

Home Performance with ENERGY STAR[®]

Sponsor Guide



Version 1.0
September 2008

Table of Contents

| | |
|--|----|
| Acknowledgements | 4 |
| Introduction | 5 |
| EPA and DOE Support | 7 |
| Acronyms and Abbreviations | 8 |
| Section 1: Program Planning | 9 |
| 1.1. Introduction | 9 |
| 1.2. Required and Recommended Elements | 9 |
| 1.2.1 Program Design | 12 |
| 1.2.2 Program Evaluation | 15 |
| Section 2: Home Performance Assessment (HPA) | 15 |
| 2.1. Introduction | 15 |
| 2.2. Required and Recommended Elements | 16 |
| 2.3. Estimating Energy Savings | 23 |
| 2.4. Example HPA Intake Form Template | 24 |
| 2.5. Example Homeowner Summary Report | 26 |
| Section 3: Post-installation Test or “Test-out” Protocols | 28 |
| 3.1. Introduction | 28 |
| 3.2. Required and Recommended Elements | 28 |
| Section 4: HPwES Summary Certificate | 31 |
| 4.1. Introduction | 31 |
| 4.2. Required and Recommended Elements | 31 |
| 4.3. Example Certificate | 32 |
| Section 5: Quality Assurance Protocols | 33 |
| 5.1. Introduction | 33 |
| 5.2. Required and Recommended Elements | 33 |
| 5.2.1 Job Reporting Review | 33 |
| 5.2.2 On-site Inspection Protocols | 34 |
| 5.2.3 Customer Feedback | 37 |
| 5.2.4 Contractor Feedback and Corrective Actions | 38 |
| 5.3. Example Job Report Review Evaluation | 39 |
| 5.4. Example On-site Inspection Scoring Methodology | 40 |
| 5.5. Example Contractor Feedback and Corrective Action Levels | 42 |
| Appendix A | |
| HPwES Partnership Agreement | |
| Appendix B | |
| HPwES Program Plan Outline | |

Acknowledgements

The Home Performance with ENERGY STAR Sponsor Guide would not be possible without the input of EPA and DOE's partners in the industry. This group includes the Home Performance with ENERGY STAR sponsor partners and stakeholders listed below. These individuals contributed their time and expertise to review and provide comments, which was invaluable to the creation of this Guide.

Technical Reviewers

Steve Baden, Residential Energy Services Network
Andrew Fisk, New York State Energy Research and Development Authority
Jim Fitzgerald, Conservation Services Group
Asa Foss, SENTECH
Jerry Hannah, National Grid
Sue Hanson, Wisconsin Energy Conservation Corporation
Bruce Harley, Conservation Services Group
John Jones, New York State Energy Research and Development Authority
Pat Justis, Missouri Department of Natural Resources
Joe Kuonen, Building Performance Institute
Emily Levin, Efficiency Vermont
Michael L'Ecuyer, ICF International
Jim Maletta, North Star Energy Consulting
Marc Milin, ICF International
Paul Norton, National Renewable Energy Laboratory
Bob O'Brien, National Grid
William J. Parlapiano III, BP Consulting
Bob Pfeiffer, Wisconsin Energy Conservation Corporation
Patricia Plympton, Navigant Consulting
Ed Schmidt, Northeast Energy Efficiency Partnerships, Inc.
Greg Thomas, Performance Systems Development
David Weitz, Conservation Services Group
Larry Zarker, Building Performance Institute
Bill Zwack, SENTECH

Introduction

Home Performance with ENERGY STAR (HPwES) offers whole-house solutions to increasing the energy performance and comfort of existing homes while improving the environment. The program is delivered by local Program Sponsors that recruit and train home improvement contractors and consultants (here after referred to as “contractor”) who are qualified to perform home performance assessments (also called comprehensive home energy audit). The assessment includes the heating and cooling systems, windows, insulation, flow of air into and out of the house, as well as a safety check of combustion appliances. Based on this assessment, participating contractors offer solutions to solve home comfort problems and reduce energy usage while decreasing the carbon footprint of the home. Another important element of HPwES is that, upon project completion, the contractor assesses the home’s performance again to document that specified improvements were properly installed to achieve the promised energy savings. Finally, all participating contractors are subject to quality assurance (QA) reviews by the third-party sponsor to ensure that projects meet program standards and homeowners receive high-quality work. The goal of HPwES is to turn building science based recommendations into improved homes.

The first step of starting a HPwES program is to develop an implementation plan that explains the scope and objectives of the program. The implementation plan includes the policies and procedures that will ensure the success of the local program and compliance with National ENERGY STAR requirements. This Guide was developed to provide guidance on the development of an implementation plan. It is organized into five sections, each of which addresses a key step in the delivery of HPwES to the market.

Each Section of this Guide covers the following topics:

- **Introduction** with a general overview of the topic.
- **Required and recommended elements** that highlight key elements that a sponsor will address and those that are optional.
- **Examples or templates** that provide a visual illustration of required or recommended elements. These examples and templates are available for Program Sponsor use and customization by request.

This Guide is not meant to be a ‘one-size-fits-all’ manual for developing a successful HPwES Program, as regional factors and organizational preferences are important and vary. This Guide does provide perspective on the major components of program design and delivery that are required and those that are recommended for local sponsors to implement.

This Guide covers the following topics:

1. *Program Planning* - Provides general guidance to develop a HPwES Program Plan. Each plan will be different, but the planning process includes common elements every program must consider.
2. *Home Performance Assessment (HPA) or “Test-in”* - Defines the minimum requirements and recommendations for assessing a home’s energy performance under the HPwES program. The local HPwES program can either meet or exceed National HPwES requirements.
 - a. *HPA Intake Form* – a template to facilitate the delivery of an HPA and can be used by Program Sponsors as a template / tool to provide to their participating contractors.
 - b. *Homeowner HPA Summary Report Form* – an example of how to summarize HPA information and recommendations for the customer in an easily understandable and compelling manner that could assist the participating contractor sell energy improvements. The Homeowner Summary Report can also be used to report information to the Program Sponsor for QA tracking.
 - c. *Estimating Energy Savings (under development)*.
3. *Post-Installation Tests or “Test-out”* – Defines the minimum level of diagnostic and visual inspections to be completed by participating contractors at the conclusion of a job.

- a. *Test-out Report Form* – a form for the test-out data and installed measures which is provided to the local Program Sponsor for QA tracking.
4. *HPwES Summary Certificate* – recommendations on issuing a summary certificate that lists the work completed and organizations involved. This certificate is presented to the homeowner by the local program sponsor after receipt of the Test-out Report Form and completion of the QA review process. This guidance explains the required and optional elements that a Program Sponsors can adopt.
 - a. *HPwES Certificate Template* – an example template that Program Sponsors can customize for their use.
5. *Quality Assurance Protocols* – defines the minimum requirements for program QA that applies to participating contractors.
 - a. *Job Reporting Review* – defines requirements and provides recommendations for developing program policies and procedures to perform QA reviews. The job reporting review focuses on the Homeowner HPA Summary and Test-out Reports, and the contracted scope of work. It provides guidance on what to look for in the paperwork review process and next steps to follow if issues with paperwork indicate further investigation is warranted.
 - b. *On-site Inspection Protocols* – defines requirements and provides recommendations for developing program policies and procedures for performing on-site inspections on participating contractors' completed jobs. Provides guidance on the on-site inspection process, sampling rates, and a contractor performance scoring methodology.
 - c. *Customer Feedback* – defines and provides guidance on meeting the requirement of obtaining customer feedback on participating contractor's work completed through the development and use of customer surveys.
 - d. *Contractor Feedback and Corrective Action* – provides recommendations for how to provide feedback to participating contractors on the results of a QA review (including paperwork, on-site, and customer survey). This guidance provides recommended corrective action levels and contractor de-listing procedures.

EPA and DOE Support

At the National level, EPA and DOE offer a variety of tools for program development and design, recruiting contractors, marketing to homeowners, and sales training for contractor participants. These tools are offered free-of-charge to Program Sponsors and discussed further below:

Consumer-recognized brand

Program Sponsors can download and use this logo in promotional materials, including Web sites and advertisements.



Program start-up assistance

EPA and DOE provide assistance to sponsors and utilities interested in exploring and planning a HPwES Program.

Program Development Fact Sheets

Program Sponsors can download program development fact sheets covering key program elements including contractor recruiting, contractor and consultant business models and quality assurance.

Home Energy Yardstick

Program Sponsors can host ENERGY STAR's Home Energy Yardstick on their web site to help homeowners take the first step toward HPwES. The Yardstick can be a great screening tool to determine how serious a homeowner may be regarding improving the performance of their home.

Utility Bill Disaggregating Tool

Program Sponsors can provide this tool to their contractors to disaggregate utility bills of their prospective customers to better determine how energy is used in their homes.

Best Practices for Implementing a HPwES Program

This Guide is a starting point for program planners to develop an implementation plan. Each section highlights important considerations and options for the development of a HPwES implementation plan.

Contractor Business Development Guide

This special edition of Home Energy Magazine includes several contractor business success stories that can help Program Sponsors educate contractors about the whole-house contracting business model.

Sales training for contractors (half-day)

Since home performance contracting is significantly different than other home improvement services due to its comprehensive nature, program sponsors recognize that participating contractors are more successful if they educate their homeowners and change their sales tactics accordingly. This training focuses on teaching in-office and in-home strategies to help participating contractors educate homeowners on the benefits and therefore sell comprehensive home performance improvements.

Marketing Toolkit

This online tool allows sponsors and participating contractors to create customized marketing materials, such as ads, fact sheets, and direct mail pieces, to promote HPwES.

Consumer Brochure

Program Sponsors and participating contractors can use this brochure to educate homeowners about the benefits of HPwES.

Case-by-case program development support

Program Sponsors may request additional support from EPA and DOE beyond what is listed above.

Acronyms and Abbreviations

ACCA – Air Conditioning Contractors of America

AFUE – Annual Fuel Utilization Efficiency

ANSI - American National Standards Institute

ARI – Air Conditioning and Refrigeration Institute

ASHRAE - American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.

ASTM – American Society for Testing and Materials

BPI - Building Performance Institute

CAZ – Combustion Appliance Zone

CFL – Compact Fluorescent Lamp

CO – Carbon Monoxide

DOE – Department of Energy

DHW - Domestic Hot Water

EER – Energy Efficiency Ratio

EF – Energy Factor

EPA – Environmental Protection Agency

GAMA – Gas Appliance Manufacturers Association

HPA - Home Performance Assessment

HPwES - Home Performance with ENERGY STAR

HVAC - Heating, Ventilation, and Air Conditioning

NFPA – National Fire Protection Association

SEER – Seasonal Energy Efficiency Ratio

SSE – Steady State Efficiency

QA – Quality Assurance

Section 1: Program Planning

1.1. Introduction

One of the best ways to start a Home Performance with ENERGY STAR (HPwES) program is to begin with setting goals for your program to achieve, assessing the barriers that inhibit energy efficiency retrofits in your chosen target market and preparing a plan to overcome those barriers. Some prospective program sponsors have requested a template for a HPwES program plan, but every market is different and will need a plan tailored to the specific market conditions. This section highlights the key ingredients needed to develop a HPwES Program Plan. For a simplified outline of suggested sections to include in your plan, please refer to *HPwES Program Plan Outline* in Appendix B.

1.2. Required and Recommended Elements

Organization Background

A HPwES Sponsor is responsible for overseeing the program's implementation and work completed by participating home performance contractors. Typical sponsor organizations include utilities, state energy agencies, municipalities or non-profit organizations that promote energy efficiency. These organizations commit to providing third-party oversight of improvements completed by participating home performance contractors, protecting the ENERGY STAR brand, and serving the public's interest. The Sponsor organization funds the program, but may decide to contract with other organizations (i.e. program implementation contractor) to assist with planning and day-to-day implementation of the program. A Program Sponsor is responsible for:

- Developing the program standards, policies and procedures,
- Submitting a Program Plan and signing the HPwES Partnership Agreement (Appendix A)
- Recruiting contractors to participate,
- Marketing the benefits of the program to homeowners,
- Verifying that work completed under the program meets program standards (i.e. quality assurance),
- Monitoring contractor use of Home Performance with ENERGY STAR logo, and
- Evaluating program success

The Program Plan will identify the sponsoring organization and describe the relationship with other organizations that may assist with program implementation.

Some Program Sponsors have created an advisory board that includes key stakeholders, to provide guidance in developing the program's design. The group, typically 8-12 people, may include building science experts, technical educators, contractors, HVAC distributor or building supply representatives, and city, state or utility officials. This group can be an important bridge of communication to several constituencies.

Goals and Objectives

Designing a HPwES program starts with defining the goals and objectives the Program Sponsor want to achieve. Achieving energy savings from home retrofits tends to be the primary goal driving Sponsor interest in HPwES. How much energy, and how soon it needs to be achieved will be key questions that will direct your program design. Once you can establish how much energy you plan to save you can break it down into more discreet objectives such as how many homes will need to be improved? What type of improvements will achieve these results; and how many contractors will be needed?

Table 1 shows the potential per home energy savings for different regions of the country. You will want to conduct your own analysis to determine what is possible in your market.

| | Census Region | | | |
|----------------------|--|---------|--------|------|
| | Northeast | Midwest | South | West |
| Electricity (kWh) | 1400 | 1700 | 4600 | 1400 |
| Natural Gas (Therms) | 400 | 400 | 200 | 200 |
| | Summer | | Winter | |
| Peak Demand (kW) | 1.6 | | 0.9 | |
| Typical Improvements | Increase attic insulation; insulating crawl spaces or rim joists; duct sealing, repair and insulation; air sealing; and installing programmable thermostat, energy-efficient heat pump, air conditioner, furnace, boiler, lighting or windows. | | | |

Target Market

Every market has different challenges and opportunities that will shape the program design and implementation strategy. An evaluation of local market conditions can provide useful background information. This information may include:

- Local energy issues, such as projected cost of energy, utility deregulation activities, air pollution and energy delivery and supply capacity;
- Population and housing stock demographics, including predominant age and style of homes, average homeowner income, average homeowner buying habits, average energy consumption and cost-effective energy improvements;
- Local contractor environment, including number of contractors skilled in residential energy assessment, local licensing requirements, and contractor training and education opportunities.

After evaluating the market conditions, consider selecting one pilot location for the initial launch of the program. Pilots typically set a goal to improve 50-100 homes. Selecting a pilot location to launch the program can help focus available resources, allow for testing of ideas and refining the program's design and delivery, and increase the overall likelihood of program success. Once the program has demonstrated success in the pilot phase, consider how to increase the scale of the program and expand to additional markets.

Implementation Schedule

An implementation schedule is a useful tool for a program sponsor to prioritize activities, and assist in planning and implementing a program. The schedule identifies, for all stakeholders, the key tasks and when they must begin and be completed.

Table 2 shows an example schedule for implementing a HPwES program.

| Table 2 -- Example Implementation Schedule | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------|---|---|---|---|---|---|---|---|----|----|----|--------------------|---|---|---|---|---|---|---|---|----|----|----|----------|--|--|
| Activity | Months in Year One | | | | | | | | | | | | Months in Year Two | | | | | | | | | | | | Years 3+ | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 - 12 | | |
| Notify ENERGY STAR of intent | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Establish advisory board | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Establish goals and objectives | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Perform market assessment | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Review draft plans with ENERGY STAR | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Select pilot/expansion markets(s) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Select program design | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Define home performance delivery | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Develop contractor recruitment Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Develop results tracking system | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Develop Marketing Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Develop incentive/financing Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Develop quality assurance Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Identify/Develop Training | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Prepare implementation Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Send Plan to ENERGY STAR | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Identify/recruit contractors | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Train/equip contractors | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Launch marketing campaign | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Implement quality assurance protocols | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Implement results tracking | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Explore program expansion | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Estimated Budget

Sponsoring a HPwES program is a significant commitment and requires a long-term investment of substantial financial resources and time. Therefore, organizations should consider the costs before making a commitment to sponsor a program. A budget will help Program Sponsors estimate what a program will cost and how to prioritize activities based on goals and available resources.

