



In-Home Energy Education Guide

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**New York State Energy Research and Development
Authority**

In-Home Energy Education Guide

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NOTE: Putting colorful reference tabs or dividers between sections of this binder will be helpful for quick reference to each section. Although this guide is meant to be read in its entirety, reference to certain sections before the audit and throughout the audit will help immensely. Large, bold headings are above each section, which starts at the top of the pages listed above are meant to help in finding each section more easily.

I. INTRODUCTION

This guide was developed as an energy education guide for energy auditors. It includes:

- A step-by-step guide through the energy education process
- Tips on education techniques
- Energy-saving strategies

The mission is to help families with high energy burdens manage their energy use and costs through energy efficiency education and services.

The goal of In-Home Education:

Assist the household in identifying 4 concrete actions that will reduce their energy use.

Success is based on the actions that the household takes as a result of your interaction, NOT on the amount of information you provide. So it's important that the education process be specific to each home--you will not do everything in this guide every time. As you become familiar with the concepts, you will learn to tailor the process to the household's needs and as you see fit. In doing so, you will increase the effectiveness of NYSERDA's work by helping households make better choices in the ways that they use energy.

This guide **does not** provide extensive technical training on Electric Reduction or Home Performance measures. Further information may be found in the Contractor Resource Manual, the Building Performance Institute website, the MIG (Materials and Insulation Guide) and other reliable sources.

Please consult with program staff for further assistance.

II. METHODOLOGY FOR IN-HOME EDUCATION

Before you begin this process, consider 6 important strategies for making this process more effective:

1. Develop your expertise

Be knowledgeable about energy efficiency strategies, savings and issues. The better you prepare, the more effective you become at energy efficiency education—and your ideas will encourage the household members to trust you.

If you don't know an answer, don't pretend that you do—just promise that you will find out and get back to them.

Bear in mind that health and safety come first in NYSERDA recommendations.

2. “Partner” with the household

Remember that the overall goal is to work with the household members to find ways to make energy more affordable. “Partner” with them in this process. If the household feels at ease and is involved in the problem-solving process, they are more likely to follow through.

Your own friendly, respectful attitude will help immensely. Remember that while you may have a greater understanding of the technical aspects of energy efficiency, the household has a greater understanding of their home. Partner with them in solving problems. If you disagree, explore the question in a mutually respectful way.

Hone your communication skills. Avoid using technical terminology that tends to keep households at a distance or communicates “superiority”. Use straight-forward language. Review the technical terms that you typically use (such as “infiltration” or “50 pascals”) and substitute simpler terms that are listener-friendly and easier to understand. If you find yourself stumbling over your words, write a script for the concept that you are explaining, and practice it until the words come naturally.

3. Tailor the Inspection to the needs of the household

Conversations with the household can provide a great deal of useful information about their habits and needs. Review the household

information available on program database before you enter the home, so that you begin with some understanding of the situation.

Listen for their concerns. Think from their perspective, not yours. Be sure to ask them appropriate questions before you provide an answer. Always listen for cues that something is on their mind that they want to talk about. Don't waste time advocating for actions that the household clearly is not going to follow through on.

One key strategy is to ask "open-ended" questions. Open-ended questions are those that require more than a yes-or-no answer. For example, instead of asking, "Is your house comfortable in the winter?" you might ask, "Tell me about how comfortable the rooms are in your house." Open-ended questions lead to a discussion and signal interest in the household.

4. Give the household choices, not obligations

Rather than presenting the "right or wrong" ways of using energy, give the household alternatives that have real life consequences, such as money saved or increase comfort. This way the household can make informed choices that better suit their needs.

For example, instead of asking the household member, "would you like me to install this LED", you might present the choice as follows: "If you continue to use your old inefficient light bulb, you will pay about \$100 for 10,000 hours of use, and probably buy 9 more light bulbs. If we install this high efficiency light bulb, it will last about 10,000 hours, and you will save about \$75 over the life of the LED, which you can use to help in paying other bills, or to buy things for the kids."

5. Identify incentives

People need incentives to change behavior. Two principle incentives for change in energy usage behaviors are 1) helping the family feel more comfortable in the home and 2) lowering costs.

Dollar savings provide stronger motivation than kilowatt or therm savings. Estimate a dollar savings whenever possible. Use the energy usage information provided to you, utility bills and your instrumented audit tools to help your accuracy.

6. Provide reinforcement for decisions made by the household

If you find that the household is already taking some positive steps, applaud these actions. “I’m glad to hear that you turn down your thermostat at night—that really does help keep your bills down!”

Encourage them to believe that they really can follow through on their actions. “All you have to do is switch your washing machine to cold water and you will save on your bill.”

Avoid using the word “should” --it only produces guilty feelings. **Think mutual support.** Don’t play “gotcha” with the household; it makes you both look bad.

III. THE ACTION PLAN

As stated in the introduction, the purpose of the education process is to help households reduce energy use to a more affordable level. The “Action Plan” is a key to this process. It keeps the focus on concrete “do-able” actions, which will result in usage. It provides a written document that encourages commitment, and it is a simple list.

The homeowner should be strongly encouraged by their contractor to write down 4 energy saving actions in Action Plan, which is included in the Certificate of Completion. An example Certificate of Completion can be seen on the following page.

