



Program for Existing Homes

February 18, 2015

Alan Shedd, Touchstone Energy Cooperatives
Roy Honican, Blue Grass Energy

Background:

Touchstone Energy Home Program

National program for high-efficiency homes

- Created in 2004
- Based on IECC 2009 with additional requirements
- Participating co-ops can make changes to suit local requirements
- Details at <http://touchstoneenergy.com/homeprogram>

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Examples:

Touchstone Energy Home Program

Blue Grass Energy, KY

- 10 Years, 1,100 homes to date, 140 homes last year
- Use HERS Index, Avg. score 68
- For co-op: demand reduction, increased member satisfaction
- For homeowner: lower bills, improved comfort

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Examples:

Touchstone Energy Home Program

Blue Grass Energy, KY

- Co-op provides free rating for code compliance
- Rebates for Energy Star appliances
- 2009 IECC, thermal bypass check
- Minimum score = 85 HERS

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Examples:

Touchstone Energy Home Program

Hoosier Energy, IN

- 10 Years, 3 program revisions
- 88 homes in 2013 with avg. HERS = 47
- For co-op: resolve high bill complaints, reduce demand
- Commitment to members = high satisfaction

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Examples:

Touchstone Energy Home Program

Hoosier Energy, IN

- Provides builder training, free ratings thru 3rd party
- Free CFLs, incentives for equipment upgrades
- Builder must complete training, 2009 IECC, thermal bypass check
- Minimum score = 70 HERS

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Examples:

Touchstone Energy Home Program

Western Farmers Electric Co-op, OK

- Rolling out new program
- 3-levels, based on HERS Index & program requirements
- Bronze: ≤ 70 , IECC 2009, SEER ≥ 15 , HSPF ≥ 8.5
- Silver: ≤ 59 , IECC 2009, SEER ≥ 16 , HSPF ≥ 8.5
- Gold: ≤ 49 , IECC 2009, Geo

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Examples:

Touchstone Energy Home Program

Western Farmers Electric Co-op, OK

- Provides incentives for HVAC
- Provides incentives to offset cost of rating and building
- Interested in energy and demand reduction

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Touchstone Energy Program for Existing Homes

Why?

- Larger number of existing homes
- Wide range of styles, ages, level of energy efficiency
- Represents a significant opportunity for energy and cost savings

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New vs. Existing Homes

- New
 - Easier to implement energy efficiency upgrades
 - Basic aspects of air barriers, thermal envelope easier to address
 - Codes and standards address new home construction
 - Cost of upgrades can be rolled into mortgage

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New vs. Existing Homes

- Existing
 - Due to diversity, a simple prescriptive approach doesn't work
 - Performance path can work but high cost of evaluation
 - Many energy efficiency upgrades in existing homes are done piecemeal
 - Access to financing can be an issue

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Needs

- Multi-tiered approach to meet needs of co-ops and homeowners
- Maintain perspective of “house as a system” while focusing on top priorities
- Start with basics: no-cost / low-cost measures
- Recommend order that makes sense (Airseal then insulate)

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Needs

- Be smart – code vs. practical
 - Code says R-38. If you already have R-19, do higher priority measures first
 - Replacing windows can solve problems but lower U-value is minor benefit
- Training and education are important
 - Homeowner
 - Contractor
 - Inspector
 - Co-op staff

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Tiered Approach

- Allows co-ops to select what works best for them
- Matches needs of members to depth of service
- Training to support each tier
- Partnership with RESNET

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Touchstone Energy Program for Existing Homes

Four Tiers

1. Simple on-line tools
2. Walk-thru Audit
3. Instrumented Audit
4. HERS Rating

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Tier 1

- Simple on-line tools
- Home Tour, Home Efficiency Analysis Tool
- Tools & training for Member Services Reps to deal with high bill complaints and perform basic triage
- Enhancements - Review of billing history, base vs. weather loads, smart meter data

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Tier 2

- Standardized walk-thru audit checklist
- Tablet based tool with auditor guidance
- Tools & training for Energy Services personnel to conduct basic walk-thru audits and recommendations
- Certification for QA and consistency
- Enhancements – project tracking database, 3rd party contractor network, project financing

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Tier 3

- Standardized instrumented audit procedures (IR camera, blower door, duct blaster)
- Training in cooperation with RESNET
- Certification for QA and consistency
- Enhancements – project tracking database, 3rd party contractor network, contractor training, project financing

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Tier 4

- HERS Rating
- RESNET Training
- Minimum score to qualify as *Energy Smart Home*
- Can tie to rebates, rates, incentives

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Touchstone Energy Program for Existing Homes

Tier 1

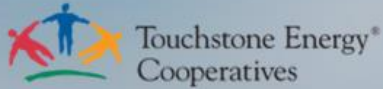
- TogetherWeSave.com
 - Home Tour
 - Home Efficiency Analysis Tool

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TogetherWeSave.com – Home Tour



Find your local Co-op:

ENTER ZIP | 🔍



TOGETHER WE SAVE

Plug in to the power of your Touchstone Energy Cooperative membership.

As your Touchstone Energy Cooperative, we strive to provide dependable electricity at a competitive cost to every member. But as a member, you have the power. The power to have a voice in how the co-op is run. To energize and enhance your life with affordable electricity. To save money through responsible energy use and a community of connections. The power is all yours. It's up to you to turn it on.

Power up and learn more about the benefits of co-op membership.

POWER OF USING ENERGY WISELY >



POWER OF MEMBERSHIP >



POWER OF VALUE >



POWER OF CONNECTIONS >



ENERGY SAVINGS HOME TOUR >

Take the Virtual Home Tour now and see how much you can save just by using energy wisely.

POWER OF ELECTRICITY >



TogetherWeSave.com – Home Tour



TOGETHERWESAVE \$51,007,637

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- Add Up Your Savings
- Share Your Story
- Energy Saving Forum
- Watch & Learn
- Energy Saving Applications
- Links & Resources
- Contact Us



Live in a manufactured home? [Click Here.](#)

What can you do?

