

Residential Energy Auditing

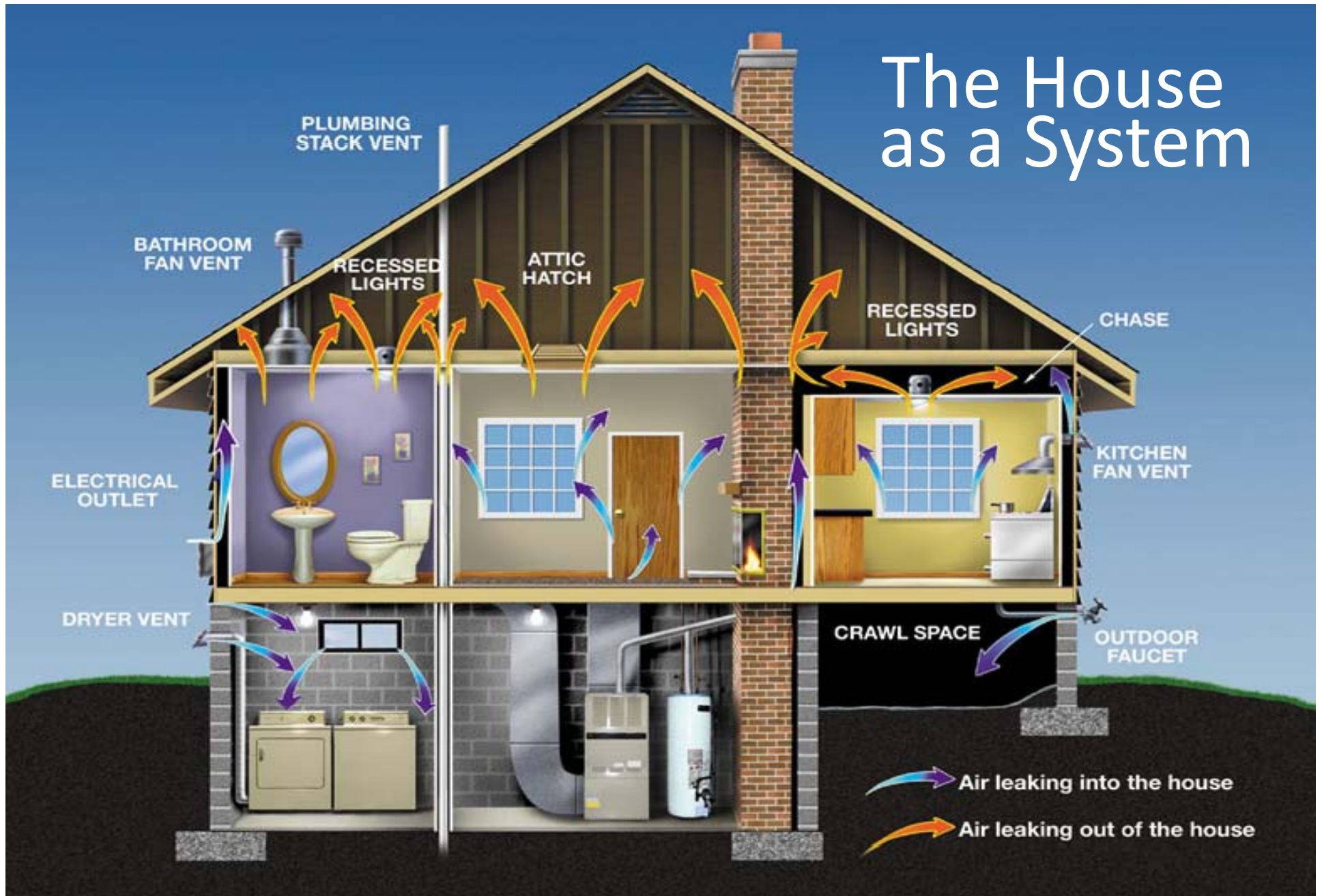


Andy Stone, Executive Director

An Energy Audit generally consists of:

