate deep into your lungs and bloodstream — we have no natural defense against them.

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

These particles enter the cardiopulmonary system and circulate through the body.

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

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

# HOW DO WE MEASURE CARBON MONOXIDE

Problem – Standard CO detectors don't alarm until levels stay above 70 ppm for 3 hours.

Thousands get sick every year from low CO levels (too low for standard detectors to catch) from gas ovens, ranges, and other combustion appliances.

Typical detectors (\$25–\$75) don't alarm at low CO levels.



Photo courtesy of Kidde

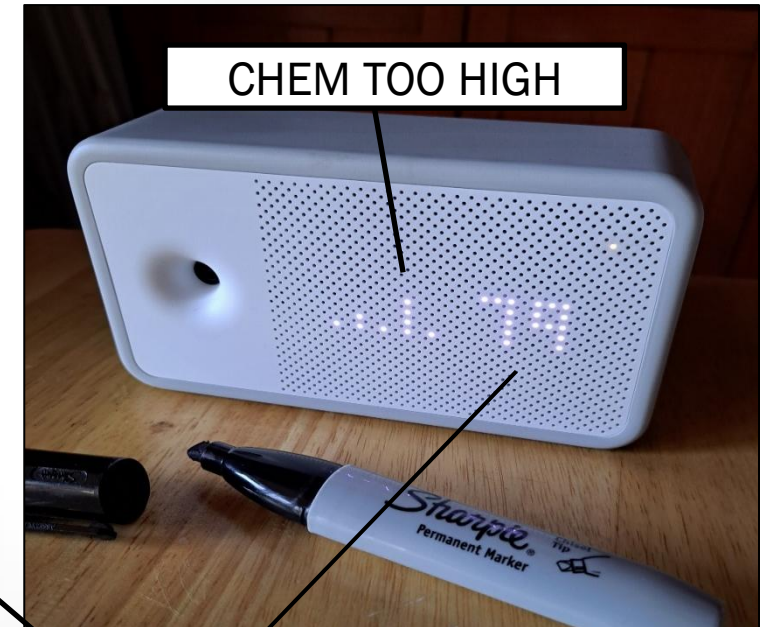
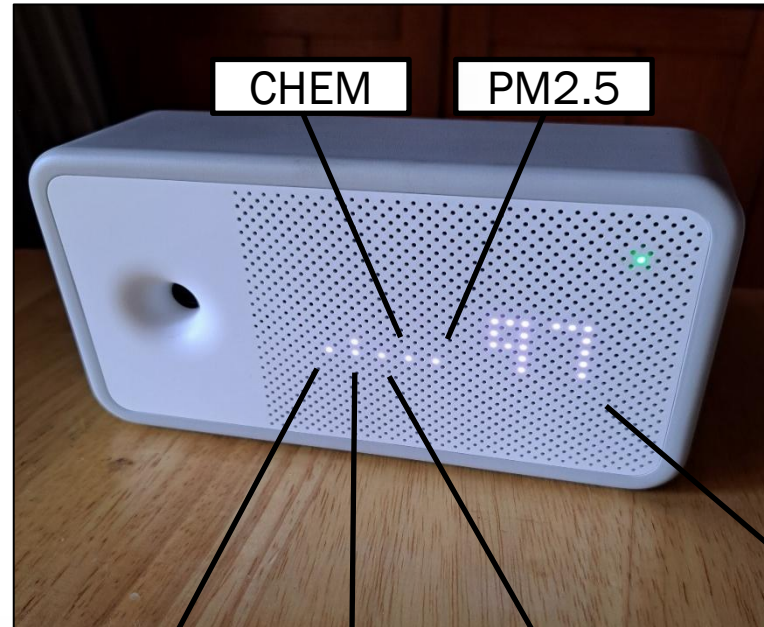




# WHAT POLLUTANTS DO YOU HAVE?

Monitors\* can help (Example showing VOCs with a Sharpie)

