

# Real Home Energy Solutions

**Sherlock Homes**

*Solving the Case of  
the Mysterious Home Condition*



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## What is a Home Performance Assessment?

**Before improving your home's energy performance, there are a few things you should know--before unexpected changes in indoor air quality and moisture control develop. A visual inspection is a necessary first step, but diagnostic testing before and after certain activities can prevent catastrophe!**

In a nutshell, a Home Performance Assessment is a modified home inspection with diagnostic testing. It focuses on indoor air quality and moisture control while evaluating the energy features of your home. This article discusses the goals and reasons for an assessment with diagnostics and what to expect when you schedule a Home Performance Assessment.

A Home Performance Assessment finds and quantifies air leakage, which impacts health, comfort, and energy efficiency. It also identifies moisture issues affecting indoor air quality and building durability. Another goal is to identify showerheads and toilets with high water consumption. Finally, it identifies concerns with combustion appliances.

**Goals and Reasons.** The main goal of a Home Performance Assessment is to find whole-house solutions to the big four homeowner concerns: health, building durability, comfort, and energy efficiency. It takes a whole-house approach, as no single solution by HVAC technicians, insulation contractors, window installers, and environmental specialists will solve complex performance issues. Anytime the building is modified, health and safety, structural durability, comfort, and energy efficiency is affected. Uncoordinated changes by any one contractor can adversely affect the rest of the house, sometimes with catastrophic results. A Home Performance Assessment helps ensure desired improvements are achieved without causing more problems.

For most buildings the number one culprit for these issues is air leakage--second only to moisture problems. Reducing air leaks through the building envelope (living space surrounded by walls, windows, and doors) from a variety of sources, including the air distribution system provides the greatest improvement on the big four concerns.

However, air sealing can cause increased moisture, which when coupled with water leaks into or in the building can affect indoor air quality and building durability. Fixing water leaks and providing fresh air ventilation resolves these problems. Air sealing can adversely change how water heaters and furnaces get rid of smoke by backdrafting it into the living areas, along with carbon monoxide. Isolating combustion appliances from living spaces or providing adequate ventilation solves these issues.

In addition to air infiltration, ineffective and insufficient insulation causes higher energy loss. Installing enough insulation and making sure it stays in place increases effectiveness and efficiency.

**Process.** The on-site portion of the Home Performance Assessment is completed in four parts: interview, evaluation, testing, and discussion.

During the interview, several questions are asked about the house's indoor air quality and moisture, energy bills, and your health. Anything you can tell me about these things helps me do a better job of evaluating your house. I'll also get some sense about what you plan to do with the house in the future, to provide reasonable recommendations.

After the interview, the home inspection begins. I inspect it as I would for any resale, new construction, or warranty inspection while ignoring certain items important to these types of home inspections. For example, the operation of windows, plumbing fixtures, and appliances are not made. Also, only critical pieces of the electrical system are reviewed. More attention is paid to the installation of heating and cooling system, insulation, and sealants. In this process, the house is talking to me. I will interpret what it is saying for you.

While going through your house, I prepare it for diagnostic testing. If there are any combustion appliances (water heaters and furnaces), worst-case depressurization testing is done and carbon monoxide levels are determined. Carbon monoxide levels are checked at any gas ovens too. Then, to avoid backdrafting appliances, they are turned off or set to pilot-light mode to prepare for air leakage testing.

Two types of air leakage tests are performed. The first one checks how leaky the living spaces are. A Blower Door is usually put in the front door to depressurize the house. I'm trying to simulate a 20 mph wind at the exterior of the building. At this low pressure (50 Pascals, 0.2 inches of water column), the impact to the house is very small. To put this in perspective, when you flush the toilet, up to 250 Pascals are exerted on the house. Once I know how much air leakage there is, then I walk around the house to find out where. As with all parts of the assessment, please join me!