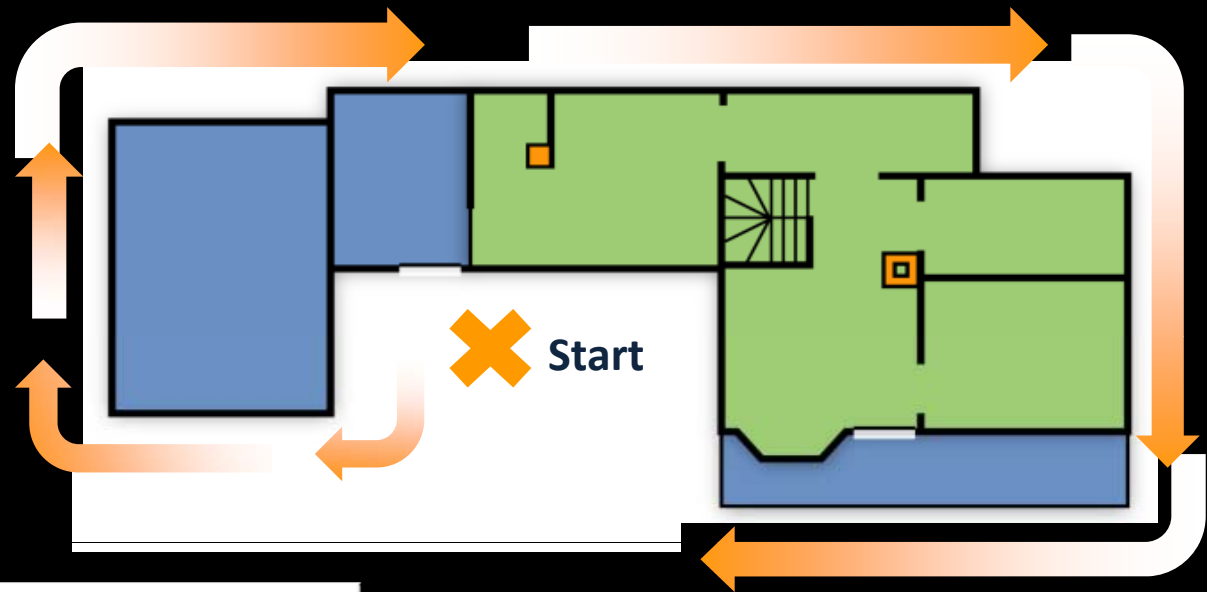
- A thorough inspection of the interior and exterior of the home using a holistic approach**
- Client education and being educated by the homeowner**
- Diagnostic/health and safety tests**
- Creating a computer model (TIPS, EA-QUIP, TREAT, EmpCALC)**
- Development of a comprehensive work scope**

The House as a System



Exterior Inspection

Exterior Walk Around





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Siding Types



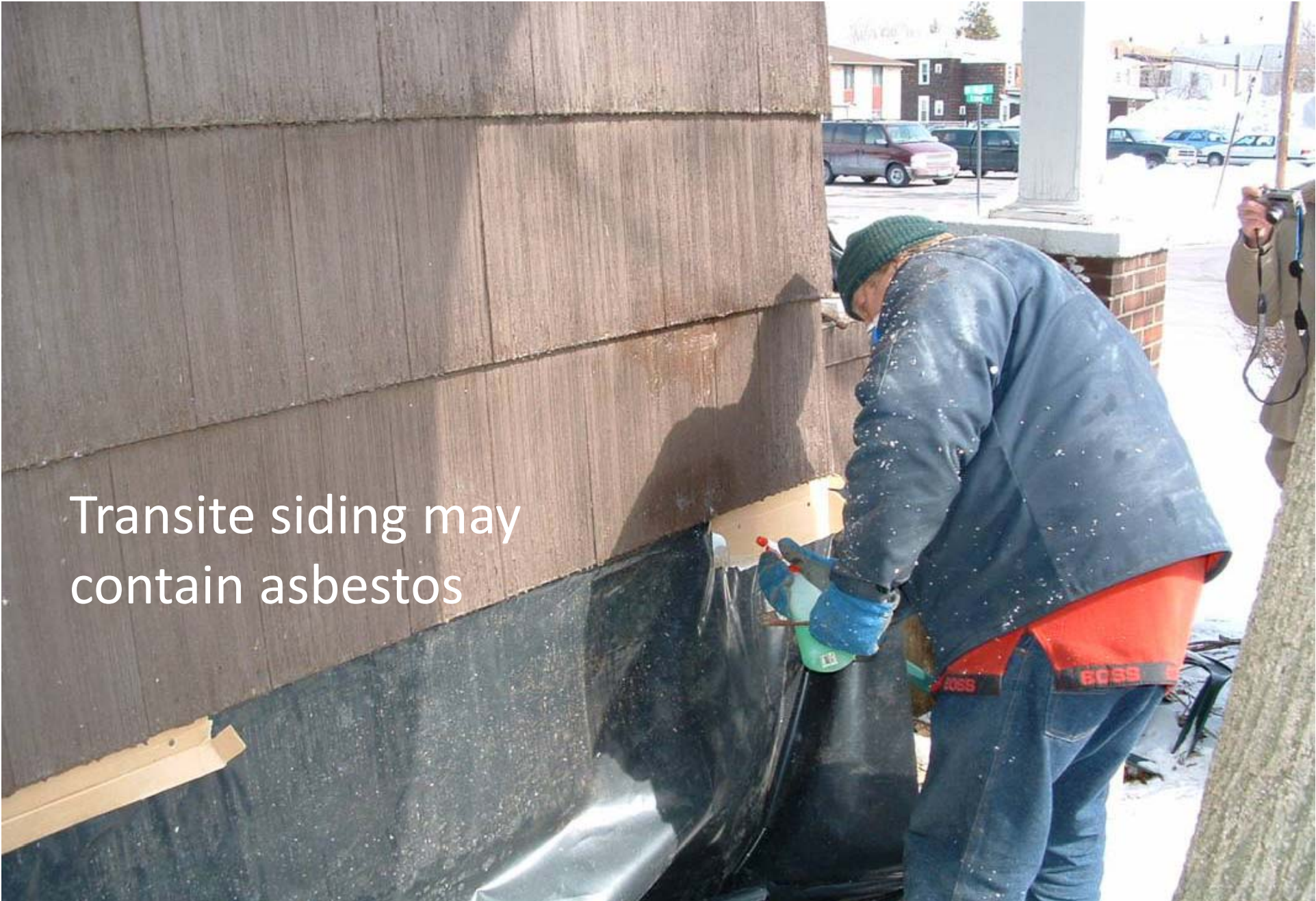
Special Considerations



Brick



Lead Based Paint

A photograph showing a construction worker in winter attire (green beanie, blue jacket, blue gloves) using a power tool to remove dark, textured siding from a building wall. The worker is wearing a red shirt underneath the jacket. The siding being removed is dark and appears to be made of a composite material. The background shows a snowy residential street with parked cars and houses.