- **TEMPERATURE** 68°  
(65° - 70° desired)
  - **HUMIDITY** 46%  
(35% - 45% desired)
- 
- **CO2** (People, combustion)  
600 (< 650ppm desired)
  - **CHEMICAL FUMES (VOCs)**  
849 (< 500 Ug/m3 desired)  
Micro Grams per cubic meter
  - **FINE DUST (PM2.5)**  
10 (< 12 Ug/m3 desired)  
Micro Grams per cubic meter



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



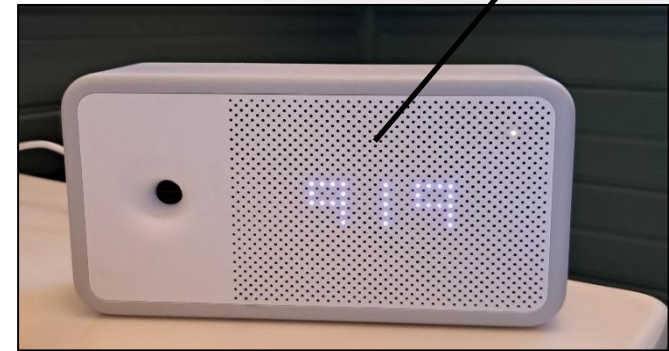
# WHAT POLLUTANTS DO YOU HAVE?

Monitors can help (Example showing soot from a single candle)

- **TEMPERATURE** 74°  
(65° - 70° desired)
- **HUMIDITY**  
43% (35% - 45% desired)
- 
- **CO2** (People, combustion)  
**919** (< 650ppm desired)
- **CHEMICAL FUMES (VOCs)**  
**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 LED Lights



FINE DUST (PM2.5) - 4 LED Lights

# IS YOUR HOME AIR HEALTHY?

You can't tell until you answer a few questions:



- 1) Is your home Clean and Maintained?
- 2) Is your home Dry and Mold free? and
- 3) Is your home Pest free?

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

# 1) CLEAN and MAINTAINED

Rethink how you've cleaned in the past – now think again:

- Reduce clutter and wall to wall carpeting.
- Clean as often as you reasonably 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.

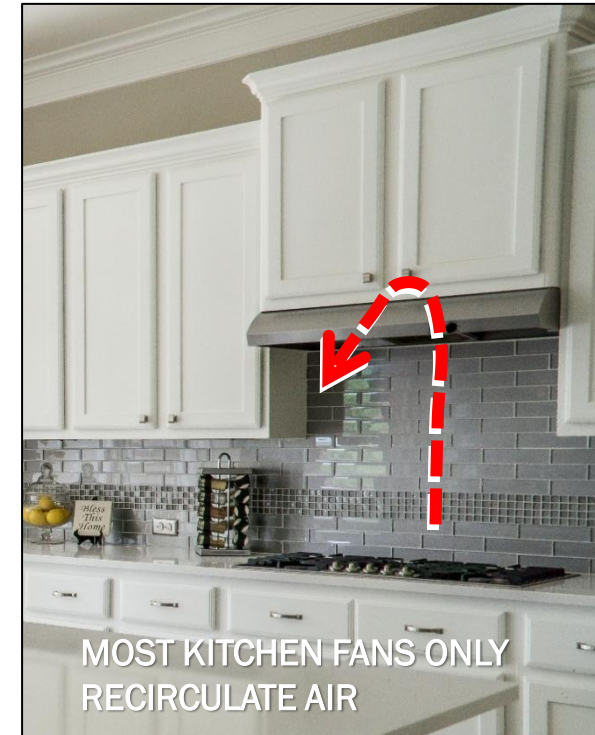


# 1) HOW CAN WE CLEAN THE AIR?

**Particulate Matter (PM)** is the most common causing heart and lung disease, heart attack, and premature death

Cooking almost always creates low levels of CO and PM2.5.

**Kitchen fans should always blow air outdoors**, but many just recirculate it — great for grease, but it does nothing for smaller particles, CO or your health.



