



Sustainable Vs. Conventional Home Building

When we at Fine Line Homes started constructing dream homes for our clients, we wanted to use the best materials and highest-quality products. We found that when we built on that premise, we naturally built green and more energy efficient homes. We quickly learned that sustainable building materials are better than their conventional counterparts and have many added benefits.

The core of sustainable building is the application of better design, construction and management practices, which reduces our effects on environmental and economic resources. Before we even start the design phase, we evaluate each home site to decide the optimal location and orientation of buildings to take advantage of passive solar energy, natural daylight, and natural breezes for ventilation.

Green building practices encompass five major elements:

1. Sustainable design
2. Water conservation
3. Renewable energy
4. Indoor environment
5. Conservation



At Fine Line, we are passionate about building homes that are forward-thinking in all of those areas. We can help you choose the options that reflect your needs, lifestyle and your budget.



Benefits of Sustainable Building

It's important not to get caught in the "payoff" game, where every choice must have financial benefit.

— Chris McLaren

Our green materials and construction practices are good for both you and the environment. Consider a few of the benefits:

- * Reduced consumption of natural resources
- * Lower utility costs
- * Greater self-sufficiency and less dependency
- * Lower maintenance costs over the life of the home
- * Enhanced indoor environment quality and increased comfort
- * Cost-effective material recovery through recycling and reusing
- * Use of products and services from local businesses, minimizing the cost and impact of obtaining materials from distant regions

So does building green cost more money? Sometimes it does, but in most cases, there is an economic tradeoff. For example, a high-performance home may cost you \$100 more a month in mortgage payments but save more than a \$100 a month on your utility bills.

But it's important not to get caught in the "payoff" game, where every choice must have a financial benefit. These materials and practices often have other benefits to keep in mind: a healthier, more comfortable environment, lower maintenance needs, better performance, and a superior look and style.

Let's compare conventional vs. sustainable building practices in several areas of the construction process.

Structure & Exterior Walls



Conventional construction uses a simple 8-inch thick concrete foundation wall with stick framing inside these walls. Above-grade exterior walls are also stick-built with dimensional lumber. These walls are then stuffed with fiberglass batts and/or blown-in and sprayed cellulose, all materials that allow air to pass between the interior and exterior wall surfaces, which can in turn create convective looping through the material. This air movement and the thermal bridging caused from each piece of lumber in the wall is the greatest cause of heat and energy loss in conventionally built homes. Thermal bridging is the transfer of heat or cold through solid materials such as dimensional lumber, which connects the exterior wall to the interior wall and has little insulation value. Conventional construction also creates more waste, which ends up in landfills if it isn't properly recycled.

Many studies, using heat flow analysis and taking thermal bridging into consideration, have shown that the average 6-inch exterior wall with R-20 batts actually has a real insulation value closer to R-14.

When building a green home, we want to optimize the value of exterior insulation and the overall thermal performance of the exterior envelope assembly, thereby lowering the home's energy needs by 40 to 50 percent. We use high-performance envelope building systems such as structural insulated panel systems, or

SIPs, and insulated concrete form systems, or ICF. These thermally non-bridged envelope systems offer the most advanced energy performance.

SIPs are typically constructed using oriented strand board (OSB) panels adhered to both sides of an expanded polystyrene foam (EPS) insulation core. A 6-inch SIP has an R-22 value, with minimal thermal bridging from inside to outside and absolutely no air movement inside the wall, since EPS is closed-cell insulation. The airtightness plays a huge role in reducing heat loss. These systems use factory-fabricated panels, cutting down on construction waste. They take minimal time to assemble, reducing their exposure to the elements, which in turn eliminates potential problems such as water damage or mold growth.

ICFs are most commonly used for foundation systems but can be used for the entire structure. The most common ICF form is constructed of EPS insulation, with 2½ inches on the interior and exterior of a 6½-inch concrete core. The 5 inches of EPS insulation has an R-22 value with no thermal bridging or air penetration, making this wall system very efficient. If you add in the thermal mass properties of concrete (its ability to hold a given temperature), the insulation value rises as high as an estimated R-35.

We use closed-cell spray foam for other parts of the structure that need good insulation, such as the floors





Roof

A conventional roof typically has asphalt shingles, which are a petroleum-based product, require a lot of energy to manufacture, have a relatively short lifespan and account for a large percentage of construction waste taken to landfills.