Transite siding may
contain asbestos



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Think this might be a problem?





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Interior Inspection

Customer Interview



Client Questionnaire

NYS DIVISION OF HOUSING AND COMMUNITY RENEWAL WEATHERIZATION ASSISTANCE PROGRAM DHCR # 11

CLIENT QUESTIONNAIRE

Unit # _____ Building Address: _____

HEATING, HOT WATER:


- How long have you lived here? ☐ Yes ☐ No
- Was the heating system operating last winter? ☐ Yes ☐ No
- Has any work been done to your heating system in the past 2-3 years? ☐ Yes ☐ No
- Do you use a separate space heater during the winter months? ☐ Yes ☐ No
What fuel? ☐ Electric ☐ Kerosene ☐ Other
- Do you have a working fireplace? ☐ Yes ☐ No
How often is it used?
When was the last time the chimney was cleaned?
- Do you use a wood stove? ☐ Yes ☐ No
How much wood did you use during the last heating season?
- Did you use your cookstove for heat during the past winter? ☐ Yes ☐ No
What type of fuel is your cookstove?
- Does your home or certain rooms ever get too warm? ☐ Yes ☐ No
If yes, explain where
- Does your home or certain rooms ever get too cold? ☐ Yes ☐ No
If yes, explain where
- Do you have any noticeably drafty areas? ☐ Yes ☐ No
If yes, explain where
- When was the last time your heating system was cleaned and tuned?
- Do you change your furnace filter regularly? ☐ Yes ☐ No
If yes, when was it done last?
- Do you have a setback thermostat? ☐ Yes ☐ No
What is the highest setting
°F
What is the lowest setting °F
- Where is the thermostat located?
- Do you close off any rooms? ☐ Yes ☐ No
If yes, which rooms?
- Do you have an air conditioner? ☐ Yes ☐ No
If yes, what type?

HEALTH & SAFETY

- Do you or any member of your household suffer from frequent headaches, flu, colds or nausea during the heating season? ☐ Yes ☐ No
- Do you or any member of your household have medical problems that are irritated by high heat? ☐ Yes ☐ No
If yes, is the affected person presently receiving doctor's care for the problem? ☐ Yes ☐ No
- Is there any condensation build-up in your home? ☐ Yes ☐ No
If yes, where?
- Is there mold or mildew in your home? ☐ Yes ☐ No
- Does your basement get wet during certain times of the year? ☐ Yes ☐ No
If yes, when and where?
- Does ice form in your attic during the winter? ☐ Yes ☐ No
- Is there ice build-up on your roof during the winter? ☐ Yes ☐ No
- Does your roof leak? ☐ Yes ☐ No
- Has your home been certified as free from lead-based paint? ☐ Yes ☐ No
- Has any member of your household been tested for lead exposure? ☐ Yes ☐ No
If yes, what were the results?
- Did you receive the lead booklet entitled "....."? ☐ Yes ☐ No

VISUAL INSPECTION COMMENTS OR CONCERNS NOTED BY AUDITOR

Utility Bill Review



www.nationalgridus.com

SERVICE FOR [REDACTED]

BILLING PERIOD
Jan 18, 2012 to Feb 15, 2012

ACCOUNT NUMBER [REDACTED] PLEASE PAY BY
Mar 16, 2012

PAGE 1 of 4

AMOUNT DUE
\$ 277.75

CUSTOMER SERVICE
1-800-642-4272

AUTOMATED SERVICES
1-888-932-0301

GAS EMERGENCIES
1-800-892-2345
(Does not replace 911 emergency medical service)

OUTAGE AND ELECTRIC EMERGENCIES
1-800-867-5222

CORRESPONDENCE ADDRESS
300 Erie Blvd West
Syracuse, NY 13202

DATE BILL ISSUED
Feb 21, 2012


ACCOUNT BALANCE


Previous Balance	324.76
Payment Received on FEB 13 (Check) <i>THANK YOU</i>	- 324.76
Current Charges	+ 277.75
Amount Due ▶	\$ 277.75


To avoid late payment charges of 1.5%, \$ 277.75 must be received by Mar 16 2012.


SUMMARY OF CURRENT CHARGES

	DELIVERY SERVICES	SUPPLY SERVICES	TOTAL
Electric Service	82.37	55.03	137.40
Gas Service	53.79	86.56	140.35
Total Current Charges	\$ 136.16	\$ 141.59	\$ 277.75

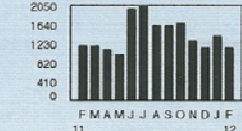
 National Grid buys low cost energy and receives a Residential Consumer Discount monthly payment from the New York Power Authority (NYP&A) to be used as a benefit for residential customers. This bill reflects a savings of \$ 2.30 from these benefits.