Table 3 shows an example budget. Actual costs will vary depending on the size and scope of the program, goals and geographic range.

| Budget Category | Pilot Phase | Year1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---------------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Management | \$156,000 | \$160,000 | \$225,000 | \$242,000 | \$259,000 | \$276,000 |
| Program Development | \$52,000 | \$53,000 | | | | |
| Contractor Recruitment | \$65,000 | \$323,000 | \$323,000 | \$323,000 | \$323,000 | \$323,000 |
| Training/Certification | \$29,000 | \$59,000 | \$88,000 | \$88,000 | \$88,000 | \$34,000 |
| Mentoring | \$13,000 | \$25,000 | \$38,000 | \$38,000 | \$38,000 | \$14,000 |
| Marketing | \$78,000 | \$191,000 | \$305,000 | \$467,000 | \$627,000 | \$770,000 |
| Contractor Job Incentives | | \$39,000 | \$117,000 | \$234,000 | \$351,000 | \$468,000 |
| Homeowner Incentives | | \$216,000 | \$647,000 | \$1,295,000 | \$1,942,000 | \$2,589,000 |
| Infield Inspections (QA) | | \$18,000 | \$40,000 | \$68,000 | \$83,000 | \$98,000 |
| Evaluation | \$25,000 | \$40,000 | \$40,000 | \$40,000 | \$40,000 | \$40,000 |
| Total | \$418,000 | \$1,124,000 | \$1,823,000 | \$2,795,000 | \$3,751,000 | \$4,612,000 |
| Contractor Goal | 10 | 31 | 63 | 94 | 125 | 136 |
| Job Goal | 0 | 250 | 750 | 1500 | 2250 | 3000 |

*Pilot Phase is typically 6 months to 1 year focused on contractor infrastructure building

1.2.1 Program Design

The design of every HPwES program will be slightly different, but all programs must meet the requirements of the Partnership Agreement (See Appendix A).

Some common program design elements include:

- Home Performance Protocols
- Contractor Recruitment Plan
- Contractor Training
- Contractor Participation Requirements
- Marketing/Media Plan
- Incentive/Financing Plan
- Quality Assurance Plan

Home Performance Protocols

The Program Plan describes how HPwES will be delivered to homeowners. It explains how contractors deliver a Home Performance Assessment (also called a comprehensive energy audit), and summary report; follow best practice work standards and post-installation tests after work is completed. (See Section 2 and 3 for guidance on defining these protocols.

If HPwES will be delivered as a second tier of an existing rebate or audit program or as a replacement of a previous program, provide details on how the integration or transition will occur.

Contractor Recruitment Plan

A common market barrier to improving home energy performance is a limited supply of qualified home performance contractors. Even if homeowners get recommendations from an energy audit to improve their home, they typically don't know who is qualified to make the improvements. Developing a strong network of professionals, skilled in whole-house assessment, diagnostic testing, and installation best practices, is essential to a successful HPwES program.

Successful Program Sponsors have developed a contractor recruitment strategy that identifies and recruits highly motivated and successful contractors to participate in the program. Activities may include speaking at NARI or ACCA Chapter meetings, cold calling reputable contractors, or hosting a *Profit from Home Performance* workshop to introduce the business opportunity. Networking with utility, state, municipal, distributor, and contractor stakeholders can help identify and recruit likely candidates.

Some Program Sponsors offer contractors incentives to participate such as discounts on training or financing to purchase equipment. Subsidizing training, certification, or equipment will encourage contractor participation, but should be contingent on completing specific milestones, such as passing certification tests and reporting test-out information (for completed home improvement projects). Another idea is to provide incentives for completed jobs to encourage quality assurance reporting. However, the incentives needs to be big enough to get a contractor's attention (\$100-\$300) and will not always work. Sometimes a tiered incentive or caps may be appropriate so all contractors are motivated and not just one large contractor. In some markets these incentives may not be necessary to spur contractor participation and interest in the program. Program Sponsors should evaluate their market and survey contractors before designing their incentive offerings.

Contractor Training

Contractor training that describes the principals of building science, how to perform energy assessments, elements of a successful home performance contracting work practice and effective sales techniques will all help to build and support an infrastructure of qualified contractors. Program Sponsors need not spend resources developing training, since many local, regional and national organizations already offer training for weatherization or home energy ratings.

Mentoring contractors on-the-job through the home performance assessment, home improvements and test-out has become a common and valuable addition to training. Mentoring reinforces training, helps to verify the contractor is proficient and provides an opportunity to suggest ways to streamline the process to make quality assurance inspections efficient and productive. Mentoring is recommended on at least 3 of the first 5 home performance jobs a contractor completes.

Sharing training and mentoring costs with participating contractors is recommended. Sponsors who offer free training do not help to establish a sustainable training infrastructure. Instead, they reinforce a belief that training is not a necessary business expense and set an expectation that will be difficult to change in the future.

Some program sponsors may decide to sub-contract training, mentoring, and quality assurance services. This is common, but program sponsors are well served to try to avoid situations where quality assurance activities are performed by the same person that delivers training and mentoring.

Because some contractors have high employee turnover rates, contractors will need to be re-trained periodically and successful program sponsors provide refresher courses. A continuing education requirement is one way to reinforce training as a business expense.

Contractor Participation Requirements

Participation in the program provides benefits and privileges to contractors, and requires a commitment from the contractor to follow program requirements. In order to maintain a good relationship with participating contractors, the expectations of both parties must be documented in a voluntary participation agreement. This agreement will specify the contractor's commitment to follow program requirements as well as the sponsor's obligations to the participating contractors.

We recommend that the contractor participation agreement be renewed annually to confirm the contractor's commitment and document any program changes and include the following commitments:

- *Comply with local business license requirements;*
- *Covered by general liability and workers compensation insurance;*
- *Follow program specified homeowner complaint/dispute resolution procedures;*
- *Follow program specified whole-house assessment process and provide homeowner with a summary report;*
- *Propose home improvements that will result in a savings of 20% of total energy use;*
- *Follow program specified standards for all work performed;*
- *Follow program quality assurance procedures;*
- *Train staff to respond to customer inquiries about Home Performance with ENERGY STAR;*
- *Follow Home Performance with ENERGY STAR's logo use guidelines; and*
- *Complete and report a minimum number of jobs annually to continue partnership.*

Marketing/Media Plan

Although many homeowners have heard of ENERGY STAR, most have not heard about Home Performance with ENERGY STAR. Program Sponsors play a very important role in educating consumers about the process and benefits of HPwES. The Program Sponsor's public reputation and credibility are very valuable in persuading homeowners to consider making whole-house energy efficiency improvements.

A marketing and media plan that explains how the Program Sponsor will promote the program to local homeowners is essential. Even though contractors are responsible for marketing their company and selling renovations, a program sponsor should promote the program and the value of a whole-house approach using a variety of tactics including: advertising, public relations campaigns, bill inserts, Web sites, media interviews, and special promotional events. The plan should include specific examples of how HPwES will be used in sales and marketing materials and web sites.

ENERGY STAR provides marketing materials such as brochures and a marketing toolkit to help program sponsors and participating contractors educate homeowners about Home Performance with ENERGY STAR.

An Energy Makeover Contest is a new and creative way to promote energy efficiency. Contest organizers award a major energy efficiency retrofit to the winning contest participant in a highly visible demonstration. The home, chosen for its inefficiency, produces dramatic energy savings. Because the Energy Makeover Contest can be designed to specifically attract consumers to a whole-house approach, it is a promising promotional tool for existing Home Performance with ENERGY STAR programs. The contest also can be used as a tool to launch a Home Performance with ENERGY STAR program.

Incentive/Financing Plan

Because home performance projects typically include comprehensive renovations, costs frequently rise above the level that homeowners are able to pay out-of-pocket. To encourage homeowners to make improvements Program Sponsors may consider offering financial incentives or a financing solution with an attractive interest rate.

Three general principals are recommended for any HPwES incentive plan. First, incentives are only awarded for the completion of energy efficiency improvements recommended in a home performance assessment by a participating contractor. Second, increase the incentive amount such that comprehensive improvements are encouraged. One way to achieve this is to define categories of improvements and base the incentives on the category and number of improvements completed. Thirdly, offer incentives to both the participating contractors and the homeowners who are improving the energy performance of their homes; this facilitates participation and retention of quality contractors.

Quality Assurance Plan

Quality assurance is an essential component of Home Performance with ENERGY STAR and a program sponsor is responsible for developing and implementing a Quality Assurance Plan. Quality assurance protects homeowners by providing an independent review of the work performed by participating contractors to ensure that it meet program standards. Quality assurance also protects the reputation of the Program Sponsor.

The Program Sponsor must identify who will be responsible for quality assurance and provide clear direction on what activities they are expected to complete. (See Section 5 for guidance on developing quality assurance protocols) Protocols that need to be defined include:

- Job Reporting Review
- On-field inspection
- Customer Feedback
- Contractor Feedback and Corrective Actions

1.2.2 Program Evaluation

Program Sponsors must track the number of contractors participating, the homes improved and on-site quality assurance inspections completed. This information must be reported to EPA and DOE quarterly for the purpose of national program evaluation. In addition, Program Sponsors are encouraged to evaluate their program accomplishments annually and a complete a detailed review every three years. An electronic system for reporting and tracking program results will help streamline this process and should be developed before the program is launched.

Section 2: Home Performance Assessment (HPA)

2.1. Introduction

One of the most important and differentiating aspects of home performance contracting is the home energy audit. In order to offer the homeowner the opportunity to increase the energy performance and comfort of their home, all of the home's systems are holistically assessed to recommend improvements that work together to improve their home.

The HPA (also called Comprehensive Home Energy Audit) includes the activities (i.e. inspections, tests, etc.) that are completed to assess a homes performance, and prepare a recommended scope of work. Contractors that agree to participate in a HPwES program need to have clear direction on what services they are expected to deliver. Therefore, Program Sponsors will have policies and procedures explaining the minimum requirements of the HPA. These policies and procedures are intended to establish a

minimum level of service that can be marketed to homeowners by a broad group of stakeholders. This guidance identifies which elements of the HPA are required by the National Program and optional steps that are recommended because they represent best industry practices or help the contractor understand the homeowner's needs and motivate them to improve their home. Program Sponsors may choose to adopt additional requirements. The required elements of the HPA do not have to be completed in one home visit but must be completed prior to the commencement of home improvements. The HPA guidance below is sequenced but it is not required that contractors deliver the components of the HPA in the order provided.

2.2. Required and Recommended Elements

2.2.1 Homeowner Interview

The contractor is required to conduct an in-person interview to collect information about the home and homeowner's concerns, motivations and goals. The information gathered can vary based on climate, housing type, site layout, etc.; the objective is to begin to establish a good base of information from which to address the homeowners' concerns. Information that may be valuable includes:

- Age of home, years that family has lived there, number of occupants.
- Remodeling, additions, window replacement, bonus rooms.
- Basic information about HVAC system(s), type of fuel, age of systems (if known).
- Use of unvented fireplaces and space heaters (if used, educate homeowner on moisture, carbon monoxide and fire risks, and inform them that envelope improvement cannot be performed unless they are removed or vented with a retrofit kit, if applicable).
- Swimming pool – dates and hours/day of pump operation, heated or not, heating source(s) and location(s), ventilation strategy if indoors.
- Utility bills
- Comfort complaints (cold rooms/hot rooms, drafts, moisture and humidity).
- Ice damming, wet crawlspaces or other common climate-specific problems.

Optional Steps for the Homeowner Interview

Pre-Assessment Telephone Interview

When scheduling the HPA, some participating contractors conduct a quick telephone interview with the homeowner to collect basic information on the home and the homeowner's concerns and motivations, so as to be more prepared, focused and time efficient during the home visit. A lead screening tool is available for participating contractors to use.

Disaggregate Energy Bills and Discuss Analysis with Homeowner

If energy consumption history is available, it can be extremely valuable for the participating contractor in building an understanding of the home's energy performance and motivating the homeowner to invest in recommended measures.

By breaking down the energy use, the contractor can more effectively identify the best energy improvement plan, educate the homeowner on the benefits of core air sealing, insulation, high-efficiency HVAC, water heating, and electric base-load measures such as lighting and appliances. A utility bill disaggregation tool is available for participating contractors to use.

Quick Walk-Through with Homeowner

Conduct a walk-through with the homeowner to ascertain additional information (homeowner has opportunity to bring up any issues or concerns that s/he has with any major items in the assessment). The contractor can take this opportunity to inspect major appliances and lighting with the customer and educate them on the benefits of replacing older appliances and lighting with ENERGY STAR qualified products.

2.2.2 Building Envelope Inspection

The building envelope offers many opportunities for energy efficiency improvements. Therefore, participating contractors are required to conduct an inspection of the building envelope:

1) Collect basic information on the envelope of the home:

- Record house type, age and condition.
- Note key features of home typical of house type (porch roof, multiple roof lines, cantilevers, bay windows, dormers, kneewall attics, attic access, crawlspaces, basements, attached garages).
- Note configuration of home additions, if any.
- Sketch house floor plan with orientation and exterior measurements; calculate floor area, and volume.

Optional Step for Basic Building Envelope Inspection

Renewable Energy Opportunities

Record house orientation, observe site layout and look for opportunities for renewable energy technology (e.g., access to sunlight on south and west sides)

2) Note condition of external building envelope features (siding, trim, fascia, soffit areas, etc.):

- Look for signs of moisture or ice dam damage (if applicable) on walls and soffits that may have resulted from building performance problems.
- Check for roof moisture damage (stains, soft or rotted deck or rafters, wet or moisture-damaged insulation) from roof leaks or inadequate ventilation.
- Note any issues with shading or exposure to sun (linked to issues with hot/cold rooms and can help prioritize window-related measures).
- Note any grading features, downspout terminations, or sprinklers that may direct water towards the foundation or affect the performance of an exterior wall.

3) Envelope Thermal Characteristics

- Determine the thermal boundary of the home and identify thermal bypasses.
- Record type(s), amount and condition of insulation in all components of the thermal boundary. For guidance on default and de-rated R-values, see Building Performance Institute (BPI) Technical Standards¹.
 - Attic flats, slopes, knee walls, knee wall flats, dropped soffits, etc., as appropriate for type of home and per configuration of additions.
 - Basement and crawlspace walls or ceilings.
 - Rim joists.
 - Attic staircase walls.
- Window inspection: Note condition of windows, type, age, signs of moisture damage and air infiltration around windows.
- Door inspection: Note type and condition of all doors to exterior (including garage) – especially note if doors are un-insulated, in poor condition, or if they are leaky and in need of weather-stripping or door sweeps.

Optional Steps for Envelope Thermal Inspection

Exterior Wall Insulation Levels

An optic probe can often be used to determine wall insulation levels. It is usually inserted next to electrical outlets or behind wall hangings. This tool can also be used to inspect potential moisture problems found with an infrared camera

Window Details

Some energy savings tools in particular require some details regarding window area and orientation, framing type, number of panes and/or presence of storm windows. Otherwise, such information is most important if it is known that replacement windows are to be included in the scope of work.

4) Envelope air leakage characteristics

- Visual Inspection of attic and basement to identify paths of air leakage

¹ BPI Technical Standards are currently being modified and this Guide will be updated to reflect any revisions.

- Attic: openings in wall top plates, electrical and plumbing runs, open areas around flues and chimneys, recessed light housings, around exhaust fans, open framing cavities, dropped soffits and ceilings.
- Basement: openings around electrical and plumbing runs and around flue pipes and chimneys, accessible sill plate areas, basement windows, exterior doors, and accessible rim/band joist areas.
- Blower door test: This test is an effective way to locate air leaks and educate the customer on air leakage issues. When the recommended work scope includes air sealing, attic insulation, enclosed cavity insulation representing 15% of the total building envelope area, sealing of the ducts outside the thermal envelope, or replacing atmospherically vented combustion appliances with sealed combustion appliances, follow ASHRAE 119 standard on blower door test procedures.
 - With blower door depressurizing the home, identify major leakage areas in living area (e.g. window trim, baseboards, upper trim, cabinets, dropped soffits, pocket doors, recessed lighting, duct chases/plenums, band joists, transitions between porch roof and exterior walls, fireplaces, cantilevered floors, etc.).
 - Identify any significant misalignments of the pressure and thermal boundaries and ways to correct them.
 - Inspect walls or ceiling between an attached garage and the living space for air leakage.

Blower Door Test

Caution:
 Do NOT conduct this test if fireplace or wood stove has recently been used.
 Do NOT conduct this test if there is evidence of exposed and/or friable contaminants (asbestos, lead dust, bio-aerosols or other dangerous materials) that might become airborne or otherwise be introduced into the living space by conducting the test.

Optional Steps for Inspections during Blower Door Test

Use of Infrared Camera
Some of the more successful home performance contractors have learned that using an infrared camera during a blower door test is an effective way to identify where insulation and air sealing are needed. It is also an effective sales tool when the contractor has the customer(s) involved in the assessment. Showing the infrared images to the customer(s) and relating them to problems that were identified during the homeowner interview demonstrate expertise and builds trust, leading to higher customer motivation and stronger sales.

Zonal Pressure Differential Tests
Using the blower door and a manometer, conduct zonal pressure differential tests if needed to diagnose particular problem areas within the building (e.g., to determine how much an attic or garage is communicating with the living space compared to the outside). This test can help focus the inspection and speed up the diagnostics tests.

2.2.3 Heating, Ventilation, and Air Conditioning (HVAC) and Domestic Hot Water (DHW) Systems Visual Inspection

The HVAC and DHW systems can offer dramatic comfort and energy savings opportunities. Therefore, participating contractors will perform a basic visual inspection of the HVAC and DHW systems in the home as follows:

- 1) Determine number and type of thermostats:
 - Note number of heating and/or cooling zones.
 - Note whether thermostats are programmable or manual.
 - If programmable, check status of setback periods and, if not being used, educate homeowner on the benefits of scheduled setbacks based on their lifestyle.

