

Fireplace And Wood Heating

If you are planning of buying or replacing your fireplace this publication is for you.



**Burn it
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The idea of burning wood in a fireplace or wood stove is appealing for many people. Watching the flames is pleasurable and a wood stove could be an emergency heating source in case of an electrical power failure. However, as many householders have found out, burning wood in the city can have drawbacks, like smoke-filled

rooms, complaints from neighbours, and more expenses and work than enjoyment. To make wood burning worthwhile you need realistic goals and a practical plan.

Below is a review of the main reasons that people choose to burn wood in their urban houses and some of the issues that can arise.

— *Burning wood in a fireplace for the pleasure of viewing the fire* —

Homeowners who want a wood fire just for its visual appeal usually opt for a fireplace because the common, conventional fireplace is not an effective heater, but tends to be an attractive feature of a room even when no fire burns. However, conventional wood burning fireplaces, even elaborate expensive ones, often cause problems and disappoint their owners. The following problems are often reported by users of conventional fireplaces.



A beautiful and expensive fireplace, but notice the smoke stains on the stone arch and wooden mantel.

- **Open fireplaces spill smoke** into rooms because they demand a large volume of room air, and new houses are too tightly sealed to supply it. To keep the smoke inside the fireplace, room air must flow rapidly

through the firebox opening and up the chimney. A house that is tight enough to be cosy and easy to heat does not leak enough to provide an open fire with the air it needs to prevent smoking. As a result, the centuries-old classic fireplace design is unsuitable for modern, energy efficient housing.

- **Fireplaces are sensitive to negative pressure** caused by household exhaust fans like kitchen range exhausts and clothes dryers. This is especially true in tightly-constructed new houses. Fans that take air from the house compete with the fireplace for air and can pull smoke out of the fireplace into the room. There is no simple, inexpensive way to prevent smoking caused by competition for air except to avoid using fans when the fireplace is in use.
- **Conventional fireplaces pollute** because they have none of the characteristics needed to burn the wood completely. The smoke from one family's fireplace can seep into a neighbour's house through small leaks around doors and windows. This problem has resulted in complaints in cities across Canada from people victimized by their neighbour's wood burning activities. For people with allergies or lung diseases like asthma or emphysema, wood smoke can produce serious health consequences. In reality, no one should be exposed to more than a hint of wood smoke against their will because extended exposure is not good for anyone's health.



Wood smoke has been identified by Environment Canada as a significant source of winter time air pollution. Burning wood in a conventional fireplace simply to watch the fire may be pleasant, but is polluting. A gas or electric fireplace with a simulated wood fire is a better alternative. For primarily decorative use, an alternative fireplace can be attractive and does not have the same problems as wood fireplaces.



Gas or electric fireplaces can be more suitable for urban households because:

- smoke does not spill into the room,
- the exhaust does not significantly pollute the outdoor environment, and
- fuel storage is not a problem.

— Supplementary and emergency heating —

Tens of thousands of Canadian families have installed wood stoves or heating fireplaces to warm chilly parts of their houses, to supplement their main heating system during cold weather and to provide emergency heating during electrical power failures. Depending on your house, its location and your objectives, the supplementary use of wood can be effective and appropriate, but some conditions can apply.

- **Don't expect to save money.** Primary heating with wood is rare in Canadian cities because the cost of wood in urban areas is usually at least as high as the cost of heating with oil or natural gas, and it is a lot more work. If you want to reduce heating costs, energy conservation is a better urban option than wood heating.
- If your **city experiences winter season air quality problems**, fuel options other than wood are preferable. Even though natural gas, oil and electric heating all have environmental impacts in their production, refining and transportation to market, they create less pollution at the point of use than wood burning. Since wood is not a highly refined fuel, its primary environmental impact occurs at the point of use in the form of smoke.

- Consider your **house location and height** relative to adjacent buildings. If the house next door is higher than yours, wood smoke from your chimney could infiltrate your neighbour's house. The same applies if



Does your smoke affect your neighbours?

your house is near the ventilation air intakes for an office or apartment building. Your smoke could be distributed throughout the building, affecting many people.

- Sometimes the arrangement of a house and proposed location of the stove or fireplace prevents the installation of a **chimney up through the heated part of the house**. In these cases the only alternative is to route the chimney out a wall and up the outside of the house. However, while they may be easier to install, outside chimneys do not function well. Cold smelly air can flow down the chimney into the room when there is no fire burning in the stove or fireplace. It is difficult to get a fire started in a system connected to an outside chimney without filling the house with smoke. Stoves and fireplaces served by outside chimneys are often a source of uncertainty, inconvenience and frustration for their owners.



Outside chimneys do not function well.

The decision to add a wood burning system to a house should not be taken lightly. A basic wood stove and chimney installation normally costs at least \$3000. Fireplace installations cost considerably more. A building permit is needed and insurance companies require that installations meet the rules found in safety codes. Finally, all new systems installed in urban areas should be designed and operated to produce the lowest possible smoke emissions.

