A guide to renovation and new construction

**The HEALTHY HIGH PERFORMANCE HOME**

**DIY HINTS & TRICKS**

1. **AIR SEAL BUILDING ENVELOPE**
   Perform blower door test to find leak points. Reduce condensation in attics by weatherstripping plate and window, and placing of soundproof and mechanical shear in attics.

2. **INSULATE ALL INSULATION**
   Add attic insulation provides comfort and energy savings. Two inches of blown cellulose insulation may be applied over existing insulation or directly on the attic deck.

3. **INSTALL AND INSULATE DUCT SYSTEM**
   New duct systems should be installed within the attic, and if they are installed in conditioned space, motorized dampers should be installed in the supply and return ducts. Ducts must be balanced and doorless insulate by aluminum foil and seal to prevent air leakage.

4. **REPLACE WATER HEATERS**
   Electric: 80% efficiency, gas: 62% efficiency. Water heater should be replaced with an energy efficient type or an unconditional space. Test duct systems for leakage with a duct balance test.

5. **REPLACE INVENTED GAS ENGINES WITH SEASON CONVERSION, DIRECT FUEL INJECTION**
   For health and safety, water conversion and vapor condensation gases to the outdoors.

6. **RESIZE UNIT**
   Brings unit up, 1/2 or greater requiring air. An furnace, operate variable furnace, conditioned space units need to be vented directly to the outdoors.

7. **REDUCE AIR INLET WITH A VARIABLE**
   Speed unit, 1/2 SEER or greater requiring air. An furnace, operate variable furnace, conditioned space units need to be vented directly to the outdoors.

8. **LOCATION WINDOWS**
   Reduce windows to solar heat gain control, and keep heat inside.

9. **WALL INSULATION**
   Blow-in fiberglass insulation provides thermal and sound insulation, it can be installed within conditioned space and vapor retardation insulation. Gas appliances should be fire-resistant and have proper ventilation.

10. **INSULATION, energy efficient appliances and building materials**

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**Resources**

EarthCraft Virginia
www.earthcraftvirginia.org

- Virginia Department of Environmental Quality
- Waste Management and Recycling Programs
- U.S. Environmental Protection Agency
  - www.epa.gov/greenbuilding/tools/funding.htm
- Virginia Tech – Cooperative Extension
- Virginia Recycling Association
  - (804) 698-4000 • www.deq.state.va.us/waste/

- Habitat ReStore
- Better Housing Coalition
  - j.galloway@betterhousingcoalition.org

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**Can the house be built too tight?**

No. If the house is vented right, if spray foam insulation, Structured Insulated Panels (SIPs) or Insulated Concrete Forms (ICF) are used, the house can be very airtight and require fresh-air ventilation. This may be done with an Energy Recovery Ventilator (ERV) or a dedicated outdoor fresh air (DOF) system. New homes should have fresh outdoor air into an air handler where it is conditioned prior to distribution in the house.

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**Why is sealing ductwork important?**

Leaky ductwork often accounts for 10–30 percent of total heating and cooling costs. While that cost is significant, protecting health and safety is the most important reason to seal ducts. Leaky ducts can draw air from crawl spaces into the home, and that air can be contaminated with dust, mold, and other potential toxins.

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**Don't crawl spaces need to be ventilated?**

No. Sealed and conditioned crawl spaces are like mini-basements, which prevent moisture build-up, protect the floor framing, and help equipment and ductwork in the crawl space operate efficiently.

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**What is EarthCraft?**

EarthCraft House is a green building program that serves as a blueprint for healthy, comfortable homes that reduce utility bills and protect the environment. EarthCraft House is a partnership between the Greater Atlanta Home Builders Association, Southface, and government and industry partners. EarthCraft Virginia is the local provider for the EarthCraft House multi-family and single-family programs. Staff will guide builders through the process of designing, building and testing EarthCraft certified homes.

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**Why is maintenance important?**

A high performance home requires periodic maintenance to continue to be healthy and energy efficient. Properly maintained heating and cooling equipment operates efficiently, providing a comfortable environment and lower operating costs. Keeping water areas from the building with a good water management system makes the building last longer and helps maintain indoor air quality.

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**It's important to preserve the historic character of your area. Can new or renovated green homes fit into a historic neighborhood?**

Yes, even a few small changes can improve the performance of a home. Many systems in a building affect each other in complex ways (for example, insulation and ventilation, and an energy professional who is familiar with healthy, high-performance building can help you choose a way to proceed that makes sense for your specific project and budget).

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**How much does it cost to build a healthy, high performance home?**

It all depends on what you currently build. To upgrade from a basic, code-built home to a home like the one described here would cost three to five percent more. But once you factor in the decreased costs of ownership, it can be far less expensive. Utility costs are lower, and there are fewer repair and replacement costs due to the durable methods and materials used in green building. But even beyond construction and maintenance costs, green homes make financial sense. They may be easier to sell and may fetch a higher price. An environmentally sensitive project can attract positive attention and help differentiate your homes from your competitors.

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**What are the best ways to save money with green building?**

Work with experienced professionals from the beginning of the design process, they can help you avoid waste and make smart choices. Trying to retrofit existing plans can cost more and take longer. Some of the things experienced architects and builders can help with are material choices, advanced framing, efficient dimensions, and compliance with EarthStar specifications that can help the home qualify for an Energy Efficient Mortgage (EEM). It is worth just making a few small changes, or do you have to completely revamp a plan in order for a green building to work?

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**Is it worth the investment?**

You, yes, a few small changes can improve the performance of a home. Modern systems in a building affect each other in complex ways (for example, insulation and ventilation, and a professional who is familiar with healthy, high-performance building can help you choose a way to proceed that makes sense for your specific project and budget).

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**What is advanced framing? Is it safe?**

Advanced framing practices, which are allowed by the International Residential Code (IRC) 2005, are safe and sustainable ways to build. They save lumber and allow insulation to be installed at wall intersections that traditionally aren’t insulated. Leaving these areas uninsulated can lead to moisture problems and mold growth, as well as heat loss.

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**Why is it important to air seal a house?**

Air-sealing the inside of a house with a 50-year latex caulk prevents drafts and keeps heat inside the walls. Many insulation contractors offer a caulk and seal package prior to insulation.
What is visitability? How is it different than accessibility?

Visitability often refers to public buildings that require a 36" clear path throughout the building and a 5' diameter circle of clear floor space in the bathroom. It also makes it easier for residents to stay in their homes if they develop a temporary or permanent mobility impairment. Accessibility usually refers to people with impairments who are able to live independently in their homes but require modifications in order to do so.

Visitability makes it possible for people with impaired mobility to get in and out of a house and use the bathroom. It's essential for existing homes to be made easier for residents to age in place. Visitability helps to ensure that people can stay in their homes as long as possible, which can improve their quality of life and reduce healthcare costs.

Visitability and accessibility are important considerations for home construction and design. Builders and designers must ensure that homes are designed with features that make them accessible to people with a range of mobility impairments. This includes providing clear paths of travel, ensuring that doors and windows are accessible, and installing grab bars in the bathroom.

In addition to these features, homes should be designed with energy efficiency in mind. This includes using insulation, efficient windows, and renewable energy systems to reduce energy costs and improve comfort. Builders and designers must work together to create homes that are not only comfortable and accessible but also energy-efficient and sustainable.

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