# 1) WHICH AIR FILTERS CLEAN THE BEST?

|                          | MERV*<br>RATING      | FPR*<br>RATING | MPR*<br>RATING |
|--------------------------|----------------------|----------------|----------------|
| <b>BEST</b> (True HEPA*) | MERV 20              |                |                |
|                          | (True HEPA) MERV 19  |                |                |
|                          | (HEPA - H14) MERV 18 |                |                |
|                          | (HEPA - H13) MERV 17 |                |                |
| <b>BETTER</b>            | MERV 16              |                |                |
|                          | MERV 15              |                | 2900           |
|                          | MERV 14              |                | 2200           |
|                          | MERV 13              | 10             | 1900           |
| <b>GOOD</b>              | MERV 12              |                | 1500           |
|                          | MERV 11              | 7              | 1000           |
|                          | MERV 10              |                |                |
|                          | MERV 9               |                |                |
| <b>BASIC</b>             | MERV 8               | 5              | 600            |
|                          | MERV 7               |                | 600            |
|                          | MERV 6               | na             | 300            |
|                          | MERV 5               |                |                |
| <b>PRE-FILTER</b>        | MERV 4               |                |                |
|                          | MERV 3               |                |                |
|                          | MERV 2               |                |                |
|                          | MERV 1               |                |                |

Minimum Home HVAC Filter recommended by heating and cooling engineers because it catches almost 100% of small particles after air passes through it a few times.

Denser filters may cut down on the amount of air delivered to some rooms. Consider installing a 2" or 4" filter instead of a 1" filter.

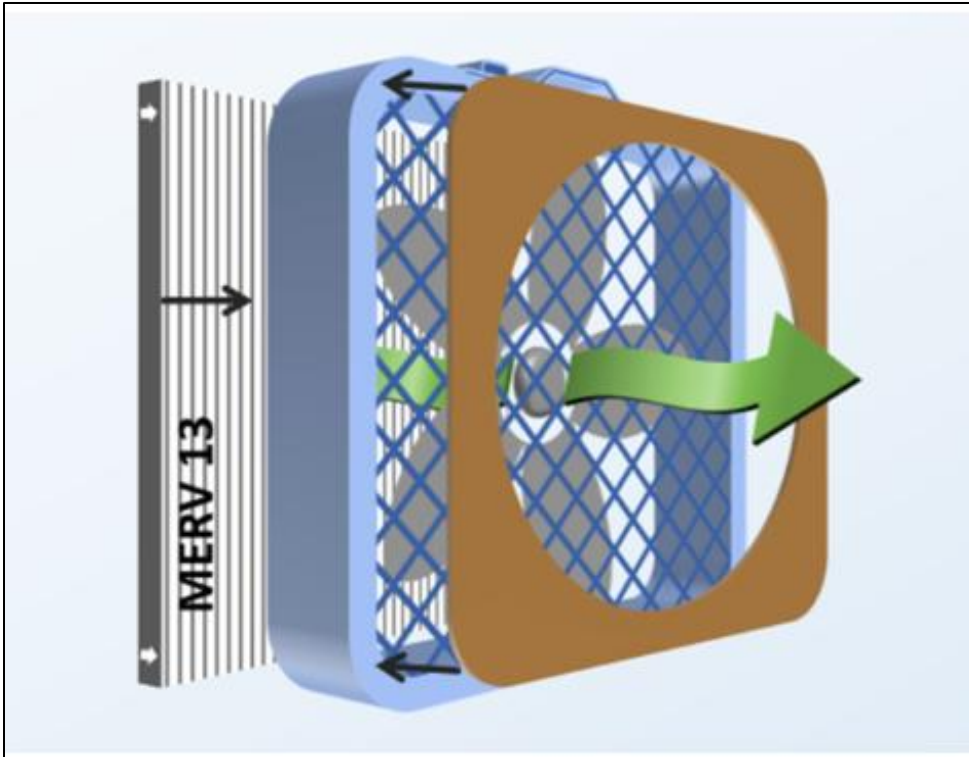
MERV\* = Minimum Efficiency Reporting Value (Industry Standard)  
FPR\* = Filter Performance Rating (The Home Depot)  
MPR\* = Micro-particle Performance Rating (3M)

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



# 1) DIY ROOM AIR CLEANER

[DIY Air Cleaners](#) | [US EPA](#)



## Supplies for building your DIY air cleaner:

### Box fan

20"x20" or what ever you own.