The second air leakage test determines how leaky the air distribution system is (air handler, plenums, ducts, and registers). All the registers are covered with tape so I can inflate the system to a known pressure. Air leakage is determined by how much air must be continually blown in to keep the air pressure in the ducts the same—much like trying to keep a leaky water bucket full with a garden hose. The air blown in matches the air lost. Typically, two results are determined: total duct leakage and duct leakage outside the living spaces. When the leakage is significant, I'm going to try to find out why. Sometimes, I use a theatrical fogger. Now that's a show!

After testing and evaluating the house, I'll sit down with you to discuss the results. I use a Scorecard to set priorities—based on standards set by the Southface Energy Institute. The results of

diagnostic testing are used to set priorities. Two sets of priorities are set: one for energy, the other for health and safety.

The first set of priorities focuses on energy improvements. They are based on cost effectiveness. Air sealing is usually easier and less costly to do than replacing appliances or windows and it makes a big difference.

The second set of priorities focuses on indoor air quality and moisture control. These are health and safety issues. The items are either recommended or highly recommended, depending on the potential impact to your health or the longevity of your house.

For house newer than 1980 or so, less than 4000 sqft, with up to 2 air central heating or cooling systems takes about 5-7 hours to complete with one assessor. If two trained assessors do the job, it'll take roughly 3-4 hours; however, fees are charged for the extra help. In this case the lead assessor evaluates the house while the other performs the tests.

**Result.** When we're done with the assessment at your house, I go home to write the report. A full report is written. Several summaries are directly derived from it.

The first one is the Scorecard, which documents what we discussed at the end of my visit.

The second summary is the Home Performance Assessment (HPES) Summary. This lets you know what needs to be done to correct the issues, based on the building code and suggestions by the ENERGY STAR program. It also contains the results of diagnostic testing. Provide this summary to your contractors.

The shortest summary is the General Statement of Work. It does two things. First, it highlights the major issues. This is followed by a general sequence of the expected workflow. It helps define what needs to be done first. However, your contractors will help you determine the actual order the work is done in.

**Next Steps.** A lot of time, energy, and treasure were spent to complete the assessment. It's all for nothing if nothing is done after that. The information I provide you is overwhelming to almost every homeowner. The summaries help sort through some of it, but you'll still probably need help.

All the contractors qualified to do the work in the Atlanta Metro Area approved by Southface Energy Institute and Georgia Power. Links to qualified contractors are on our website.

We know homeowners get work done at various rates: some all at once and others over time. We'll be there as long as you own your house.

When you get a proposal from any contractor, I will review it with you for sanity. This is a free service to you as long as I can do it over the phone and from my office.

**Follow-Up Testing.** When certain activities are done, re-testing is required by the standards. Generally, the kinds of things requiring follow-up testing involve air sealing, window upgrades, insulation increases or location changes, and appliance replacement. First, testing is done to ensure your house is still safe to live in. Some changes will impact indoor air quality and moisture control. The other reason is to demonstrate improvement. Sometimes financial incentives are

provided for doing certain kinds of work. Southface Energy Institute and Georgia Power approved contractors know how to do the tests. However, some choose not to for a variety of reasons. You may also feel more comfortable having a third-party do it. I'll be happy to!

## What Does a Home Performance Assessment Cost?

The time it takes to do a Home Performance Assessment takes twice as long as it does to complete a home inspection. A rough rule of thumb is that it'll cost about twice what a home inspection does.

There are a couple of ways to estimate the price. One is based on the diagnostic testing required. The other relies on a combination of building size and number of tests. Both give roughly the same price in most cases.

The example used here for comparison purposes is a 4000 sqft house, built after 1980, with two heating and cooling systems. A water heater and air handler is in the crawlspace and another air handler is in the attic.