Seal the cracks	\$0
Adjust the blinds	\$0
Add insulation	\$0
Adjust your thermostat	\$0
Pull the plug	\$0
Adjust your water heater	\$0
Turn off the lights	\$0
Install CFLs	\$0
Upgrade your refrigerator	\$0
Upgrade your HVAC	\$0
Upgrade your dishwasher	\$0
Seal your air ducts	\$0
Upgrade washing machine	\$0
Change your air filter	\$0

TOTAL SAVED: \$0

Calculation Assumptions

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Change your air filter	\$0

TOTAL SAVED: \$0
Calculation Assumptions

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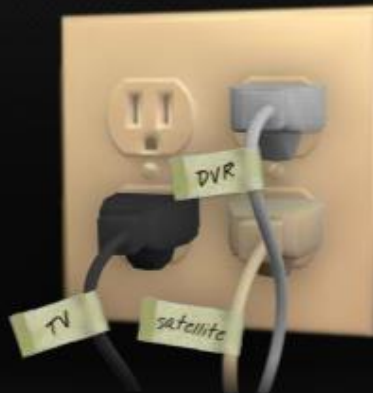
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SELECT A ROOM

PULL THE PLUG

Entertainment center electronics consume energy when they're off. Click to pull the plug on phantom loads.



Your savings: \$100 per year

ADD ↻

WATCH VIDEO

BLOG POST

READ MORE

END TOUR

What can you do?

Seal the cracks	\$0
Adjust the blinds	\$0
Add insulation	\$0
Adjust your thermostat	\$0
Pull the plug	\$100
Adjust your water heater	\$0
Turn off the lights	\$0
Install CFLs	\$0
Upgrade your refrigerator	\$0
Upgrade your HVAC	\$0
Upgrade your dishwasher	\$0
Seal your air ducts	\$0
Upgrade washing machine	\$0
Change your air filter	\$0

TOTAL SAVED: \$100

Calculation Assumptions

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END TOUR

What can you do?	
Seal the cracks	\$0
Adjust the blinds	\$0
Add insulation	\$0
Adjust your thermostat	\$0
Pull the plug	\$100
Adjust your water heater	\$0
Turn off the lights	\$0
Install CFLs	\$0
Upgrade your refrigerator	\$0
Upgrade your HVAC	\$0
Upgrade your dishwasher	\$0
Seal your air ducts	\$0
Upgrade washing machine	\$0
Change your air filter	\$0
TOTAL SAVED:	\$100
Calculation Assumptions	

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- Watch & Learn
- Energy Saving Applications
- Links & Resources
- Contact Us

ADJUST YOUR WATER HEATER

Turn down the water temperature to turn up the savings.
How hot does it need to be anyway?

150°F 90°F
120°F 110°

Your savings: \$62 per year **ADD**

WATCH VIDEO
BLOG POST
READ MORE

END TOUR

What can you do?	
Seal the cracks	\$0
Adjust the blinds	\$0
Add insulation	\$0
Adjust your thermostat	\$0
Pull the plug	\$100
Adjust your water heater	\$62
Turn off the lights	\$0
Install CFLs	\$0
Upgrade your refrigerator	\$0
Upgrade your HVAC	\$0
Upgrade your dishwasher	\$0
Seal your air ducts	\$0
Upgrade washing machine	\$0
Change your air filter	\$0
TOTAL SAVED:	\$162
Calculation Assumptions	

Home Efficiency Analysis Tool

Online Tool

- Picks up where Home Tour leaves off
- Asks simple questions about your home
- Provides prioritized list of projects
- Focuses on 4 areas of home
- Provides PDF “Recipe Cards”
- Project Tracker makes it easy to return and update progress

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Home Efficiency Analysis Tool

Online Tool

<http://homeefficiency.togetherwesave.com/>

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Home Efficiency Analysis Tool



Welcome Guest
LOG IN | CREATE ACCOUNT

Welcome to the **HOME EFFICIENCY ANALYSIS TOOL** 

INTRO

MY HOME SETUP

MY PROJECTS

How energy-efficient is your home?



We know saving energy often means saving money, but did you know that having an energy-efficient home can help out even more?

Making energy efficiency improvements is pretty easy, too! Tell us a bit about your home and we'll give you quick tips and fixes, designed around your space, to help you cut down on your energy and costs.

[CONTINUE TO YOUR PROFILE](#)

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Home Efficiency Analysis Tool



Welcome Guest
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Welcome to the HOME EFFICIENCY ANALYSIS TOOL

INTRO MY HOME SETUP MY PROJECTS

LOCATION

HOME TYPE

SIZE & AGE

CONSTRUCTION DETAIL

OCCUPANCY

CONFIRMATION

WHAT TYPE OF HOME ?



MULTI-STORY



SPLIT LEVEL



SINGLE STORY



DUPLEX / TOWNHOUSE

BACK

SAVE & CONTINUE

TOGETHERWESAVE.COM

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INTRO MY HOME SETUP MY PROJECTS

LOCATION

HOME TYPE

SIZE & AGE

CONSTRUCTION DETAIL

OCCUPANCY

CONFIRMATION

Review and confirm your information.

CONFIRM THE FOLLOWING:

ZIP CODE
31331

LOCATION



MULTI-STORY

HOME TYPE



CONSTRUCTION DETAIL

2200 sq. ft.

Est. 1999

SIZE & AGE



OCCUPANCY

BACK

The above information is correct.

CONFIRM

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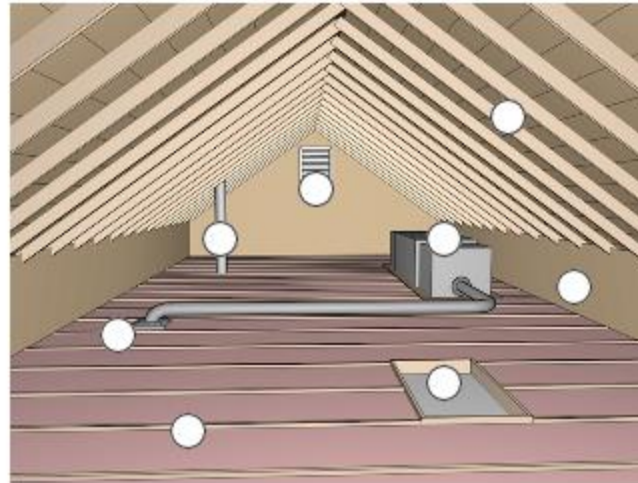
INTRO | MY HOME SETUP | MY PROJECTS

ATTIC | LIVING SPACE | BASEMENT | SYSTEMS

Attic Projects



Click the areas of interest on the illustration on the right to download your project PDF files.