After each section of this guide, you will note lists of “Household energy actions” related to that section. Those household energy actions are great suggestions to the household members of what could be included in their action plan, depending what issues they have in their home. A compiled list of these energy actions will be included at the end of the guide.



Certificate of Completion
Post-Installation Health and Safety Test Results

EmPower New York
 Home Performance with ENERGY STAR®
 Coordinated AHP/EmPower New York
 Customer Name: _____ Contractor Name: _____
 EmPower ID #: _____ Office Location (if applicable): _____
 Home Performance ID #: _____
 Technician Name: _____ BPI ID #: _____
 WAP Coordination:
 WAP work complete
 WAP work in-progress
 WAP will be completed within 12 months

A. Customer Education: Energy Savings Action Plan:
 To reduce my monthly energy costs, I will take the following actions:

Action 1: _____

Action 2: _____

Action 3: _____

Action 4: _____

If household opts out of Energy Education, have household initial here _____

B. CUSTOMER STATEMENT AND SIGNATURE

I, _____, attest that my home was left in good condition. I will make my best effort to complete the energy saving actions that I have listed above.

Customer Signature: _____ Date: _____

C. CAZ TESTING Test Out Date: _____

MVG: _____ CFM50 Building Leakage _____ CFM50 Fan Ring: Open A B C

Inside Temp: _____ F Outside Temp: _____ F House Pressure: _____ Pa Fan Pressure: _____ Pa

CAZ Test Venting Condition. Select the row that best describes the venting condition in the home and fill in the CAZ Worst Case Depressurization test result in that row.	BPI Limit (PA)	CAZ Worst Case Depressurization (Net)	
		CAZ #1	CAZ #2
Orphan natural draft water heater (including outside chimneys).	-2		
Natural draft boiler or furnace commonly vented with water heater.	-3		
Natural draft boiler or furnace w/ vent damper commonly vented with water heater; Induced draft boiler or furnace commonly vented with water heater; Individual natural draft boiler or furnace.	-5		
Power vented or induced draft boiler or furnace alone.	-15		
Exhaust to chimney-top draft inducer; High static pressure flame retention head oil burner; direct vented appliances; or Sealed combustion appliances.	-50		

CAZ #1 Worst _____ -Base _____ =Net _____ Pa CAZ #2 Worst _____ -Base _____ =Net _____ Pa

Appliance Type	CO Ambient (max.) In CAZ (during test):		CO Ambient (max.) in living space:	
	Draft Pascals (Pa)	Spillage (Worst Case)	Spillage (Natural)	CO (Worst Case)
Heating System 1	_____ Pa	<input type="checkbox"/> Pass/Fail <input type="checkbox"/>	<input type="checkbox"/> Pass/Fail <input type="checkbox"/>	_____ PPM
Heating System 2	_____ Pa	<input type="checkbox"/> Pass/Fail <input type="checkbox"/>	<input type="checkbox"/> Pass/Fail <input type="checkbox"/>	_____ PPM
Water Heater 1	_____ Pa	<input type="checkbox"/> Pass/Fail <input type="checkbox"/>	<input type="checkbox"/> Pass/Fail <input type="checkbox"/>	_____ PPM
Water Heater 2	_____ Pa	<input type="checkbox"/> Pass/Fail <input type="checkbox"/>	<input type="checkbox"/> Pass/Fail <input type="checkbox"/>	_____ PPM
Oven	<input type="checkbox"/> Electric	<input type="checkbox"/> Gas w/ no vent	<input type="checkbox"/> Gas w/vent	_____ PPM

CO Ambient (max.) in living space: _____ PPM

Contractor: I, _____, attest that all measures completed by my company for EmPower New York adhere to current standards defined by the Building Performance Institute (BPI) and the current EmPower New York Program Guidelines. I further attest that, for all Home Performance designated projects, I have conducted the appropriate Combustion Appliance Zone (CAZ) testing and left the home in a safe condition as per BPI Standards.

Technician Signature: _____ Date: _____

IV. PREPARING FOR THE VISIT

1. REVIEW HOUSEHOLD DATA BEFORE THE AUDIT

Prior to your visit to the home become familiar with available household information. Be sure to read any notes provided by the household, or referral sources.

Whenever possible, obtain energy usage information prior to the visit. If the data is not available beforehand, request that the household provide this information at the time of the audit. Study the patterns of energy use: does the electric use peak in the summer time? Is the natural gas use unusually high in the winter? Learning to read the patterns in the monthly usage can greatly enhance the decision-making process. Consult program staff if you need further training on this strategy.

If the household members are tenants, determine whether a landlord agreement is in place. Certain measures, such as LEDs, may be installed without landlord permission; others require it. Refer to program guidelines for details, or consult program staff.

3. CONTACT THE HOUSEHOLD TO ARRANGE A VISIT.

During the phone call:

- ❖ Confirm that at least one primary adult household member will be available, but encourage others to participate as well.
- ❖ Emphasize that the visit will be fun and interesting.
- ❖ Review the address and check for directions.
- ❖ Ask them to think about questions or issues that they may have, and write down any issues that they mention. Assure them that you will spend time answering their questions during the visit.
- ❖ Be sure to tell the household about how long the visit will take and emphasize that you will need their attention for the whole time.
- ❖ Be sure that they know the visit will include a tour of the home.
- ❖ Emphasize that there is **no cost to them** for the service. Keep in mind that many sales people make calls like yours; so don't be surprised if they are suspicious.
- ❖ Find out if they have a halogen or incandescent torchiere. If so, and if you carry an inventory, you can bring it along for replacement.
- ❖ Invite the household member to provide you with the refrigerator make and model numbers during the phone call. If it is provided, you may be able to evaluate replacement before the visit. However, if it is difficult for the household to find or read these numbers, hold off until the visit.