**Diagnostic Tests Required Method.** This method starts with a base consulting fee covering reporting, travel expenses, and other overhead items: about \$250. A flat fee is assessed for each air leakage test. Usually, at least 1 building air leakage (Blower Door) test and 1 duct leakage (Duct Blaster) test is needed. When this method is used, expect \$100 per Blower Door test and \$125 per Duct Blaster test. On newer homes, 1 Blower Door will cover up to 4000 sqft. A Duct Blaster test is need for each heating and cooling system. If there are any water heaters or gas furnaces, it costs about \$50 per group of appliances: combustion appliance zones. If there is a crawlspace under the floor, plan \$50 to check it out. Expect an additional cost of \$50 or more per hour for a trained assistant. Additional services, such as thermography and duct airflow analysis, are extra.

Using our example:

|                                |              |
|--------------------------------|--------------|
| Consulting                     | \$250        |
| Blower Door                    | \$100        |
| Duct Blaster (2)               | \$250        |
| Combustion Appliance Zones (2) | \$100        |
| Crawlspace                     | <u>\$100</u> |
| Total                          | \$800        |

**Building Size & Components Method.** An alternative method uses the size of the house and number of tests performed. First, there is an overhead fee of \$100. Figure \$10/100 sqft of heated living space. Each test costs \$50. Plan \$50 for each unfinished space, such as an unfinished basement or a crawlspace.

Using our example:

|                                |              |
|--------------------------------|--------------|
| Overhead (travel, etc.)        | \$100        |
| Building Size                  | \$400        |
| Crawlspace                     | \$ 50        |
| Combustion Appliance Zones (2) | \$100        |
| Blower Door                    | \$ 50        |
| Duct Blaster (2)               | <u>\$100</u> |
| Total                          | \$800        |

A contractor will do this assessment for much less, because it can be made up in the cost of goods and services they hope to provide. The level of reporting is much less. In most cases, a contractor is not extensively versed in all parts of the building code. Their goal is to do what it takes to get past the assessment results to a proposal for their products and services. Fair enough!

Home InSight does independent, third-party assessments. The goal is to analyze the house thoroughly to make recommendations for improvements. The assessment is fully documented with pictures and information. This report can be forwarded to a variety of contractors.

With your permission (subscription to this website) I'll be providing a lot of information in the form of emails, tips, teleseminars, etc. It'll grow and evolve over time. I'm always learning new things I want to share with you. This is to help you get a good grip on what's going on and how to deal with it. A single visit to your house won't be enough to know everything you need to understand, but it is a great start! If it was easy for us to get our heads around the performance issues quickly, our houses would be built right in the first place. I'll do this for you, regardless of where you live or who does the assessment for you.

### **Who Does it? How Do I Get One?**

Obviously, I can't do everyone's Home Performance Assessment! If you live in the Atlanta Metro Area, I'd like to be your assessor of choice. However, if I can't do it, I have professional, like-minded friends who'd I gladly refer you to. You'll meet some of them on teleseminars. Please call me at 404-915-5321 to discuss this. Unless I'm out with my Boy Scouts, I take calls between 8 AM – 9 PM everyday, weekends included. If I don't answer, leave a voice mail message and I'll get back to you. When you're ready to schedule an appointment, you can do so on-line or call my office: 678-266-9970

If you live outside my service area, then you'll need to track someone down. The [Energy Conservatory](#) has a list of people who do assessments. The [Comfort Institute](#) does too. Also try the [Building Performance Institute](#). As always, use your favorite Internet search engine.

Folks doing assessments have different levels of training and processes they follow. All assessors should have an organization they are accountable to. The [Southface Energy Institute](#) is responsible for my quality assurance oversight. The goals and objectives should be the similar to what is presented here, though methods may differ. I just want to help have a healthy, durable, comfortable home while cutting you energy use. I believe all us in this industry do.

### **In Closing . . .**

I enjoy helping make a difference in cutting energy use in our world while improving health and making houses last longer. Thanks, my environmentally responsible friend, for following me on this journey! Please contact someone today or tomorrow do your part! Get a free energy audit provided by your utility company. Get a home inspection by a Home Performance Assessor. Ideally, get a Home Performance Assessment!