PROJECT  TRACKER


TOGETHERWESAVE.COM

Home Efficiency Analysis Tool – Recipe Cards

ATTIC
ENERGY SAVING RECIPE
TOGETHERWESAVE.COM

Air Sealing Details

Air Seal to Reduce Air Infiltration Between the Attic and Living Spaces



SKILL SET
Do it yourself or hire a professional. Two people make the task easier. Familiarity with small hand tools is essential, power tools are optional.

SAFETY
This job requires working in unconditioned attic spaces, tight clearances and under task lighting. Use a dust mask/respirator, gloves, safety glasses and kneepads.

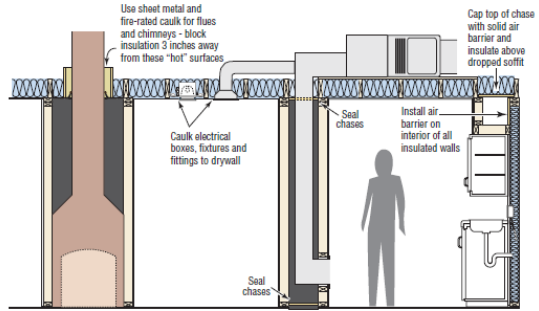
TOOLS
Hammer, screw-gun, utility knife, table or circular saw, caulk gun, measuring tape, lights, straight edge and markers

MATERIALS
Foam/caulk/construction adhesive
Cavity insulation – batts
Rigid foam – blocking material
Sheathing – drywall, OSB/plywood, code-approved foam board or bubble-wrap radiant barrier
Fasteners – screws with washers or button-capped nails

COST BENEFIT
Materials are inexpensive, labor is the big cost. An effective installation ensures proper insulation and air blocking in the attic, which provides greater comfort.

PRIORITY LEVEL
LOW MED HIGH

SKILL LEVEL
DIY PRO



Some chases extend from attic to basement or crawlspace - block and seal both ends.

Attic Air Sealing

Attics are not the only places where leakage can occur in homes, but leaks between the house and the attic are especially troublesome during the winter when warm air inside the home naturally tends to rise and flow out through leaks into the attic. This could lead to drafts (as colder outside air must be pulled in to offset the amount of air that flows up and out), condensation on the roof decking in the attic and high energy bills to heat the unconditioned air that leaks in.

In the summer, poor comfort and indoor air quality can result as leaks from an attic allow hot, humid and dusty attic air to enter a home when exhaust appliances such as kitchen or bathroom fans and clothes dryers operate. In some homes, those powerful powered attic ventilators (PAV's), actually waste considerable energy in the summer because they unintentionally pull conditioned air out from the house and up to cool the attic.

Reduce Air Infiltration Pathways

Attic air sealing is a critical step in upgrading an existing home's energy performance and should always be performed before adding additional attic insulation. Blocking and sealing chases and penetrations in a ceiling is one of the most cost effective means for improving the comfort of a home and reducing energy consumption and pollutant pathways.

Typical gaps, seams and other penetrations in a ceiling are fairly small in their dimension but significant in total area where they add up to considerable sized holes. Imagine having 25 to 30 quarter sized (~1" diameter) holes that represent electrical wire penetrations drilled through top plates – collectively, they'd represent a 5'-6" grapefruit sized opening into the attic.


As a general rule, you should measure and cut a piece of any sheet material to cover/block large openings, mechanically fasten the material in place with screws or nails and seal the edges of the sheet material using caulk or canned spray foam. Sometimes this requires the need for additional framing or ledgers to support and fasten to the sheet material. Insulation will be added later.

Exclude hazards and repair existing maintenance issues before proceeding including knob and tube wiring, exposed electrical junctions, vermiculite insulation containing asbestos, lead paint, pest infestation and roof leaks. Always follow common sense safety measures when working in the attic.

FOUNDATION
ENERGY SAVING RECIPE
TOGETHERWESAVE.COM

Foundation Subfloor

Insulate Floor Systems in Basements and Crawlspaces



SKILL SET
Be sure you have the experience needed for this job. If you are in doubt, hire a contractor.

SAFETY
These tasks require working in tight clearances and under task lighting. Use a dust mask/respirator, gloves, safety glasses and kneepads. Wear a long sleeve shirt and consider applying baby powder to exposed skin before installing fiberglass to minimize itching.

TOOLS
Utility knife, table or circular saw, caulk gun, measuring tape, lights, straight edge and markers

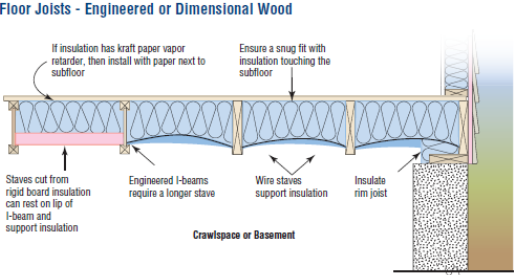
MATERIALS
Foam/caulk/construction adhesive/duct mastic
Insulation – cavity batts or rigid foam board insulation
Sheathing – OSB/plywood or code-approved foam board
Fasteners – screws with washers or button-capped nails

COST BENEFIT
Insulation, combined with air sealing in basements and crawlspaces reduces heating and cooling costs and improves comfort and indoor air quality.

PRIORITY LEVEL
LOW MED HIGH

SKILL LEVEL
DIY PRO

Floor Joists - Engineered or Dimensional Wood



A stave is a mechanical method of supporting insulation from the bottom-up. Placing extra wire staves may be required to ensure adequate contact of the insulation with the subfloor even if it results in more compression of the insulation. Whether the insulation is oriented parallel or perpendicular to the rim joist, make sure the rim joist has full height coverage. Consider removable insulation to allow for pest and termite inspection.

Air sealing and then insulating framed floor assemblies over basements and crawlspaces represent one of two options on how to determine the thermal envelope at the foundation. The other approach is to condition or indirectly condition the basement or crawlspace and thus air seal and insulate the foundation walls.

Subfloor Insulation Details

Before insulating the subfloor, consult the *Air Seal Foundation Subfloor* recipe card. Remember, only after air sealing has been properly performed should insulation installation commence.

