

Residential Home-Performance Programs National Summary

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Note: All information contained in this document was compiled from interviews and documented program information. Every effort was made to provide the most current and accurate information. If a correction is necessary, contact Erica Schroeder, CEE, at (617) 589-3949, ext. 231, or eschroeder@cee1.org or Rebecca Foster, CEE, at (617) 589-3949, ext. 207, or rfoster@cee1.org.

Background

As more and more CEE members establish home performance programs, CEE has found it necessary to investigate the current status of the home performance concept. In this document, general definitions of home performance and building science are put forth, as is a brief description of a basic home performance program. Different residential building systems that home performance programs address are then examined. The document next turns to Home Performance with ENERGY STAR[®] (HPwES), which serves as a national platform for CEE members' and others' programs. Finally, the programs themselves are addressed. The different approaches that program administrators have adopted are described, as are some of the challenges that they face. Attached to this document are program summaries of several of the home performance programs currently in existence, including all of those run by current CEE members.

What is a Home Performance Program?

When referred to by those in the energy efficiency industry, “home performance” indicates a program based on building science. Building science attempts to look at buildings throughout their lifecycle in an integrated way. This “whole-house” approach requires looking at a house as a collection of interacting systems. Because the construction of residential homes includes a natural mix of disciplines, professions, and physical processes, proponents of buildings science believe the greatest promise of decreasing energy use while increasing health, comfort, and safety is to create a cross-disciplinary understanding of these fundamentals.¹

Home performance programs vary significantly, but all known efforts focus on existing homes.² Programs strive to encourage cost-effective home improvements that acknowledge the interactions of each major system in the house and are capable of delivering measurable improvements in energy efficiency, comfort, health, safety, and durability. There are currently twelve home performance programs operating in twelve different states,³ and this number is likely to increase even in the next year.

Programs begin with a home performance evaluation, similar to an energy audit. The evaluation can consist of a variety of diagnostic tests and visual inspections and comprises a multi-disciplinary assessment of each improvement for its potential to affect the other interacting home systems. For example, a home performance program administrator may require an HVAC contractor to evaluate whether adding additional insulation before installing a new HVAC system would enable a smaller system to be

¹ Building Science Group: <http://arch.ced.berkeley.edu/resources/bldgsci/bsg/bsg.html>

Increasing health, comfort and safety in homes is frequently a primary concern for consumers, at least initially. Decreased energy use and lower utility bills are often of secondary importance. This can be reflected in the ways in which home performance programs market themselves. See Section 4, “Home Performance Programs,” for more detail on individual program marketing and incentives.

² Home performance programs refer to improvements to existing homes. While many program administrators also promote home performance of new homes, these programs are commonly labeled “New Construction Programs” or “ENERGY STAR Homes Programs.”

³ This is the number of programs based on the Home Performance with ENERGY STAR model. A program list, with links to more information, can be found at: http://www.energystar.gov/index.cfm?c=home_improvement.hm_improvement_HPwES_partners

installed. Similarly, an insulation contractor may be encouraged to evaluate the need to make ventilation improvements in conjunction with insulation in order to preserve indoor air quality. Ultimately, in an ideal home performance situation, a home performance contractor would evaluate and execute every necessary improvement. The cost of recommended improvements remains a primary barrier. As a result, many programs encourage these improvements with rebates, special financing options, and other approaches, though several of the smaller programs have no direct incentives. All programs have some mechanism for quality assurance, which is discussed in more detail later.

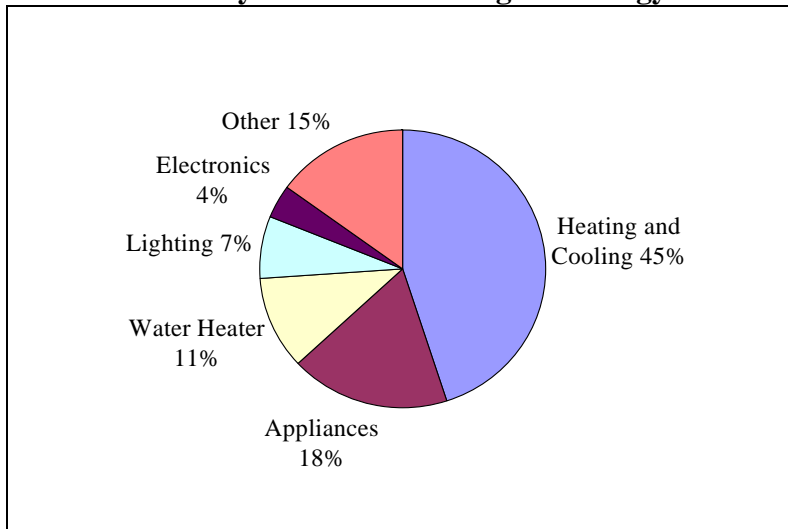
Home Systems

A house is comprised of several systems, each of which has its own parts, in turn. These systems interact with each other and affect the performance of a home. They include:

- Envelope: Outer Walls; Windows, Doors, and Skylights; Roof; and, Insulation
- HVAC: Equipment and Distribution System
- Other Energy Users: Water Heater; Appliances; Electronics; Lighting; and, others

The systems are described in more detail below. Chart 1 illustrates how each system contributes to a home’s total energy bill. As this chart demonstrates, heating and cooling, which most home performance programs address, dominate home energy use.

Chart 1: Home Systems as Percentage of Energy Bill⁴



Envelope

Definitions of a home’s envelope, or “shell,” vary. Usually, the definition includes outer walls, ceiling, floors, windows, doors, and skylights. The roof and insulation are also

⁴ Adapted from “What does my energy bill pay for?” at http://www.energystar.gov/index.cfm?c=products.pr_pie. “Appliances” includes clothes washers, dryers, dishwashers and refrigerators. “Electronics” includes TVs, VCRs, DVDs, computers and monitors. “Other” represents an array of household products, including stoves, ovens, microwaves, and small appliances. Individually, these products account for no more than about 2% of a household’s energy bills.

sometimes included. These components work together to control airflow, repel moisture, and prevent heat from being lost or gained. A high-performance envelope helps maintain a consistent temperature even under extremely hot or cold conditions.