 **Effective January 15, 2012**, business hours for our Customer Service Call Center will be Monday through Friday 7 a.m. to 7 p.m. As always, emergency support is available 24 hours a day, seven days a week.

 **Lower Bills in 2012:** Electric rates starting 1/1/12 will be changing. Most customers will see lower bills. Using the same or less energy, bills will decrease. Visit nationalgrid.com for more information.

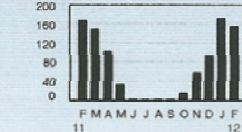
 **PAYMENT CONCERNS?:** We're here to help you. We have several plans that can help you manage your energy bills. Go to www.nationalgridus.com/paymentoptions to find out more or call us at 1-800-443-1837.

ELECTRIC USAGE HISTORY (kWh)



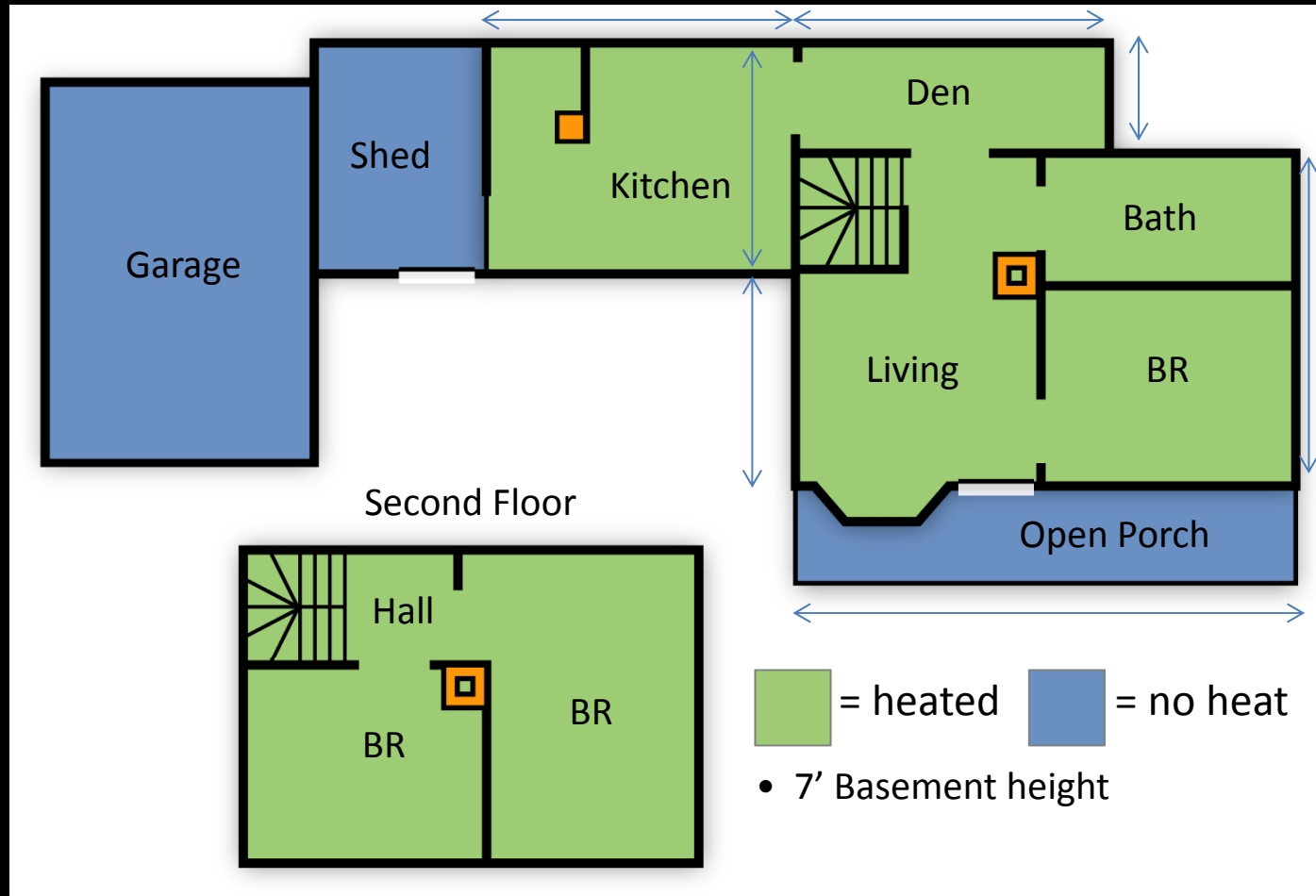
Daily Averages	Feb 11	Feb 12
kWh	42.4	41.2
Cost	\$ 6.35	\$ 4.90