- ❖ Reassure them that you will be bringing along identification, and suggest that they ask to see this identification when you arrive.

If the audit was scheduled more than a couple of days in advance, be sure to call the household the night before to confirm the arrangements.

V. GET STARTED IN THE HOME

Carry appropriate referral and emergency numbers with you. Taping them to your clipboard is a great idea. **Be sure that you and the household member are clear as to which of you is going to make the referral.**

The first few minutes of the audit are crucial to setting the tone and establishing trust. Begin the visit by:

1. Display identification at the door, whether the household member asks for it or not.
2. Introduce yourself to all household members you encounter, and help the household member to be comfortable with your visit. The goal should be to begin to build trust, to create buy-in for the program and to establish a dialogue.
3. If refrigerator or freezer metering is to take place, ask if you can install the meter right away, and then do so.
4. Put a thermometer into the freezer and refrigerator compartments. They should stay in at least 10-15 minutes.
5. If there are distractions, such as a blaring TV, don't fight them. Ask politely that the TV be turned off while you are there.
6. Ask the household if you can sit with them for a few minute and discuss the program.

VI. THE INITIAL DISCUSSION

1. Give full focus to the household member.
2. Explain that the goal is “to help you to manage your energy use and costs.”
3. Describe the process that will occur during the visit, and the estimated time that it will take.
4. Reassure the household member that there will be no cost for the program (including the measures that you may install during the audit).
5. Initiate a discussion about the home by **asking what actions the household is already taking**. Reinforce their actions or clarify misconceptions.

Questioning can be an uncomfortable process! You may find it less threatening if you begin with small talk, and then some questions that the household can easily answer. Then, move on to “open-ended” questions that call for elaboration rather than just yes-or-no answers.

For this initial discussion, you may keep the questions general; but if the household brings up a specific concern, explore this in more detail. In some cases, you may want to get up and go to the location of the concern to continue the conversation.

The Teachable Moment: One helpful education strategy is to focus on a household’s concern immediately: if some issue is on their mind, you may want to stop what you are doing and focus on the issue raised. If the household member says that they are worried about a leak in the bathroom, for example, you might want to stop the interview and go right to the bathroom, take a look and begin to discuss solutions. By doing so, you signal interest in the household’s concerns and may remove a distraction from their mind during your further conversations.

6. If the household has questions about their energy bill, ask them to take out their most recent bill. Identify key features for them such as account number, usage dates, consumption and cost amount, and where to call with questions. Share with the household the results of your analysis of their usage.

A metaphor for purchasing energy: Buying energy is like buying groceries from a supermarket where the goods have no price stickers, and the bill comes at the end of the month. By using energy saving estimates you will be helping the household to put price tags on all of the goods.

7. Explain the concept of the Action Plan: that, in addition to the energy measures provided through the program, you are asking them to participate in finding actions that they can take to reduce their energy use. Invite the household member to participate in the walk-through.
8. Provide a clipboard, blank paper and a pen, and invite them to write down ideas. The clipboard provides the household member with a tool for writing down possible actions without committing to them. It also helps them to feel competent and involved. As you tour the home, invite them to note actions in each area that may be good choices for them.

NOTE: Be sure to look for clues that the household member may not be literate. If you suspect this to be the case, do not press the issue, and read information to them as appropriate.

9. If the household member is the homeowner, validate ownership by reviewing the appropriate documents. Be sure to have an Owner Agreement form signed.
10. During the discussion, household members may express frustration with their utility bill. Some families may express the belief that their high energy bills are due to faulty wiring or repairs completed on or near their home. In reality, high bills are very rarely due to such causes. If such concerns arise, it can be helpful to review the household's energy use patterns with them: show them the breakdown of their energy use patterns that you've complete prior to the visit. If the need arises, list the appliances in use in their home, and estimate the use of each, using the Energy Wheel or other tools. In many cases you will find that you can account for the usage through these techniques.

UTILITY RESPONSIBILITY: People sometimes feel that their utility has been unfair to them because the utility didn't come into the home and solve a problem. "They just looked at the meter and said that there was nothing that they could do!"

Most utility responsibilities really do stop at the meter. Some utilities are not allowed by law to become involved in electrical repairs in the home as it puts them in competition with private contractors. There are liability issues as well. Be careful to represent the utility responsibilities correctly. Consult with your local utility for further information.

VII. THERMOSTAT INSPECTION

1. In New York State, the highest energy use is typically for home heating. The thermostat is an important place to begin the energy education.
2. Identify for the household the part of the bill that is related to space heating. Breaking out the heating costs beforehand helps move the process along. If accurate usage is not available, work with the household to create a reasonable estimate.
3. Identify current temperatures and setbacks, and note these on the audit form.

Many people still believe that it is best to keep the thermostat at the same temperature all the time. This is incorrect. It takes less money to warm up a house in the morning than it is to keep it at a higher temperature setting all night long.