If the home has insulation under the subfloor it should be removed in order to air seal. One strategy is to carefully remove any existing insulation from an area, perform necessary air sealing and then neatly replace the old insulation. The condition of the existing insulation will need to be assessed to determine the viability of reuse.

Another approach is to remove all the old insulation, perform the air sealing and begin with new insulation. Many older homes have never received any underfloor insulation and after air sealing has been performed, should be insulated to code approved values.

Extreme temperature variability, especially in warm seasons, can create moisture condensation issues in the crawlspaces. Proper air sealing between the living space and the crawlspace, plus a plastic vapor barrier over the crawlspace dirt, in addition to insulating the subfloor, helps to control temperature and moisture variations between the house and crawlspace.

Exclude hazards and repair existing maintenance issues before proceeding including knob and tube wiring, exposed electrical junctions, asbestos, lead paint, radon, dust, mold, pest infestation and water infiltration. Always follow common sense safety measures when working in tight crawlspaces.

Home Efficiency Analysis Tool



Welcome Guest
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Welcome to the **HOME EFFICIENCY ANALYSIS TOOL**

INTRO

MY HOME SETUP

MY PROJECTS

ATTIC

LIVING SPACE

BASEMENT

SYSTEMS

HOME VIEW

Completed	Download Project	Priority	Cost	Ease	Email
<input type="checkbox"/>	Attic Access				
<input type="checkbox"/>	Air Sealing				
<input type="checkbox"/>	HVAC Systems				
<input type="checkbox"/>	Insulation				
<input type="checkbox"/>	Kneewalls				
<input type="checkbox"/>	Radiant Barrier				
<input type="checkbox"/>	Ventilation				
<input type="checkbox"/>	Pipes & Vents				

TOGETHERWESAVE.COM

Home Efficiency Analysis Tool – Audit Form



Pedernales Electric Cooperative

Residential Energy Survey

LOCATION INFORMATION

Member Name: Last First Initial
 Address: City: Zip:
 Phone Number: Home: Work:
 Homeowner: Renter: Business Agreement #:
 E-mail Address:
 Issues or Concerns:
 High Bill: Conservation Recommendations: Equipment Issues:
 Other:
 Date: Auditor:

PROPERTY INFORMATION

Square Footage: Type of Construction:
 Property Faces: Year House Built:
 # of Levels: Exterior Construction:

WATER HEATING SYSTEMS AND PUMPS

Water Heater

WH#1 Temp:
 Type:
 Size:
 Wattage:
 Timer: Yes No

WH#2 Temp:
 Type:
 Size:
 Wattage:
 Timer: Yes No

WH#3 Temp:
 Type:
 Size:
 Wattage:
 Timer: Yes No

Pool

Yes No
 Heated: Yes No
 Heated by:
 Wattage:
 Pump #1 HP:
 Wattage:
 Run Time:

Pump #2 HP:
 Wattage:
 Run Time:

Pump #3 HP:
 Wattage:
 Run Time:

Hot Tub

Yes No
 Heated by:
 Electric Wattage:
 Pump HP:
 Wattage:

RECOMMENDATIONS

- Insulate exposed hot water line.
- Set WH thermostat between 120 and 125 degree
- Install heat traps on hot water line.
- Install timer on water heater and circulation pump
- Install timer on pod or hot tub filtering system

COOLING AND HEATING SYSTEMS

Unit #1

Age:
 Conditioned Area:
 System Type:
 Tonnage:
 Cooling System Type:
 Evaporator Coil Location:
 Heating System Type:
 Heat Strip KW:
 Duct Type:
 Duct Leakage:
 Duct Condition:
 Programmable Thermostat:
 Thermostat Setting:
 Actual Temp.:
 Return Air Temp.:
 Supply Air Temp.:
 Heating Working Property:
 Thermostat properly installed:
 Is filter clean:
 Is evaporator clean:
 Is fan motor clean:
 Is air handler airtight:
 Is return air plenum clean:
 Is return air plenum sealed:
 Is condenser clean:
 Is suction line insulated:

Unit #2

Age:
 Conditioned Area:
 System Type:
 Tonnage:
 Cooling System Type:
 Evaporator Coil Location:
 Heating System Type:
 Heat Strip KW:
 Duct Type:
 Duct Leakage:
 Duct Condition:
 Programmable Thermostat:
 Thermostat Setting:
 Actual Temp.:
 Return Air Temp.:
 Supply Air Temp.:
 Heating Working Property:
 Thermostat properly installed:
 Is filter clean:
 Is evaporator clean:
 Is fan motor clean:
 Is air handler airtight:
 Is return air plenum clean:
 Is return air plenum sealed:
 Is condenser clean:
 Is suction line insulated:

Unit #3

Age:
 Conditioned Area:
 System Type:
 Tonnage:
 Cooling System Type:
 Evaporator Coil Location:
 Heating System Type:
 Heat Strip KW:
 Duct Type:
 Duct Leakage:
 Duct Condition:
 Programmable Thermostat:
 Thermostat Setting:
 Actual Temp.:
 Return Air Temp.:
 Supply Air Temp.:
 Heating Working Property:
 Thermostat properly installed:
 Is filter clean:
 Is evaporator clean:
 Is fan motor clean:
 Is air handler airtight:
 Is return air plenum clean:
 Is return air plenum sealed:
 Is condenser clean:
 Is suction line insulated:

RECOMMENDATIONS

- Have HVAC system serviced
- Clean evaporator coil
- Insulate suction line
- Seal or replace leaking ducts
- Seal return air plenum
- Seal air handler/furnace
- Clean return air plenum
- Clean outdoor condenser coil
- Set thermostat at 78° in summer
- Set thermostat at 68° in winter
- Change air filters monthly
- Clean indoor fan motor

Home Efficiency Analysis Tool – Audit Report

ENERGY SMART Home Improvement FirstEnergy Energy Analysis Report



Prepared For:
Greg & Beth Hench
9 High St
Boiling Springs, PA 17007

Summary

Results of a FirstEnergy Energy Analysis conducted at 9 High Street in Boiling Springs, Pennsylvania on December 16, 2013 revealed significant energy consumption and home comfort deficiencies related to air leakage (convection) and insulation (conduction). Several practical weatherization improvements can be implemented to achieve a significant decrease in energy expenditures and increase in home comfort. The following report details the principal problem areas as well as recommended retrofit strategies.

