Wood Stoves for Home Heating | Earth 911

Gemma Alexander

In some cases, wood stoves can be an ecological choice, if you choose your stove wisely and burn your wood properly. Take a few minutes to assess your choices, because some wood-burning options are far better for the environment.

There are many reasons why natural gas is the most common home heating source in America while fewer than 10% of U.S. homes burn wood as a primary heat source. If your home is in the woodburning camp, you already know that fireplaces are not the best home heating system. Fuel availability is often the driving force behind choosing to heat with wood — either because you have your own woodlot, or because heating with electricity or pulling gas to a remote home is prohibitively expensive.

Stoves vs. Fireplaces

Sometimes people refer to wood stoves and fireplaces interchangeably. They are both hearth appliances (that is, safe containment systems for burning fires) and the fuel they both burn is generally wood. Sometimes they even look the same when wood stoves are placed inside a fireplace structure.

But there is a world of difference between the two. A fireplace is essentially an indoor campfire. At best, a fireplace achieves about 10% efficiency in its use of the energy stored in the wood. They can even operate at negative efficiency, meaning

they actually draw more heat out of the house than they create. By contrast, a wood stove is a fully-enclosed appliance whose efficiency can be up to 50% higher than the fireplace. Wood stoves are rated by the EPA.

Measuring Wood Stove Efficiency

There are two ways of measuring the efficiency of wood-burning appliances.

Combustion efficiency refers to how much of the energy embodied in the fuel is converted to heat (rather than smoke, ash, or other byproducts). Overall efficiency is the percentage of the available energy that is actually transferred to the space to be heated.

Overall efficiency will always be lower than the combustion efficiency — by as much as 20%. So, when you are shopping for a wood stove, be sure to find out which efficiency the number on the tag refers to.

Good Wood

There is no Energy Star system for wood stoves because they generally do not draw electric power. But the EPA has established standards for wood stove efficiency. An EPA certified wood stove is independently tested by an accredited laboratory to meet the New Source Performance Standards (NSPS) emission limits that govern how many particulates a stove can release into the air. Basically, NSPS requires all but a few grams of your wood is completely burned instead of going up the chimney as soot and ash.

In 2020, the NSPS emission limit for new room heaters was lowered to 2.5 grams of particulate per hour burning cordwood. Wood stoves certified under the 2015 NSPS meet a particulate emissions limit of no more than 4.5 grams per hour. So stoves manufactured before 1990 should be replaced, however aesthetically pleasing their design may be, to meet the new standards. They burn wood much less efficiently than contemporary models, wasting fuel and polluting the air inside your home and outdoors.

Currently certified wood stoves produce heat 50% more efficiently, require 30% less wood, decrease pollution by 70% and reduce the risk of creosote buildup compared to older stoves.

EPA certified wood stove by Ashley Hearth. Image: Amazon.com

Alternate Fuels

Pellet stoves, which burn pellets of compressed sawdust, are still your best choice. They are the cleanest burning solid-fuel stove option.

Some models of EPA certified pellet stove can reach efficiencies in the range of 70% to 83% — comparable to a gas fireplace. You do have to buy pellets, which eliminates the savings from cutting your own wood. And some pellet stoves do require a small amount of electricity to operate the hopper that feeds pellets into the fire, which is a drawback if your home frequently loses power. But there is no question that operating a pellet stove is much less work than burning logs.

EPA certified pellet stove by Comfortbilt. Image: Amazon.com

Choosing a Wood Stove

There are two types of high-efficiency wood stoves. Non-catalytic stoves are more common. They achieve high combustion rates by using firebox insulation and a large baffle to produce a longer, hotter gas flow path; and by introducing pre-heated air through small holes above the fuel in the firebox. Catalytic stoves tend to be more expensive and depend more on correct maintenance by the user. But they produce the long, even output that homeowners want from a heat source. Catalytic stoves pass the smoky exhaust through a coated ceramic honeycomb inside the stove. There, gases and particles in the smoke ignite and burn.

Proper sizing is also critical to choosing the right stove. Small stoves are best for heating individual rooms or for "zone heating." Big stoves are best for heating the whole home, but only if you have an open-plan home. In homes with numerous rooms, a large stove can cause one area of the home to overheat while the rest remains cold. You can use a BTU calculator to estimate your heating needs, but it's best to consult a professional who can help match your particular situation to a right-sized hearth appliance.

This article contains affiliate links. If you purchase an item through one of these links, we receive a small commission that helps fund our Recycling Directory.

You Might Also Like...

Recent Posts

- Author
- Recent Posts

Gemma Alexander has an M.S. in urban horticulture and a backyard filled with native plants. After working in a genetics laboratory and at a landfill, she now writes about the environment, the arts and family. See more of her writing here.

Latest posts by Gemma Alexander (see all)