4. Explore potential additional savings with day or night setbacks.

As a general rule, a household will save about 3% of their heating bill for every degree lower the thermostat is set for 24 hours, and 1% for every degree lower the thermostat is set for 8 hours. Using this data, propose setbacks and estimate savings:

- ❖ If the household is keeping the home at a temperature greater than 68 degrees, propose an overall lower setting. Estimate the savings (number of degrees above 68 times 3%)
- ❖ If the household is out of the house all day, propose a daytime setback (number of degrees below the new overall setting times 1%).
- ❖ If the household keeps the temperature higher at night, propose a nighttime setback (number of degrees below the new overall setting times 1%).

Using the household's current energy bills and unit fuel costs, estimate the savings for these changes. Record this data on the audit form, and share it with the household.

Caution: Seniors often require higher temperatures. Be careful to take health concerns into consideration before recommending setbacks.

5. Proceed to the thermostat and check its functionality:
 - a. Put a thermometer on the wall to double check temperature.

- b. Check the location. It should be:
- On an inside wall
 - Not near a heat source such as a register, hot light or kitchen appliance
 - Away from the sun.
6. Ask the household if they have any problems with the thermostat. Make notes and investigate as appropriate.
7. Consider installing a programmable thermostat. Review the functions of the thermostat. **DO NOT INSTALL A PROGRAMMABLE THERMOSTAT UNLESS: (1) YOU HAVE TAUGHT THE FAMILY HOW TO USE IT (2) THE FAMILY IS CLEARLY COMFORTABLE WITH THE CONTROLS AND (3) THE FAMILY INTENDS TO USE THE SETBACK FUNCTIONS.** If you plan to install the thermostat at a later date, bring a practice model and make sure that the household is comfortable using it before you commit to installing it. Here's one way to put to approach the subject:

“If you are comfortable programming a VCR, you will probably be comfortable with an energy saving thermostat. If you find VCR's frustrating, you will probably want to stick with your old one.”

CAUTION: If the household has a HEAT PUMP heating system, a special programmable thermostat is required. Some older heating systems operate on a “mili-volt” system that also requires a special thermostat. Consult with your technical staff if these issues arise.

If thermostat setbacks, replacements, repairs or relocations are potential measures, either put them down as program actions, or invite the household member to write them down as household energy actions.

Household actions related to the thermostat:

- ✓ **Set the thermostat no higher than 68 degrees** when home and awake.
- ✓ **Turn down the thermostat at night** while sleeping. Put extra blankets on the bed if needed.
- ✓ **Turn down the thermostat when out of the house** for more than 4 hours.
- ✓ **Install a programmable setback thermostat.**

- ✓ **Wear comfortable layers of clothes instead of turning up the thermostat.**
- ✓ **Add rugs to areas with cold floors** in order to increase comfort without turning up the thermostat.
- ✓ **Apply for Weatherization** if household is determined to be low-income, or other helpful programs, if not already participating. Reassure the household that there is not cost to them.

VIII. HOT WATER TEST/ USAGE

1. Hot water temperature testing

Before going to the basement, suggest a hot water temperature test. If the household decides to lower the temperature, it can be done while in the basement.

- A. Invite the household member to the kitchen sink. Explain that hot water heating is often the second biggest energy user in New York State. If the hot water temperature is higher, lowering the hot water temperature to around 120 degrees can save money.

CAUTION: Hot water set at 140 or 160 degrees is not only wasteful, but can also cause serious burns to young children.

- B. Use an accurate thermometer (NOT a temperature card) with a range from at least 32 degrees to 180 degrees.
- C. Have a household member put a cup or glass under the kitchen faucet. Run the water long enough for the water to become hot, and then, with the water running, put the thermometer in the glass. Note the temperature when it stabilizes.
- D. Now ask the household member to adjust the water to the temperature at which they use hot water for bathing. If the household member says that they like a “really hot shower” invite them to demonstrate by setting the temperature at the faucet. Now do the same test and note the difference.
 - You will often find that “a really hot shower” is about 108 degrees! Even if the temperature is set at 120 degrees, there is cold water mixed in. You may point out to the household that if they never run out of hot water and never use the hot unmixed, this is a clue that they can save money by turning it down. This is a good time to discuss the benefits of a water and energy saving showerhead.

2. Usage testing and measures

Examine hot water usage with the following tests and inspections. You may use household bill analysis or estimates to underscore the cost of a household’s hot water use. As you complete the following audit tasks, include the household member in the evaluation.

- **Test the flow rate of the shower, using a one-gallon milk jug.** Consult the program guidelines for guidance. Install a high-efficiency shower head if

usage is greater than 3 gallons per minute, and the household is amenable to the installation.

- **Discuss faucet aerators** and install as appropriate.
- **Check faucets for leaks.** Hot water leak repairs may be an acceptable program measure. Use a “drip cup” to estimate losses from hot water leaks and document leak rate on audit paperwork.

Household energy actions related to water use:

- ✓ **Set water temperature to approximately 120 degrees.**
- ✓ **Take shorter showers.** If the kids are the culprits here, rewards for shorter showers can have an impact!
- ✓ **Rinse dishes in cold water in a pan, not under running water.**
- ✓ **Repair leaky hot water faucets (if not a program measure).** Repair to cold faucets can also help by reducing a household’s water bills.
- ✓ **Install high efficiency showerheads (if not program measures.)**
- ✓ **Wrap electric hot water heaters in unconditioned spaces** (if not a program measure).
- ✓ **Insulate 3 feet of input (“cold”) pipe leading into hot water heater, and 6 feet of output (“hot”) pipe** (if not a program measure). Heat in the tank sometime siphons out of the tank into the input pipe as well as the cold pipe.