Home Energy Usage Report

page 1

How Does Your Home
MEASURE UP?

5.6



Your Yardstick score is calculated against similar homes nationally and is scored between 0 and 10, with 10 being the most energy efficient. 5 is average.

Estimated Annual CO₂ Emissions:
24,000 lbs of CO₂

Your Home

Building Information:
777 KAYLYN DR
JEFFERSON CITY, MO 65109

Occupants: 2
Square Footage: 950

Year Built: 1972

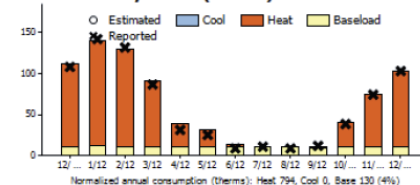
Hot Water Source:
Natural Gas

Annual Usage:
Nat. Gas: 734 therms/yr
Electricity: 6350 kWh/yr

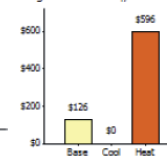
Report Date: March 18, 2014

Your Energy Usage

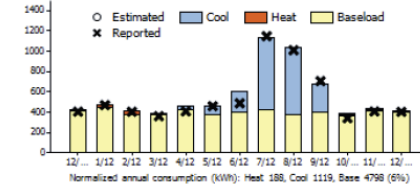
Nat. Gas Use By Month (therms)



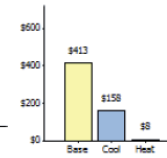
Nat. Gas Cost By Use



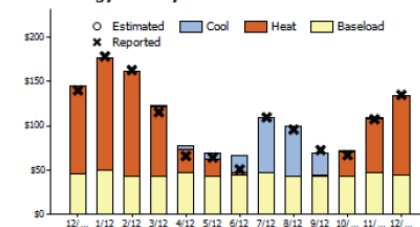
Electricity Use By Month (kWh)



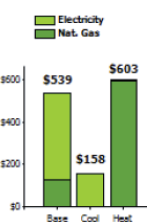
Electricity Cost By Use



Total Energy Cost By Use



Total Cost By Use



Your Savings Potential

Natural Gas	
20% Annual Savings	
Heating	\$154
Cooling	\$0
Baseload	\$25
Electricity	
20% Annual Savings	
Heating	\$3
Cooling	\$19
Baseload	\$83
Total Energy	
20% Annual Savings	
Heating	\$157
Cooling	\$19
Baseload	\$108
Total	\$284

Explanation of Terms

Savings are for a typical year.
Baseload energy is the energy not affected by outdoor temperature. This includes appliances, lighting, and hot water.
Reported energy is your recorded monthly consumption values.

Home Efficiency Analysis Tool – Audit Report

Greg & Beth Hench
9 High St
Boiling Springs, PA 17007

Recommended Improvements

Based on the observations detailed within this report, the following represents a **Top Four** list of recommended retrofit improvements. These improvements will *cumulatively* yield the greatest impact on energy consumption and home comfort and have the shortest payback period.

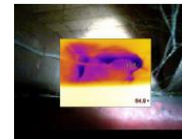
Top Five Rank	Improvement	Description
1	Basement Air Sealing	<ul style="list-style-type: none"> Air seal and insulate accessible rim joist, band board, and sill plate areas with a "picture frame" application of two-part spray foam. Seal accessible penetrations in basement walls (vents, electrical, pipes, etc.) using one-part and/or two-part spray foam.
2	Attic Air Sealing & Insulating	<ul style="list-style-type: none"> Install high density cellulose insulation beneath floor boards in attic. This will provide insulation coverage of approximately R-20, the maximum possible for the measured cavity depth. Furnish and install high density cellulose insulation in sidewall cavity of attic stairwell and below stairs. This will require drilling, plugging, and patching holes in each stud bay. Additionally some of stairway sidewalls need an air barrier as lathe is exposed. Insulate and weather strip access door to attic.
3	Sidewall Air Sealing & Insulating	<ul style="list-style-type: none"> Drill holes in interior drywall or plaster and install high density cellulose insulation where insulation is deficient or non-existent. Use infrared camera to determine effectiveness of sidewall insulation.
4	General Air Sealing	<ul style="list-style-type: none"> Develop a plan to effectively air seal the area of the pocket door. Repair holes in plaster sidewalls.

Greg & Beth Hench
9 High St
Boiling Springs, PA 17007

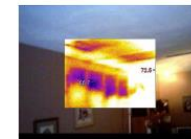
Air Leakage & Ventilation (Continued)

Target Areas

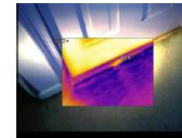
- **Basement & Crawlspace Rim/Band Boards** – significant infiltration detected where the foundation meets the wood framing.
- **Sidewalls & Ceilings** – significant air movement detected within the walls during depressurization, particularly at top plate framing and baseboard trim.
- **Attic Access** – major air infiltration detected around plywood attic hatch
- **Ceiling Penetrations** – moderate air infiltration detected around penetrations in second floor ceiling, e.g., recessed lights, bath fans and supply registers.
- **Windows and Doors** – mild to moderate air infiltration noted around windows and doors.



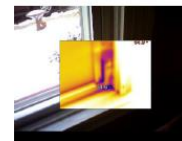
Baseboard Rim & Band



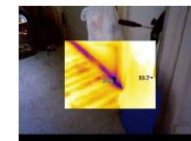
Sidewalls & Ceilings



Attic Access



Windows



Doors



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Program for Existing Homes

Roy Honican

Program for Existing Homes

Level – 3

- Field testing

Level – 4

- Certification

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Level – 3 (Field Testing)

Air leakage

- Total leakage must be less than or equal to 7 ACH₅₀



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Level – 3 (Field Testing)

Duct Leakage

- Leakage to outside must be less than or equal to 8 cfm per 100 square feet of conditioned floor area



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Level – 4 (Certification)

Existing Home – first draft

1. Program all Cooperatives can use
2. Energy efficient
3. Comfortable
4. Better than standard
5. Shouldn't use Touchstone Energy in name because pre-drywall inspection isn't passable

Togetherwesave.com



Touchstone Energy[®]
Cooperatives
The power of human connections[®]

Level – 4 (Certification)

Existing Home – first draft

- **Program all Cooperatives can use**
 - Field verification would be difficult for Cooperatives not staffing energy advisors
 - Program should be multi level so that all Cooperatives can participate

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Level – 4 (Certification)

Existing Home – first draft

- **Energy Efficient & Comfortable**
 - What is an energy efficient existing home?
 - Complete envelop (insulation) with an air barrier (Thermal Bypass Check),
Low air leakage (7 ACH₅₀),
Low duct leakage (8 CFM per 100 square feet).