2) Visually inspect heating system:

- Verify system information: age, model, heat in/out, general condition and maintenance history.
- Check for evidence of back draft/flame roll-out.
- If boiler, verify that pressure relief valve is present and not obstructed.
- If condensing unit, check the condensate line for signs of blockage or leaks.
- Check exhaust vent for proper fitting and termination.

3) Visually inspect air conditioning system:

- Verify system information: age, model, capacity (sometimes available on nameplate).
- Check condensate line(s) for blockage or leaks.
- Note any issues around compressor/fan unit in yard, such as recirculation/air flow obstruction from built features or plantings or problems with coil blockage from leaves, twigs or other debris.
- Record number of window or wall units, model and EER if available.
- Check for insulation on refrigerant line set.

4) Visually inspect distribution systems:

- Inspect air filter(s) and ask homeowner how frequently they are replaced.
- Verify presence of secondary overflow pans when air handling unit is within, above or adjacent to finished living space and verify presence of condensate drain line or float disconnect switch.
- Note the presence of any ducts or air handlers in garages (this requires a recommendation to relocate or create air-tight enclosures to isolate them from garage and prevent transportation of carbon monoxide and other fumes from the garage to the living space).
- Record insulation level of ducts in unconditioned spaces.
- Check for ductwork leaks, disconnects, crimps, signs of moisture presence, return leaks near combustion equipment, damage or other atypical conditions (inspection will include inaccessible ducts to extent possible).
- For hydronic systems, record insulation levels and note opportunity for pipe insulation if practical, especially on long pipe runs if there are comfort issues.
- For baseboard systems, check for condition and positioning of covers and for presence of dust, webs and other material on the fins.

5) Visually inspect DHW system:

- Record approximate age, model, capacity, condition.
- Check for evidence of back draft/flame roll-out.
- Verify that pressure relief valve is present and not obstructed.
- Note temperature setting on water heater. This is a good opportunity to educate homeowner on standby losses and scalding threats if it's above 120 degrees F, and reduce the setting if homeowner approves.
- Check for signs of leakage from water heater tank vessel.
- Conduct visual inspection of water heater and hot water pipes for efficiency improvements (presence or lack of insulation, convective loop, and feasibility of retrofitting insulation on tank and/or pipes).

6) Combustion appliance zone (CAZ) safety inspection:

- Make sure that there are no flammable or explosive materials near any combustion source. This is a good opportunity to recommend moving them to a safe place.

7) Living space safety inspection:

- Note number, location and operability of CO detectors and smoke detectors in living space. Codes in some jurisdictions may require them.

- Note presence of unvented gas fireplaces and propane or kerosene space heaters and discuss with and educate the homeowner – explain that envelope work cannot be performed unless they are removed or vented with a retrofit kit.

8) Inspect mechanical exhaust ventilation:

- Check whether mechanical exhaust venting systems in bathrooms and kitchen, if present, are designed, installed and terminated properly.
- If garage is attached, note whether exhaust fan is present and operable in garage.
- Note presence and operability of power attic or whole-house exhaust fans and inform homeowner of correct operation.
- Determine required ventilation rate per ASHRAE 62.2-2007 or BPI Technical Standards².

² BPI Technical Standards are currently being modified and this Guide will be updated to reflect any revisions.

Optional Steps for HVAC System Inspection

In addition to a basic visual inspection of the HVAC system, there is additional information that may be needed in order to produce energy savings estimates for replacement measures. This information can include:

Thermostat Settings:

Ask the homeowner about average thermostat settings for both summer and winter (this information can be important for analyzing energy consumption and savings).

Heating and Cooling Systems:

- 1) Review maintenance records and/or ask homeowner about frequency, type and last occurrence of maintenance.*
- 2) If the heat pump or air conditioner is more than 10 years old or the furnace or boiler is more than 15 years old consider recommending replacement with ENERGY STAR qualified equipment.*
- 3) Estimate AFUE of heating system and HSPF/SEER of heat pump/cooling system via product nameplate information, looking product up in Gas Appliance Manufacturers Association (GAMA) or Air Conditioning and Refrigeration Institute (ARI) directories, instrumented testing (see next section) or a combination thereof. Having a good understanding of operating efficiency helps the contractor produce a more accurate estimation of energy savings. Some energy modeling software will require a good estimate of AFUE, HSPF and SEER in order to predict accurate energy savings.*
- 4) Check central air conditioning systems for proper refrigerant charge and airflow across the indoor coil to determine if they are in balance to operate as efficiently as possible. EPA refrigerant certification is required to handle refrigerants and most jurisdictions may require this be completed by a licensed HVAC contractor.*

Air Handlers and Ductwork:

- 1) Determine condition of air handler and coil and need for cleaning.*
- 2) Conduct a test to determine adequacy of air flow, using one of the following methods: Duct Blaster® or other plenum pressure-matching air flow test, flow plate, flow hood, static pressure test, and/or temperature rise/drop tests.*
- 3) If ducts or an air handler are located outside of home's pressure boundary and cannot be relocated inside, conduct a test to determine duct leakage, using a metered and calibrated duct pressurization device.*
- 4) Inspect for condensation moisture or damage from condensation on exterior of duct liner (in hot humid climate) or interior of A/C only ducts (in cold climate) for ducts outside conditioned space.*
- 5) Check air return grills are properly sized.*

Water Heater:

Estimate Energy Factor (EF) of water heater based on model number. Most energy modeling software will ask for EF for the purpose of estimating energy consumption.

Mechanical Ventilation:

Educate homeowner on the benefits of a timer-operated or humidity controlled bathroom exhaust fan.

2.2.4 Instrumented Tests on Combustion Appliances, Combustion Appliance Zone (CAZ) and Living Space

- 1) Combustion appliance and CAZ tests.

Performing these tests can help identify problems that affect the health and safety of the customer. Therefore, participating contractors will perform diagnostic tests on combustion equipment including vented heating systems, water heaters and ovens, in accordance with the BPI Technical Standards³ or an equivalent method developed by the HPwES Program Sponsor in accordance with their Partnership Agreement and approved by EPA and DOE. This inspection includes:

- Carbon monoxide measurement at each appliance.
- Draft measurement and spillage evaluation for atmospherically vented appliances.

³ BPI Technical Standards are currently being modified and this Guide will be updated to reflect any revisions.

- Worse-case negative pressure measurement for each CAZ.

Examples of acceptable alternative diagnostic testing standards that cover a portion, but not all, of the diagnostic testing covered by BPI include:

- ASTM Standard E1998-02, “Standard Guide for Assessing Depressurization-Induced Backdrafting and Spillage from Vented Combustion Appliances”.
- Canada General Standards Board 51.71-95, “The Spillage Test Method to Determine The Potential for Pressure Induced Spillage from Vented, Fuel-fired, Space Heating Appliances, Water Heaters and Fireplaces”.
- National Fuel Gas Code (ANSI Z223.1/NFPA 54, Annex H).

Note: Vented appliances that are going to be replaced with direct vent or power vented equipment as part of the work scope do not have to be tested, except as an interim test if the home is air sealed as part of the work scope prior to installation of the new equipment (having the heating equipment installed first would prevent the need for such a test).

2) Ambient carbon monoxide readings.

The contractor will take ambient carbon monoxide readings in CAZ zones and in main living spaces and continuously monitor carbon monoxide levels in the ambient air around technician during combustion tests.

Optional Steps for Instrumented Tests

Steady State Efficiency (SSE) Test

This test can be performed relatively quickly while conducting other combustion tests on a furnace or boiler. It can provide good information for the contractor in evaluating the condition and operation of the equipment. Some energy modeling software will use the SSE as an input in order to estimate baseline energy consumption.

Gas Leak Test

Small gas leaks present a health and safety threat, waste energy, and emit methane, a greenhouse gas 22 times more powerful than carbon dioxide. Using gas leak detection equipment, check for gas leaks at all accessible gas pipe connections, T's, elbows, unions, and fittings, from the gas meter to the inlet to each combustion appliance. Any gas leak discovered with detection equipment will be verified with a commercial soap solution before making repairs.

2.2.5 Moisture Inspection

- Check basement and crawlspace for moisture deposition or damage on basement floors, walls, sill plate area, around basement windows and bulkhead doors.
- Determine whether there is continuous moisture barrier in the crawlspace.
- Check around exterior of foundation for signs of moisture deposition from such sources as faulty gutters or watering too close to the foundation.
- Check attic for moisture deposition or damage on roof deck, rafters, joists, and insulation (wet or moisture-compacted insulation).
- Inspect condition of windows and look for signs of condensation or other conditions that could cause damage or affect durability.
- If there is evidence of high moisture levels in the living space, check for discoloration on walls behind headboards, furniture – corners of closets on exterior walls, and other areas of stagnation and cold temperature for moisture deposition or damage and conditions that promote fungal growth.

Optional Appliance and Lighting Inspection

1) Record approximate age, type and condition of major appliances and showerheads. If applicable, determine number, age and condition of room air conditioners (check with homeowner if the assessment is performed outside of the cooling season and they could be in storage).

- If homeowner has any older (>10 years) appliances, discuss benefits of replacing them with ENERGY STAR qualified appliances.
- Educate homeowner on water and energy savings from low-flow showerheads and toilets.

2) Inspect high-use lighting areas for any obvious opportunities to upgrade to ENERGY STAR compact fluorescent lamps (CFLs) or fixtures. Check with homeowner to get estimated daily burn-time for lighting to be recommended for replacement (important for estimating energy savings calculation).

2.2.6 HPwES HPA Summary Report

Reviewing the findings with the customer is the culmination of the HPA process. This is the opportunity to present the homeowner with the improvement opportunities discovered during the HPA and solutions for improving the performance of the customer's home. Therefore, the participating contractor will discuss inspection findings and present a recommended scope of work to the homeowner.

At a minimum, the following elements are required to be included in an HPA Summary Report provided to a homeowner after the HPA has been completed:

- Participating contractor name, contractor contact information, and name of technician completing the HPA.
- Assessed home's address.
- Date assessment was performed.
- HPwES logo.
- Existing conditions:
 - Air leakage visual inspection or diagnostic results.
 - Insulation levels for walls, attic, rim-joists, and foundation (crawl, basement, or slab).
 - Approximate age and condition of HVAC equipment (heating, cooling, and ventilation fans), water heating equipment, and condition of exhaust flues for HVAC or water heating equipment that consumes fossil fuel.
 - Type and condition of windows and doors.
 - Duct system visual inspection findings.
 - Approximate age and condition of appliances.
 - Any signs of moisture deposition, building performance failures or conditions affecting the durability of the home.
 - Results of tests related to the use of combustion appliances (draft, spillage, carbon monoxide, combustion appliance zone (CAZ) depressurization and gas leak testing).
- A set of recommendations that is reasonably comprehensive in identifying measures that save energy, address combustion safety, comfort, moisture deposition, durability or other building performance problems.
- Recommendations in the comprehensive work scope must address air leakage between the house and attached garage due to the potential for infiltration of carbon monoxide and other fumes.
- An estimate of energy savings from recommended improvements and improvement installation cost.

2.3. Estimating Energy Savings

To be developed.