### HVAC filter

To match your fan or 20"x20"x1" (or 2" or 4")  
MERV 13 is recommended.

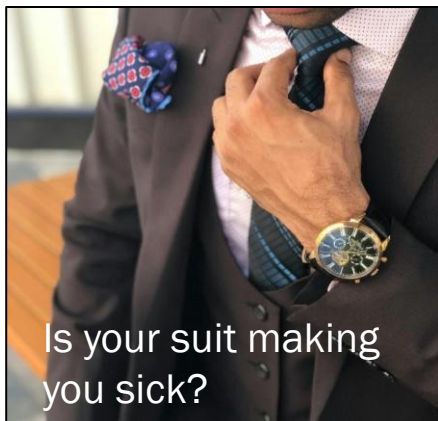
### Cardboard and Tape

Cardboard to match your fan or 20"x20"x1" and  
cut with a round hole. Tape to hold everything  
together.



# 1) SUMMARY FOR HEALTHY AIR

- Clean and declutter your house.
- Store chemicals (cleaners, paint) safely — outside if possible.
- Run your kitchen fan whenever you cook.
- Filter the house air.
- Consider adding a fresh air supply or balance ventilation system when you upgrade your HVAC system.
- Bring in fresh air, when possible, but remember “dilution is not the solution to pollution”. Removing the source matters more — see below.



Is your suit making  
you sick?

**One example: Perchloroethylene, or “perc” —**  
Is used in dry-cleaning, adhesives, sealants, and lubricants.  
It slowly releases fumes from dry-cleaned clothes.  
**Low levels** may cause eye, skin, nose, and throat irritation.  
**High levels** can cause unconsciousness or death.

## 2) DRY and MOLD FREE

Mold spores and mold are literally everywhere but usually don't cause health issues.

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

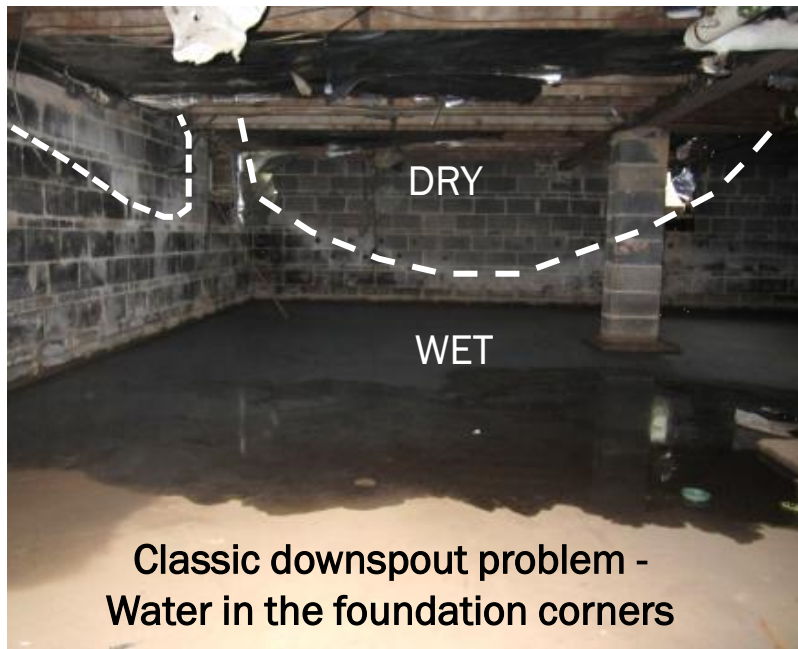
But large amounts can trigger your immune system — you can become allergic to mold, like any other substance.

- Moisture and high humidity favor mold and MITES, RODENTS, and ROACHES.
- Mold also needs food, like wood, to grow.
- Both are associated with ALLERGIES and ASTHMA.

## 2) DRY and MOLD FREE

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

These spaces create pathways for water and vapor to enter the house. Photos below show two typical problems.