IX. BASEMENT INSPECTION

1. Continue the house tour with a visit to the basement, beginning with the heating system. If you are conducting a Home Performance audit, now is the time to inspect and test the heating system, examine the distribution system and foundation.

CAUTION: If you smell or suspect a natural gas leak have the household contact the local utility immediately. Most utilities have a policy of quick response to reported natural gas leaks. Consult program guidelines for appropriate procedures for your program.

Households actions related to heating the home, found in the basement: (In some situations, these actions may be appropriate program measures; in others, the household may choose to undertake them as energy actions.)

- ✓ **Check the furnace filter every month and change as needed.** If the filter is dirty, you may replace it during the audit (if you have brought along the appropriate size). If the household will take responsibility for this action, show them how to replace the filter:
 - **Provide them with the correct size**, and make sure that they write down the filter size for future reference.
 - **Point out the arrow that indicates filter installation direction.**
 - **If the filter goes into a slot, encourage them to cover the slot with metal tape.** If the slot is left open, air is often drawn from the basement rather than through the return ducts.
- ✓ **Close furnace duct to basement.** Most often, unless the basement is a conditioned space, these ducts can be closed. This will improve heating upstairs.
- ✓ **Adjust duct dampers.** If household has expressed a concern about the distribution of heat to the various rooms (some too hot or too cold) in a house with a forced hot-air system, they may be able to adjust the balance by adjusting duct dampers. Not all systems have this feature so don't be surprised if you don't find it. Be sure to show the household member how to operate the dampers, rather than just doing it for them.
- ✓ **Have a clean-and-tune performed on burner.** If they are using oil it should be done every year; with natural gas, every two to four years. If it

hasn't been done in the last few years, it's an important measure to consider.

- ✓ **Seal gaps in ducts.** This is best done with mastic or metal tape, not duct tape. Caution the household member to wipe the dust off before applying the tape or mastic; otherwise it won't stick.
- ✓ **Eliminate electric heaters used to prevent freezing pipes.** If you find that the household is keeping an electric heater turned on in the basement to prevent pipes from freezing, there might be more low-cost options such as sealing foundation holes or broken windows that cause the freezing, or using heat tape.

2. Inspecting Water Heater:

- Examine the tank for leaks. If the water heater is leaking, there is likely to be big savings in replacing it.
- If appropriate, insulate the tank and wrap the hot water pipes.
- If you are conducting a Home Performance audit, you must test for back drafting.
- Explore the option of switching an electric water heater to natural gas, if appropriate
- If the household is on a time-of-use rate, explore the option of a timer.

Household actions related to the water heater:

- ✓ **Show the participating household how to turn down the water heater temperature, and have them do so if appropriate.** You could easily do this yourself; however, it is much better for the household member to learn how to do this. It may help some household members overcome a "block" about touching their heating appliances, and if at a later date they find the need to adjust the temperature again, they can do so without having to call you back.

CAUTION: If the water heater is electric, make sure that the circuit breaker is off before opening the panels on the tank.

4. You may encounter the following appliances in the basement. Repair to these appliances may be acceptable program measures, if energy savings can be documented. Consult program staff for guidance. If such measures are not accepted by the program, such actions may be appropriate household actions. Repair or replacement of the following appliances is very rare in program measures.

Sump pump: If the discharge hose is leaking, the pump may run continuously. In this situation, repairs to the discharge hose may be an acceptable program measure. (Replacement of failed sump pumps, however, is typically not an acceptable program measure.

Well pump: If the pump is running continuously, a repair may lower the electric bill and prolong the life of the pump.

Dehumidifiers: These devices are high energy users. While they are sometimes necessary due to moisture problems in the home, their use can be eliminated or reduced by resolving the moisture problems in the home.

Household energy actions related to these appliances:

- ✓ **Repair the discharge hose on a sump pump.**
- ✓ **Repair a well pump.**
- ✓ **Explore ways to solve moisture problems** that create the need for dehumidifiers, such as gutter repairs, bathroom vent use or repairs, or plastic over dirt in crawlspaces.

X. LAUNDRY

If the washer and dryer are in the basement, now is a good time to explore the options here.

1. Depending on energy costs, family size and program rules, replacement of an electric clothes dryer with a natural gas model may be an appropriate measure. If this measure is under consideration, be sure to identify the number of loads of laundry per week, and determine amount of gas line modification required.
2. Check the dryer exhaust duct. Make sure that it vents outside and is not constrained or clogged.

Household energy actions related to laundry:

- ✓ **Wash clothes in cold water:** Cold water cleans clothes well, and saves money. Recommend that a liquid detergent is used.
- ✓ **Run the washer through a second “spin” cycle:** A second spin cycle drives more moisture out of the clothes and reduces dryer run time.
- ✓ **Clean dryer lint filter after each use:** This protects the dryer and reduces run time.
- ✓ **Use a clothes line outside** in warm weather rather than running the dryer.
- ✓ **Clean dryer exhaust vent, replace vent, or vent dryer to the outside:** If a household member is capable, these may be appropriate actions for the household to undertake. If not, they may be completed through the program.
- ✓ **Wash and dry full loads.**
- ✓ **Do multiple loads—one load immediately after another—whenever possible** to take advantage of residual heat in the dryer.