2.4. Example HPA Intake Form Template

| Company Logo | <h2 style="margin: 0;">Home Performance Assessment</h2> <p style="color: red; font-weight: bold; margin: 0;">[Enter Company Name]</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|-------------------------------------|-----------------------------------|-----------------------------|--------------------------|--------------------------------|-------------------------------|-------------------------------------|---|-----------------------|-------------------------------|--------------------------------|------------------------------|--------------|----------------|---------------------|-----------------------|--------------|---|--------------|----------------------------|---|--------------------|--------------|--|--------------|-----------|--------------|------------|-----|--|--|--|-----|--|-----------------|--|-----|-----------|--|--|-----|--------------|--|--|-----|--|--|-----|-----------|----|--|--|-----|--|--|----------------------|-----|--|-----|-----------|-------|--|--|--|--|--|--|--|--|-----|-----------|--|--|--|--|--|-------------------------|---------|-----------------|-------------------|----------------------|----------------------|-------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|
| Customer Name: _____ Customer Phone Number (h): _____ Customer Address: _____ Customer Phone Number (w): _____ City, State, Zip: _____ Customer Email: _____ Inspection Date: _____ Home Performance Analyst: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Homeowner Interview and Consumption History | How Did They Hear? Article Referral Web Search Radio Regional Program Nat'l Program Other: _____ Type of Home: Colonial Dutch Colonial Cape Split Level Duplex Town/Rowhouse: End Unit? Y N Other: _____ Foundation/Basement: Slab on Grade Basement: Conditioned / Unconditioned / Partially Conditioned Crawlspace: Vented / Unvented Year Built/Age: _____ Roof Age/Cond: / _____ Fireplace/Wood Stove: Yes No Pool Open/Close Dts: / _____ Yrs in Home: _____ Siding Type/Cond: / _____ Confirm no fires for HPA: Yes No Pool Pump Hrs/Day: _____ # Occupants: _____ Heating Fuel: _____ DHW Fuel: _____ Pool Pump HP/Watts: _____ Additions: _____ Back-Up Elect Heat: Yes No Pool Htg Fuel: _____ Pool Area (L x W): _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Top Homeowner Priorities / Concerns / Motivations 1. _____ 2. _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">Energy Consumption History</th> <th colspan="2">Customer Needs / Complaints</th> </tr> <tr> <th colspan="2" style="text-align: center;">Electric</th> <th colspan="2" style="text-align: center;">Fossil</th> </tr> <tr> <th>Month</th> <th>kWh</th> <th>\$</th> <th>Units</th> </tr> <tr><td>Jan</td><td></td><td></td><td></td></tr> <tr><td>Feb</td><td></td><td></td><td></td></tr> <tr><td>Mar</td><td></td><td></td><td></td></tr> <tr><td>Apr</td><td></td><td></td><td></td></tr> <tr><td>May</td><td></td><td></td><td></td></tr> <tr><td>Jun</td><td></td><td></td><td></td></tr> <tr><td>Jul</td><td></td><td></td><td></td></tr> <tr><td>Aug</td><td></td><td></td><td></td></tr> <tr><td>Sep</td><td></td><td></td><td></td></tr> <tr><td>Oct</td><td></td><td></td><td></td></tr> <tr><td>Nov</td><td></td><td></td><td></td></tr> <tr><td>Dec</td><td></td><td></td><td></td></tr> <tr><td>Total</td><td></td><td></td><td></td></tr> </table> | | Energy Consumption History | | Customer Needs / Complaints | | Electric | | Fossil | | Month | kWh | \$ | Units | Jan | | | | Feb | | | | Mar | | | | Apr | | | | May | | | | Jun | | | | Jul | | | | Aug | | | | Sep | | | | Oct | | | | Nov | | | | Dec | | | | Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Energy Consumption History | | Customer Needs / Complaints | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Electric | | Fossil | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Month | kWh | \$ | Units | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Jan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Feb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Mar | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Apr | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| May | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jun | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jul | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aug | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Oct | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nov | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dec | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">Interviewee:</th> <th style="text-align: left;">Details</th> </tr> <tr><td>1. High Bills</td><td>Yes No _____</td></tr> <tr><td>2. Drafts</td><td>Yes No _____</td></tr> <tr><td>3. Hot/Cold Rooms</td><td>Yes No _____</td></tr> <tr><td>4. Air Quality Problems</td><td>Yes No _____</td></tr> <tr><td>5. Odors</td><td>Yes No _____</td></tr> <tr><td>6. Moisture Issues</td><td>Yes No _____</td></tr> <tr><td>7. Water Leaks</td><td>Yes No _____</td></tr> <tr><td>8. Window Problems</td><td>Yes No _____</td></tr> <tr><td>9. Door Problems</td><td>Yes No _____</td></tr> <tr><td>10. Moisture Issues/Damage</td><td>Yes No _____</td></tr> <tr><td>11. Excessive Duct</td><td>Yes No _____</td></tr> <tr><td>12. _____</td><td>Yes No _____</td></tr> <tr><td>13. _____</td><td>Yes No _____</td></tr> </table> | | Interviewee: | Details | 1. High Bills | Yes No _____ | 2. Drafts | Yes No _____ | 3. Hot/Cold Rooms | Yes No _____ | 4. Air Quality Problems | Yes No _____ | 5. Odors | Yes No _____ | 6. Moisture Issues | Yes No _____ | 7. Water Leaks | Yes No _____ | 8. Window Problems | Yes No _____ | 9. Door Problems | Yes No _____ | 10. Moisture Issues/Damage | Yes No _____ | 11. Excessive Duct | Yes No _____ | 12. _____ | Yes No _____ | 13. _____ | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Interviewee: | Details | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. High Bills | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Drafts | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Hot/Cold Rooms | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Air Quality Problems | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. Odors | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. Moisture Issues | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. Water Leaks | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. Window Problems | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. Door Problems | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. Moisture Issues/Damage | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. Excessive Duct | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12. _____ | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13. _____ | Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Major Appliances</th> <th>Estar</th> <th>Size</th> <th>Age</th> <th>Model Number</th> <th>Condition</th> <th>Usage</th> </tr> <tr><td>Refrigerator 1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Refrigerator 2</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Freezer</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Dishwasher</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Washing Machine</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Dehumidifier</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Dryer</td><td>NA</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Cooking Range / Oven</td><td>NA</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> | | Major Appliances | Estar | Size | Age | Model Number | Condition | Usage | Refrigerator 1 | | | | | | | Refrigerator 2 | | | | | | | Freezer | | | | | | | Dishwasher | | | | | | | Washing Machine | | | | | | | Dehumidifier | | | | | | | Dryer | NA | | | | | | Cooking Range / Oven | NA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Major Appliances | Estar | Size | Age | Model Number | Condition | Usage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Refrigerator 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Refrigerator 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Freezer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dishwasher | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Washing Machine | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dehumidifier | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dryer | NA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cooking Range / Oven | NA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Lighting</th> <th># Bulbs</th> <th>% CFL</th> </tr> <tr><td>High Use (>3 hrs/day)</td><td></td><td></td></tr> <tr><td>Other</td><td></td><td></td></tr> <tr><td colspan="3">Room Air Conditioners</td></tr> <tr><td># of Units: _____</td><td>Age: _____</td><td></td></tr> <tr><td>Estar: Yes No _____</td><td>EER (if known): _____</td><td></td></tr> <tr><td colspan="3">Dryer Fuel: _____ Vented Properly? Yes No _____</td></tr> <tr><td colspan="3"># CO Detectors: _____ Per Floor: Yes No _____</td></tr> <tr><td colspan="3"># Smoke Detectors: _____ Per Floor: Yes No _____</td></tr> </table> | | Lighting | # Bulbs | % CFL | High Use (>3 hrs/day) | | | Other | | | Room Air Conditioners | | | # of Units: _____ | Age: _____ | | Estar: Yes No _____ | EER (if known): _____ | | Dryer Fuel: _____ Vented Properly? Yes No _____ | | | # CO Detectors: _____ Per Floor: Yes No _____ | | | # Smoke Detectors: _____ Per Floor: Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lighting | # Bulbs | % CFL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Use (>3 hrs/day) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Other | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Room Air Conditioners | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| # of Units: _____ | Age: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Estar: Yes No _____ | EER (if known): _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dryer Fuel: _____ Vented Properly? Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| # CO Detectors: _____ Per Floor: Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| # Smoke Detectors: _____ Per Floor: Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td># Thermostats: _____</td> <td>Programmable? Yes No _____</td> <td>Heating Setpoint: _____</td> <td>Cooling Setpoint: _____</td> </tr> <tr> <td># Bathrooms: _____</td> <td># of Bathrooms: _____</td> <td>Vented Properly? Yes No _____</td> <td>Low-Flow Showerheads?: Yes No _____</td> </tr> </table> | | # Thermostats: _____ | Programmable? Yes No _____ | Heating Setpoint: _____ | Cooling Setpoint: _____ | # Bathrooms: _____ | # of Bathrooms: _____ | Vented Properly? Yes No _____ | Low-Flow Showerheads?: Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| # Thermostats: _____ | Programmable? Yes No _____ | Heating Setpoint: _____ | Cooling Setpoint: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| # Bathrooms: _____ | # of Bathrooms: _____ | Vented Properly? Yes No _____ | Low-Flow Showerheads?: Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>Conditioned Sqft: _____</td> <td>Outside Temp: _____</td> <td>Knob & Tube Wiring?: Yes No _____</td> </tr> <tr> <td>Avg Ceiling Hgt: _____</td> <td>House Orientation: _____</td> <td>Whole House Fan?: Yes No _____</td> </tr> <tr> <td>Number of Stories: _____</td> <td>Roof Vent Type(s): _____</td> <td>Unvented Space Htrs/Fireplaces?: Yes No _____</td> </tr> <tr> <td>Volume Cond: _____</td> <td>Roof Vents Are: OK Inadequate</td> <td>Balloon Framing?: Yes No _____</td> </tr> <tr><td colspan="3">Moisture/Other Issues: _____</td></tr> </table> | | Conditioned Sqft: _____ | Outside Temp: _____ | Knob & Tube Wiring?: Yes No _____ | Avg Ceiling Hgt: _____ | House Orientation: _____ | Whole House Fan?: Yes No _____ | Number of Stories: _____ | Roof Vent Type(s): _____ | Unvented Space Htrs/Fireplaces?: Yes No _____ | Volume Cond: _____ | Roof Vents Are: OK Inadequate | Balloon Framing?: Yes No _____ | Moisture/Other Issues: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Conditioned Sqft: _____ | Outside Temp: _____ | Knob & Tube Wiring?: Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Avg Ceiling Hgt: _____ | House Orientation: _____ | Whole House Fan?: Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of Stories: _____ | Roof Vent Type(s): _____ | Unvented Space Htrs/Fireplaces?: Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Volume Cond: _____ | Roof Vents Are: OK Inadequate | Balloon Framing?: Yes No _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Moisture/Other Issues: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Attic Insulation | <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th rowspan="2">Attic Flats and Slopes</th> <th>R-Val</th> <th>Insulation Type</th> <th>Insulation Amount</th> <th>Cav Size (e.g. 2x6)</th> <th>Open or Enclosed</th> <th>Surface Area (sqft.)</th> <th># Rec. Cans</th> <th>Attic Access</th> <th>Attic Fan</th> <th>Notes</th> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr><td></td><td></td><td></td><td></td><td>2 x</td><td>Open Encl</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>2 x</td><td>Open Encl</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>2 x</td><td>Open Encl</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>2 x</td><td>Open Encl</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>2 x</td><td>Open Encl</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <th rowspan="2">Attic Kneewall/Vertical</th> <th>R-Value</th> <th>Insulation Type</th> <th>Insulation Amount</th> <th>Cav. Size (e.g. 2x4)</th> <th>Surface Area (sqft.)</th> <th colspan="5">Notes</th> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr><td></td><td></td><td></td><td></td><td>2 x</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>2 x</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>2 x</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>2 x</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> | | Attic Flats and Slopes | R-Val | Insulation Type | Insulation Amount | Cav Size (e.g. 2x6) | Open or Enclosed | Surface Area (sqft.) | # Rec. Cans | Attic Access | Attic Fan | Notes | | | | | | | | | | | | | | | 2 x | Open Encl | | | | | | | | | | 2 x | Open Encl | | | | | | | | | | 2 x | Open Encl | | | | | | | | | | 2 x | Open Encl | | | | | | | | | | 2 x | Open Encl | | | | | | Attic Kneewall/Vertical | R-Value | Insulation Type | Insulation Amount | Cav. Size (e.g. 2x4) | Surface Area (sqft.) | Notes | | | | | | | | | | | | | | | | | | | 2 x | | | | | | | | | | | 2 x | | | | | | | | | | | 2 x | | | | | | | | | | | 2 x | | | | | | |
| | Attic Flats and Slopes | R-Val | | Insulation Type | Insulation Amount | Cav Size (e.g. 2x6) | Open or Enclosed | Surface Area (sqft.) | # Rec. Cans | Attic Access | Attic Fan | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 2 x | Open Encl | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 2 x | Open Encl | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 2 x | Open Encl | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 2 x | Open Encl | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 2 x | Open Encl | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Attic Kneewall/Vertical | R-Value | Insulation Type | Insulation Amount | Cav. Size (e.g. 2x4) | Surface Area (sqft.) | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 2 x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 2 x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 2 x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 2 x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Customer Name: _____ [Company Name Here] Inspection Date: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---------------------------------|--|--------------------------|---|---------------------------------------|--|--------------------------|---|------------------------------------|-----------------------------|------------|---------------------|-------------------------------|----------------------|--|--|--|
| Wall Insulation | Sidewall Sections | | R-Value | Insulation Type | Insulation Amount | Cav. Size (e.g. 2x4) | Surface Area (sqft.) | Notes | | | | | | | | |
| | | | | | | 2 x | | | | | | | | | | |
| | | | | | | 2 x | | | | | | | | | | |
| | | | | | | 2 x | | | | | | | | | | |
| Basement/Crawl Insul. | Basement Walls & Sill Plate | | Conditioned? | Insulation Location | R-Value | Wall Height | Depth Bel. Grd. | Sqft or Linear Ft | Notes | | | | | | | |
| | | | Yes No | | | | | | | | | | | | | |
| | Sill Plate | | Yes No | | | | | | | | | | | | | |
| Crawspace | Crawspace | | Access | Vented? | Insulation Location | R-Value | Wall Height | Depth Bel. Grd. | Sqft Walls | Sqft Floor | Notes | | | | | |
| | | | Gd Pr | Yes No | | | | | | | | | | | | |
| | | | Gd Pr | Yes No | | | | | | | | | | | | |
| Windows/Doors | Windows (Select typical size) | | | | | | Exterior Doors | | | | | | | | | |
| | Orientation | Qty. | Panes | Storms? | Frame | Condition | Typ Size | %Wall | Location | Type | Condition | Insulated | Air Seal Needed | | | |
| | | | 1 2 3 | Yes No | W V M | Gd Fair Pr | x | | | Wd Mt | Gd Fair Pr | Yes No | WX Sweep Clk | | | |
| | | | 1 2 3 | Yes No | W V M | Gd Fair Pr | x | | | Wd Mt | Gd Fair Pr | Yes No | WX Sweep Clk | | | |
| Air Leakage | Blower Door Test: | | CFM50 / ACH (circle one) | Ventilation Standard: | CFM50 / ACH (circle one) | Excess Air Leakage: | | CFM50 / ACH (circle one) | | | | | | | | |
| | Air Leakage Locations (check all that apply) | | | | | | | | | | | | | | | |
| | Attic Wire/Pipe Penetrations | <input type="checkbox"/> | Recessed Lights | <input type="checkbox"/> | Crawspace | <input type="checkbox"/> | Porch Roof | <input type="checkbox"/> | Note: _____ | | | | | | | |
| | Kneewalls / Attic Stairs | <input type="checkbox"/> | Chimney / Flues | <input type="checkbox"/> | Windows | <input type="checkbox"/> | Garage Wall | <input type="checkbox"/> | | | | | | | | |
| Pocket Doors / Attic Access | <input type="checkbox"/> | Basement Penetrations | <input type="checkbox"/> | Cantilevers | <input type="checkbox"/> | Garage Ceiling | <input type="checkbox"/> | | | | | | | | | |
| Drop Soffits | <input type="checkbox"/> | Sill Plate | <input type="checkbox"/> | Bay Window | <input type="checkbox"/> | El. Closets | <input type="checkbox"/> | | | | | | | | | |
| Heating and Cooling Systems | Heating System 1 | | | | Heating System 2 | | | | Cooling System 1 | | | | Cooling System 2 | | | |
| | Brand: _____ | | | | Brand: _____ | | | | Brand: _____ | | | | Brand: _____ | | | |
| | Type (Furnace, Boiler, HP): _____ | | | | Type (Furnace, Boiler, HP): _____ | | | | Type (AC, HP): _____ | | | | Type (AC, HP): _____ | | | |
| | Fuel: _____ | | | | Fuel: _____ | | | | Model #: _____ | | | | Model #: _____ | | | |
| Model #: _____ | | | | Model #: _____ | | | | Tonnage: _____ | | | | Tonnage: _____ | | | | |
| Age / Cond.: _____ | | | | Age / Cond.: _____ | | | | Age / Cond.: _____ | | | | Age / Cond.: _____ | | | | |
| Input/Output BTU's: _____ | | | | Input/Output BTU's: _____ | | | | SEER / EER: _____ | | | | SEER / EER: _____ | | | | |
| Eff. Rating (AFUE, HSPF): _____ | | | | Eff. Rating (AFUE, HSPF): _____ | | | | Air Handl Loc.: _____ | | | | Air Handl Loc.: _____ | | | | |
| Steady State Eff.: _____ | | | | Steady State Eff.: _____ | | | | Coils Cond.: _____ | | | | Coils Cond.: _____ | | | | |
| Location (Bsmt, Gar): _____ | | | | Location (Bsmt, Gar): _____ | | | | Cond. Out Unit: _____ | | | | Cond. Out Unit: _____ | | | | |
| Loc. Outside Unit: _____ | | | | Loc. Outside Unit: _____ | | | | Loc. Outside Unit: _____ | | | | Loc. Outside Unit: _____ | | | | |
| Freq. of Servicing: _____ | | | | Filter Clean: _____ | | | | Condensate Line Issues: _____ | | | | Condensate Line Issues: _____ | | | | |
| Humidifier: Yes No | | | | Flue Vent Issues: _____ | | | | | | | | | | | | |
| Combustion Related Tests | Flue Gas CO ppm | | Natural Draft | Worst Case Draught | Natural Spillage | Worst Case Spillage | Fuel CO ppm Vent Out? | | | | | | | | | |
| | | | Pass Fail | Pass Fail | Pass Fail | Pass Fail | Oven 1: _____ | | Yes No | | Yes No | | | | | |
| | | | Pass Fail | Pass Fail | Pass Fail | Pass Fail | Oven 2: _____ | | Yes No | | Yes No | | | | | |
| | | | Pass Fail | Pass Fail | Pass Fail | Pass Fail | Ambient CO 1: _____ | | Kitchen Main Living Other | | Ambient CO 2: _____ | | | | | |
| Ambient CO | | Base Pressure | Worst Case Pressure | Final (Net) CAZ Depressurization | CAZ Standard | Pass or Fail | Fuel Leaks: <input type="checkbox"/> None detected <input type="checkbox"/> Leak(s) detected - see below: | | | | | | | | | |
| CAZ 1: _____ | | _____ | _____ | _____ | _____ | P F | | | | | | | | | | |
| CAZ 2: _____ | | _____ | _____ | _____ | _____ | P F | | | | | | | | | | |
| DHW | Location: _____ | | Conditioned Element / Utility Room / Closet | Unconditioned Basement / Utility Room | Garage | Crawspace | Other: _____ | | | | | | | | | |
| | Type: _____ | | Age/Condition: _____ | Model #: _____ | Tank Wrapped?: _____ | | Yes No | | Press. Relief Valve?: _____ | | | | | | | |
| | Gallons: _____ | | Output BTU: _____ | Temp Setting: _____ | Press. Relief Valve?: _____ | | Yes No | | | | | | | | | |
| Distribution System and Notes | % Ducts in Uncond Attic: _____ | | % Ducts in Uncond Bsmt/Crawl: _____ | | Duct Leakage Test (optional): _____ | | Duct Blast | BD Subtract | Delta Q | Press Pan | | | | | | |
| | Duct / Pipe Insulation: _____ | | R - _____ | | Duct Test Result (use note field for press pan): _____ | | Airflow Test Result (optional): _____ | | | | | | | | | |
| | Visual Leakage: _____ | | Low Med High | | | | | | | | | | | | | |
| | Notes Field: _____ | | | | | | | | | | | | | | | |
| | | | | | | | | Pressure Pan Test (Duct WRT House) | | | | | | | | |
| | | | | | | | | House WRT Duct Location: _____ pa | | | | | | | | |
| | | | | | | | | Location Pa Location Pa | | | | | | | | |
| | | | | | | | | 1 _____ 10 _____ | | | | | | | | |
| | | | | | | | | 2 _____ 11 _____ | | | | | | | | |
| | | | | | | | | 3 _____ 12 _____ | | | | | | | | |
| | | | | | | | | 4 _____ 13 _____ | | | | | | | | |
| | | | | | | | | 5 _____ 14 _____ | | | | | | | | |
| | | | | | | | | 6 _____ 15 _____ | | | | | | | | |
| | | | | | | | | 7 _____ 16 _____ | | | | | | | | |
| | | | | | | | | 8 _____ 17 _____ | | | | | | | | |
| | | | | | | | | 9 _____ 18 _____ | | | | | | | | |