Depending on your budget, we first look for a longer-lasting product to cut down on the number of times you will need to replace your roof. We start with an affordable lifetime shingle that has a good wind rating so that repairs or replacements aren't constantly needed. Next, we can look for recycled products that reuse old asphalt shingles or other products, such as plastics and metals. We can also use clay, concrete and slate tile, metal roofing, fiber-cement composite roofing or recycled plastic/rubber shingles as desired.

A radiant heat barrier, a thin layer of metal foil insulation that can be installed on the underside of your roof, reduces heat transfer into your attic. This, in combination with proper venting and a lighter-colored roofing material, can help lower cooling costs.

Our sustainable roofs are longer-lasting, require lower maintenance and provide greater comfort than conventional roofs.



Windows

Conventional windows are usually standard Energy Star-rated, with an insulated value of R-2 or R-3. This represents a weak point in your home's energy performance, since heat is most often lost through the windows.

Your green home can have super-insulating windows that use a combination of glazing and films to offer optimal light while lowering solar gain and heat transmission. These windows have an R-value of 5 up to 9, which can reduce heat loss by 30 percent compared with the typical R-3 window.

These windows also offer other benefits:

- Unique design that keeps the window warmer in the winter and cooler in the summer
- Great UV protection to reduce facing and interior damage
- Increased indoor comfort
- Less sound transmission
- Reduced interior condensation

Homeowners can go a step further by using insulated window treatments, increasing the insulation value even more.



Electrical

Lighting is the third-biggest energy user in most homes. Conventional building practices have evolved in recent years to include more energy-efficient lighting and appliances, but usually it stops there.

Sustainable electrical design goes further, incorporating the following:

- Natural daylighting techniques, which significantly reduce the reliance on artificial lighting and the energy required to power it
- More efficient LED and florescent lighting
- Lighting controls and sensors that turn lighting off when natural light is present or when you leave the room
- Electrical conditioning systems that help manage electrical irregularities and the associated energy loss
- High-performance structure and mechanical systems, which dramatically lower the energy required for heating and cooling
- When you opt for wind or solar power generation systems, you can produce your own electricity, reducing or eliminating your dependance on the utility company. If you generate more electricity than your energy-efficient home needs, you can even get paid for the excess electricity that you supply to the grid.

An energy-management system allows you to control your home's energy usage from any computer or smartphone, putting the power of conservation literally in your hands. You can adjust the temperature inside your home, turn lights on or off, or just keep tabs on your energy consumption.



Mechanical

Conventional building uses standard furnaces that have an efficiency of about 80 to 85 percent. Most hot water tanks still use pilot lights and are not very efficient.

We use state-of-the art, high-efficiency heating, ventilation and air conditioning equipment, boilers and plumbing materials. Our boiler systems, which have sealed combustion chambers and achieve an efficiency of 95 to 98 percent, can run all of your heating needs, from on-demand hot water to in-floor heating to fan-coil furnaces with variable speed drives.

Gray-water systems recycle the water from your baths and kitchen, treat it and reuse it in the toilets, lowering your water consumption by as much as 40 percent. Rainwater collection systems provide water to irrigate your landscape or garden.

Here are some other features available in our mechanical systems:

- Heat recovery ventilators to keep the air fresh in the home without losing heat energy
- Geothermal heat pump technology for both heating and cooling needs
- Solar thermal systems for assisting hot water needs
- Solar electric systems to supplement or produce all needed electricity
- Maximize operable windows and natural ventilation

Finishing

Conventional building practices don't take careful note of chemicals and air pollutants being introduced into the new living environment. These building materials, adhesives, sealants, finishes and furnishings may release dangerous off-gasses and volatile organic compounds, or VOCs, which can be harmful to your family's health.

We use low-VOC paints and coatings, which provide less contamination from harmful toxins, keeping your indoor air cleaner. We also work to limit the off-gassing from other interior components, including the carpeting. We recommend carpets that are made from natural materials such as wool or corn. Other flooring materials include natural and reclaimed hardwood, cork and bamboo. To enhance the beauty and luxury of the kitchen and bathrooms, we can use natural stone for tile and countertops.



We can also cater to your health and comfort by providing individual zone controls for heating and cooling throughout the home.

Our interior finishes are both beautiful to look at and environmentally friendly. We strive to use materials that are plentifully available, renewable, reused or recycled.