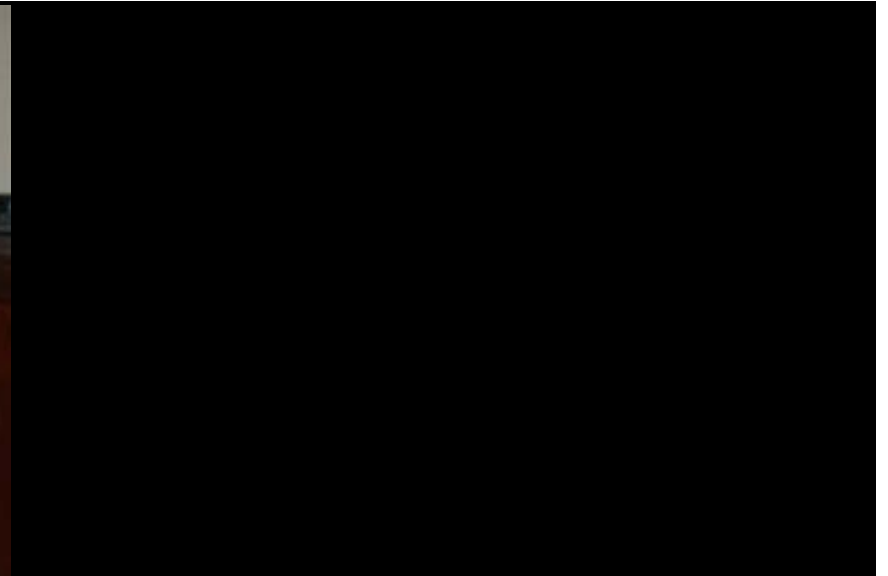
GAS USAGE HISTORY (Therms)



Daily Averages	Feb 11	Feb 12
Therms	6.0	5.5
Cost	\$ 6.90	\$ 5.01

Footprint Sketch





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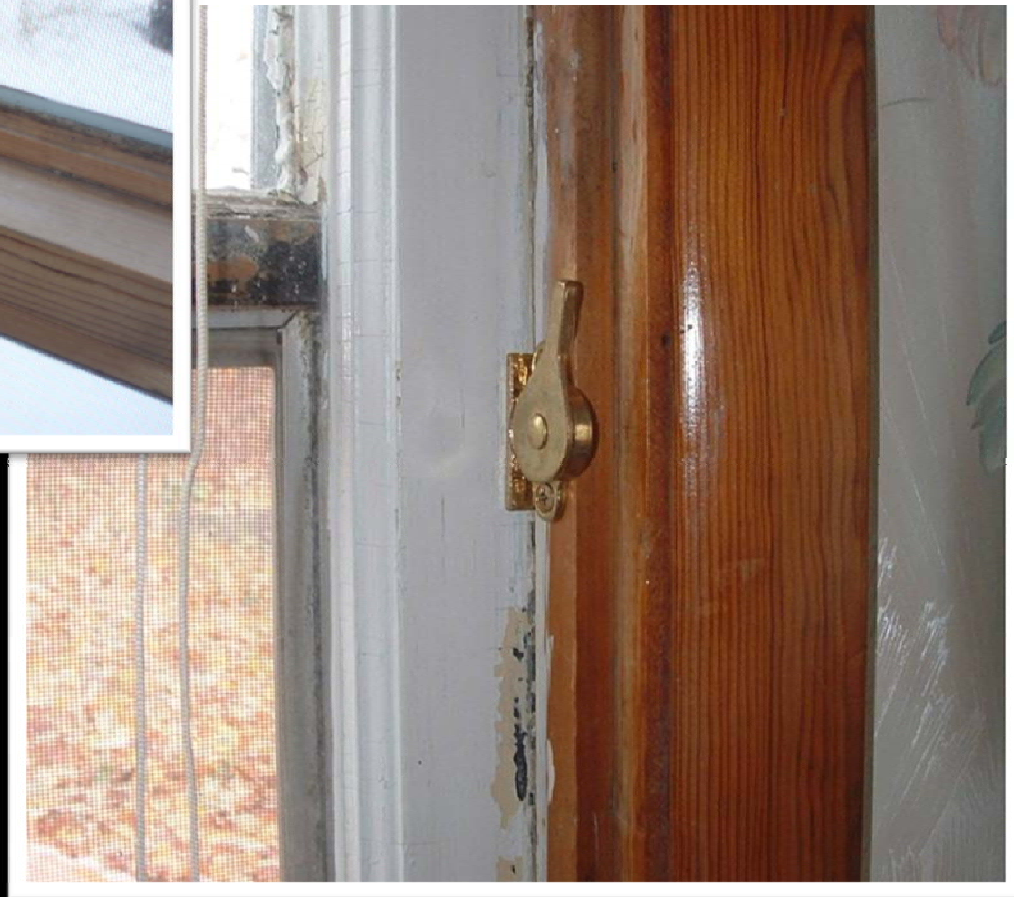


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Drop ceilings can hide a multitude of problems





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Sidewall insulation can be assessed through room outlets