2.5 Example Homeowner Summary Report

| Home Performance Assessment Summary Report | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--|--|--|--|--|--|--|--------------------------------|--|--|---|-------|------------------------------------|-------|--------------------------------------|-------|---|-------|---|-------|--|
| Smith Home Performance Contracting | | | | | | | | | | | | | | | | | | | | | | |
| 1 Address Street, City, ST 00000 • Phone: 000-000-0000 • Fax: 000-000-0000 • smithhpc@smithhpc.com | | | | | | | | | | | | | | | | | | | | | | |
| Customer Name: | <input type="text"/> | Customer Phone Number (h): <input type="text"/> | | | | | | | | | | | | | | | | | | | | |
| Customer Address: | <input type="text"/> | Customer Phone Number (w): <input type="text"/> | | | | | | | | | | | | | | | | | | | | |
| City, State, Zip: | <input type="text"/> | Customer Email: <input type="text"/> | | | | | | | | | | | | | | | | | | | | |
| Inspection Date: | <input type="text"/> | Home Performance Analyst: <input type="text"/> | | | | | | | | | | | | | | | | | | | | |
| <p>Your Home Performance Assessment identifies opportunities to improve the performance of your home based on our analysis. This report summarizes the findings, prioritizes recommended improvements, and helps you determine the best improvements for your home.</p> | | | | | | | | | | | | | | | | | | | | | | |
| Findings and Recommendations | | | | | | | | | | | | | | | | | | | | | | |
| Priority | Findings on Existing Conditions | Recommendations for Improvements | | | | | | | | | | | | | | | | | | | | |
| Building Envelope Evaluation | Air Sealing Blower door test: _____ cfm50 Tightness std: _____ cfm50 Leakage pathways observed: <input type="checkbox"/> Basement/crawl ceiling <input type="checkbox"/> Interior baseboard/top molding/fireplaces <input type="checkbox"/> Sill plate <input type="checkbox"/> Window and door frames <input type="checkbox"/> Attic floor <input type="checkbox"/> Attic hatch(es) <input type="checkbox"/> Band joist between floors <input type="checkbox"/> Recessed lights <input type="checkbox"/> Major air leakage bypass(es): _____ <input type="checkbox"/> Other: _____ | <input type="checkbox"/> Reduce leaks by _____% <input type="checkbox"/> No recommendations Air seal the following leakage pathways: <input type="checkbox"/> Bsmnt./crawl penetrations <input type="checkbox"/> Exposed sill plate <input type="checkbox"/> Attic penetrations <input type="checkbox"/> Top wall plates in attic <input type="checkbox"/> Flue/chimney penetrations <input type="checkbox"/> Open attic stairs/walls <input type="checkbox"/> Attic hatch/pulldown <input type="checkbox"/> Base and ceiling molding <input type="checkbox"/> Door and window frames <input type="checkbox"/> Around fireplace/mantle Weatherstrip: <input type="checkbox"/> doors <input type="checkbox"/> windows <input type="checkbox"/> hatches <input type="checkbox"/> outlets <input type="checkbox"/> Recessed lights: <input type="checkbox"/> covers <input type="checkbox"/> inserts <input type="checkbox"/> new housings | | | | | | | | | | | | | | | | | | | | |
| | Duct Sealing Duct leakage observed at: <input type="checkbox"/> No ducts in unconditioned space <input type="checkbox"/> Main trunk connections <input type="checkbox"/> Duct disconnects/failures at: _____ <input type="checkbox"/> Branch line connections _____ <input type="checkbox"/> Accessible register connections _____ <input type="checkbox"/> Unable to visually diagnose duct work _____ | <input type="checkbox"/> Duct sealing: _____ hours <input type="checkbox"/> Air flow balancing <input type="checkbox"/> Include duct blaster test for leakage to outside <input type="checkbox"/> Repair or reconnect ducts <input type="checkbox"/> Add return(s) <input type="checkbox"/> Replace approx. _____% of duct system <input type="checkbox"/> Duct cleaning <input type="checkbox"/> No recommendations | | | | | | | | | | | | | | | | | | | | |
| | Insulation Levels <table border="0"> <tr> <th></th> <th>R-Value/Inches Insulation</th> </tr> <tr> <td><input type="checkbox"/> Above grade walls</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/> Attic (flat)</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/> Attic (slope)</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/> Kneewall(s)</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/> Floor over uncond.</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/> Rimjoists</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/> Crawl walls</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/> Basement walls</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/> Ductwork (uncond. space)</td> <td>_____</td> </tr> </table> | | R-Value/Inches Insulation | <input type="checkbox"/> Above grade walls | _____ | <input type="checkbox"/> Attic (flat) | _____ | <input type="checkbox"/> Attic (slope) | _____ | <input type="checkbox"/> Kneewall(s) | _____ | <input type="checkbox"/> Floor over uncond. | _____ | <input type="checkbox"/> Rimjoists | _____ | <input type="checkbox"/> Crawl walls | _____ | <input type="checkbox"/> Basement walls | _____ | <input type="checkbox"/> Ductwork (uncond. space) | _____ | Insulate in the following locations: R-Value/Inches Insul. <input type="checkbox"/> Walls _____ <input type="checkbox"/> Attic (flat) _____ <input type="checkbox"/> Attic (slope) _____ <input type="checkbox"/> Kneewall _____ <input type="checkbox"/> Floor _____ <input type="checkbox"/> Rimjoist _____ <input type="checkbox"/> Foundation walls _____ <input type="checkbox"/> Ductwork _____ <input type="checkbox"/> No recommendations _____ |
| | | R-Value/Inches Insulation | | | | | | | | | | | | | | | | | | | | |
| | <input type="checkbox"/> Above grade walls | _____ | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Attic (flat) | _____ | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Attic (slope) | _____ | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Kneewall(s) | _____ | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Floor over uncond. | _____ | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Rimjoists | _____ | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Crawl walls | _____ | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Basement walls | _____ | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Ductwork (uncond. space) | _____ | | | | | | | | | | | | | | | | | | | | | |
| Windows and Doors <table border="0"> <tr> <td><input type="checkbox"/> Single pane windows</td> <td>Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor</td> </tr> <tr> <td><input type="checkbox"/> Double pane windows</td> <td>Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor</td> </tr> <tr> <td><input type="checkbox"/> Double pane low-e</td> <td>Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor</td> </tr> <tr> <td><input type="checkbox"/> Storm windows</td> <td>Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor</td> </tr> <tr> <td><input type="checkbox"/> Doors</td> <td>Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor</td> </tr> </table> | <input type="checkbox"/> Single pane windows | Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor | <input type="checkbox"/> Double pane windows | Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor | <input type="checkbox"/> Double pane low-e | Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor | <input type="checkbox"/> Storm windows | Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor | <input type="checkbox"/> Doors | Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor | <input type="checkbox"/> Replace windows with a u-value ≤ _____ and solar gain ≤ _____ <input type="checkbox"/> Replace _____ door(s) w/ _____ <input type="checkbox"/> Solar screens <input type="checkbox"/> Other: _____ <input type="checkbox"/> No recommendations | | | | | | | | | | | |
| <input type="checkbox"/> Single pane windows | Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Double pane windows | Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Double pane low-e | Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Storm windows | Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Doors | Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor | | | | | | | | | | | | | | | | | | | | | |
| Mechanical Equip. Evaluation Space Heating Main heating system is a _____ System efficiency is _____ and age _____ Condition: <input type="checkbox"/> Good <input type="checkbox"/> Service <input type="checkbox"/> Replace Prog. thermostat <input type="checkbox"/> Yes <input type="checkbox"/> No # of thermostats: _____ 2nd heating system is a _____ System efficiency is _____ and age _____ Condition: <input type="checkbox"/> Good <input type="checkbox"/> Service <input type="checkbox"/> Replace Prog. thermostat <input type="checkbox"/> Yes <input type="checkbox"/> No Filter condition: _____ Filter size: _____ Qty: _____ Condensate line: Blocks: <input type="checkbox"/> Yes <input type="checkbox"/> No Leaks: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Other: _____ | <input type="checkbox"/> Replace main heating system with new _____ with _____ rated efficiency <input type="checkbox"/> Replace 2nd heating system with new _____ with _____ rated efficiency <input type="checkbox"/> Fix/replace condensate line <input type="checkbox"/> Remove 2nd heating system <input type="checkbox"/> Install prog. thermostat <input type="checkbox"/> Replace filter(s) <input type="checkbox"/> Fix/replace condensate line <input type="checkbox"/> Other: _____ <input type="checkbox"/> No recommendations | | | | | | | | | | | | | | | | | | | | | |

| Findings and Recommendations (cont.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|--|---------------------|--|----------|---|---|--|-------------|---|---|--|----------------|---|---|--|----------------------------|---|--|--|-------------------|---|--|--|--------------|---|--|--|---------------------------|--|--|------------|------------------|--|--|--|----------------------------|--|--|----------------|--------------------|--|--|--|--|--|--|----------------------------------|
| Priority | Findings on Existing Conditions | Recommendations for Improvements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mechanical Equip. Evaluation (cont.) | Space Cooling Main cooling system is: <input type="radio"/> Central <input type="radio"/> Room <input type="radio"/> Heat pump System efficiency is _____ and age _____ Condition: <input type="radio"/> Good <input type="radio"/> Service needed 2nd cooling system is: <input type="radio"/> Central <input type="radio"/> Room <input type="radio"/> Heat pump System efficiency is _____ and age _____ Condition: <input type="radio"/> Good <input type="radio"/> Service needed Air handler location: _____ | <input type="radio"/> Replace main cooling system with _____ SEER system <input type="radio"/> Replace 2nd cooling system with _____ SEER system <input type="radio"/> Clean/adjust blower <input type="radio"/> Check and adjust charge <input type="radio"/> Clean coils inside/outside <input type="radio"/> Check and adjust airflow <input type="radio"/> Fix/replace condensate line <input type="radio"/> Clean/adjust blower <input type="radio"/> Check and adjust charge <input type="radio"/> Clean coils <input type="radio"/> Check and adjust airflow <input type="radio"/> No recommendations | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Water Heating Water heating system is a _____ Estimated system efficiency is _____ or age _____ Condition: <input type="radio"/> Good <input type="radio"/> Replace Temperature Setting: _____ Size: _____ Gallons Low flow showerheads <input type="radio"/> Yes <input type="radio"/> No | <input type="radio"/> Replace water heating system with new _____ with _____ rated efficiency <input type="radio"/> Install solar hot water <input type="radio"/> Pipe insulation <input type="radio"/> Install low flow showerhead <input type="radio"/> Insulation jacket <input type="radio"/> Other: _____ <input type="radio"/> No recommendations | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Baseload and Renewables | Appliances and Lighting Refrigerator Age: _____ <input type="radio"/> ENERGY STAR Dishwasher Age: _____ <input type="radio"/> ENERGY STAR Clothes washer Age: _____ <input type="radio"/> ENERGY STAR Dryer Age: _____ <input type="radio"/> ENERGY STAR Other: _____ <input type="radio"/> ENERGY STAR High-use lighting _____% CFL bulbs All lighting _____% CFL bulbs Renewable opportunities: _____ | <input type="radio"/> Replace with ENERGY STAR refrigerator <input type="radio"/> Replace with ENERGY STAR dishwasher <input type="radio"/> Replace with ENERGY STAR clothes washer <input type="radio"/> Replace with dryer <input type="radio"/> _____ <input type="radio"/> Install _____ ENERGY STAR CFL bulbs in high-use fixtures <input type="radio"/> Purchase ENERGY STAR CFLs when replacing bulbs <input type="radio"/> Install renewables: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Combustion Appliance Testing <table border="0"> <tr> <td></td> <td>Heating System</td> <td>Water Heater</td> <td></td> </tr> <tr> <td>CO tests</td> <td><input type="radio"/> Pass <input type="radio"/> Fail</td> <td><input type="radio"/> Pass <input type="radio"/> Fail</td> <td></td> </tr> <tr> <td>Draft tests</td> <td><input type="radio"/> Pass <input type="radio"/> Fail</td> <td><input type="radio"/> Pass <input type="radio"/> Fail</td> <td></td> </tr> <tr> <td>Spillage tests</td> <td><input type="radio"/> Pass <input type="radio"/> Fail</td> <td><input type="radio"/> Pass <input type="radio"/> Fail</td> <td></td> </tr> <tr> <td>Ambient CO in living space</td> <td><input type="radio"/> Pass <input type="radio"/> Fail</td> <td></td> <td></td> </tr> <tr> <td>Ambient CO in CAZ</td> <td><input type="radio"/> Pass <input type="radio"/> Fail</td> <td></td> <td></td> </tr> <tr> <td>Oven CO test</td> <td><input type="radio"/> Pass <input type="radio"/> Fail</td> <td></td> <td></td> </tr> <tr> <td>Gas or oil leaks detected</td> <td><input type="radio"/> Yes <input type="radio"/> No</td> <td></td> <td>CO Monitor</td> </tr> <tr> <td>Locations: _____</td> <td></td> <td></td> <td><input type="radio"/> Yes <input type="radio"/> No</td> </tr> <tr> <td>Htg/DHW sys venting issues</td> <td><input type="radio"/> Yes <input type="radio"/> No</td> <td></td> <td>Smoke Detector</td> </tr> <tr> <td>Description: _____</td> <td></td> <td></td> <td><input type="radio"/> Yes <input type="radio"/> No</td> </tr> <tr> <td></td> <td></td> <td></td> <td><input type="radio"/> Inoperable</td> </tr> </table> | | Heating System | Water Heater | | CO tests | <input type="radio"/> Pass <input type="radio"/> Fail | <input type="radio"/> Pass <input type="radio"/> Fail | | Draft tests | <input type="radio"/> Pass <input type="radio"/> Fail | <input type="radio"/> Pass <input type="radio"/> Fail | | Spillage tests | <input type="radio"/> Pass <input type="radio"/> Fail | <input type="radio"/> Pass <input type="radio"/> Fail | | Ambient CO in living space | <input type="radio"/> Pass <input type="radio"/> Fail | | | Ambient CO in CAZ | <input type="radio"/> Pass <input type="radio"/> Fail | | | Oven CO test | <input type="radio"/> Pass <input type="radio"/> Fail | | | Gas or oil leaks detected | <input type="radio"/> Yes <input type="radio"/> No | | CO Monitor | Locations: _____ | | | <input type="radio"/> Yes <input type="radio"/> No | Htg/DHW sys venting issues | <input type="radio"/> Yes <input type="radio"/> No | | Smoke Detector | Description: _____ | | | <input type="radio"/> Yes <input type="radio"/> No | | | | <input type="radio"/> Inoperable |
| | Heating System | Water Heater | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CO tests | <input type="radio"/> Pass <input type="radio"/> Fail | <input type="radio"/> Pass <input type="radio"/> Fail | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Draft tests | <input type="radio"/> Pass <input type="radio"/> Fail | <input type="radio"/> Pass <input type="radio"/> Fail | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spillage tests | <input type="radio"/> Pass <input type="radio"/> Fail | <input type="radio"/> Pass <input type="radio"/> Fail | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ambient CO in living space | <input type="radio"/> Pass <input type="radio"/> Fail | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ambient CO in CAZ | <input type="radio"/> Pass <input type="radio"/> Fail | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Oven CO test | <input type="radio"/> Pass <input type="radio"/> Fail | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gas or oil leaks detected | <input type="radio"/> Yes <input type="radio"/> No | | CO Monitor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Locations: _____ | | | <input type="radio"/> Yes <input type="radio"/> No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Htg/DHW sys venting issues | <input type="radio"/> Yes <input type="radio"/> No | | Smoke Detector | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Description: _____ | | | <input type="radio"/> Yes <input type="radio"/> No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | <input type="radio"/> Inoperable | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Health, Safety, and Durability | Moisture & Durability Locations with signs of moisture or durability issues: <input type="radio"/> Windows <input type="radio"/> Crawlspace <input type="radio"/> Attic <input type="radio"/> Walls <input type="radio"/> Roof <input type="radio"/> Soffits <input type="radio"/> Other: _____ <input type="radio"/> Sill plate <input type="radio"/> Interior: _____ <input type="radio"/> Other: _____ | <input type="radio"/> Add attic ventilation <input type="radio"/> Replace/fix roof <input type="radio"/> Re-grade around foundation <input type="radio"/> Add gutters <input type="radio"/> Install sump pump <input type="radio"/> Extend downspouts <input type="radio"/> Other: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Exhaust Vent. Improperly vented, non-operable, or needs ventilation: <input type="radio"/> Master bath <input type="radio"/> 3rd bath <input type="radio"/> Dryer <input type="radio"/> Whole-house <input type="radio"/> 2nd bath <input type="radio"/> Range hood <input type="radio"/> Crawlspace <input type="radio"/> Other: _____ | <input type="radio"/> Replace/install exhaust fan <input type="radio"/> Install dehumidifier <input type="radio"/> Add humidistat/timer <input type="radio"/> Other: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Recommended Measures Summary | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Estimated Annual kWh Savings _____ Estimated Annual Therm Savings _____ Estimated Annual Storage Fuel Savings _____ Estimated Total Annual Energy Cost Savings _____ Estimated Package of Improvements Installed Cost _____ Monthly Payment at _____% _____ Yr. Term _____ Simple Payback (Installed Cost ÷ Annual Savings) _____ | Non-Energy Benefits: <input type="radio"/> Reduced drafts <input type="radio"/> Reduced maintenance <input type="radio"/> _____ <input type="radio"/> Improved comfort <input type="radio"/> Improved indoor air <input type="radio"/> _____ <input type="radio"/> Increased durability <input type="radio"/> Reduced dust <input type="radio"/> _____ <input type="radio"/> Increased home value <input type="radio"/> Reduced odors <input type="radio"/> _____ <input type="radio"/> Reduced moisture issues <input type="radio"/> Environmental <input type="radio"/> _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I understand that the above recommendations do not constitute a binding contract proposal. I am interested in receiving such a proposal as a next step. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Customer Signature: _____ | | Date: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Section 3: Post-installation Test or “Test-out” Protocols

3.1. Introduction

One of the features that distinguish HPwES as a value-added service for residential customers is the series of instrumented tests and inspections that the home performance contractor performs after the improvements have been made to a home. These tests support the “do-no-harm” principal which is a hallmark of home performance contracting. While there is no guarantee that any home will operate safely under all conditions, the home performance contractor is uniquely concerned about health and safety of the occupants. In addition to addressing health and safety issues that may be directly affected by the home performance work, some of the tests provide valuable information on the effectiveness of air and duct sealing measures installed.