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Level – 4 (Certification)

Existing Home – first draft

- **Better than standard**
 - What standard?
 - HERS Index is the only Rating system approved by ANSI



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Level – 4 (Certification)

Existing Home – first draft

- **Shouldn't use Touchstone Energy in name because pre-drywall inspection isn't passable**
 - Co-Brand *TogetherWeSave* and RESNET Energy Smart

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Energy Smart Home

Insulation

- The objective is to insure the home has a complete envelop to insure comfort, therefor minimum and preferred insulation standards were established.
- This will encourage the Member to address areas with no insulation first to take advantage improvements with a low ROI.

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Energy Smart Home

Example

- 1,000 square foot attic with no insulation has an annual heating cost of \$397
- Add R-19 for \$600
- Heating cost drops to \$75
- ROI of 1.86 years

Source: REM/Rate 14.4.1 / \$0.10/kWh / 13 SEER heat pump / Climate Zone 4

[Togetherwesave.com](http://togetherwesave.com)



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Energy Smart Home

Example

- 1,000 square foot attic with R-19 has an annual heating cost of \$75
- Add additional R-19 for \$600
- Heating cost drops to \$37
- ROI of 15.79 years

Source: REM/Rate 14.4.1 / \$0.10/kWh / 13 SEER heat pump / Climate Zone 4

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Energy Smart Home

Insulation Standard

Climate Zone	Window		Ceiling		Floor		Walls		Basement Walls	
	Minimum	Preferred U-factor	Minimum R-value	Preferred R-value	Minimum R-value	Preferred R-value	Minimum R-value	Preferred R-value	Minimum R-value	Preferred R-value
1	Single pane with storm	1.2	19	30	11	13	11	13	0	R-5 continues
2	Single pane with storm	0.65	19	30	11	13	11	13	0	R-5 continues
3	Single pane with storm	0.50	19	30	11	19	11	13	R-5 Frost line up	R-5 continues
4 except Marone	Single pane with storm	0.35	19	38	11	19	11	13	R-5 Frost line up	R-10 continues
5 and Marine 4	Single pane with storm	0.35	19	38	11	30	11	19	R-5 Frost line up	R-10 continues
6	Single pane with storm	0.35	19	49	11	30	11	19	R-5 Frost line up	R-15 continues
7 and 8	Single pane with storm	0.35	19	49	11	38	11	19	R-5 Frost line up	R-15 continues

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Energy Smart Home

Thermal Bypass Check

- The Thermal Bypass Check is designed to identify voids in the home's envelop and to insure permeable wall insulation preforms properly and reduces air infiltration.

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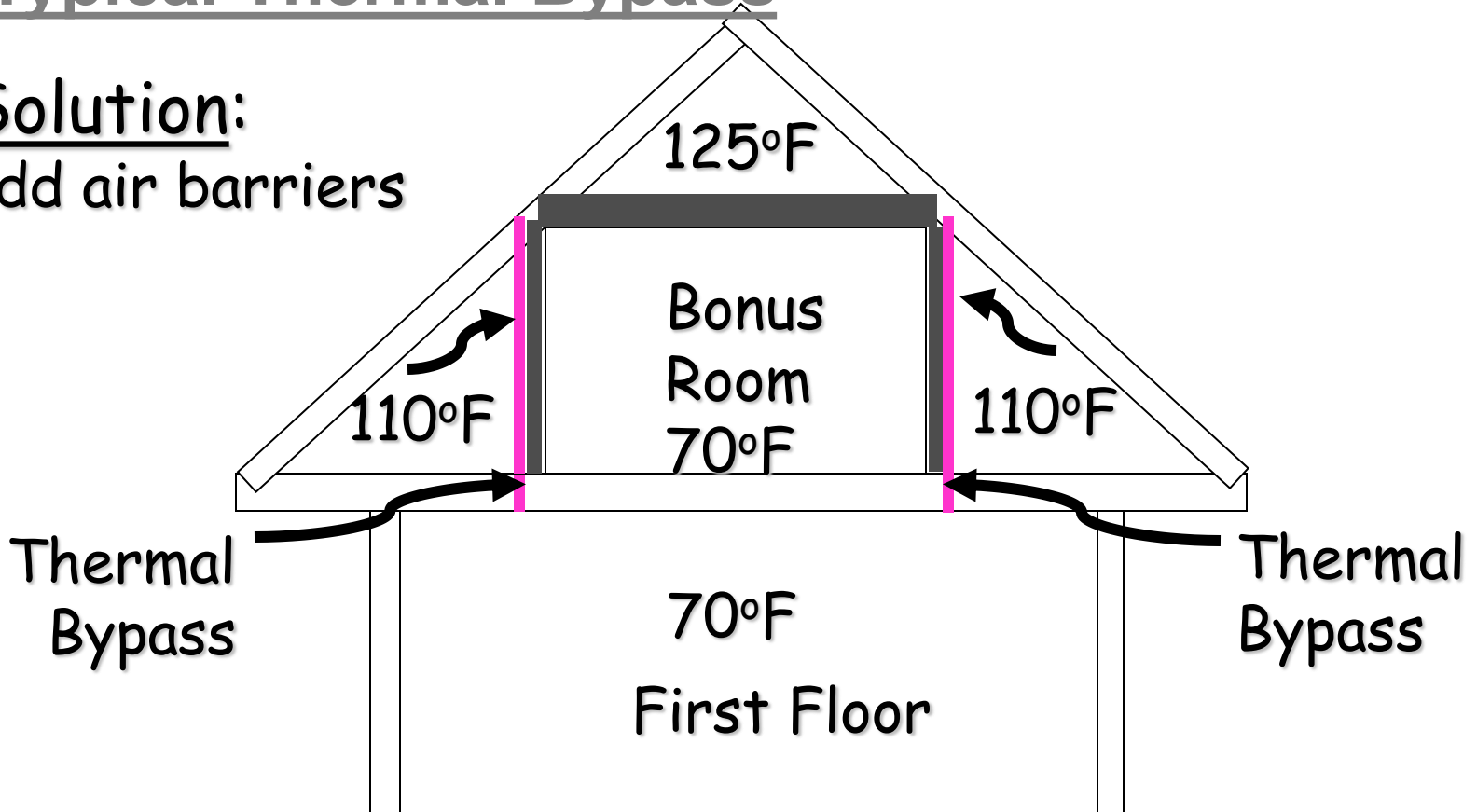
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Typical Thermal Bypass