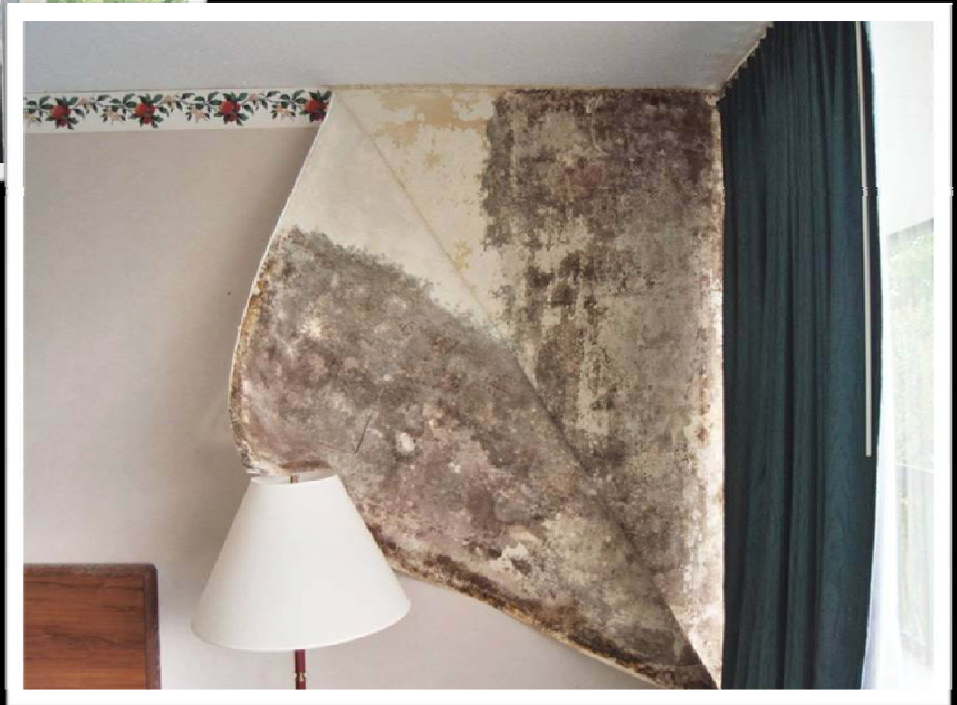




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The Basement



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Improper distribution causes flow restrictions



Venting Disconnects are common





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Dryer fire caused by plugged lint trap



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Diagnostic/Health and Safety Tests

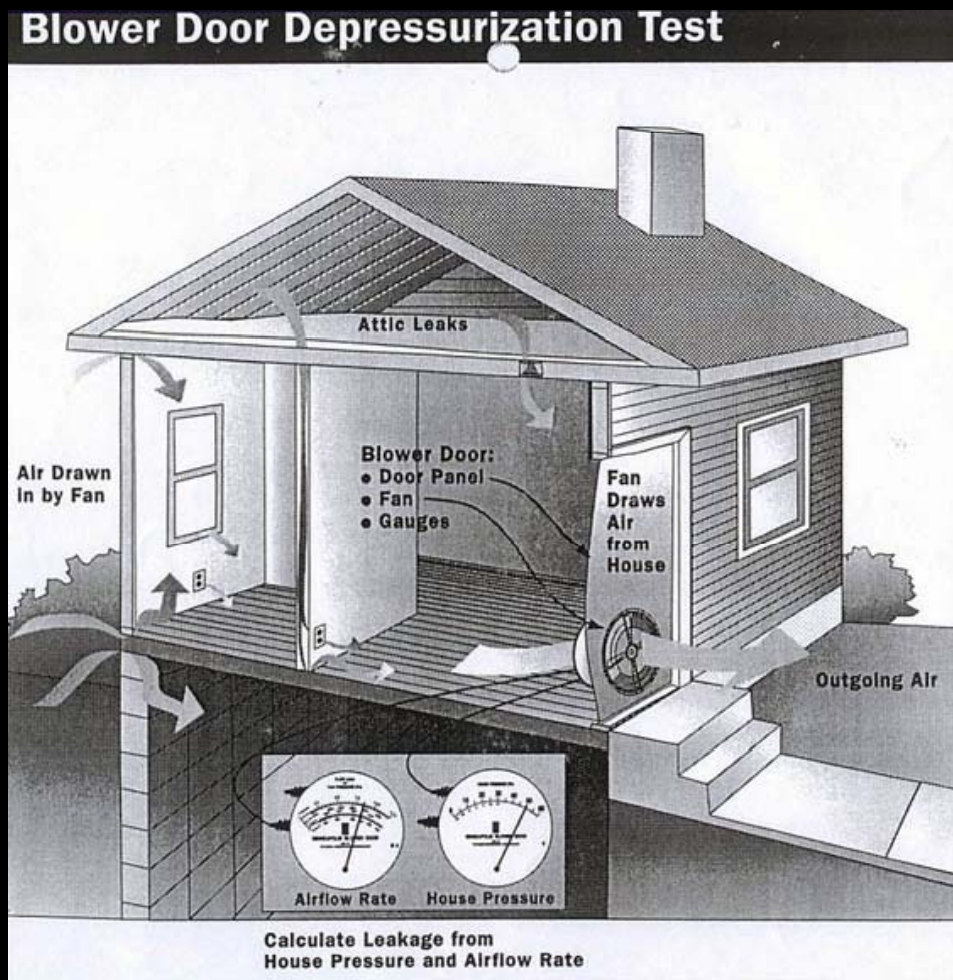
Carbon Monoxide Testing- Ambient and in Oven