3.2. Required and Recommended Elements

3.2.1 Program Oversight of Post Installation or “Test-out” Requirements

To ensure that the “test-out” is performed adequately by participating contractors, Program Sponsors need to adopt “test-out” requirements in their program policies and procedures that meet or exceed the guidance in this document. The following guidance and test-out template are offered to assist Program Sponsors with the development of their “test-out” procedures. When a participating contractor completes home performance improvements for a customer, they will perform the post-installation tests and inspections described in this section, and enter the results in a “Post-Installation Tests and Inspections” Form (the National Program offers a template form that can be used or modified by Program Sponsors). If any of the tests or inspections show the need for corrective action, the contractor can record the action item(s) in the document or postpone completing the Form (including having the customer sign it) until those corrective actions have been made. The job will not be considered complete until the Program Sponsor has received a signed Post-Installation Tests and Inspection Form that indicates that all standards have been met (i.e., all tests and inspections have been passed successfully) and that no further actions are required.

Optional Elements for Program Test-Out Requirements

Two-Part or Duplicate Forms for Customer Copy

While it raises program cost overheads slightly, providing the customer with a copy of the post-installation test form is recommended, because it provides the customer with a record of the test-out details, as well as a record that they signed off on the completion of the job, in case any subsequent issues arise.

Additional Information

Programs may find it valuable as a customer information piece to include additional details on the test-out form, such as summary information on the projected energy savings to be expected from the measures installed and/or environmental emissions prevented. Alternatively, this information could be included on a program-generated certification of completion that is sent to the customer after a completed job has been reported to the Program Sponsor (see Section 4: HPwES Summary Certificate).

3.2.2 Post Installation Test or “Test-out” Requirements

The required post-installation tests depend upon the scope of work:

- 1) Confirmation of measures installed, can be a simple check-off list that the participating contractor uses to confirm that all contracted measures have been installed. The customer would also sign the test-out form signifying their agreement that the job has been completed.
- 2) Blower Door test will be completed after installation of any of the following measures:
 - Enclosed cavity insulation representing more than 15% of the total building shell area.
 - Air sealing.

- Sealing of ductwork outside the building envelope.
- Replacement of atmospherically vented combustion appliance with sealed combustion appliance (due to removal of an exhaust appliance from the home).

3) Minimum house ventilation requirement calculation will be performed whenever changes to the building shell requiring a blower door test have occurred to ensure that the home is receiving adequate outside air per BPI Technical Standards⁴.

4) Combustion appliance tests on all combustion equipment including vented heating systems, water heaters, and ovens, in accordance with BPI Technical Standards, will be completed whenever changes to the building envelope and/or heating system have occurred. This inspection includes all of the following tests:

- Carbon monoxide measurement at each appliance (including ovens).
- Draft measurement and spillage evaluation for atmospherically vented appliances.
- Worst-case negative pressure measurement for each CAZ.

5) Inspection and testing of orphaned water heaters: water heaters may not be left venting alone into a previously shared chimney without ensuring the chimney meets appropriate NFPA requirements under the new condition and the water heater has been tested and passed all required combustion safety tests (spillage, draft, CAZ depressurization).

6) If a new central air conditioner, heat pump, or furnace is installed then installation contractor will provide a commissioning report documenting that the installation met the ACCA HVAC Quality Installation Specification.

Optional Post Installation Test or “Test-out” Requirements

Gas Leak Detection

Check all accessible gas/propane lines for leaks using a combustible gas detector.

Radon Testing

Perform a radon test at the finish of any job including air sealing in the scope of work.

⁴ BPI Technical Standards are currently being modified and this Guide will be updated to reflect any revisions.

Sponsor or Contractor Logo Here

Home Performance with ENERGY STAR

Post-Installation Tests and Inspections
[Enter Company Name]



Customer Name: _____ Customer Phone Number (h): _____
Customer Address: _____ Customer Phone Number (w): _____
City, State, Zip: _____ Customer Email: _____
Inspection Date: _____ Home Performance Analyst: _____

Blower Door Test and Ventilation Compliance

Method Used to Determine Building Leakage Standard (check one):

- Whole Building Mechanical Ventilation per ASHRAE 62.2 - 2007
- Ventilation Credit for Air Leakage (indicate software used):
 - TECTITE ZipTest Pro2
- Ventilation Exemption for Existing Homes per ASHRAE 62.2 - 2007
- BPI Legacy Building Air Tightness Std per ASHRAE 62.2 - 1989
- Other: _____

Blower Door Test Results:

Blowdown (Test-In): _____ CFM50 / ACH (circle one)

Blowdown (Test-Out): _____ CFM50 / ACH (circle one)

_____ CFM50 / ACH / Mech. Ventilation CFM (circle one)

Pass Pass w/ Ventilation Recommended
 Fail - Action Required: _____

Combustion Equipment Testing / Combustion Appliance Zone Testing

| | Worst Case Test Results | | | Natural Condition Test Results | | | Flue Inspection |
|-------------------|-------------------------|-------|-----|--------------------------------|-------|-----|---|
| | Spillage | Draft | CO | Spillage | Draft | CO | |
| Heating System 1: | Pass Fail | pa | ppm | Pass Fail | pa | ppm | Pass Fail <input type="checkbox"/> Action Required: |
| Heating System 2: | Pass Fail | pa | ppm | Pass Fail | pa | ppm | Pass Fail <input type="checkbox"/> Action Required: |
| DHW System 1: | Pass Fail | pa | ppm | Pass Fail | pa | ppm | Pass Fail <input type="checkbox"/> Action Required: |
| Other: | Pass Fail | pa | ppm | Pass Fail | pa | ppm | Pass Fail <input type="checkbox"/> Action Required: |

| CO Ambient | Base Pressure | Worst Case Pressure | Net CAZ Depress. | Limit for CAZ | Result |
|------------|---------------|---------------------|------------------|---------------|---|
| CAZ 1: | | | | | Pass Fail <input type="checkbox"/> Action Required: |
| CAZ 2: | | | | | Pass Fail <input type="checkbox"/> Action Required: |

Gas Leak Testing: No Leaks Detected Leaks Detected as Noted: _____

Ambient CO: Kitchen Main Living Other - ppm

Action Required: _____

Oven CO: Fuel CO ppm Vent out? Action Required: _____

Dryer Vent: Electric Gas Properly Vented Gas Improperly Vented. Action Required: _____

Distribution System Air Flow (required if ducts are sealed as part of project) and Leakage Test

Airflow Test Result: Pass Fail

If fail, action to be taken: _____

Duct Leakage Test: Duct Blaster BD Subtract Delta Q Press Pan

Duct Test Result (enter here or attach separate form): _____

Pressure Pan Average (Test-In): _____ Pressure Pan Average (Test-Out): _____

Verification of Measures Installed:

| | | | |
|--|---|---|---|
| <input type="checkbox"/> Basement Air Sealing | <input type="checkbox"/> Attic Insulation | <input type="checkbox"/> DHW System Replace / Repair | <input type="checkbox"/> Health & Safety: _____ |
| <input type="checkbox"/> Attic Air Sealing | <input type="checkbox"/> Window Replacement / Repair Qty: _____ | <input type="checkbox"/> DHW Blanket / Pipe Insulation | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Baseboard / Molding Air Sealing | <input type="checkbox"/> Window Film / Solar Screen Qty: _____ | <input type="checkbox"/> Exhaust Fans - Qty: _____ / HRV | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Windows / Doors Air Sealing | <input type="checkbox"/> Door Replace / Repair Qty: _____ | <input type="checkbox"/> Exhaust Vents Reroute / Insulate | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Ext. Wall to Garage Air Sealing | <input type="checkbox"/> Heating System Replace / Repair | <input type="checkbox"/> Attic Vents Qty: _____ | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Attic Flat Insulation | <input type="checkbox"/> Central Air Conditioner Replace / Repair | <input type="checkbox"/> Appliance: _____ | <input type="checkbox"/> Notes/Items Requiring Follow-Up: _____ |
| <input type="checkbox"/> Attic Slope Insulation | <input type="checkbox"/> Htg / DHW Flue Replace / Repair | <input type="checkbox"/> Appliance: _____ | |
| <input type="checkbox"/> Attic Knee Wall Insulation | <input type="checkbox"/> Air Handler Replace / Repair | <input type="checkbox"/> Lighting: CFL's / Fixt. Qty: _____ | |
| <input type="checkbox"/> Exterior Wall Insulation | <input type="checkbox"/> Duct Sealing / Insulation / Replacement | <input type="checkbox"/> Renewable Energy Syst: _____ | |

Contractor Statement and Signature: I attest that all of the information entered above is correct to the best of my knowledge. I agree to complete any items noted above for follow-up corrective action, and will submit an additional Post-Installation Tests and Inspections form that verifies the successful completion of those items and records required follow-up tests or inspections:

Contractor Signature: _____ Date: _____

Customer Statement I attest that I am the owner of the property specified above, and that all materials and equipment included my home improvement contract with the above Contractor have been furnished and installed by the Contractor, and that the work has been completed pursuant to the contract.

Customer Signature: _____ Date: _____

Section 4: HPwES Summary Certificate

4.1. Introduction

Homeowners who choose to invest in upgrading the energy performance and comfort of their home are often interested in having a “Summary Certificate” that documents the improvements, as well as the organizations and companies involved in their home performance improvement. This “Summary Certificate” is recommended when an estimated energy savings of 20% or more is achieved through improvement measures.

Local Program Sponsors who want to develop their own “Summary Certificate” must ensure that it includes the required elements specified below and is submitted to the National Program for approval prior to being distributed.

4.2. Required and Recommended Elements

The required elements of the “Summary Certificate” are:

- The National HPwES logo mark and mission statement.
- Address of home where improvements were completed.
- Names of companies performing and verifying improvements.
- Date of improvements completion.
- Specific home improvements completed (e.g., attic insulation increased to R-30, SEER 14 air conditioner installed, air sealing performed).

Optional Elements for the Summary Certificate Include:

- *Estimated energy savings or home performance results achieved. (e.g. HERS® Index)*
- *Estimated environmental impacts of improvements.*
- *Local Program Sponsor logo mark and mission statement (if applicable).*
- *Program representative signature block.*

4.3. Example Certificate

Home Performance with ENERGY STAR®

Summary of Energy Improvements Performed



Efficiency Vermont

Home Address:
OWNER NAME
Address
City, State, Zip

Work Performed by:
Company Name

Work Verified by:
Company Name

Work Completed on:
Month 00, Year

Program Representative (Signature Optional) _____

Home Performance Improvements:
(Sample List)

- Air Sealing Performed
- Attic Insulation Increased to R-30
- Wall Insulation Added
- Ducts Sealed
- Seer 14 Air-Conditioning Installed
- 90% AFUE Furnace Installed
- High-Performance Windows Installed
- ENERGY STAR Qualified Dishwasher and Refrigerator Installed
- 5 ENERGY STAR Qualified CFLs Installed

Environmental Impact of Improvements:
(Optional)

- CO₂ Emissions reduced by: 1360 lbs

Home Performance Results Achieved:
(Optional)

- Home energy use before improvements
- Home energy use after improvements (estimated)

Home Performance with ENERGY STAR® offers a comprehensive, whole-house approach to home improvement that results in better energy efficiency, greater comfort, and lower energy bills.
ENERGY STAR is a voluntary partnership sponsored by the U.S. EPA and U.S. DOE to protect the environment through superior energy efficiency.



HOME PERFORMANCE WITH
ENERGY STAR

Section 5: Quality Assurance Protocols

5.1. Introduction

In accordance with the terms and conditions of using the ENERGY STAR logo mark, and to maintain HPwES's reputation for quality and value all Program Sponsors are required to implement a QA plan. This plan will include strategies to ensure that participating contractors are qualified and that completed improvements meet program standards. QA plans will explain:

- Reporting process that requires participating contractors to report jobs that are promoted to homeowners and performed under the HPwES logo.
- Job report review process that ensures program compliance and provides for follow-up with the contractor when necessary.
- Customer feedback mechanism which allows customers to provide feedback directly to the Program Sponsor.
- On-site inspection protocols including a sampling rate set at a minimum of 5% (1 in every 20 jobs) for all participating contractors.
- Conflict resolution mechanism for responding to and resolving customer complaints.
- Record keeping and tracking of results from on-site inspections, customer surveys, and corrective actions. Records must be available for review upon request from the National HPwES Program.

5.2. Required and Recommended Elements

Program Sponsors are required to implement a QA program that evaluates whether participating contractors have:

- Performed a HPA and made comprehensive recommendations for improving the performance of the home.
- Installed improvements which will reduce energy use in the home, improve comfort, or address specific building performance problems, such as failures on combustion tests.
- Satisfactorily completed the contracted scope of work.
- Performed required diagnostic tests and inspections upon completing the improvements.

5.2.1 Job Reporting Review

This guidance has been developed to help clarify the job report review process and provide recommendations for Program Sponsors to consider while developing program policies. While the Program Sponsor may choose to consolidate reporting of all information into one submittal, this section describes the report review process as three separate document reviews which are supplemented by a periodic review of a contractors performance history across a period of time. An example of questions to be answered during the job report review process is in Section 5.3.

This guidance has been divided into the following areas:

- HPA Summary Report (Findings and Recommendations).
- Scope of Work Review.
- Test-out Report Review.

Optional Report Review Process

The required paperwork reporting associated with completed jobs may be reported to the Program Sponsor at set intervals or at the completion of the job. Providing incentives to encourage contractor reporting is recommended.

HPA Summary Report (Findings and Recommendations)

The HPA summary report will include findings of existing conditions and recommendations to improve the performance of the home. Many Program Sponsors may choose to receive this report with the scope of work contracted by the homeowner. This review would verify that:

- Compliance with HPA delivery requirements.
- Recommendations provided to the homeowner are reasonably comprehensive and consistent with the findings of the HPA.
- Recommendations include an estimate of energy savings from the proposed improvements.

Scope of Work Review

Some programs may require a review of the scope of work before approving financing or incentives for eligible measures.

Test-out Report Review

The review of test-out information must be included in the report review process. This is a review of all required post-completion test-out data and will include a customer's signature signifying that the work is complete (and meets their reasonable expectations). The test-out report may be compared to the contracted scope of work and other pre-installation reporting data for consistency and accuracy of the completed job. The HPA findings, test-out report and installed measures will provide the basis for the on-site QA inspections. If corrective action is needed, based on results of an on-site QA inspection, then an additional test-out report will be submitted to document the corrective action completed with a customer signature.

Optional Report Review Process

Summary and Trends Review

It is recommended that Program Sponsors not only look for clear examples of noncompliance, but also look for patterns of potential non-compliance over many jobs (for instance, a heating contractor demonstrating a habit of failing to recommend attic insulation in the Homeowner Summary Report). For this reason, it is recommended that all reviews be tracked and trend analysis be completed quarterly.

Follow-up

If reviews indicate that a contractor's reported jobs do not meet program policies and procedures then the Program Sponsor will consider conducting an on-site inspection on the job being reported.

5.2.2 On-site Inspection Protocols

Local Program Sponsors' QA protocols are required to explain how on-site inspections will be conducted. The on-site inspections will be delivered by individuals that meet or exceed the local program's minimum technical requirements for a participating contractor.

The protocols for performing on-site inspections have been divided into the following areas:

- Job Selection Protocol
- Customer Discussion
- Visual Inspection and Diagnostic Tests
- Contractor Performance Record
- Inspection Documentation

Job Selection Protocol

Program Sponsors are required to perform on-site inspections at a minimum sampling rate of 5% on each participating contractor's completed jobs. On-site inspections focus on evaluating a participating contractor's ability to perform a HPA, develop a scope of work of eligible improvements, and properly install the improvements selected by the customer.

Jobs will be selected through a random sample in order to obtain a representative sample of each contractor's work. However, the sample is not expected to be purely random. Some homeowners will not be willing to schedule the inspection; other customers may request an inspection due to issues or concerns about the work performed; and some inspections may be conducted as a result of issues raised in the job report review process.