Insulation

The purpose of insulation is to resist heat flow—it keeps heat inside the home in colder weather, and reduces the amount of heat in the house in warmer weather. The better insulated a house is, the less work its HVAC system has to do to maintain a comfortable temperature, thereby reducing energy consumption. Different types of insulation include fiberglass (batt and blown), cellulose, rigid foam, rock wool, and spray foam. Insulation is usually placed in the roof (below the waterproofing layer) or ceiling of a home, and/or between the exterior and interior walls of a home. The effectiveness of insulation is indicated by its R-value, which is a measure of a material's resistance to heat flow in units of Fahrenheit degrees * hours * square feet per Btu. The higher the R-value of a material, the greater its insulating capability is; this is not necessarily correlated to its thickness or weight, however. To be effective, insulation must be installed correctly, which, at the most basic level means using the proper thickness of insulation and avoiding gaps. In addition, all insulation, particularly loose insulation (e.g. fiberglass, cellulose, etc.), does not function properly unless the cavity in which it is inserted is airtight.

Outer Walls

To maintain consistent temperatures and moisture levels in a house, and to insure that insulation functions properly, the walls and ceiling plane should be as airtight as possible. To test for this, a contractor often uses a blower door test. By depressurizing the structure with a powerful fan and measuring the air flow across the fan, the air tightness of the building is determined. Air leakage, particularly through the ceiling plane or in the basement of a home, is detrimental to the energy efficiency of a home, though the extent to which this is true depends on climate factors. To improve air tightness, weather stripping, spray foam or caulk is used to seal any holes or cracks, including around any windows or doors to the outside, in order to reduce the passage of air and moisture. Weather stripping is available in strips or rolls of metal, vinyl, or foam rubber and can be applied on the inside or outside of a building. ENERGY STAR has a home sealing specification, and more information on air tightness can be found on the ENERGY STAR web site.⁵

Windows, Doors, and Skylights

In addition to sealing the areas around windows and doors as part of improving a home's energy efficiency, a homeowner can also upgrade to energy-efficient doors, windows, and skylights. The energy efficiency of windows is rated by two parameters: U-Factor and Solar Heat Gain Coefficient (SHGC).⁶ The U-Factor indicates the window's ability to keep heat inside the home, whereas the SHGC measures how well a window blocks

⁵ Find ENERGY STAR Home Sealing information at: http://www.energystar.gov/index.cfm?c=home_sealing.hm_improvement_sealing.

⁶ U-Factor and SHGC are two of the five parameters used by the National Fenestration Rating Council (NFRC), the national organization established to streamline window labeling. For more information on window labeling, see the NFRC's web site at: www.nfrc.org.

heat from the sun. Various technologies contribute to windows' energy efficiency, including: the operating type of the window, its orientation, the frame type, the glazing on the window (e.g. tinted glazing), the coating (e.g. low emissivity, or low-e, coating), gas fills between layers of glazing, low conductance spacers between layers of glazing, and others. ENERGY STAR has a windows, doors, and skylights specification and provides further information on its web site.⁷

Roof

A roof is generally defined as the uppermost surface of a building structure. Energy-efficient roofs are designed in such a way as to reflect more of the sun's rays. This in turn lowers the roof's surface temperature, decreases the amount of heat transferred into the house, and reduces the amount of air conditioning needed. Roofs tend to be differentiated by slope—low versus steep/high slope—and the products used to increase reflection depend on this distinction in order to maximize the roof's energy efficiency. These products include single-ply membranes, built-up-roofs (BUR), modified bitumen, spray polyurethane foam, roof coatings, standing-seam profiled metal, composite shingles, clay, concrete, or fiber-cement tile, slate, shakes, architectural profiled metal and individual metal roof components. ENERGY STAR has a roof products specification and web site, which contain further detail on these products.⁸ Energy-efficient roofs are rated in terms of their solar reflectance (or albedo).⁹

HVAC

HVAC (Heating Ventilation and Air Conditioning) systems are normally the largest consumer of energy in a home and have a major impact on all aspects of home performance. Replacing aging standard-efficiency HVAC equipment with properly sized and installed ENERGY STAR HVAC equipment is often the area of greatest potential for improving a home's performance.

Equipment

An HVAC system includes equipment that adds or removes heat (e.g., central air conditioner, furnace, boiler, or heat pump) and a distribution system that enables conditioning of the air throughout the home. There are four primary metrics used to measure HVAC equipment performance: Seasonal Energy Efficiency Ratio (SEER), Energy Efficiency Ratio (EER), Heating Seasonal Performance Factor (HSPF) and Annual Fuel Utilization Efficiency (AFUE). ENERGY STAR has heating and cooling equipment specifications and web pages that contain further detail on these products.¹⁰

⁷ Find the ENERGY STAR Windows, Doors, and Skylights web site and specification at: http://www.energystar.gov/index.cfm?c=windows_doors.pr_windows.

⁸ Find ENERGY STAR Roof Products web site and specification at: http://www.energystar.gov/index.cfm?c=roof_prods.pr_roof_products.

⁹ ENERGY STAR rates roof products only by their solar reflectance. The Cool Roof Rating Council (CRRC) lists both solar reflectance and thermal emittance (radiative properties) as considerations for roof products energy efficiency. The CRRC was formed in 1998 in an effort to streamline the rating process. For more information see the CRRC web site at: <http://www.coolroofs.org>.

¹⁰ Find ENERGY STAR heating and cooling equipment web sites and specifications at: http://www.energystar.gov/index.cfm?c=heat_cool.pr_hvac.

Distribution

Air is typically conditioned by electric resistance, a hydronic system or a forced air system. Hydronic systems rely on hot water pipes that release heat through radiation (radiators and radiant floor systems) or convection (resistors).¹¹ Forced air systems, on the other hand, rely on ducts throughout the house.

Leaky ducts can severely detract from forced air distribution efficiency. Duct leakage is generally measured in cubic feet per minute (CFM) at 50 Pascals (Pa), or CFM50. Duct leakage testing can be accomplished with a duct pressure tester, typically a Duct Blaster, and can be done in either of two ways: the total leakage test, or the leakage to the exterior test. ENERGY STAR has created a duct sealing specification available on their web site.¹²

Other Energy Users

In addition to the specific features of the home structure and its HVAC system, the water heater, appliances, electronics and lighting that a homeowner chooses can have a large impact on the home's energy efficiency. ENERGY STAR can serve as a guide for most major home appliances, electronics, and lighting.¹³ CEE and others offer guides for higher efficiency appliances.¹⁴ Though home performance programs generally do not include these end users, the amount of energy consumed by some of them, particularly appliances and electronics, is growing. This growth in energy consumption by appliances is demonstrated Chart 2 below.