Blower Door



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Combustion Analyzer



Steady State Efficiency Tests



Digital Manometer



CAZ Zone Depressurization

**Make sure the
fumes are going
up the chimney
not dumping back
into the house**



Drilling the Draft Test Hole



Measuring chimney draft



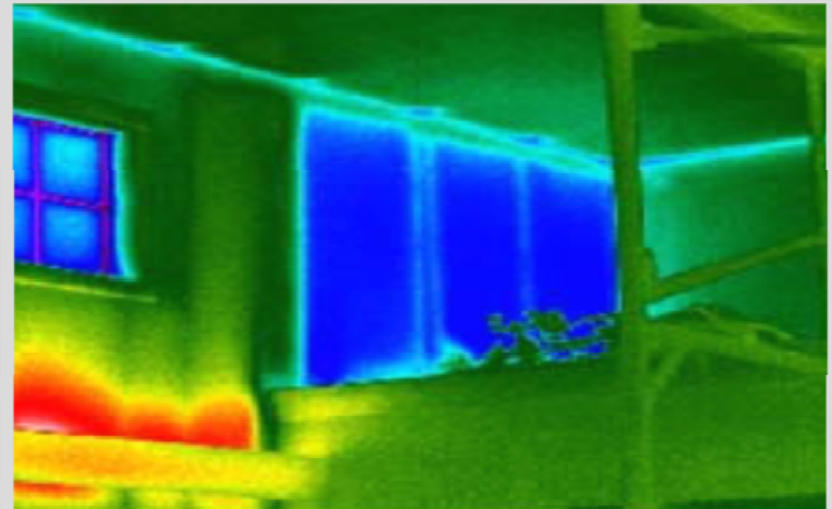
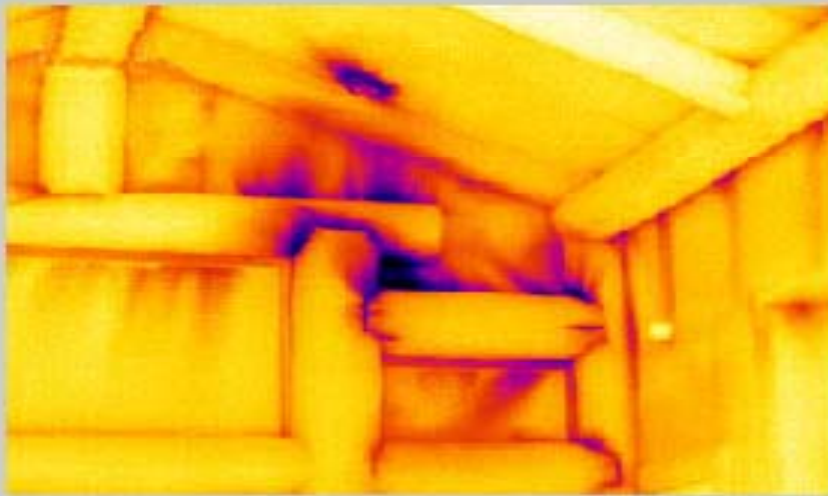
Worst Case Draft



Infrared Camera



Infrared Camera



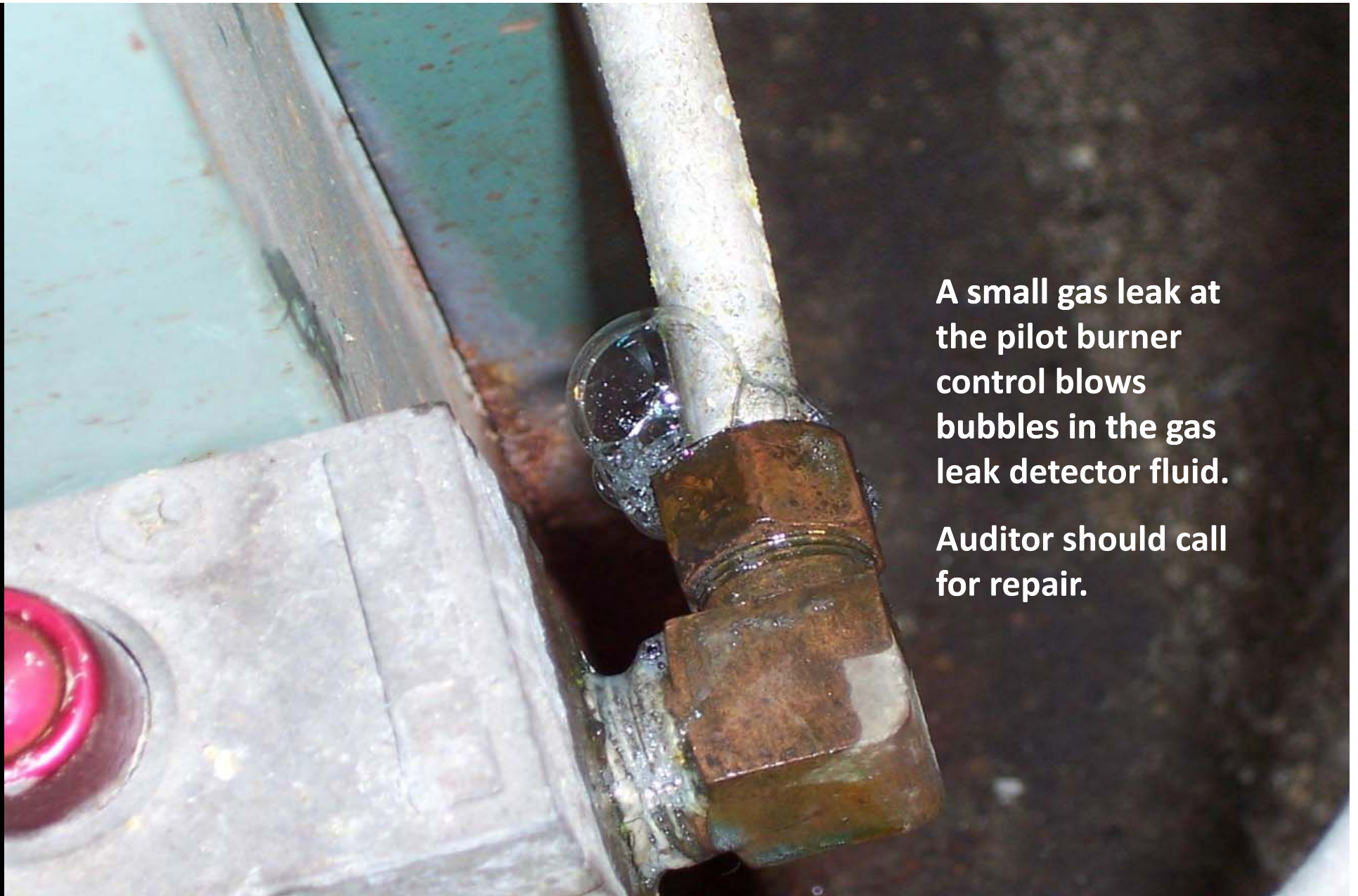
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Gas Leak Detection