## 2) SUMMARY - DRY and MOLD FREE



A thick plastic moisture barrier  
(12 mil polyethylene sheeting)\*



Foamboard overlapping with  
plastic sheeting\*

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

### FIND THE SOURCE

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

- Remove the source
- Or separate yourself from the source – often by air sealing
- Identify and control the pathway

### CLEAN UP

- Clean or remove all mold-contaminated materials.
- Use dehumidifiers and/or fans to dry out the area.

\*Photo source unknown

### 3) PEST FREE?

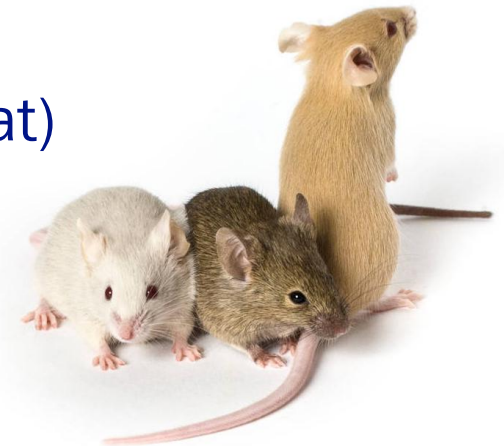
Studies show a direct link between  
pest exposure and asthma episodes in children.

**Remember that all pests are just looking for two things:**  
water and food.

Integrated Pest Management (IPM) — a common-sense, low-chemical approach — controls pests by understanding their behavior, not by using toxic chemicals. The first steps always include creating:

**A clean and maintained space** (no place to live or food to eat)

**A dry and mold-free space** (no water to drink)





### 3) SUMMARY - PEST FREE

#### Key steps to become pest free:

- Vacuum with a HEPA filter; dust with a damp cloth.
- Use hard floors and rugs instead of carpet — easier to clean.
- Store food (including pet food) in pest-resistant containers.
- Air seal cracks in floors, walls and ceilings — this also stops energy-wasting drafts.
- Reduce clutter in your home.
- Use sticky-traps or baits in closed containers, or other non-chemical methods.
- Store garbage outside in a can with a lid — or use a Green Cone™ food composter (photo right) if you have a sunny yard..



# EASY ACCESS TO PPL INFORMATION

- Income-based offers
  - [ppl electric.com/IncomeBase](https://ppl electric.com/IncomeBase)
  - [ppl electric.com/WRAP](https://ppl electric.com/WRAP)
- All rebates
  - [ppl electric.com/Rebates](https://ppl electric.com/Rebates)
- Energy assessments + audits
  - [ppl electric.com/HomeAudit](https://ppl electric.com/HomeAudit)
- Trade Ally locator
  - [ppl electric.com/Contractor](https://ppl electric.com/Contractor)
- HVAC / heat pump programs
  - [ppl electric.com/ChooseHVAC](https://ppl electric.com/ChooseHVAC)

# EVALUATE YOUR HOME ENERGY USAGE

## 1) The Energy Analyzer

FREE — on your PPL online account page. Learn about your usage and what to ask during an assessment or audit.

## 2) Virtual Assessments

Describe your problem to an Energy Advisor by phone or video call. Free for electric heating/central air customers, includes a free energy savings kit. Call 877-486-9204 to schedule

## 3) In-Home Auditing

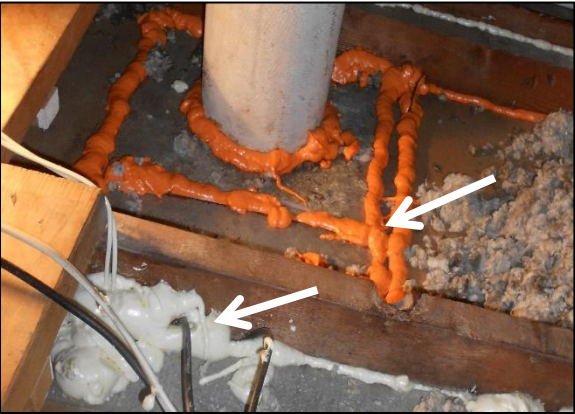
A deep-dive to find hidden problems and solutions. Ask your auditor if the assessment is free before scheduling. <https://www.pplelectricsavings.com/contractor>