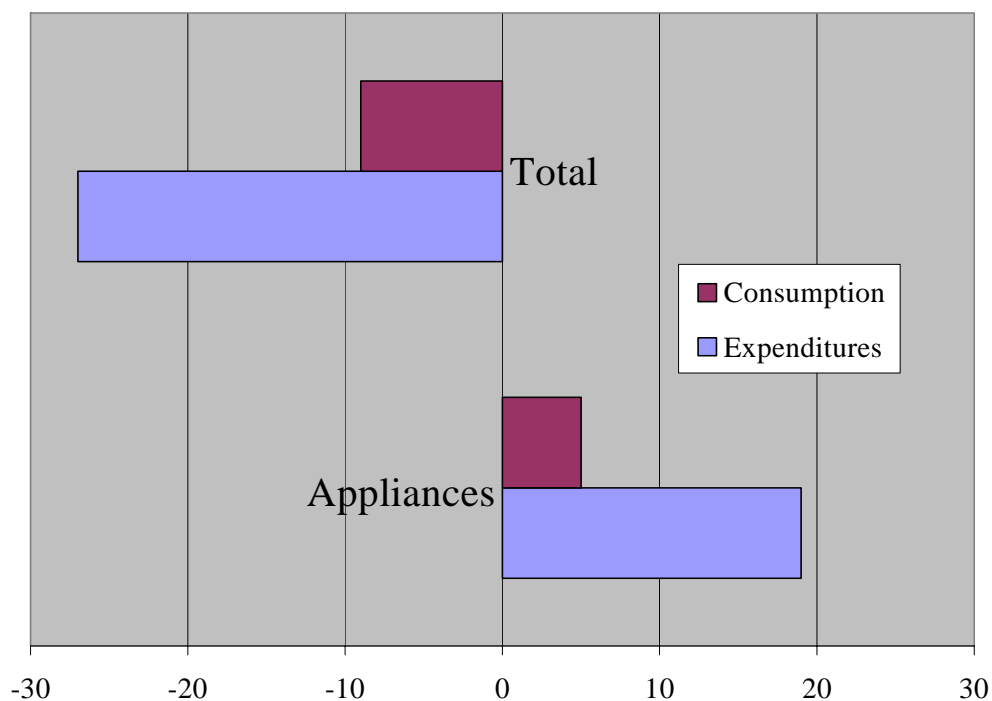
¹¹ Hydronic radiant floor systems pump heated water from a boiler through tubing laid in a pattern underneath the floor. The temperature in each room is controlled by regulating the flow of hot water through each tubing loop. This is done by a system of zoning valves or pumps and thermostats. (Definition from www.eere.energy.gov)

¹² Find more information about duct sealing and the ENERGY STAR duct sealing specification at: http://www.energystar.gov/index.cfm?c=ducts.pr_ducts.

¹³ Find more information on ENERGY STAR qualified products at: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.

¹⁴ Find information on CEE's Residential Programs, including higher efficiency product specifications, at: <http://www.cee1.org/resid/resid-main.php3>.

Chart 2: Percentage Changes in Energy Consumption and Expenditures per U.S. Housing Unit, 1978 – 2001¹⁵



Home Performance with ENERGY STAR

Home Performance with ENERGY STAR (HPwES) is a national platform for whole-house programs wishing to use the ENERGY STAR brand and logo to promote improvements to a home's safety, durability and energy efficiency, and to the health and comfort of individuals in the home. While existing homes can become ENERGY STAR qualified, just like a newly constructed home, HPwES focuses on home performance contracting services, rather than labeling a home. This way, home performance programs can use the ENERGY STAR brand without requiring homeowners to make the all of the improvements to qualify their home as an ENERGY STAR home, which can be prohibitively expensive.

To begin with, a contractor, auditor, or home performance consultant performs a full visual and diagnostic energy inspection of the home. The inspection is geared towards determining the causes of various problems a homeowner may be experiencing, including high energy bills, cold rooms, ice dams, damp basement, moisture on windows, etc. It is also intended to help gauge the home's energy efficiency and durability. As part of the inspection, the contractor is required to make sure the home's gas or oil appliances are venting properly as well. This is known as a combustion appliance zone (CAZ) test.

The contractor, consultant, or auditor will then recommend improvements based on the inspection. These may include changes to the systems mentioned in the previous section,

¹⁵ Laurence, Michael. DOE Energy Information Administration. Presentation at 2004 Market Transformation Symposium. Washington, DC

e.g., installing new windows, adding insulation, upgrading to new HVAC equipment, air-sealing and duct-sealing, installing energy efficient lighting, and others. The recommended solution for most homes often includes a combination of several improvements.

This evaluation is the first step in an integrated effort to see that improvement measures are actually installed in homes. ENERGY STAR expects individual program information, marketing, and incentives to place emphasis on the installation of recommended measures. A program will connect homeowners to appropriate qualified contractor(s) able to implement the recommendations, including the contractor providing the inspection and/or other contractors qualified in home energy inspection, building science, and proper installation techniques. All installed measures are expected to be in accordance with industry best practices.

ENERGY STAR also requires that any HPwES program be consistent with and protect the ENERGY STAR message, support the credibility of the brand, and offer results to consumers. Quality assurance for an HPwES program can be obtained either through a rigorous certification and accreditation process recognized by ENERGY STAR or through oversight and inspection by a qualified third party.

For more information on HPwES, please see the ENERGY STAR web site.¹⁶

Home Performance Programs

An HPwES program is managed locally by an ENERGY STAR partner (typically an efficiency program administrator, state agency, or local nonprofit). Partners have developed a spectrum of quality assurance mechanisms, as well as different ways of treating the role of contractors in the program. These are discussed below, as are some of the challenges facing home performance programs.

Quality Assurance

On one end of the quality assurance spectrum are programs that use third party inspections of the home to verify the improvements. These contractors will have received building science training and generally use a “test-in/test-out” approach. The “test-in” allows a contractor to identify a baseline level of performance of the home, as well as the cause of any problems. This is often part of the initial home energy audit. The “test-out” allows him or her to verify and measure any change in home performance. This verification is generally executed on a random sampling of at least 15% of completed homes, though some programs inspect up to 100% of completed homes. On the other end of the quality assurance spectrum are partners that train and certify technicians, or even accredit contractors, in order to ensure that they deliver quality work. Sometimes certification and accreditation will come through a third party, like the Building Performance Institute (BPI). In fact, the HPwES Partnership Agreement stipulates that any certification process be “at least as rigorous as the technical certifications offered by the Building Performance Institute.”

¹⁶ Home Performance with ENERGY STAR web site available at:
http://www.energystar.gov/index.cfm?c=home_improvement.hm_improvement_hpwes.

Role of Contractors

Some programs focus on creating home performance contractors, or contractors that can inspect a home and then actually carry out their recommendations for improving the home's performance. The NYSERDA New York Energy Smart Home Performance with ENERGY STAR program¹⁷ uses this model. Other programs, including Wisconsin's Focus on Energy Home Performance program have decided to encourage the existence of home performance "consultants."¹⁸ This model seeks to train individuals to carry out the initial home inspection. These "consultants" then refer the consumer to other contractors to perform the recommended improvements.