Solution:
add air barriers



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Vertical duct, plumbing, flue, and chimney shaft penetrations

- Blocked and air sealed



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Energy Smart Home

Horizontal duct soffits penetrating garage or crawl

- Blocked and air sealed



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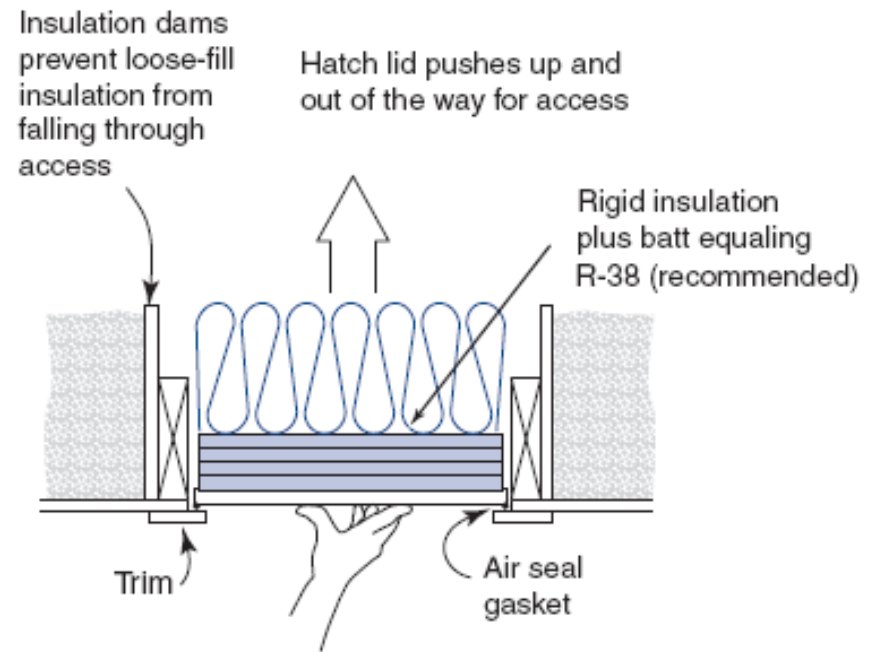
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Energy Smart Home

Attic access hatches and knee wall doors:

- Minimum: R-5 with weather-stripping
- Preferred; insulated to equivalent surrounding surfaces with weather-stripping



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Energy Smart Home

Attic knee wall

- Minimum: R-11 with air barrier
- Exception: Inaccessible knee wall areas less than 100 square feet may be exempt



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Energy Smart Home

Cavity under knee walls

- Blocked and sealed
- Exception: Inaccessible knee wall areas less than 100 square feet may be exempt



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Energy Smart Home

Partition walls separating garages or crawl spaces from basements

- Minimum: R-11 with air barrier on both sides and solid blocking over wall



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Energy Smart Home

Doors in partition walls separating garages and crawl spaces from basements

- Weather-stripped and insulated



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Energy Smart Home

Doors in partition walls separating garages and crawl spaces from basements

- Weather-stripped and insulated



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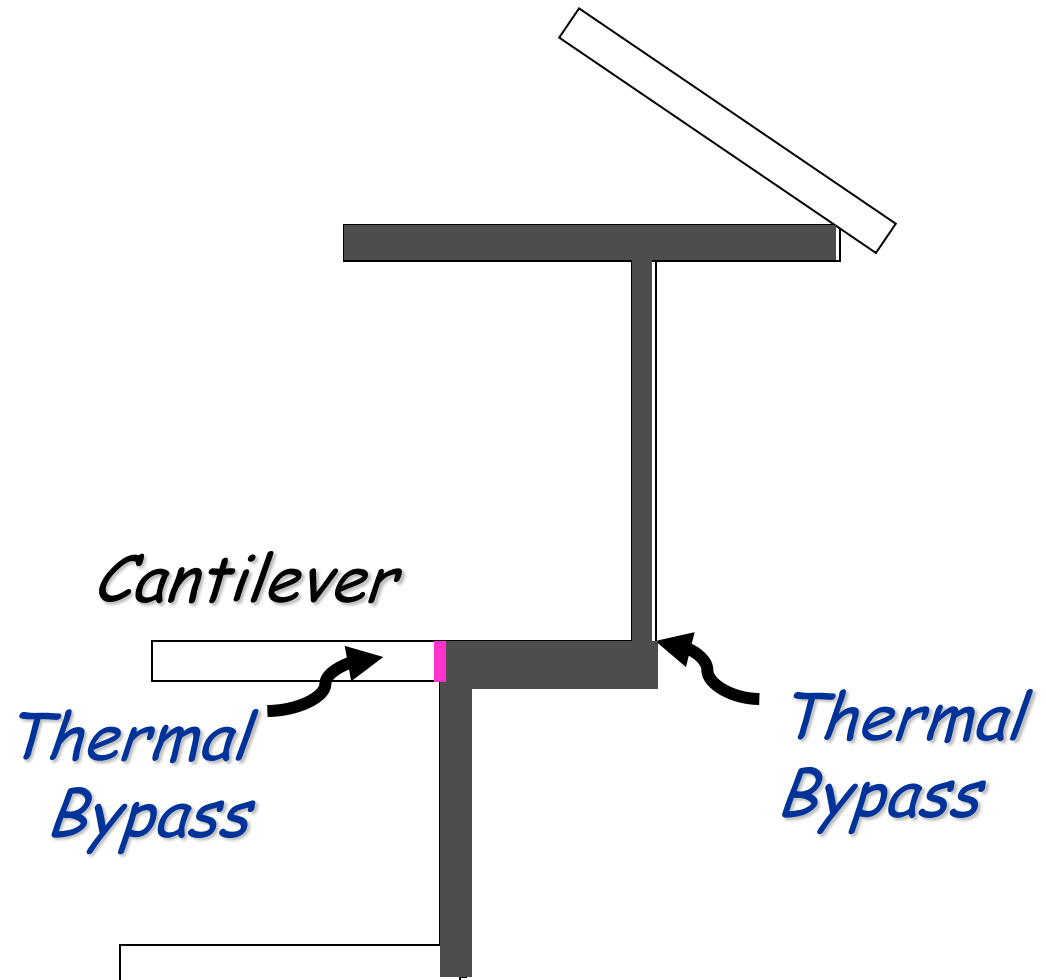
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Energy Smart Home