All on-site job inspections will occur after improvements have been installed. However, the on-site inspection may be scheduled during the contractor's test-out and prior to the job completion being reported to the Program Sponsor. On-site inspections will be made on a continuous basis and not completed in bulk (e.g., do not wait until a contractor has completed their first 20 jobs to start performing on-site inspections). Contractors with multiple offices or locations across wide geographic areas will be treated as separate participants for the purpose of determining their on-site inspection rate.

Optional Tiered Sampling Rate

It is recommended that a greater sampling rate be applied to participating contractors who are new to the program and/or are not fully meeting program requirements. The following is an example of a tiered approach to sampling rates for on-site inspections:

- Tier 1 In-field inspection or mentoring on 3 of the first 5 jobs completed by a new contractor participant.*
- Tier 2 After the first 5 jobs are completed, 20% of the next 20 jobs would receive in-field inspections.*
- Tier 3 After completion of their first 25 jobs, the Program Sponsor would begin inspecting jobs at a lower sampling rate while maintaining an overall rate that is above or equal to 5% of total completed jobs (minimum required sampling rate).*

The specific sampling rate can vary as long as overall a 5% inspection rate is maintained. In this tiered approach, a Program Sponsor would typically not reduce a contractor's inspection rate until the contractor is making satisfactory progress toward meeting program standards. For example, a Program Sponsor may use the Tier 1 sampling rate for a new contractor beyond the contractor's first five jobs if the initial in-field inspections indicate significant difficulties in meeting program requirements.

Customer Discussion

It is required that the on-site inspection begins with the inspector (acting on behalf of the Program Sponsor) introducing themselves, their organization affiliation, and their purpose: to verify the work meets program guidelines. The inspector should address any questions that the customer has about the inspection and determine if the customer has any specific concerns about the installed work. However, it is very important the inspector present a positive and objective attitude during all conversations with the homeowner.

Optional Customer Discussion Items

The inspector may interview the customer about their experience with their home performance consultant and/or contractor to gain valuable insights that may enhance the program. This discussion could include:

- *Verifying that the customer received program information explaining the HPA process and what to expect from the program (if providing this program information is required by program).*
- *Confirming that the customer received an HPA report and recommendations for comprehensive improvements.*
- *Verifying the important pre-existing conditions (if appropriate) and installation of contracted measures.*
- *Verifying who installed the measures and when the improvements were completed.*
- *Inquiring as to whether the customer has utility bill data available, if the utility bills were requested by the contractor and, if so, whether the customer provided the utility bills to the contractor.*
- *Verifying completion of diagnostic test(s) before and after installation of measures (e.g. blower door test prior to beginning installation of shell measures and again after they were complete).*
- *Discussing the customer's satisfaction with: the participating contractor's assessment, the installation; and their overall experience with the HPwES program.*
- *Encouraging customers to refer friends and family to the program.*

Visual Inspections and Diagnostic Tests

After completing the introductory discussion with the customer, the inspector will begin the required visual and diagnostic inspection. The visual and diagnostic inspections are derived from HPA requirements (see Section 2.2.) and required test-out diagnostic tests and inspections based on the installed scope of work (see Section 3.2. of this Guide).

The following list describes the areas the inspector will examine:

- Obvious missed opportunities for improving home performance that were not reflected in the HPA findings and recommendations.
- Proper installation of measures installed by the contractor.
- Verify test-out inspections and diagnostic results completed by the participating contractor.

Results of these visual and diagnostic inspections will be compared to the documentation (HPA summary report, recommended improvements, installed improvements, and test-out data) reported to the program by the contractor to evaluate their performance.

The inspector will not make judgments about the contractor's professional integrity or service to the customer. Any communication about the contractor's performance will always follow program protocols for contractor feedback and corrective action.

Inspection Documentation

Program Sponsors are required to keep a record of all inspections performed including on-site QA inspection form(s), and any follow-up actions with the contractor and/or customer. Program Sponsors will document:

- On-site inspection report including contractor performance (e.g. scoring protocol, see example in, Section 5.2.).
- Follow-up with contractor, if required. This includes a record of any remedial actions, such as corrective measures in the home by the contractor; assignment of program technical or administrative assistance to address a particular contractor need; or, in more serious cases, program disciplinary actions. If corrective measures in the home are requested and installed, the

program must receive additional documentation with appropriate test-out information and a customer signature.

Contractor Performance Record

It is required that the performance of contractors be evaluated as part of the on-site inspection process. Program Sponsors are required to develop a methodology for tracking a contractor's performance across their completed jobs. This methodology will be explained in the Program Sponsor's implementation plan.

Optional Contractor Performance Methodology

Scoring Protocol

A scoring methodology may be helpful to document a contractor's performance history, provide contractor feedback, and provide an objective basis for increasing the on-site inspection rate or removing a contractor from HPwES program. Program Sponsors may develop a scoring protocol and submit to EPA and DOE as part of their implementation plan. An example of a job scoring protocol is in Section 5.4. of this guide.

5.2.3 Customer Feedback

Receiving direct feedback from homeowners (participating contractor customers) is an important part of a HPwES QA program. Local Program Sponsors are required to have a mechanism for customers to provide feedback. Direct customer feedback can reduce risks and costs by helping to:

- Determine customer satisfaction.
- Check for program compliance.
- Identify high performing and low performing contractors.
- Focus marketing efforts.

Optional Elements for Receiving Customer Feedback

The National HPwES Program recommends the use of customer surveys as the principle means for collecting customer feedback. The local Program Sponsor can use these guiding principles when developing a customer survey or other customer feedback mechanism:

- *Survey should be short and easy to do (5-10 questions maximum).*
- *Survey should be done routinely on every job or on an established sampling interval.*
- *Survey should be sent or performed directly by the Program Sponsor or independent representative.*
- *Survey should be sent directly back to the Program Sponsor or independent representative.*
- *Survey should include, at a minimum, questions on the following topics:*
 - *Customer satisfaction with the quality of the work done.*
 - *Was a HPA performed at the beginning of the job?*
 - *Customer satisfaction with the contractor who did the HPA and those who did the work.*
 - *How the customer found out about the HPwES Program.*
- *Survey should be anonymous, but allow the customer to provide contact information.*
- *Survey should include information on how to contact the program sponsor for additional feedback (phone number and/or e-mail).*
- *Survey results should be saved, compiled, and analyzed on a routine periodic basis.*

For the best survey success (highest return rate), customers should be actively asked to provide feedback. This can be done by several methods:

- *Calling customers to do the survey over the phone.*
- *Directly mailing or e-mailing customers the survey.*
- *Completing the survey during on-site inspections.*

Contractor Follow-up

If either positive or negative feedback is received from a customer, that information will be recorded as part of a contractor's performance history. An on-site inspection will be scheduled if customer feedback warrants additional investigation to verify that the contractor is meeting program policies and procedures.

5.2.4 Contractor Feedback and Corrective Actions

This QA component of the HPwES program serves a dual purpose: first to ensure that contractors are meeting all program guidelines and technical standards and second to provide a mechanism for constructive feedback intended to improve their diagnostic capabilities, comprehensiveness and quality of work and customer relations. Contractor feedback is a key to maximizing program benefits, ensuring their persistence over time and providing a pathway to successful market transformation. *Since HPwES programs are voluntary, it is recommended that QA communications be delivered in a positive spirit of assistance, education and continuous improvement.*

Providing feedback to contractors on delivering effective HPA's, following technical standards, and installing improvements using best practices can be the most important and valuable service that a Program Sponsor can provide to new participating contractors. *For this reason, it has been recommended to have a tiered sampling rate (see Section 5.2.2.) to assist new participants.*

At the same time, contractor feedback on performance ensures a "level playing field" for all participating contractors, a feature that can be critical to retaining them as program participants, as well as critical brand protection for the National Program and local Program Sponsor.

Program Sponsors will formalize a process for managing contractors that do not meet program policies and procedures. This process will be clearly explained in a contractor participation agreement. When issues are discovered as a result of job reporting reviews, customer surveys, customer inquiries and concerns, or on-site inspections the first step is to contact the contractor and try to resolve the issue in a positive way. Because issues can not always be resolved in a constructive way it is best to document all QA findings and inform participating contractors of any significant or serious deficiencies and any corrective actions that need to be taken immediately. Examples of program job report review evaluation forms, on-site inspection scoring forms, and contractor feedback and corrective action scenarios on individual projects can be found in Sections 5.3., 5.4. and 5.5., respectively.

A Program Sponsor's process for evaluating and managing contractor performance will include the following:

- Written field reports followed by contractor performance feedback discussion.
- If required, corrective action work scopes and completion verification.
- Written notification of recurring, systematic or otherwise serious non-compliance with program policies, standards behavior or applicable laws or regulations.
- Provisions for disciplinary action, such as probation or suspension.
- Provisions for contractor to appeal a disciplinary action.

Optional Corrective Actions

Re-training and Mentoring

If contractor performance fails repeatedly, it is recommended that the program consider additional program action beyond the corrective action measures in the home. Additional training or job mentoring can be offered or required to address the deficiencies in performance, if deemed necessary by the QA inspector.

Increased On-site Inspection Rate

It is also recommended that the program increase the on-site QA inspection sampling rate until the contractor demonstrates improvement.

Maintaining the integrity of the program should be a Program Sponsors primary concern. Therefore, contractors who consistently fail to follow program policies and procedures, or existing laws and regulations should be removed from the HPwES Program. If this situation occurs Program Sponsors are strongly encouraged to make a good faith effort to work with the contractor to overcome any shortcomings confidentially. If a contractor is removed from the HPwES Program, the Program Sponsor must notify EPA and DOE of the action.

5.3. Example Job Report Review Evaluation

HPA Summary Report Review

| HPA Summary Report Review | Yes | No |
|--|-----|----|
| All required diagnostic tests have been performed and information provided is consistent with program policies and procedures. | | |
| Findings reflect strong adherence to the technical guidelines and local program requirements | | |
| Combustion equipment tests have been completed and appropriate recommendations have been made to mitigate any failures in the | | |
| Recommendations are comprehensive and consistent with program policies and procedures and with HPA findings | | |
| Estimated savings for proposed improvements have been provided as part of the summary report | | |
| Notes: | | |

Scope of Work Review

| Contract Scope of Work of Contract Review | Yes | No |
|---|-----|----|
| Any findings of combustion safety issues have been included and addressed in the scope of work | | |
| The scope of work is consistent with the recommendations in the HPA Summary Report and program policies (cost effectiveness or allowed measures and installation specifications). | | |
| The scope of work is comprehensive in nature and includes the replacement of more than one system (e.g. Not just an HVAC replacement or window replacement job) | | |
| Notes: | | |

Test-out Report Review

| Test-out Report Review | Yes | No |
|---|-----|----|
| All appropriate post diagnostic and visual inspections have been recorded per the contracted scope of work. | | |
| All installed measures in the contracted scope of work have been verified as installed. | | |
| Airflow tests have been completed on the HVAC system if work on ducts or an HVAC system was replaced in the scope of work. Is the airflow within the acceptable range? Refrigerant charge was check for AC or HP replacements | | |

| | | |
|---|--|--|
| Combustion equipment testing and combustion appliance zone testing has been completed and results recorded. No corrective action is needed based on results | | |
| Building air-tightness standards have been calculated and appropriate recommendations for ventilation or required corrective action has been installed | | |
| The contractor and customer have signed the test-out reporting form attesting to the completeness of work | | |
| Notes: | | |

5.4. Example On-site Inspection Scoring Methodology

The following is a proposed methodology to use during on-site inspection to evaluate a contractor's work or can be used by Program Sponsors to design their own scoring methodology. The scoring tables below provide a conceptual basis for a programmatic scoring system that would be based substantially on a Program Sponsor's adopted technical standards (e.g. BPI Technical Standards⁵).

In this example a contractor would receive the lowest score for which they received a "Yes" on an inspection finding. The scoring protocol presents a set of statements that characterize a contractor's work performance. The inspector would begin with the first set (Score 0) and answer each question either "Yes" or "No". If the contractor receives a "Yes" answer to any question, they receive a score of 0. If not, they proceed to the next set of questions and repeat the process. The scoring is on a scale of 0 to 4, with the 0-2 scores in the "Fail" range and 3-4 in the "Pass" range.

Score: 0 - Contractor's performance does not meet technical standards or program requirements and the home requires immediate corrective action:

| On-site Inspection Findings | Yes | No |
|---|-----|----|
| Combustion appliance testing (including carbon monoxide test, draft measurement, spillage evaluation, and worst-case depressurization of combustion appliance zone) results do not meet BPI Technical Standards or relevant equivalent program standard | | |
| Measures in contracted scope of work not installed (e.g. attic insulation not installed or duct sealing work not completed) | | |
| Minimum standards for building ventilation are not being met (e.g. BPI Technical Standards) | | |
| Unsafe conditions resulting from installed work and posing an immediate risk to occupants are found (e.g. greater than 35 ppm recording during combustion appliance testing) | | |
| Notes: | | |

Score: 1 - Contractor's performance does not meet technical standards or program requirements and the home requires corrective action:

| On-site Inspection Findings | Yes | No |
|--|-----|----|
| Serious moisture issues have gone unaddressed and have not been included in recommendations per Program Sponsor requirements | | |

⁵ BPI Technical Standards are currently being modified and this Guide will be updated to reflect any revisions.

| | | |
|---|--|--|
| Health and safety issues present, but do not pose an immediate risk to occupants | | |
| Measures were not installed correctly (Airflow or refrigerant charge associated with a new AC system does not meet program requirements (e.g. ACCA HVAC QI Specification or BPI Technical Standards)) | | |
| Customer did not receive HPA report or did not receive comprehensive recommendations | | |
| Notes: | | |

Score: 2 - Contractor's performance meets all combustion safety requirements but several technical deficiencies were observed that require corrective action:

| On-site Inspection Findings | Yes | No |
|--|------------|-----------|
| Below standard installation of insulation (e.g. significant gaps or voids in installation of attic insulation or attic insulation levels do not meet specifications in the contracted scope of work) | | |
| Air sealing work did not address significant pathways for infiltration (e.g. large attic bypasses into the living space around duct work penetrations, dropped soffits ceilings, etc...) | | |
| Windows installed did not meet program requirements (e.g. specified performance for u-value and solar heat gain co-efficient) | | |
| Garage to living space leakage found and not addressed in the HPA findings and recommendations nor the scope of work | | |
| HVAC equipment not installed to program guidelines or not operating properly (e.g. flame interference found in gas furnace, indoor evaporator coil not matched to the outdoor coil for AC system replacement, or furnace temperature rise test not within manufacturer specified range) | | |
| Recommended measures on HPA report were not comprehensive; inspection found several cost effective improvements that were not recommended to the customer (e.g. blower door test results indicate considerable opportunities for air sealing that were not included in HPA findings and recommendations) | | |
| Test-out reporting does not match on-site QA inspection (inaccurate testing results) | | |
| Notes: | | |

Score: 3 - Contractor's performance meets all technical standards and program requirements but some areas of technical performance need improvement and may require corrective action:

| On-site Inspection Findings | Yes | No |
|--|------------|-----------|
| Installed measures did not meet all technical installation standards, but no serious deficiencies and contractor corrected items. (e.g. use of sealant on ductwork that does not meet UL 181, UL 181A, or UL 181B) | | |
| Some incorrect data gathered and provided to customer but with no significant impacts on the work completed or effectiveness of the job | | |
| Recommendations in customer report are fairly, but not completely comprehensive (e.g. did not address minor moisture issues like | | |

| | | |
|---|--|--|
| downspout extensions or some air sealing opportunities were missed) | | |
| Notes: | | |

Score: 4 - Contractor's performance meets all technical standards and program requirements

| On-site Inspection Findings | Yes | No |
|---|------------|-----------|
| All technical standards for installation have been met (e.g. BPI Technical Standards) | | |
| Work comprehensive in nature, and high priority items have been installed. | | |
| Recommended and installed measures were consistent with program requirements; work not performed was by customer decision | | |
| Test-out reporting verified to be accurate | | |
| Notes: | | |

5.5. Example Contractor Feedback and Corrective Action Levels

The following list shows 5 potential scenarios from the QA process and contractor feedback and/or corrective actions that could be taken:

1. If there are no deficiencies in performance found and the contractor has provided comprehensive recommendations, fulfilled the work scope, and installed measures that meet all technical standards, it is recommended that the program provide positive feedback to the contractor on their performance. Exemplary performance should also be documented and, if consistent, it is suggested that contractors be recognized for their contributions to the program.
2. If the customer is satisfied with the work, program and technical standards have generally been met, but there are relatively minor deficiencies or opportunities to improve a contractor's performance such as a non-comprehensive set of recommendations in the homeowner report, evidence of repeatedly non-comprehensive job scopes (suggesting a lack of desire or success in selling comprehensive work) or an indication of minor inaccuracies in tests performed, then constructive feedback should be provided to the Contractor. This feedback would encourage performance improvement in the future and to reinforce positive aspects of their job performance.
3. If the customer is satisfied with the work and program standards have generally been met, but deficiencies are present in the completeness, compliance with the contract or quality of the work performed, the QA inspector is required to contact the Contractor to discuss findings and corrective actions to be taken. The QA inspector will provide a work scope of corrective actions to the contractor and require the contractor to correct deficiencies within a specific period of time (recommended to not exceed 30 days). Contractor is required to provide written documentation with the customer's signature after completing the corrective actions. Program evaluates whether additional training or job mentoring is necessary to improve the contractor's performance and a higher on-site inspection rate is applied to future jobs.
4. If the customer is dissatisfied and the QA inspector verifies that deficiencies are present but are not an immediate health or safety threat to the home's occupants, the QA inspector is required to document findings and contact the Contractor / Field Supervisor to discuss the findings and corrective actions that will be taken. The QA inspector will provide a list of corrective actions to

the contractor and require the contractor to correct deficiencies within a specific period of time (recommended to not exceed 30 days). Contractor is required to provide written documentation with the customer's signature after completing the corrective actions. The program evaluates whether additional training or job mentoring is necessary to improve the contractor's performance and a higher on-site inspection rate is applied to future jobs.