Program Challenges

Many program administrators recognize that implementing a bona fide home performance program can prove difficult. These challenges have led administrators to devise a wide spectrum of program approaches, several of which are detailed in the attached Program Summaries. As innovative program administrators have developed program designs to overcome the barriers listed below, an increasing number of organizations are initiating home performance programs.

Some of the primary challenges include:

Lack of infrastructure

Home performance and building science are relatively new concepts. Only in 2001 did ENERGY STAR create a formal national platform for home performance programs. Furthermore, though home performance contractors trained in building science exist in some areas, a national supply of these contractors has not yet developed. Some work has been done in this area by the Building Performance Institute (BPI), the New York based contractor certification and accreditation body that recently received a federal grant to expand nationally. Nonetheless, this lack of infrastructure makes it difficult for administrators unfamiliar with home performance to begin programs. At the same time, the situation is beginning to change somewhat as contractors around the country learn of home performance opportunities and become interested before programs are established, sometimes even changing their business models in advance of any program incentives to do so.

Lack of consensus on performance testing protocols

Related to the lack of trained home performance contractors is the lack of consensus on the tests and practices that these contractors should use. Again, although BPI continues to work towards a national standard for contractors, there remains today no consensus on which tests contractors should perform, both before any work is done (in the audit phase) and after work has been completed (during the quality assurance phase). In addition, best practices documents describing how the actual improvements should be made are lacking

¹⁷ For more information on NYSERDA's HPwES program, please see the program web site at: <http://www.getenergysmart.org/GES.portal>.

¹⁸ For more information on Wisconsin's HPwES program, please see the program web site at: <http://www.focusonenergy.com/page.jsp?pageId=34>.

for many of the disciplines associated with home performance. This makes it difficult to establish program goals and to provide credible performance promises to consumers.

Financial

According to ENERGY STAR and home performance program administrators, new home performance programs are generally not cost effective for the first year or more of their existence. This fact makes it difficult to begin a program when many programs need to report savings in the same year as funds were expended. At the same time, home performance programs that have overcome this initial hurdle, and have established an infrastructure and taken care of other early needs, have developed programs that are proving to be more cost effective. Both NYSERDA's New York Energy \$mart HPwES Program and Wisconsin's Focus on Energy HPwES Program are examples of programs that have had some success here, and more information can be obtained by contacting these programs.¹⁹

Lack of evaluation

Useful multiyear evaluations of early programs using the ENERGY STAR model are only just coming out, and only a few of these currently exist. Although these evaluations will no doubt be helpful to new or nascent home performance programs elsewhere, the general lack of evaluation makes it difficult to learn from past programs experience and to understand how managers overcame the challenges discussed above. One of the most comprehensive evaluations currently available is NYSERDA's, available on the New York Energy \$mart web site.²⁰

¹⁹ For more information on NYSERDA's HPwES program, please see the program web site at: <http://www.getenergysmart.org/GES.portal>. For more information on Wisconsin's HPwES program, please see the program web site at: <http://www.focusonenergy.com/page.jsp?pageId=34>.

²⁰ The NYSERDA evaluation can be found at: http://www.nyserda.org/Energy_Information/05sbcreport.asp. Copies of some the studies done on the program used in this report can be found by accessing the "Additional Information and Report Listing for New York State Energy \$martSM Programs" link at the bottom of the page.

Program Summaries

All of the programs listed below have made use of the Home Performance with ENERGY STAR model and brand. Attached find program summaries of these programs.

CEE Member Programs

- Austin Energy -- Austin Home Performance with ENERGY STAR Rebate Program
- NSTAR, National Grid and Berkshire Gas – MassSAVE Home Performance with ENERGY STAR
- National Grid – *EnergyWise*
- New Jersey BPU/South Jersey Gas – New Jersey Home Performance with ENERGY STAR
- NYSERDA – New York Energy Smart Home Performance with ENERGY STAR
- Wisconsin Department of Administration, Energy Division – Wisconsin Focus on Energy Home Performance with ENERGY STAR

CEE Non-member Programs

- CBPCA – California Home Performance with ENERGY STAR Program
- Colorado E-Star – Colorado Home Performance with ENERGY STAR

ORGANIZATION	<i>Austin Energy</i>
Type	Utility
Territory	Austin, Texas
Web Site	www.austinenergy.com
PROGRAM BACKGROUND	
Name	Home Performance with ENERGY STAR® Rebate Program
Program Coordination	The Home Performance program is coordinated with other Austin Energy programs.
Year Established	2003 (predecessor), 2004 (Home Performance with ENERGY STAR compliant)
Target Audience	The program markets itself to both customers and contractors.
Specification Reference	In addition to the Home Performance with ENERGY STAR criteria, the program has its own Contractor Handbook that was developed over the years. It has installation specifications that were developed in-house that meet or exceed energy code requirements.
Budget Cycle	Annual
Budget	In 2004, the total budget was approximately \$1.7 million. <ul style="list-style-type: none"> ▪ Approximately 75% for rebates ▪ Approximately 25% for loans
Goals and Objectives	The goal of the program has always been to help save energy for customers and, at the same time, to reduce peak demand on the utility. All rebates are based on KW savings. The program's specific goals in the coming year are: <ul style="list-style-type: none"> ▪ Estimated 1,500 jobs completed ▪ Estimated 3,300 KW energy savings ▪ Estimated 3,500,000 kWh energy savings
Role of Contractors	Contractors can inspect a home and provide a list of recommendations. Once approved, they carry out their recommendations for improving the home's energy efficiency.
Design Strategy	The program markets itself to both customers and contractors in order to achieve its goals. Contractors are trained according to the Austin Energy handbook, which the program intends to integrate gradually with the Building Performance Institute (BPI) standards. Homeowners are informed of the program by a variety of means, and are encouraged with different incentives and financing options.
Contact	Mike Thomas, Program Coordinator michael.thomas@austinenergy.com 512-482-5317
Web Site	Home Performance with ENERGY STAR Rebate Program
PROGRAM COMPONENTS	
Incentives	Under the Home Performance with ENERGY STAR Program, Austin Energy offers rebates up to \$1,400 for the installation of individual retrofit measures such as, attic insulation, duct sealing and repair, home sealing, solar screens, window film or low-e glass, and a properly sized air conditioner and heat pump system.