XI: TOUR OF THE HOME: GENERAL HEATING AND COOLING

Continue your tour of the home upstairs. As you conduct your energy audit, keep an eye out for energy actions related to heating and cooling.

Household energy actions related to heating:

- ✓ **Remove obstructions, such as furniture or piles of clothes, from heating registers and radiators.** Air flow is important to efficient heating. In mobile homes, the vents are sometimes blocked with debris in the ducts below. Cleaning objects out can make a big difference in the air flow.
- ✓ **Make sure the fireplace damper is closed.**
- ✓ **DO NOT use an oven as a heat source.** As an auditor, look for alternatives—such as distribution repairs—that can eliminate this need.
- ✓ **Close off unused rooms in home.** Be sure do advise household to close heat registers and keep the door shut.
- ✓ **Install switch and outlet gaskets on exterior walls.** However, if the program will be installing wall insulation, this measure will not be necessary.

Household energy actions related to cooling:

- ✓ **Use fans instead of air conditioners.**
- ✓ **Apply for Weatherization** if the household qualifies as low-income (if not already done) to insulate walls and/or attic. These measures can reduce cooling load as well as heating load!
- ✓ **Close drapes on sunny days in summer.**
- ✓ **Set air conditioning thermostat no lower than 78 degrees in summer.**
- ✓ **Keep windows and doors closed while an air conditioner is running.**

XII: TOUR OF THE HOME: ELECTRIC SPACE HEATERS

Investigate all electric space heater use. Because the heaters are often small in size, households may believe that they are inexpensive to use. In fact, electric space heaters can add significantly to a household energy bill. If you have completed an analysis of the household electric use, you may be able to identify the winter “spike” in usage created by the space heaters; share this information with the household.

In some cases households resort to the use of electric space heaters because they are in debt to their fuel supplier, who may refuse to make a delivery. If you suspect this to be the case, be sure to counsel the household on the high cost of electric heat. Make sure that they are aware of assistance that may be available to them through HEAP and Emergency HEAP.

If the electric space heaters will continue to be used, review safety considerations: are the heaters positioned an appropriate distance from drapes, bedding and other flammable materials? Check the power cords for fraying and splitting.

If program measures such as insulation, air sealing or distribution repairs may have an impact on the electric space heater use, be sure that the high cost of electric space heat is taken into considerations when prioritizing measures. Look for alternatives that may keep an area warm without electric space heat.

Household energy actions related to electric space heater use:

- ✓ **Eliminate electric space heaters.**
- ✓ **Repairs or enhance the main heating system distribution system.**
- ✓ **Add rugs or wear warmer clothes.**

XIII. TOUR OF THE HOME: WINDOWS AND DOORS

Household energy actions related to windows:

- ✓ **Make sure all windows and storms are closed tightly in the winter.** Check a few while you are there, and show the household how best to close them up.
- ✓ **Repair broken windows.**
- ✓ **Use rope-caulk to seal cracks.** This action is especially useful to renters. Bring some along with you, and demonstrate its use.
- ✓ **Moving furniture away from drafty windows.**
- ✓ **Open south-facing drapes during the day.**
- ✓ **Close all drapes at night to keep the heat in.**
- ✓ **Remove or cover window air conditioners during the heating season.**
- ✓ **Use Plastic over windows in winter:** Plastic is as good as glass in reducing heat loss. Actually, the material doesn't matter here—it is the additional surfaces that create the insulation. Even thin plastic over the inside of the windows is as good as thick glass in saving energy. Plastic on the inside is as effective as on the outside, and lasts longer.

A note on replacement windows: Replacement windows often have a longer payback than other common energy efficiency measures. Be sure to guide your clients toward the program measures that are most cost-effective. If a household is in need of new windows, programs such as Assisted Home Performance with ENERGY STAR can provide a comprehensive home assessment to help prioritize the improvements. Financing may be available.

Household energy actions related to doors:

- ✓ **Door sweeps:** A “draft dodger” at the bottom of the door can be helpful, but a permanent door sweep is more effective.
- ✓ **Door weather-stripping:** Samples of quality material can help.

XIV. TOUR OF THE HOME: APPLIANCES

As you tour the home, explore appliance use. While you follow program guidelines for energy measures related to appliances, identify the high use appliances in the home, and look for household strategies for energy savings.

Household energy actions related to appliances:

- ✓ **Turn off the computer when not in use.** There is a common misconception that turning the computer on and off will damage the hard drive or cause data loss. Households also find it convenient to leave a computer running due to the long startup process. However, leaving a computer turned on over long periods of time can be costly—even in sleep mode.
- ✓ **Operate dishwasher only when full, and use the “no-heat” or “air-dry” settings.** Using a dishwasher once a day rather than washing dishes in the sink multiple times can actually save energy. However, many dishwashers have a heater for drying the dishes. This is typically unnecessary; households can save money by letting the dishes air dry.
- ✓ **If the TV is on for background noise, use a radio instead.** Keep in mind too that the new big-screen TV’s use about twice the energy of the older ones!
- ✓ **If the TV is running all night long, install an inexpensive timer to shut it off when everyone is asleep.** (Newer TV’s often have a timer feature for this.)
- ✓ **Use a microwave instead of a stove-top or oven to heat food.**
- ✓ **Keep the heated waterbed mattress covered.** First offer to replace the heated mattress with a conventional one sized to fit the waterbed frame. If the household insists on keeping it, encourage them to keep it covered.
- ✓ **If a swimming pool pump is in use, put it on a timer and run fewer hours.**
- ✓ **When replacing old appliances, choose an ENERGY STAR model.** These use up to 50% less energy than comparable appliances.

