

# A Comparison of Pellet Stoves and Masonry Heaters

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*June 20, 2008*

The question is often asked if masonry heaters can burn pellets. While the answer to this question is no, it is interesting to note some similarities between masonry heaters and pellet stoves. First, they both burn biomass fuel (wood) which is a renewable resource. However, it might be argued that the required processing of wood products for producing pellets leaves a larger environmental footprint than simply harvesting trees for cordwood. Second, they are very comparable in overall PM (particulate emissions) 2-3 g/kg, CO (carbon monoxide emissions) approximately 20 g/kg and net efficiency approximately 60-70 %.

In reviewing the 2008 Issue #1 newsletter of the Pellet Fuels Institute I found a number of points of interest that I will pass along. The president of the institute writes that "The spread between oil, natural gas and pellet prices has always been close. The payback period for the capital costs to convert non-space heating applications from traditional fuels to pellet fuels has always been too long to justify the expense. Not any longer. The market for these pellet fired central heaters is going to explode. It has already happened in Europe (with the help of subsidies), and I predict that it will happen here."

This brings up the question of subsidies. The PFI newsletter points out in February 2008 the House of Representatives passed the Renewable Energy and Energy Conservation Tax Act of 2008, which includes a \$300 tax credit for pellet appliances. This bill is now awaiting action in the Senate. In addition, the Senate may vote on the Lieberman-Warner "America's Climate Security Act" (S.2191). This bill includes many provisions that could be very beneficial to the pellet fuels industry, owing to the fact that our fuel is "carbon neutral" or very nearly so.

If either of these pieces of legislation pass it will be very helpful to the pellet stove industry. In Europe masonry heaters are also included in this type of legislation. In the United States the market share for masonry heaters is much lower in comparison to the market share in Europe. However, through the help of the Hearth, Patio & Barbeque Association (HPBA) and the Masonry Heater Association of North America (MHA) we have already caught the attention of EPA as a clean burning appliance, comparable to pellet appliances, and we hope that this recognition by the EPA will help us piggy-back on the recent successes of the pellet industry.

The availability of pellets for home heating has been up and down in recent years. Again the president of the PFI writes, "A lot of new capacity was built since the shortages [after] Katrina.....Expanding our raw material base has to be an industry priority as the housing slump has decreased the amount of "traditional" raw materials." My guess is that the availability and price of pellet fuel will fluctuate much more over the next few years as demand increases, than will the availability and price of cordwood for a masonry heater. Also just like pellet stoves you can burn recycled wood scrape from construction, cabinet shops and shipping pallets. Often these materials are free for the asking.

While you get to use biomass fuel and have relatively comparable emissions and efficiencies with masonry heaters and pellet appliances, there are some major differences. The first, in favor of pellet stoves, is price. Masonry heaters are much more expensive. However, the higher initial cost of a masonry heating system can be paid back in a number of ways. A masonry heater, like a masonry fireplace, adds fire viewing enjoyment and value to your home. Installed cost a masonry heater can actually be very comparable to a conventional masonry fireplace, but the value for the money is considerably higher. The investment in a masonry heater is working for you every day of the heating season as an active thermal mass storage system gently heating your home with comfortable radiant heat.

Now for some advantages of heating with a masonry heater rather than with a pellet stove. First, one of the biggest problems with using a hot air convection appliance like a pellet stove, in the relatively mild climate of the Mid-Atlantic and South Eastern region of the country, is that most of the heating season is actually spring and fall weather with real winter weather only a few weeks long.....not months in duration as compared to the Northern regions of the country. This is an important consideration. Much of the time, the average energy demand of your house will be quite low. The BTU output from a pellet stove, will most likely be greater than comfort allows during the spring and fall portion of the heating season and will work satisfactorily only when it is fairly cold outside. In other words it will produce too much heat during the lengthy fall and spring heating seasons in the southern regions of the country.

Another positive consideration in favor of a masonry heater is its ability to provide even heat over a much larger area within your home. A masonry heater produces radiant heat which warms wall, ceilings, floors and objects in the room, not the air directly. The air in the room is warmed in turn to the same temperature as the surfaces and objects in the room. The secret of natural convection of air to adjoining rooms lies in the fact that the surface temperatures in the adjoining rooms (being in the shade) are slightly cooler than in the room directly heated by the masonry heater (being in the sun). The laws of thermal dynamics dictate that heat flows from warm surfaces to cool surfaces. This occurs through convection of air between rooms. As long as there is an opening between rooms the air temperature will equalize naturally. The natural convection process will continue until the wall surfaces in both rooms are equal. Convection between rooms will not stop until the masonry heater stops radiating to the surfaces of the room in which it is located (normally between 12 to 24 hours). When you walk from one room to the next it will be similar to walking from the direct rays of the sun in to the shade. When you walk into an adjoining room you will lose the direct warmth of the masonry heater's "sunshine" but the air temperature will change very little if at all.

With a hot air convection appliance like a pellet stove most of the convection related to the appliance occurs within the room in which it is located and not between adjacent rooms. This is why you are often too hot in the room with the appliance and too cool in the adjoining rooms. With pellet stove or forced air systems that generate hot air, the air rises to the ceiling comes in contact with the coolest outside wall in the room settles to the floor, sweeps across the floor creating a draft on its way back to the pellet stove or the cold air return of the forced air system. The colder it is outside, the greater the need for more hot air, the greater the speed of convection (air movement) in the room, the greater the "wind chill" in the room, the less comfortable you

are in the room. Often with a convection type heat system, the only solution for comfort is to rap a blanket around you as you read a book or watch television. On the other hand, with a radiant system you just sit in the sunshine.

In addition as a convection heat appliance, the pellet stove blows hot air into the room, circulates dust, dries out the air and promotes draft conditions in your living space. The radiant heat from a masonry heater does not these negative effects. The quality and comfort of the heat from a pellet stove can not compete with the radiant warmth of a masonry heater, which comfortably heats your home from the earliest needs in the fall heating season to the last needs in the spring heating season.

Pellet stoves require electricity to operate, masonry heaters do not. In an emergency, you will still have heat for your home when you heat with a masonry heater.

The circulating fan of a pellet stove runs constantly during operation producing background noise in the room in which it is located. Masonry heaters produce the sounds of a crackling fire as they are being charged (usually for one to three hours) and are silent during the rest of the heating cycle.

Pellet stove require frequent cleaning maintenance and in order to operate efficiently. Masonry heaters produce very little ash which is easily removed and recycled to your lawn or gaden. Due to the high combustion temperatures (1100 to 1800 degrees Fahrenheit) only the mineral content of the wood is left after a fire.

Pellet stoves are at best utilitarian to look at. Masonry heater can be designed to fit into the architecture of the home and provide a wonderful focal point for the room in which it is located. They can add substantial value to your home, particularly when you look at the overall cost for heating the home, not to mention the dramatically improved comfort of the home during the heating season.