Financing	Under the Home Performance with ENERGY STAR “Loan” Program, Austin Energy partnered with a local credit union in 2004 to offer 0% interest loans for 3 or 5 years, 2.9% for 7 years or 4.5% for 10 years to finance the installation of the major energy efficiency improvements. To receive the loan, customers must install all recommended building envelope measures and install a properly sized air conditioning or heat pump system.
Training	Austin Energy is creating a self-sustaining contractor-training program for existing and newly recruited contractors through a third party contractor, Conservation Services Group, Inc. The training program being developed will provide contractors knowledge in building science principals, diagnostic testing of homes, and proper installation of heating and cooling equipment. The objective of the training program is to prepare and give the contractor an opportunity to become certified and accredited through Building Performance Institute.
Audits	The program does a 100% pre-inspection on all jobs to make sure that what the contractors recommended to the customer is what that customer needs. After the work is completed, the program does 100% post-inspection to make sure that the work was done correctly. This is all done with in-house Austin Energy representatives.
Education	The program does direct mailing to its customers and educates them through a monthly newsletter that is sent out with the utility bill. Austin Energy also sends employees to speak to public and/or private organizations about programs.
PROGRAM MARKETING AND EVALUATION	
Quality Assurance	The program relies on inspections after jobs are completed (see Audits).
Past Performance	<p>Full program evaluations are not available. Summary findings for 2004 are as follows:</p> <ul style="list-style-type: none"> ▪ The program saved an estimated 3.4 million kWh. ▪ Engineering calculations indicate peak demand savings of 2,910 kW. ▪ The program saved the following in emissions: <p>51.42 kg of Sulfur Dioxide (SO₂) 305.48 kg of Nitrogen Oxides (NO_x) 168 tons of Carbon Dioxide (CO₂)</p>
Marketing and Outreach	The program uses direct mail as the primary marketing strategy, though bill inserts and door hangers are also used. The program also works with local stores to promote energy-efficient lighting and appliances and has special rebate coupons that are displayed in participating retail stores in Austin. In addition, there are several strategically placed billboards around Austin that advertise the program.

ORGANIZATION	<i>California Building Performance Contractors Association (CBPCA)</i>
Type	Non-profit
Territory	The program is currently operating in Northern and Central California.
Web Site	www.cbPCA.org
PROGRAM BACKGROUND	
Name	California Home Performance with ENERGY STAR Program
Program Coordination	The program is currently part of the ratepayer funded energy efficiency program administered by the California PUC. Next year, CBPCA hopes to expand its territory to include Southern California. This will be accomplished by working directly with other investor-owned and municipal utilities.
Year Established	2002
Target Audience	The program combines upstream and downstream approaches. The primary audiences are the residential retrofit contracting community and single-family homeowners.
Specification Reference	The program references no specifications aside from the Home Performance with ENERGY STAR criteria.
Budget Cycle	Multi-year (currently 2004-2005)
Budget	Total 2-year budget is \$1.9 million. <ul style="list-style-type: none"> ▪ 25% in administrative costs ▪ 45% in direct implementation costs ▪ 20% in marketing costs ▪ 10% in evaluation costs
Goals and Objectives	The program has no specific energy goals. Targets for this cycle are to recruit 40 contracting companies and to train 50 personnel. These targets have been met as of June 2005.
Role of Contractors	CBPCA is an association of contractors trained in home performance. These contractors can inspect a home and then actually carry out their recommendations for improving the home's energy efficiency.
Design Strategy	The program is built around contractor training in whole-house diagnostics and remediation with emphasis on practical mobilization issues. That is, the program will focus on helping contractors to integrate home performance services into their business models and how to include new services in their offerings. Limited public outreach is also included.
Contact	Steven Sokolsky calhomeperf@bki.com 888-352-2722
Web Site	California Home Performance with ENERGY STAR Program
PROGRAM COMPONENTS	
Incentives	The program only has incentives for contractors. A percentage of diagnostic equipment costs are reimbursed (based on reporting needs) and limited co-marketing funds are available.

Financing	The program works with the Electric and Gas Industries Association's (EGIA) program that allows trained contractors to offer EGIA's financing packages.
Training	The program is based on contractor training and mentoring. It offers a one-day business and marketing session, a six-day diagnostic and remediation training session (includes two days in the field), and post-training one-on-one field mentoring to contractors.
Audits	Contractors are trained to perform complete, whole-house diagnostics using the "house as a system" approach and then prescribe and install appropriate remedies.
Education	The program includes limited public education and outreach. These activities are done mostly through placing case studies in media and exhibiting at home and garden shows. Member contractors are given marketing materials for customization and general marketing/sales instruction and assistance.
PROGRAM MARKETING AND EVALUATION	
Quality Assurance	The program uses the Home Performance with ENERGY STAR method: a certain percentage of each contractor's completed remediation are inspected and verified.
Past Performance	Program reports are available at www.cbPCA.org . Evaluations are available at www.calmac.org .
Marketing and Outreach Strategy	Contractors are recruited through industry associations, mass-marketing, conferences, and associated seminars. Contractors are trained to perform their own marketing and outreach to past and potential new customers. CBPCA provides some marketing materials to member contractors.

ORGANIZATION	<i>Colorado E-Star</i>
Type	Regional program administrator
Territory	The E-Star territory is the state of Colorado, though a Wyoming company is being trained, as well. As an "administrator," Colorado E-Star plans to serve contractors, who will directly serve the customers.
Web Site	www.e-star.com
PROGRAM BACKGROUND	
Name	Colorado Home Performance with ENERGY STAR
Program Coordination	The program will refer any income-qualified customers to weatherization agencies. It will contract for services from E-Star Colorado Certified Home Energy Raters.
Year Established	2004
Target Audience	The program generally has an upstream focus. It directly interacts with contractors, who will directly target consumers. In addition, however, the program will run a general consumer campaign to increase awareness about the program.
Specification Reference	The program references no specifications aside from the Home Performance with ENERGY STAR criteria.
Budget Cycle	The budget cycle is based on local funding partners. Municipalities have given Colorado E-Star grants that tend to have a nine-month to one-year term.
Budget	The program target is to operate on approximately \$200,000 per year.
Goals and Objectives	The program has no specific savings targets, but plans to monitor the jobs to identify what actual savings occur. The program hopes to serve nine contractors by year end, and at least three more by the end of June 2006. It also hopes to integrate itself into demand-side management (DSM) programs of participating utilities (e.g., Xcel Energy).
Role of Contractors	The program relies on contractors in E-Star Contractors network (www.chpwes.org/order.html). These contractors can inspect a home and then actually carry out their recommendations for improving the home's energy efficiency.
Design Strategy	Colorado E-Star interacts directly with contractors in order to train them on the home performance approach and performs ongoing quality assurance on these contractors. The program also does limited consumer outreach in order to educate consumers about the existence of the home performance program. Note: CEE member Xcel Energy's territory is within the program territory, and the company has representation on E-Star's advisory council. At this point, however, Xcel has not decided to be an implementation partner. Xcel will see how the Colorado Home Performance with ENERGY STAR program might fit with the company's future DSM programs in the future.
Contact	Megan Edmunds, E-Star Executive Director medmunds@e-star.com 303-297-7380
Web Site	Colorado Home Performance with ENERGY STAR