A small gas leak at the pilot burner control blows bubbles in the gas leak detector fluid.

Auditor should call for repair.

Multi-Family Buildings



Modular Boilers



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Computer Modeling



Modeling, Analysis, and the Savings to Investment Ratio (SIR)

ESB Subgrantee System - Current Contract/Amend = C090049 / 0 For Agency ONON

File Edit Tools ESB Reports Window Help

Agency Contract Bldgs Exit Print Insert Delete Save Close

Building Data Entry Window

Contract No/Prog Year: C090049 / 2007 Start Date: 04/01/2007 End Date: 03/31/2008 Agency: ONON Building Search

Building No: 1 Address: 123 Energy LN, Syracuse, NY 132040000

Bldg Project Client/Unit/Demo Cost Measures Audit TIPS Cond. TIPS Model TIPS WkScope Other WkScope

Model EF: 11.53 Proposed EF: 9.0 TOTAL TIPS Investment: \$2,883

Building Model					Proposed Measures						
Item	Area	Prevalue	HNAC	(%)	Area	Postvalue	Cost	Life	HNAC	(%)	SIR
Wind1	107	0.48	5.87	8%	107	0.48	0	0	5.87	11%	0.0
Wind2	0	0.0	0.00	0%	0	0.0	0	0	0	0%	0.0
Wind3	0	0.0	0.00	0%	0	0.0	0	0	0	0%	0.0
Other1	0	0.0	0.00	0%	0	0.0	0	0	0	0%	0.0
Door1	35	0.3	1.20	2%	35	0.3	0	0	1.2	2%	0.0
Door2	0	0.0	0.00	0%	0	0.0	0	0	0	0%	0.0
Wall1	1,218	0.08	11.14	16%	1218	0.08	0	0	11.14	21%	0.0
Wall2	0	0.0	0.00	0%	0	0.0	0	0	0	0%	0.0
Wall3	0	0.0	0.00	0%	0	0.0	0	0	0	0%	0.0
Wall4	0	0.0	0.00	0%	0	0.0	0	0	0	0%	0.0
Ceil1	886	0.08	8.10	12%	886	0.02	800	25	2.03	4%	1.3
Ceil2	0	0.0	0.00	0%	0	0.0	0	0	0	0%	0.0
Ceil3	0	0.0	0.00	0%	0	0.0	0	0	0	0%	0.0
Floor1	886	0.06	6.08	9%	886	0.06	0	0	6.08	11%	0.0
Floor2	0	0.0	0.00	0%	0	0.0	0	0	0	0%	0.0
ALeak		1,603	9.89	14%		1,500	80	15	9.26	17%	1.0
HDist		78	11.93	17%		80	100	15	8.9	16%	1.4
HAppl		78	15.29	22%		82	60	2	9.76	18%	1.0
TOTAL			69.50	100%					54.24	100%	

Rec. Appl. Size: 32,100 To 38,520 BTU/Hr *Not to be used for steam Proposed MAT/LAB\$: \$1,040

Enter the post-weatherization area if the workscope calls for the area to change.

09/06/2007 12:48

start ESB Subgrantee Syst... Microsoft PowerPoint ... 12:48 PM

Typical Workscope

- Attic Insulation
- Sidewall Insulation
- Air Sealing
- Furnace Cleaning
- Furnace Repair
- Duct Sealing
- Baseload Measures
- Setback Thermostat
- Refrigerator
- DHW Replacement
- Doors
- Windows
- Health and Safety Measures/Repairs

The End Game is:

Work scope development that will
provide the most energy savings
and net benefit to the customer