- ✓ **Use power strips to turn off all electronics on a computer or home entertainment setup.** Many of these appliances use electricity when plugged in but turned off. A power strip can eliminate this “phantom load”.

Become familiar with the energy costs of appliances. Tools such as the Energy Wheel, energy usage worksheets used in EmPower and other data can be useful to quantify savings. Study this information.

Again, have the household write down energy actions they will consider.

Presenting Energy Savings: Putting the savings in terms of one year or 10 year savings can send a stronger message than daily or monthly savings. For example, you can say that on average a waterbed costs **53 cents** a day (at \$0.13 cents a kWh). Or instead you can suggest that ten years of using a waterbed can cost the household **\$1,950**. Invite the household to consider all of the other household needs that they could spend this money on.

XV. LIGHTING

1. If the household has purchased or received CFLs, but has not installed them, be sure to do so during the audit.
2. When installing LEDs, choose good locations, and be sure to share your reasoning with the household. They may purchase additional bulbs in the future, so it helps to teach them how and where to install them:
 - ❖ Install the LEDs where the lights are most frequently used.
 - ❖ CAUTION: Do not install the LEDs on circuits with dimmer switches, and caution the household not to do so.
 - ❖ If the household members are renters, remind them that the LEDs are for their benefit, and encourage them to take them away to their next apartment.
 - ❖ Some manufacturers have created LEDs that are very small but provide the same luminescence of the larger ones. Keep a supply of these with you for use in small fixtures.
3. **A HELPFUL FORMULA FOR ESTIMATING LIGHTING SAVINGS:** In all lighting change outs it is helpful to provide the household with an estimate of the savings created by the replacement. The formula for doing so goes like this:

(WATTAGE OF OLD BULBS) - (WATTAGE OF NEW BULBS) x
10,000 hours (average life of high efficiency bulbs) x
.001 (conversion of Watts to KWH) x
(current cost per kWh for electricity excluding the Service Charge.)

Since 10,000 (hours) X .001 (conversion to kWh) = 10, this formula can be simplified to:

(Old Wattage) - (New Wattage) x (Utility Factor: utility kWh unit cost times 10)

A quick way, then, to provide the household with an estimate of savings is to subtract the post-wattage from the pre-wattage and multiply it by the household's Utility Factor.

Below are Utility Factors developed for New York State. Source of utility kWh costs: NY Public Service Commission, 2010. Numbers based on average of the two periods. Keep in mind that these numbers are subject to change.

Utility Factors (Utility kWh cost times 10):

Central Hudson G&E:	1.4
ConEd:	1.6
NYSEG:	1.0
National Grid:	1.4
O&R:	2.0
RG&E:	1.1

For example: if a 75 Watt bulb is replaced by a 23 Watt bulb in a NYSEG household:

$$(75-23) \times 1.0 = \$52.00 = \text{savings over the life of the bulb.}$$

Household energy actions related to lighting:

- ✓ **Turning off lights that are left on.** Some households have been successful in getting their kids to turn off lights left on by a reward system, rather than nagging. “If I go in your room 3 times this month when you are out and the light is off, I will treat you to _____.” The household can fill in the blank.
- ✓ **Downsize lighting.** Are there situations where there are more bulbs in use than are needed? Can fewer bulbs provide sufficient light?
- ✓ **Task lighting.** Look for places where a higher wattage overhead light can be replaced by a lower wattage light, such as a desk lamp, closer to the task being done.
- ✓ **Motion sensors for outdoor lighting.** These are inexpensive to buy, but may require an electrician to do the installation.
- ✓ **Install a night light if lights are left on all night.** Install it for them if this is an acceptable program measure. Calculating the savings with the above formula.
- ✓ **Discontinue the use of halogen torchieres. These lights are costly to use and have been known to cause fires.** If your program allows for replacement with fluorescent models, do so for the household.

XVI. REFRIGERATORS AND FREEZERS

1. If you are metering these appliances, it is important to let the meter run for as long as possible. If so, it makes sense to leave these appliances for last. As you evaluate them, be sure to include the household in the discussion, and communicate clearly regarding the options under consideration:
 - a. Be sure to explain that appliances are replaced in EXCHANGE for the old appliances—the household must be willing to give up the old unit.
 - b. When evaluating these appliances, take note of their location. Are they directly in the path of a heating vent? Is the freezer kept on a hot sun porch? Moving these appliances may increase their efficiency. On the other hand, if a fridge or freezer is kept in an unconditioned area, such as a garage, the energy use is likely to be very low; the unit should not be considered for replacement.
 - c. Be sure to measure the space available and ensure that the proposed model will fit before recommending an installation.
 - d. Discuss the proposed model with the household and make sure that they agree to the size to be installed.