PROGRAM COMPONENTS	
Incentives	The program does not currently offer incentives. However, two of the three currently participating municipalities do offer specific incentives for certain appliances directly to consumers through municipal utility demand-side management (DSM) programs. The program plans to promote the use of those incentives to participating contractors and their customers.
Financing	The program has identified potential financing partners with which participating contractors can work. However, it does not have a dedicated source of funding for financing.
Training	The program emphasizes required upfront training, and ongoing mentoring and support.
Audits	Contractors do performance testing. However, the results of the tests are not formalized into a home energy rating score.
Education	E-Star offers classes for homeowners on energy efficiency retrofits (www.chpwes.org/classes.html)
PROGRAM MARKETING AND EVALUATION	
Quality Assurance	The program works through certified contractors.
Past Performance	The program has not yet done any program evaluations of Home Performance with ENERGY STAR.
Marketing and Outreach Strategy	The program plans to reach their target audience (primarily contractors, but also consumers) through word of mouth and media.

ORGANIZATION	<i>NSTAR, National Grid and Berkshire Gas</i>
Type	Utilities
Territory	The program covers participating utility territories in the state of Massachusetts. NSTAR: 1.4 million residential and business customers National Grid: 1.2 million residential customers Berkshire Gas: 31,000 residential customers
Web Site	NSTAR: www.nstaronline.com National Grid: www.nationalgridus.com Berkshire Gas: www.berkshiregas.com
PROGRAM BACKGROUND	
Name	MassSAVE Home Performance with ENERGY STAR
Program Coordination	The program is coordinated statewide with electric and gas utilities.
Year Established	The HPwES program was established in 2002. MassSAVE has been around in some form since 1980.
Target Audience	The program has a downstream focus; that is, it focuses on residential customers. All electric utilities are mandated by the state to send a utility bill stuffer to customers. They target specific customers by age of house, potential energy savings, etc.
Specification Reference	The program references no specifications aside from the Home Performance with ENERGY STAR criteria.
Budget Cycle	Annual
Budget	NSTAR has a budget of \$2.5 million for the program. National Grid's program budget is \$3.19 million. Berkshire Gas's budget for the program is approximately \$100,000.
Goals and Objectives	NSTAR's 2005 savings goal is 5,439 MWh. National Grid's 2005 savings goal is 3,386 MWh. Berkshire Gas does not have specific savings targets.
Role of Contractors	A program contractor serves as a consultant to the customer by doing a home energy assessment and recommending improvements, and sometimes contractors that can carry out these improvements. The customer then contacts appropriate contractors. These contractors are not directly dealt with by the program.
Design Strategy	The program is designed to target the residential customers through a variety of media (radio, TV, bill stuffings, etc). When the customer shows interest, the program determines whether they have a home with enough energy savings potential to make improvements cost effective. If so, the program offers different incentives and financing to make it possible for the customer. Contractors are not directly dealt with by the program.
Contact	NSTAR: Robert Eckel, Conservation Services Group Robert.eckel@csgroup.com 508-836-9500 x3309 National Grid: Jerry Hanna, Program Manager jerome.hanna@us.ngrid.com 508-421-7223 Berkshire Gas: Alan Silverstein, Center for Ecological Technology alans@cetonline.com 413-445-4556 x21

Web Site	NSTAR & National Grid: MassSAVE Home Performance with ENERGY STAR Berkshire Gas: MassSAVE Home Performance with ENERGYSTAR
PROGRAM COMPONENTS	
Incentives	The program currently offers the following incentives: <ul style="list-style-type: none"> • 50% off up to \$1500 for thermal shell upgrades (insulation, air sealing, duct sealing, etc.) • \$300 - \$500 rebates for installation of high efficiency oil or propane heating systems and \$300 for indirect water heaters installed in conjunction with a qualifying heating system • \$200 rebate towards replacement of inefficient refrigerators with a new ENERGY STAR labeled refrigerator • \$10 rebate per window (maximum \$500) for installation of ENERGY STAR labeled windows
Financing	The program currently offers a \$400 instant rebate and 0% APR financing for 36 months for thermal shell upgrades in lieu of the 50% up to \$1500 offer.
Training	The vendors train staff and subcontractors who work for them.
Audits	The program has a two-tiered level of service. Tier I consists of general energy efficiency information and education to customers. Tier I also includes a screening process designed to determine a customer's need for and interest in making energy efficiency improvements in their home. Tier II consists of a Home Energy Assessment (HEA) whereby site specific recommendations are made and access to the incentives is explained and facilitated.
Education	As previously stated, individual customer education occurs at Tier I. Additionally, educational information is available at on the MassSAVE web site.
PROGRAM MARKETING AND EVALUATION	
Quality Assurance	Five to 10% of jobs are inspected after completion.
Past Performance	Massachusetts Division of Energy Resources has evaluations of MA energy efficiency programs. They are available at: www.mass.gov/doer/pub_info/pub_info.htm#report . The statewide MassSAVE Program is currently undergoing a multi-year, three phase process and impact evaluation.
Marketing and Outreach Strategy	NSTAR Electric and Berkshire Gas publicize the program through their web sites, the MassSAVE Web site and through bill inserts mandated by the Department of Telecommunications and Energy. NSTAR also actively promotes the program through direct mail marketing, public relations, customer newsletters, and other media both company specific as well as collaboratively with other utilities in the state. National Grid uses various media to publicize the program, including radio, newspaper, internet, TV, direct mailings, bill stuffers and billboards.

