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

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Exterior Inspection
Exterior Walk Around
Siding Types
Special Considerations

Brick

Lead Based Paint
Transite siding may contain asbestos
Think this might be a problem?
Interior Inspection

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CLIENT QUESTIONNAIRE

HEATING, HOT WATER

- How long have you lived here? Q Yes Q No
- Was the heating system operating last winter? Q Yes Q No
- Has any work been done to your heating system in the past 3 years? Q Yes Q No
- Do you use a separate space heater during the winter months? Q Yes Q No
- What fuel? Electric Q Gasoline Q Other
- Do you have a working smoke alarm? Q Yes Q No
- How often is it tested? Q Yes Q No
- When was the last time the chimney was cleaned? Q Yes Q No
- Do you use a wood stove? Q Yes Q No
- How much wood did you use during the last heating season? Q Yes Q No
- Did you use your refrigerator for heat during the past winter? Q Yes Q No
- What type of fuel is your co-op/tenants? Q Yes Q No
- Does your home or certain rooms get too hot or too warm? Q Yes Q No
- Explain where? Q Yes Q No
- Does your home or certain rooms ever get too cold? Q Yes Q No
- If yes, explain where? Q Yes Q No
- Do you have any obviously drafty areas? Q Yes Q No
- Explain where
- When was the last time your heating system was cleaned and tuned? Q Yes Q No
- Do you change your furnace filter regularly? Q Yes Q No
- If you, whom else? Q Yes Q No
- Do you have a exhaust system? Q Yes Q No
- Where is the highest setting? Q Yes Q No
- What is the lowest setting? Q Yes Q No
- Where is the thermostat located? Q Yes Q No
- Do you close off any rooms? Q Yes Q No
- If yes, which rooms? Q Yes Q No
- Do you have an air conditioner? Q Yes Q No
- If yes, what type? Q Yes Q No

HEALTH & SAFETY

- Do you or any member of your household suffer from frequent headaches, eye, nose or nasal problems during the heating season? Q Yes Q No
- Do you or any member of your household have medical problems that are irritated by heat? Q Yes Q No
- If yes, is the affected person currently receiving doctors care for the problem? Q Yes Q No
- Is there any insulation build-up in your home? Q Yes Q No
- Is there mold or mildew in your home? Q Yes Q No
- Does your basement get wet during certain times of the year? Q Yes Q No
- If yes, explain where and when? Q Yes Q No
- Does your home have a gas or oil furnace? Q Yes Q No
- Is there ice build-up on your roof during the winter? Q Yes Q No
- Does your roof leak? Q Yes Q No
- Has your home been certified as free from lead-based paint? Q Yes Q No
- Have any members of your household been tested for lead exposure? Q Yes Q No
- If yes, what were the results? Q Yes Q No
- Did you receive the lead test kit? Q Yes Q No
- VISUAL INSPECTION COMMENTS OR CONCERNS NOTED BY AUDITOR

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Utility Bill Review

ACCOUNT BALANCE

Previous Balance: 324.76
Payment Received on Feb 13 (Check): THANK YOU
Current Charges: + 277.75
Amount Due: $ 277.75

To avoid late payment charges of 1.5%, $ 277.75 must be received by Mar 18 2012.

SUMMARY OF CURRENT CHARGES

<table>
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<th>DELIVERY SERVICES</th>
<th>SUPPLY SERVICES</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>Electric Service</td>
<td>82.37</td>
<td>55.03</td>
<td>137.40</td>
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<tr>
<td>Gas Service</td>
<td>53.79</td>
<td>86.56</td>
<td>140.35</td>
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<tr>
<td>Total Current Charge</td>
<td>$ 135.16</td>
<td>$ 141.89</td>
<td>$ 277.75</td>
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National Grid buys low cost energy and receives a Residential Consumer Discount monthly payment from the New York Power Authority (NYPA) 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 8 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 CONCERNST: 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 1-800-445-1857.
Footprint Sketch

- Garage
- Shed
- Kitchen
- Den
- Bath
- Living
- BR (heated)
- BR (no heat)
- Open Porch
- Hall
- Second Floor
- 7’ Basement height

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Drop ceilings can hide a multitude of problems
Sidewall insulation can be assessed through room outlets
The Basement
Improper distribution causes flow restrictions
Venting Disconnects are common
Dryer fire caused by plugged lint trap
The Attic
Diagnostic/Health and Safety Tests
Carbon Monoxide Testing - Ambient and in Oven
Blower Door

Blower Door Depressurization Test

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