Cantilevered floor

- Sealed and filled with insulation

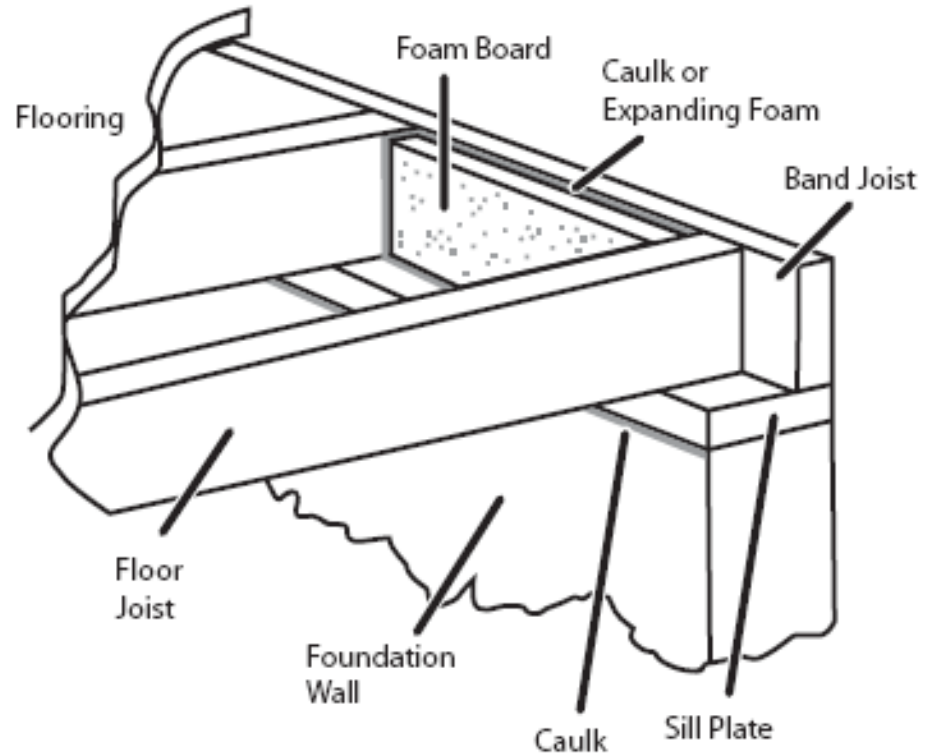


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Energy Smart Home

Band Joist in basements

- Air sealed with
Minimum: R-10



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Energy Smart Home

Air leakage

- Total leakage must be less than or equal to 7 ACH50



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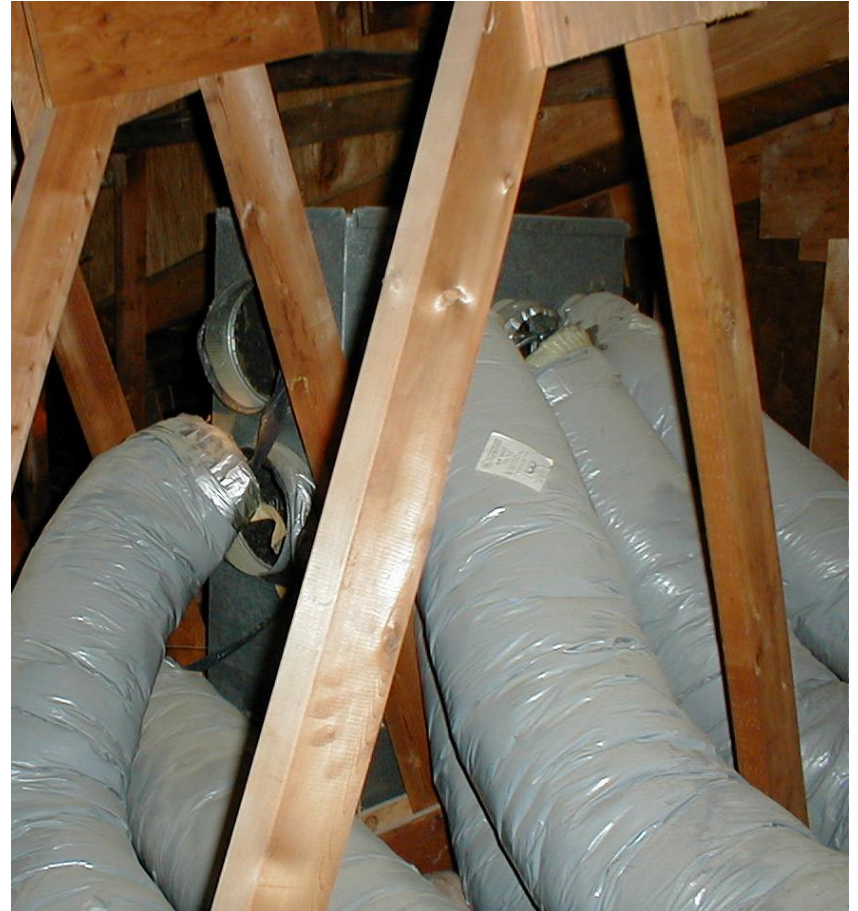
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Energy Smart Home

Duct Leakage

- Leakage to outside must be less than or equal to 8 cfm per 100 square feet of conditioned floor area



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Energy Smart Home

HERS Index

- 85 or less



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Energy Smart Home

Roy Honican royh@bgenergy.com

Alan Shedd Alan.Shedd@NRECA.coop