5. If any serious condition is found through the QA process (typically on-site inspection) that must be addressed immediately because of imminent health and safety threats, it is required that the QA inspector contact the contractor without delay and inform the homeowner of the condition. The QA inspector will take remedial action, as appropriate, which may include educating the homeowner, calling the fire department, or shutting off appliances. The QA inspector will ensure to the maximum extent possible that the condition has been addressed in the short term and provide the contractor with a list of corrective actions. The contractor will provide the program with written documentation that the customer has signed, to verify completion of the corrective actions. Program evaluates whether additional training or job mentoring is necessary to improve the contractor's performance and a higher on-site inspection rate is applied to future jobs.

Appendix A

HPwES Partnership Agreement

Program Sponsor Partnership Agreement For Home Performance with ENERGY STAR®



Return this form to ENERGY STAR:
HomePerformance@EnergyStar.gov
US EPA (Mail Code 6202J)
1200 Pennsylvania Ave, NW
Washington, DC 20460
FAX: 202-343-2200

Eligible Organizations: Organizations that implement a residential home improvement program that meets the criteria for Home Performance with ENERGY STAR, a joint U.S. Environmental Protection Agency and U.S. Department of Energy program.

Through this agreement, ENERGY STAR and _____
(hereafter "the Partner") agrees to work in cooperation to promote Home Performance with ENERGY STAR under the program name _____ (hereafter "the program").

Organization Name: _____
Contact Name: _____ Email: _____
Address: _____ City/State/Zip: _____
Telephone: _____ Fax: _____ Web Site: _____
Major Metro Area(s) Served: _____

Partner Commitments

The following are the terms of the ENERGY STAR Partnership Agreement for Home Performance with ENERGY STAR (HPwES) Program Sponsors. Guidance on this agreement is available at: www.energystar.gov/hpwessponsors.

- A. ENERGY STAR Brand Requirements** –The partner agrees to comply with ENERGY STAR branding requirements as follows:
1. Comply with current ENERGY STAR Identity Guidelines, (available at www.energystar.gov) which describe how the ENERGY STAR marks, marketing graphics, and name may be used. The Partner is responsible for adhering to these guidelines and for ensuring that its authorized representatives, such as implementation contractors, advertising agencies, and participating contractors are also in compliance. In order for the Partner to ensure compliance, the Partner must maintain a current list of authorized representatives which ENERGY STAR may request to verify compliance.
 2. The Partner is responsible for the proper use of the ENERGY STAR marks, as well as the proper use of the Home Performance with ENERGY STAR marketing graphic used by participating program contractors.
 3. Feature the appropriate ENERGY STAR marks(s) on Partner's Web site and in other promotional materials. To link to the Partner on the ENERGY STAR web site, the Partner must first comply with the ENERGY STAR Web Linking Policy found on the ENERGY STAR Web site.
 4. Submit all Web site designs, and marketing materials, developed for the Partner's Home Performance with ENERGY STAR promotions to ENERGY STAR (using the address listed above) for review to ensure accuracy of ENERGY STAR marks used and consistency of the ENERGY STAR message. The Partner will allow a minimum of five full working days for ENERGY STAR to review and approve Web site designs and marketing materials.
 5. Provide Home Performance with ENERGY STAR training to all employees who provide customer service. This training shall include: a) a description of Home Performance with ENERGY STAR, b) tips for answering questions about Home Performance with ENERGY STAR, and c) information on the economical and environmental benefits of energy efficiency.
 6. Notify ENERGY STAR (using the address listed above) of a change in the designated responsible party or contacts for this agreement within 30 days.

B. Program Plan Requirements – The Partner agrees to develop and submit a Program Plan to HPwES as follows:

1. Develop and submit a program plan to implement HPwES using the Program Plan Guidance available at www.energystar.gov/hpwessponsors.
2. After the Partner submits a program plan along **with a signed Partnership Agreement**, ENERGY STAR will review them for approval. Once approved, the Partner will be listed as an ENERGY STAR Partner.
3. The Program Plan shall be updated annually to reflect the current practices of the program.

NOTE: Help on Program Plan development is available directly from HPwES support staff. To request assistance contact HomePerformance@EnergyStar.gov.

C. Program Requirements - The Partner agrees to promote whole-house evaluation and building science-based energy improvements to existing homes. The goal of HPwES is making cost-effective, energy-efficient improvements to homes. The program shall consist of the following components:

1. **Home Performance Assessment or “Test-in”.** An energy specialist trained in building science principles will perform a Home Performance Assessment (HPA) which will include a visual and diagnostic energy inspection of the home using a form standardized for the program. See HPwES Sponsor Guide at www.energystar.gov/hpwessponsors for HPA details.
2. **Inspection Results and Recommended Improvements.** Improvements to the home will be recommended based on the initial inspection and homeowner interview. The homeowner will be given a review of the findings and provided with a summary report including:
 - a. A summary of HPA findings
 - b. Improvement recommendations
 - c. An estimation of costs for the improvements
 - d. An estimation of energy savings from implementing the recommendations.

NOTE: Recommendations for improvements will be on a fuel-neutral basis.

NOTE: See HPwES Sponsor Guide at www.energystar.gov/hpwessponsors for details.

3. **Installation of measures.** The program will help homeowners identify qualified contractors able to implement the HPA recommendations. This can either be the participating contractor providing the inspection and recommendations or other contractors qualified in home energy inspection, building science, and proper installation techniques. All installed measures will be in accordance with industry best practices. See HPwES Sponsor Guide at www.energystar.gov/hpwessponsors for details.
4. **Post-Installation Tests or “Test-out”.** Documentation of improvements and diagnostic testing (test-out) will be used to verify the performance of installed measures as well as to meet health and safety standards. A summary of the final tests will be given to the homeowner. The results may be in the form of a “Summary Certificate”. See the HPwES Sponsor Guide at www.energystar.gov/hpwessponsors for details.

D. Program Quality Assurance (QA) Requirements –The Partner, either directly or through it’s implementation contractor, will administer a quality assurance (QA) program that meets the following minimum requirements (See HPwES Sponsor Guide at www.energystar.gov/hpwessponsors for additional guidance on program QA):

1. All participating contractors will agree to the terms of a participation agreement established by the Partner. The terms of the contractor participation agreement will include a requirement to comply with the current ENERGY STAR Identity Guidelines and properly use the HPwES logo. All jobs performed by contractors who agree to these requirements and sign the agreement (i.e. “participating contractor”) must be reported to the Partner after a Home Performance Assessment is completed and some recommended improvements are completed.
2. All job reports will be reviewed by the Partner based on protocols established by the Partner to identify quality of service problems associated with jobs completed by participating contractors. If needed, the Partner may follow-up with a contractor or conduct an on-site inspection to verify the quality of the service provided.

3. In addition to the above, the Partner will conduct on-site inspections, at a set inspection rate, of the work of all participating contractors. The minimum on-site job inspection rate is set at 5% (1 in every 20 jobs).
NOTE: It is recommended that the Partner establish an adjustable on-site inspection rate for contractors based on job experience and performance. This inspection rate reduces as the contractor gains experience in the program and as on-site inspections show the contractor is performing well. Contractors may drop down a tier if performance slips. Here is the recommended set of tiers:
 - a. Tier 1 Contractor - The first 3-5 jobs will be inspected on-site or mentored.
 - b. Tier 2 Contractor - 20% of the next 20 jobs are inspected on-site (4 out of 20).
 - c. Tier 3 Contractor - 5% of all jobs inspected on-site (1 in 20).
4. All Partners are required to have a systematic customer feedback mechanism which allows customers to provide feedback directly to the Partner. Negative feedback must be addressed.
5. All Partners must record and track their inspections, rate of inspections, findings, and corrective actions. Records must be available for review when requested.

NOTE: HPwES is a voluntary program and QA communications with participating contractors should be delivered in a positive spirit of assistance, education and continuous improvement.

NOTE: Partners may authorize an independent entity to review reports, initiate customer feedback, follow-up on problems, perform on-site inspections, and document actions.

E. Program Data Reporting Requirements –The Partner, either directly or through its implementation contractor, will provide ENERGY STAR (using the address listed above) with data to assist in determining the effects of the program and to ensure that QA is being performed by all Partners. (See HPwES Sponsor Guide at www.energystar.gov/hpwessponsors for additional guidance on data reporting requirements.)

1. Provide to ENERGY STAR, on a quarterly basis and in electronic format, the following minimum data:
 - a. Number and names of participating contractors
 - b. Number of completed jobs per contractor
 - c. Number of on-site inspections completed per contractorThis information is due by April 30th for the first quarter, July 31st for the second quarter, October 31st for the third quarter, and January 31st for the fourth quarter.

***NOTE: Partners that do not submit quarterly reports will be considered inactive and removed from the ENERGY STAR web site. In addition, to remain active, the Partner must report a minimum of 50 jobs per year. A new program has 2 years to meet this requirement.**

2. In addition to quarterly reporting, an annual summary report (**due by December 15th for the current calendar year**) is required. This annual report will include at a minimum:
 - a. An annual summary of contractor recruitment/training activities,
 - b. Quality assurance activities,
 - c. Marketing activities, and
 - d. Future program plans.This report should be less than three pages and can be used in a Partner's application for an ENERGY STAR Award.

ENERGY STAR Commitments to Partners:

1. Increase awareness of HPwES by distributing key messages on the benefits of a whole-house approach to improving energy efficiency.
 2. Provide current HPwES news, information, and reference documents (via the ENERGY STAR Web site, Hotline, e-mail or other means).
 3. Provide ENERGY STAR Partners with public recognition for their involvement in HPwES.
 4. Respond swiftly to any Partner request for information or clarification on HPwES policies.
-

General Terms and Disclaimers:

1. The Partner will not construe, claim or imply that its participation in ENERGY STAR constitutes federal government approval, acceptance, or endorsement of anything other than the Partner's commitment to ENERGY STAR. Partnership does not constitute federal government endorsement of the Partner or its services.
2. The Partner understands that the activities it undertakes in connection with ENERGY STAR are voluntary and not intended to provide services to the federal government. As such, the Partner will not submit a claim for compensation to any federal agency.
3. The Partner and ENERGY STAR will assume good faith as a general principle for resolving conflict and will seek to resolve all matters informally, so as to preserve maximum public confidence in ENERGY STAR.
4. This agreement is voluntary and can be terminated by either party at any time for any reason. Failure to comply with any of the terms of this partnership agreement can result in its termination. Termination of the partnership will result in the termination and cessation of access to the benefits of ENERGY STAR, including allowance to use any ENERGY STAR marks.
5. ENERGY STAR will actively pursue resolution of noncompliance related to the use of the ENERGY STAR marks.

To be completed by Partnering Organization

Representative with authority to commit partnering organization to the terms of this agreement

(printed name): _____

Title: _____ E-mail: _____ Phone _____

Signature: _____ Date: _____

To be completed by ENERGY STAR representative:

Kathleen Hogan, U.S. EPA

Signature: _____ Date: _____

David E. Rodgers, U.S. DOE

Signature: _____ Date: _____

Appendix B

HPwES Program Plan Outline

Home Performance with ENERGY STAR Program Plan Outline

This outline is designed to assist potential and current Home Performance with ENERGY STAR (HPwES) program sponsors in developing and refining program implementation plans. Each section highlights important considerations and questions that sponsors need to address. The HPwES Sponsor Guide and the HPwES Partnership Agreement provide additional clarification on program requirements.

| SUGGESTED PROGRAM PLAN OUTLINE | |
|---|--|
| <p>1) Introduction</p> <ul style="list-style-type: none"> a) Organization Background b) Goals and Objectives c) Target Market d) Implementation Schedule e) Estimated Budget <p>2) Program Design</p> <ul style="list-style-type: none"> a) Home Performance Protocols b) Contractor Recruitment Plan <ul style="list-style-type: none"> i) Training ii) Participation Requirements c) Marketing/Media Plan d) Incentive/Financing Plan e) Quality Assurance Plan <p>3) Program Evaluation</p> <ul style="list-style-type: none"> a) Evaluation Plan | |
| PROGRAM PLAN GUIDANCE | |
| 1) Introduction | |
| Organization Background | <p>Who is the sponsoring organization?</p> <ul style="list-style-type: none"> • Type of organization (e.g. Utility, State Energy Office, Non-profit, etc) • Describe relationship between program sponsor and other organizations that assist with program implementation |
| Goals and Objectives | <p>What are the programs goals and objectives?</p> <ul style="list-style-type: none"> • Number of contractors participating by year • Number of jobs completed by year • Projected electricity and heating fuel savings (if appropriate) |
| Target Market | <p>Where will the program be delivered?</p> <ul style="list-style-type: none"> • Describe initial target market(s) conditions. <ul style="list-style-type: none"> ○ Utility rates, housing and population demographics, average energy use, typical improvement measures ○ Identify market influencers, stakeholders, and advisory group. ○ Gas and electric utility territories. (propose strategies for cooperation) |
| Implementation Schedule | <p>What is the schedule for implementation?</p> <ul style="list-style-type: none"> • Timeline for delivery (e.g. program launch, contractor recruiting, contractor training, marketing kickoff) |
| Budget | <p>What is the budget?</p> |

| 2) Program Design | |
|------------------------------------|--|
| Home Performance Protocols | <p>How does the program meet ENERGY STAR requirements for Home Performance with ENERGY STAR?</p> <ul style="list-style-type: none"> • Describe the home energy audit and any required modeling tool/software • Describe the standard operating procedures and/or protocols |
| Contractor Recruitment Plan | <p>How will the program recruit contractors?</p> <ul style="list-style-type: none"> • Process for identifying and recruiting contractors <ul style="list-style-type: none"> ○ Are there key local organizations to assist in recruiting? • Describe contractor incentives (consider performance-based incentives) <p>What are the contractor requirements and process for participation?</p> <ul style="list-style-type: none"> • Describe required training / certifications <ul style="list-style-type: none"> ○ Will BPI certification and accreditation be required or encouraged? ○ Contractor mentoring period • Contractor Participation Agreement <ul style="list-style-type: none"> ○ Participation criteria, participant and sponsor roles, expectations, etc. ○ Procedures for terminating participation if necessary |
| Marketing /Media Plan | <p>How does the sponsor plan to market the program to homeowners?</p> <ul style="list-style-type: none"> • Describe how HPwES will be used in sales and marketing materials, including Web sites. <ul style="list-style-type: none"> ○ Consider use of materials and tools available from EPA and DOE (www.energystar.gov/hpwessponsors) ○ Consider special events like Home Energy Makeover Contests • Explain how consumer inquiries will be managed |
| Incentive/Financing Plan | <p>What financing or financial incentives will be offered to homeowners?</p> <ul style="list-style-type: none"> • Describe what consumer incentives or financing will be available <ul style="list-style-type: none"> ○ Consider financing with interest rate buy-down ○ Consider incentives for comprehensive improvements |
| Quality Assurance Plan | <p>How will the program verify that participating contractors are meeting program standards?</p> <ul style="list-style-type: none"> • Identify the organization or individuals responsible for quality assurance. • Describe the quality assurance protocols that will be followed including details on project file review and on-site inspections. • Describe how the program will measure homeowner satisfaction. • Describe the protocols that will be followed to provide feedback about a contractor's performance in the program and corrective actions. <p>What is the reporting process for improvements completed by participating contractors?</p> <ul style="list-style-type: none"> • Explain reporting and record keeping protocols. <ul style="list-style-type: none"> ○ Consider using contractor incentives to encourage reporting. <p>Will a "Completion Certificate" be issued after work is completed?</p> <ul style="list-style-type: none"> • Consider using certificate to encourage QA reporting and promote referrals. |
| 3) Program Evaluation | |
| Evaluation Plan | <p>How will program success be evaluated?</p> <ul style="list-style-type: none"> • Identify what information and metrics to collect for evaluation. • Develop system to report and track program results. |