— What are the environmentally appropriate options? —

As a general guideline, only wood stoves and fireplaces certified to the United States Environmental Protection Agency (EPA) or the Canadian Standards Association (CSA) B415 smoke emission regulations should be installed in urban areas. These units have internal characteristics that enable them to burn with about 90 per

cent lower smoke emissions than conventional stoves and fireplaces. They are also easier to use and about one-third more efficient than older wood stoves. These advanced technology products have proven reliable over the past fifteen years.

Fireplace Insert



A fireplace insert converts a conventional fireplace into a heating system.

If you have a conventional wood burning fireplace, especially one made from brick, block or stone, you may be able to upgrade it to a supplementary heating system by installing an EPA certified fireplace insert. An insert is like a wood stove that has been adapted by its manufacturer to fit

within the firebox of an existing fireplace. Attached to the flue collar of the insert is a new stainless steel liner that runs to the top of the chimney, isolating the insert and its exhaust from the original fireplace structure. A good insert installation transforms a troublesome, inefficient fireplace into a supplementary heating system. Note that glass doors and accessory devices like tubular grates for fireplaces do not significantly improve efficiency and can create other problems.

Wood Stove



A wood stove is usually the most flexible and economical wood heating option.

A wood stove is the most flexible and economical wood burning device because it can be installed almost anywhere there is enough space for the installation and where the chimney can be routed straight up. An area about one and a half metres square (five feet square) is needed for the stove and minimum installation clearances. If you are in doubt about routing the chimney straight up through the house construction, consult an experienced wood heat

installer, such as one who has achieved certification under the Wood Energy Technical Training (WETT) program. In most cases the apparent obstacles can be overcome in order to produce a system that functions well.

Advanced Technology Fireplace

An advanced technology fireplace combines the clean burn and efficiency of an EPA certified wood stove with the built-in look of a regular fireplace. There are models to suit most décor preferences, from rustic to formal. They have insulated cabinets which permit installation within combustible construction, and are vented through insulated metal chimneys. A factory-built fireplace does not need a concrete foundation, but can be mounted on a floor of standard construction. Because these fireplaces have large door openings relative to their chimney size, it is particularly important that the chimney be routed straight up, avoiding offsets that can introduce resistance to exhaust flow, increasing the likelihood of smoke spillage.



This fireplace could heat part of a large house or all of a small house.

Masonry Heater

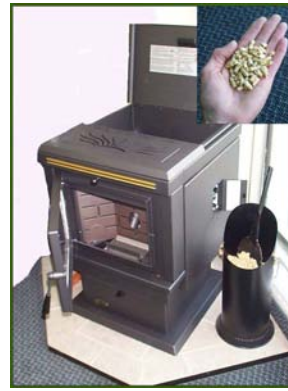
A fully masonry alternative to such fireplaces is a masonry heater which uses its massive structure to store the heat from a fast-burning fire, then releases it slowly over the following several hours. Masonry heaters are highly specialized and must be built by experienced heater masons so they work correctly and are durable. Well-built masonry heaters are as efficient and clean burning as EPA certified stoves and fireplaces.



A masonry heater tends to form the centrepiece off a house.

Pellet Stove

For those who want the convenience of unattended operation, a pellet stove might be a suitable option. Depending on heat demand, a pellet stove can operate without refuelling for up to 24 hours. The fuel is made by compressing dry, finely ground wood waste into small pellets that are so dense that they don't float in water. The pellets are fed from a hopper in the stove to the combustion chamber where only a small quantity burns at a time. Despite their convenience, pellet stoves are not suitable as emergency heating systems because they require electricity to operate.



Pellet stoves appeal to householders who value the convenience of automatic operation.

— How to be a responsible urban wood burner —

If everyone in a neighbourhood decided to burn wood every day, the effect on local air quality could be dramatic, and harmful. The impacts of wood burning on air quality can be reduced, but never completely eliminated. As a result, each household that chooses to burn wood should use an advanced technology stove or fireplace and operate it so that smoke is minimized. Since wood smoke is wasted energy, the effort to burn without making smoke is worthwhile because it reduces wood consumption.

Tips for responsible wood burning



If you see this much smoke coming from your chimney, something is wrong. Using good fuel and the other tips here, you should see no visible smoke except for the first few minutes after a fire is started.

- Burn only firewood that is fully seasoned and dry enough to burn without hissing and sizzling in the fire (see the companion document [Good Firewood](#)).

- Firewood should be cut and split to the correct size for your stove or fireplace. Pieces longer than 40 cm (16") and larger than 15 cm (6") across the largest cross sectional dimension should be avoided. Smaller pieces make stoking easier and smouldering less likely. Use plenty of finely split dry kindling and plain newspaper to start fires so that smouldering is minimized.
- Always leave the air control fully open until the firebox is full of flames and the firebox is thoroughly heated. The firebricks in a hot firebox are tan in colour, not black.
- Never turn the air control down so much that the fire smoulders. Wood should be flaming brightly until it is reduced to charcoal.
- If your fires smoulder, split the wood smaller and use more pieces each time you load.
- As you learn to burn without smoke, check your chimney frequently for visible smoke. If you see smoke, change your fuel or burning practices so that no smoke is visible while the stove or fireplace is in operation.



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