# SAMPLE REBATE GRID

| Project                                                                     | Qualification Notes                                                                                                                              | Rebates<br>(Available to all customers) | Enhanced Rebates<br>(Up to 250% FPL) |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------|
| ♦ Air Sealing                                                               | Up to \$0.25 per CFM reduction                                                                                                                   | Up to \$150                             | Up to \$165                          |
| ♦ Attic Insulation<br>(Home With Electric Heat and Central A/C)             | The new insulation must achieve an R-value greater than the existing insulation R-value.                                                         | Up to \$500                             | Up to \$575                          |
| ♦ Attic Insulation<br>(Home With Non-Electric Heat and Central A/C)         | The new insulation must achieve an R-value greater than the existing insulation R-value.                                                         | Up to \$200                             | Up to \$250                          |
| ♦ Basement Wall Insulation<br>(Home With Electric Heat and Central A/C)     | The new insulation's R-value must be $\geq$ R-15 for continuous sheathing for interior or exterior of the home or $\geq$ R-19 cavity insulation. | Up to \$500                             | Up to \$575                          |
| ♦ Basement Wall Insulation<br>(Home With Non-Electric Heat and Central A/C) | The new insulation's R-value must be $\geq$ R-15 for continuous sheathing for interior or exterior of the home or $\geq$ R-19 cavity insulation. | Up to \$200                             | Up to \$250                          |

Air Sealing (like the foam pictured below) is always recommended first, because it is the most cost-effective treatment available. Insulation typically doesn't work well without air sealing.

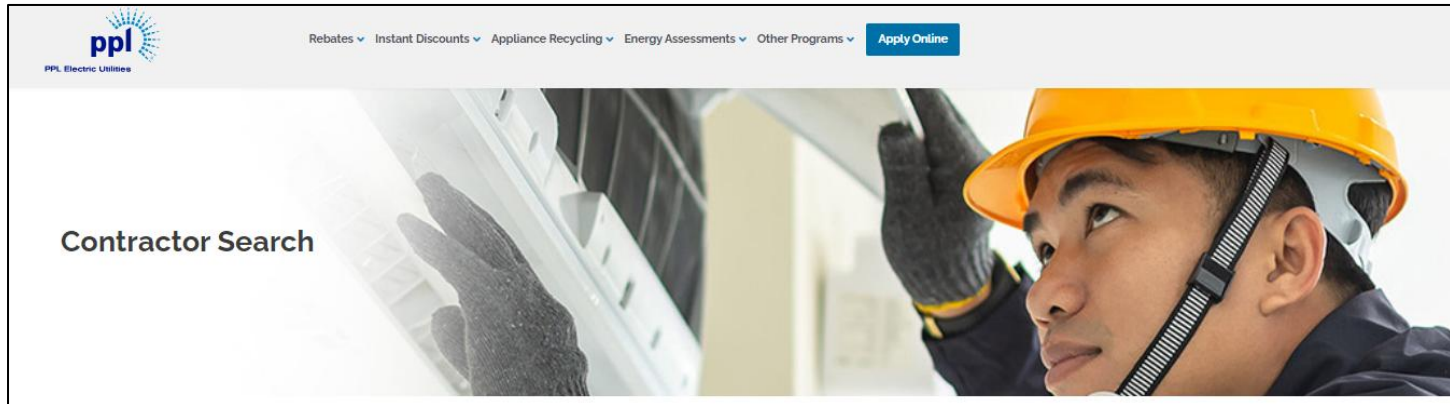


Energy Link: This same air sealing lowers your bills — pair it with fresh-air ventilation to protect indoor air quality too.

# FIND A CONTRACTOR

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

[pplelectric.com/Contractor](https://pplelectric.com/Contractor)



You can filter our Contractor Search page to find contractors who serve your county.

Note - contractors are not PPL Electric employees



# QUESTIONS and COMMENTS ?

Please type them into the question/chat box



# Thank you for coming to today's webinar

## CREATING A HEALTHY HOME INDOOR AIR QUALITY

You'll be emailed this presentation as a PDF file along with more information about the PPL programs.



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Senior Project Manager



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Marketing Manager