ORGANIZATION	<i>National Grid (Rhode Island)</i>
Type	Utility
Territory	The utility covers the state of Rhode Island, with the exception of Pascoag Electric service territory. It serves 465,000 customers.
Web Site	www.nationalgridus.com
PROGRAM BACKGROUND	
Name	EnergyWise
Program Coordination	The program is not currently coordinated with any others.
Year Established	The HPwES program was established in 2004. The EnergyWise program has been available since 1997 and serves both single family homes and multifamily facilities.
Target Audience	The program has a downstream focus on residential customers. All National Grid residential customers are eligible and 1-4 unit dwellings are eligible for HPwES.
Specification Reference	The program references specifications in its bid documents as well as the Home Performance with ENERGY STAR criteria.
Budget Cycle	Annual
Budget	The program budget is \$1.8 million for 2005, including services to both single family and multifamily customers
Goals and Objectives	The program goals are to serve 3,699 customers and to save 2,955 MWh.
Role of Contractors	The program puts out a bid for a general contractor whose staff serves as free consultants to the customer by doing a home energy assessment and recommending improvements. Trade contractors are hired by this general contractor or by the customer to install energy efficiency measures in the customer's home.
Design Strategy	The program has a traditional resource acquisition program design strategy. The General Contractor makes sure work is performed to HPwES standards.
Contact	Robert O'Brien Robert.obrien@us.ngrid.com 508-421-7280
Web Site	There is no specific web site for the program.
PROGRAM COMPONENTS	
Incentives	<p>Program incentives include:</p> <ul style="list-style-type: none"> ▪ 75% of cost of qualified insulation in electrically heated homes ▪ Rebates of \$100 - \$450 to replace inefficient refrigerators. ▪ Free installation of ENERGY STAR light bulbs and electric water saving measures ▪ Incentives for ENERGY STAR lighting fixtures and thermostats

Financing	Financing options include low interest loans for weatherization, insulation, air sealing and ENERGY STAR windows and doors.
Training	The general contractor trains staff and subcontractors and ensures that Building Performance Institute (BPI) requirements are met.
Audits	A free in-home assessment is available to customers who have not previously participated.
Education	Individual customer education is provided in the home or facility.
PROGRAM MARKETING AND EVALUATION	
Quality Assurance	A percentage of homes are inspected and the general contractor must meet BPI standards.
Past Performance	Some past program evaluations may be available upon request.
Marketing and Outreach Strategy	The program reaches its target audience through word of mouth and direct mail to high-use electric customers.

ORGANIZATION	<i>New Jersey Board of Public Utilities / South Jersey Gas</i>
<p>Note: The New Jersey Board of Public Utilities (NJBPU) sponsored the program through a Special Projects grant from the U.S. Department of Energy, but that funding has ended. South Jersey Gas (SJG) will continue the program and sponsor it through a project extension. All the details of the SJG program have not been worked out yet, and a program contract is being developed.</p>	
Type	The first sponsor, NJBPU, was a Board of Public Utilities. The new sponsor, South Jersey Gas, is a utility.
Territory	Under the NJBPU contract, the geographic scope was Atlantic County, NJ, and the program served any NJ residents that wished to participate in the program. The area to be served under the South Jersey Gas program extension is still to be determined, although it is likely to continue to be the Atlantic County area.
Web Site	NJBPU: www.bpu.state.nj.us South Jersey Gas: www.sjindustries.com/sjg
PROGRAM BACKGROUND	
Name	New Jersey Home Performance with ENERGY STAR
Program Coordination	Under the NJBPU-sponsorship, the program coordinated with the New York Home Performance with ENERGY STAR program in that venues were arranged for the NJ pilot program contractors to network with established NY program contractors who were familiar with how the program could benefit their business and their customers, as well as how it could be integrated into their business models.
Year Established	Funding was awarded for the NJBPU-sponsored pilot program in 2003, and the contract was finalized in 2004.
Target Audience	The program targets contractors and mid-market players (e.g., suppliers of materials), and provides the contractors with assistance in closing jobs.
Specification Reference	Any work done by participating contractors is required to meet Building Performance Institute (BPI) standards.
Budget Cycle	The NJBPU budget cycle was annual. The SJG budget cycle is to be determined.
Budget	The NJBPU budget was \$99,000. The SJG budget is expected to be approximately \$200,000 per year.
Goals and Objectives	The NJBPU pilot program aim was to recruit 5 to 6 program contractors in the target area (Atlantic City), and help them become BPI-certified/accredited in order to work in the program according to program standards.
Role of Contractors	Contractors can inspect a home and then actually carry out their recommendations for improving the home's energy efficiency. In this way, the New Jersey program is based directly on NYSERDA's program.
Design Strategy	The New Jersey Home Performance with ENERGY STAR program is modeled off of the NYSERDA program. The program targets contractors and requires that they be trained to meet BPI standards. Contractors then do their own outreach to customers and perform audits and improvements.
Contact	Mark Dyen, Conservation Services Group 508-836-9500x3215 Mark.Dyen@csgpr.com
Web Site	New Jersey Home Performance with ENERGY STAR

PROGRAM COMPONENTS	
Incentives	The NJBPU-sponsored pilot offered three incentives to participating contractors and one to participating customers. (1) 75% of the cost of contractors' Building Performance Institute (BPI) certification and accreditation was directly paid for by the pilot program. (2) Participating contractors were reimbursed for 50% (up to a capped amount) of the equipment required for them to participate in the program. (3) Participating contractors were eligible for a 25% co-op advertising incentive, up to \$2,000. The first 50 participating program customers were eligible to receive a free carbon monoxide detector.
Financing	Consumers who participated in the program were eligible for financing through Energy Finance Solutions (EFS), which is part of the Wisconsin Energy Conservation Corporation (WECC).
Training	Contractors were provided with home performance training free of charge. This training served to inform contractors of program procedures, and also prepared them for BPI certification/accreditation.
Audits	The program incorporated audits of one- to two-family buildings. The purpose of the audits was for participating contractors to inform homeowners of opportunities to make their homes safer, more energy efficient and more comfortable.
Education	The program did not incorporate any direct public education. The program relied on contractors to educate potential customers about the benefits of the service they provided.
PROGRAM MARKETING AND EVALUATION	
Quality Assurance	The program worked through accredited/certified contractors, and the quality assurance goal was for 10% of homes where work was performed to be inspected by the program implementation quality assurance staff.
Past Performance	No evaluations of past program performance are available.
Marketing and Outreach Strategy	The NJBPU-sponsored pilot reached potential program contractors through market research, targeted mailing, and one-on-one outreach efforts by a recruitment staff person. Potential customers were reached via a targeted mailing, press events, and the media (newspapers).