Household energy actions related to refrigerators and freezers:

- ✓ **Unplugging a second refrigerator or freezer:** This is a simple, no cost option, and should be encouraged prior to offering an exchange. If the household uses the second appliance during a certain time of the year (for example, immediately after Thanksgiving) suggest that they unplug the appliance for part of the year, and use it only when they need it.
- ✓ **Adjust freezer temperatures:** Check the thermometer that you placed in the freezer: if the temperature is set below zero, adjust it upward to 0 degrees Fahrenheit or slightly higher. (The refrigerator setting should be between 35 and 38 degrees.)
- ✓ **Turn off anti-sweat switch:** Some refrigerators have a small heater to reduce humidity on the front surface. In New York State this is often unnecessary. Show the household how to turn this switch off.
- ✓ **Clean dirty coils:** If the cooling coils are dirty, the household may benefit from cleaning them—especially if they have pets that shed hair. Encourage the household to clean them while you are there, and to check and clean them periodically.

- ✓ **Keep freezer full** (plastic milk jugs full of water).

XVII. ENERGY EDUCATION WRAP UP

1. **Review and Reinforce:** Review with the household member the measures that you together have identified in the home as potential energy savers. Reinforce the concept of focusing on the big savers.
2. **Assure all concerns and questions have been dealt with:** Review the original list of household concerns and questions, and any issues raised during the audit. Make sure that they have all been dealt with, and ask if the household member has any other questions.
3. **Complete the Action Plan:** Invite them to choose 3 to 5 actions from the notes on their clipboard or from suggestions in this guide that will help them reduce energy and write them down in their Action Plan, located on the Certificate of Completion.

NOTE: The household member should write down the actions, not the auditor.

4. **Be supportive:** Be supportive of their choices. Identify and write down the consequences of their actions. Be as specific as you can.
5. **Explain the next steps:** Explain what follow-through actions you will take through your program. Do not promise any measures—work through the audit and consult with program staff as needed first. If you have made any promises to follow-up with information, etc., be sure to do so.
6. **Leave your contact information:** Be sure to leave the household with your contact information and any appropriate referral information.
7. **Say “Thanks!” and pitch environmental value:** Thank the household for their time and support the good work done today by all of you! Now’s also a good time to pitch for the environmental values of what you are doing. For example: “If everyone in the country installs one high-efficiency light bulb it will eliminate the need for one new power plant.”
8. **Don’t forget anything:** Make sure that all of your audit paperwork is completed. Check to make sure that all appliances and breakers are back on and that you have all of your tools and thermometers before you go!
9. **Reflect:** After you leave, spend a few minutes reflecting on the process. What worked? What didn’t work? If there were concepts you had difficulty

understanding make a note to learn more about the issue. Discuss any concerns with program staff—they are there to help.

Energy education is like other professions: an ongoing active developing skill. Start by building a strong knowledge base and then adding to your abilities and skills as you go along. Always remember to have fun!

XVIII. COMPILED LIST OF HOUSEHOLD ENERGY ACTIONS

Household energy actions related to the thermostat:

- ✓ **Set the thermostat no higher than 68 degrees** when home and awake.
- ✓ **Turn down the thermostat at night** while sleeping. Put extra blankets on the bed if needed.
- ✓ **Turn down the thermostat when out of the house** for more than 4 hours.
- ✓ **Install a programmable setback thermostat.**
- ✓ **Wear comfortable layers of clothes instead of turning up the thermostat.**
- ✓ **Add rugs to areas with cold floors** in order to increase comfort without turning up the thermostat.
- ✓ **Apply for Weatherization** if household is determined to be low-income, or other helpful programs, if not already participating. Reassure the household that there is no cost to them.

Households energy actions related to water use:

- ✓ **Set water temperature to approximately 120 degrees.**
- ✓ **Take shorter showers.** If the kids are the culprits here, rewards for shorter showers can have an impact!
- ✓ **Rinse dishes in cold water in a pan, not under running water.**
- ✓ **Repair leaky hot water faucets (if not a program measure).** Repair to cold faucets can also help by reducing a household's water bills.
- ✓ **Install high efficiency showerheads (if not program measures.)**
- ✓ **Wrap electric hot water heaters in unconditioned spaces** (if not a program measure).
- ✓ **Insulate 3 feet of input ("cold") pipe leading into hot water heater, and 6 feet of output ("hot") pipe** (if not a program measure). Heat in the

tank sometime siphons out of the tank into the input pipe as well as the cold pipe.

Household energy actions related to these appliances:

- ✓ **Repair the discharge hose on a sump pump.**
- ✓ **Repair a well pump.**
- ✓ **Explore ways to solve moisture problems** that create the need for dehumidifiers, such as gutter repairs, bathroom vent use or repairs, or plastic over dirt in crawlspaces.

Household energy actions related to cooling:

- ✓ **Use fans instead of air conditioners.**
- ✓ **Apply for Weatherization** if the household qualifies as low-income (if not already done) to insulate walls and/or attic. These measures can reduce cooling load as well as heating load!
- ✓ **Close drapes on sunny days in summer.**
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- ✓ **Keep windows and doors closed while an air conditioner is running.**

Household energy actions related to electric space heater use:

- ✓ **Eliminate electric space heaters.**
- ✓ **Repairs or enhance the main heating system distribution system.**
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Household energy actions related to windows:

- ✓ **Make sure all windows and storms are closed tightly in the winter.** Check a few while you are there, and show the household how best to close them up.
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