ORGANIZATION	<i>New York State Energy Research and Development Authority (NYSERDA)</i>
Type	State agency
Territory	The NYSERDA Home Performance with ENERGY STAR program covers all of participating utility territories in New York State. Thus far, over 7,500 homes have been served.
Web Site	www.nyserda.org
PROGRAM BACKGROUND	
Name	New York Energy \$mart Home Performance with ENERGY STAR
Program Coordination	The program is not coordinated with any other programs or initiatives.
Year Established	2001
Target Audience	The program targets both "midstream" and downstream market actors. "Midstream" encompasses contractors, and the program focuses here on developing infrastructure and creating a base group of contractors to do the home performance work. The program also targets consumers in an effort to create a demand for the contracting work (see marketing info below).
Specification Reference	Any work done by participating contractors is required to meet Building Performance Institute (BPI) standards.
Budget Cycle	Annual
Budget	The total budget for the program is approximately \$6 million to \$7 million a year. These funds are divided into four primary categories: <ul style="list-style-type: none"> ▪ 30% implementation ▪ 30% mid-stream incentives ▪ 15% homeowner financing ▪ 25% marketing
Goals and Objectives	The program's primary goal is market transformation, though energy savings are also important. The program focuses on the whole house as a system, and addresses all fuels, though it focuses on electric primarily. The program measures its success in terms of households served.
Role of Contractors	Contractors must be BPI certified and must be able to inspect a home and then actually carry out their recommendations for improving the home's energy efficiency.
Design Strategy	Through training contractors and technicians, along with educating, marketing to, and providing incentives for consumers, New York Energy \$mart's Home Performance program aims to transform the market.
Contact	Andrew Fisk, Senior Program Manager ajf@nyserda.org 518-862-1090 x3351
Web Site	New York Energy \$mart Home Performance with ENERGY STAR

PROGRAM COMPONENTS	
Incentives	The program will cover up to 50% of the costs associated with the energy-efficiency improvements, up to a maximum of \$5,000 per household or \$10,000 for a two to four family building. This includes: insulating; air sealing and duct sealing; heating system repair or replacement; domestic hot water heating upgrades; ENERGY STAR appliances and lighting; and, other cost-effective energy saving measures.
Financing	The program offers homeowners a low-interest, unsecured loan from \$2,500 to \$20,000, depending on qualifications. The loan can be taken for terms of three, five, seven or 10 years. The program also offers secured residential loans. New York Energy \$mart reduces the rates on these loans by up to 4.0% over a 10-year term. A maximum of \$20,000 may be borrowed for a one to four family unit building. The New York Energy \$mart Loan Fund is available to owners and renters.
Training	The program offers training for contractors that is recommended though not required. All training is offered in parallel with BPI certification, and the program requires certification as a Building Analyst I and in at least one of three specialties: shell; heating; or, cooling. The training is offered in all four of these areas. Technicians must all come from companies that are BPI accredited as well (incorporates insurance, dispute resolution, etc.).
Audits	A complete home assessment is part of the program.
Education	The program uses mass marketing techniques including PSAs and paid advertising to educate customers.
PROGRAM MARKETING AND EVALUATION	
Quality Assurance	The program relies on BPI accredited contractors.
Past Performance	Past performance evaluations are available online at www.nyserda.org/Energy_Information/evaluation.asp . The 2005 Energy \$mart Program Evaluation is available at www.nyserda.org/Energy_Information/05sbcreport.asp .
Marketing and Outreach Strategy	The program uses marketing techniques described in the Education section above.

ORGANIZATION	<i>Wisconsin Dept. of Administration, Energy Division</i>
Type	State energy office
Territory	The program operates in the state of Wisconsin. 1,200 homes were served last year and 1,500 are expected to be served in 2005.
Web Site	www.doa.state.wi.us/energy/index.asp
PROGRAM BACKGROUND AND DESCRIPTION	
Name	Wisconsin Focus on Energy Home Performance with ENERGY STAR
Program Coordination	The program is coordinated with other programs within Focus on Energy (e.g. HVAC, appliances, lighting).
Year Established	2001
Target Audience	The program focuses on upstream marketing, i.e. to consultants and contractors.
Specification Reference	The program references no specifications aside from the Home Performance with ENERGY STAR criteria. It does, however, provide guidelines that were developed in cooperation with the weatherization assistance program, and has standards such as combustion safety and infiltration testing must be completed before and after work completion.
Budget Cycle	Annual budget cycle that operates with the state fiscal year (July to June)
Budget	The Home Performance with ENERGY STAR budget is \$2.5 million. <ul style="list-style-type: none"> ▪ 60% incentives ▪ 10% labor/fringe/indirect/overhead/etc ▪ 10% marketing ▪ 15% subcontractors ▪ 5% direct costs
Goals and Objectives	The program's metrics are related mainly to the development of the market structure, and training and recruitment of new contractors. The program has an annual unit completion goal of 1,000 households this year.
Role of Contractors	When residential homeowners contact a participating contractor, they typically include a home energy evaluation by a program consultant as part of their service. Based on the findings the consultant recommends improvements and other contractors within a local network where necessary. After contractors complete their work, the consultant returns to perform post testing and verification of work results.
Design Strategy	The model is to train and support consultants to build networks of businesses in geographic areas around the state. They typically work with insulation, HVAC, remodelers and home improvement companies. Referrals are generated anywhere within the network. For example, a customer could contact a remodeler for an addition, and then the remodeler could hire a consultant and build the consultant's fee into the cost of the project. As other work is needed, the consultant brings in other companies within the network to complete HVAC, insulation, air sealing or whatever the project requires.

Contact	Gregg Newman, Wisconsin Energy Conservation Corporation greggn@weccusa.org 608-249-9322 x315
Web Site	Wisconsin Focus on Energy Home Performance with ENERGY STAR
PROGRAM COMPONENTS	
Incentives	Incentives encourage customers to increase the number of improvements they undertake. Typical incentives include those for attic, sidewall, and foundation insulation, water heating, central heating and air conditioning and air sealing. Incentives paid average \$465 per house.
Financing	Contractors can present customers with loan information from Energy Finance Solutions. However the program does not buy down interest rates.
Training	All consultants and contractors are required to be trained in building science. Consultants must have 2 years previous experience in the energy efficiency field, and must be trained and pass the Resnet certification exam.
Audits	Rem/Rate is available to all customers before improvements are made. The program also allows for in-house assessments to be performed. Assessments involve the same basic data collection without computer analysis.
Education	Public education is included and is handled by the Focus on Energy's Information/Education program.
PROGRAM MARKETING AND EVALUATION	
Quality Assurance	The program conducts post-improvement inspections in approximately 10% of completed units.
Past Performance	Past performance program evaluations are not available.
Marketing and Outreach Strategy	The program is structured so work originates from participating contractors and consultants, though it does do some marketing to generate referrals in two main ways: <ol style="list-style-type: none"> 1. PR campaigns that are focused locally and use a local consultant as the face and phone number to call 2. Specific sales tools targeted to specific companies (e.g. HVAC furnaces, for remodelers to use on customers, etc.). The program has generated dozens of these.