

# Furnaces keep the heat flowing

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Most of us divide the year into four seasons – and at this time of year in the Yukon, three of them seem awfully short.

However, people who spend a lot of time thinking about home heating count two seasons. There's the heat-in season when heat comes into your house from the outside world, and the heat-out season when heat flows outward, given the slightest opportunity.



That leads to the two important aspects of home heating.

First, don't give the heat an opportunity to escape through leaky doors, cracks in window frames, uninsulated walls and ceiling, and all the other places where the inside of the house connects a little too closely with the outside. Good barriers are the home-dweller's first line of defence during the heat-out season – but that's a topic for another occasion.

The second line of defence is a good and efficient source of heat inside the home – something that can generate a little more heat than the outside world sucks away.

The basic components of home heating are far from new. You need a way to create heat, a way to transfer the heat to your living space, and a way to get rid of the waste products of heat generation.

For millennia, home heating was simple. A fire in the middle of the living space provided heat, and a hole in the roof above it got rid of the waste products, or

most of them. The problem of transferring heat through the living space was solved by keeping the living space small and sticking close to the fire.

As long as the floor is dirt or stone and the space is small, it's not a bad system. In fact, a lot of the world still heats its dwellings in much the same way.

However, a modern Yukon home is usually built of wood, with multiple rooms and multiple storeys. It's definitely not designed for an open fire and a hole in the roof. Something more complex is called for.

One solution moves the energy source, the modern equivalent of the fire, outside the house – way outside. For a house heated by electricity, the energy source is a power plant somewhere down the road, anywhere from a few kilometres to hundreds of kilometres away. Heat is both created and distributed inside the house by passing electricity through devices like baseboard heaters.

Most Canadian houses, however, still use an energy source inside the house. There are plenty of options: fireplaces, woodstoves, boilers that heat water as a way of moving the heat around, heat pumps that pull heat from natural sources like the ground or outside air, and more.

In the Yukon, the most common in-the-house heat source is a forced-air furnace. Some are fuelled by propane or wood, but most are fuelled by oil.

The furnace is the modern equivalent of the fire in the middle of the floor, but it's much more mysterious. To many home-dwellers, it's that big box in the basement that takes up too much space in the laundry room. The outside of



Illustration: Tanya Handley

a furnace doesn't reveal a lot about what's going on inside.

Inside, however, the furnace still does much the same thing the old heating-fire did. It burns fuel to heat air. The difference is that the fuel burns much more efficiently and safely, and the warmed air – which is kept separate from the fire – is blown through ducts to different parts of the house.

The fire itself takes up relatively little space in the furnace. Most of the space in the big-box part of the furnace, in fact, is devoted to moving air and gases around.

The burner, the source of fire, is that egg-crate-sized mechanism attached to the front of the furnace. The burner draws in air and pumps fuel oil under high pressure through a nozzle, where the air and oil are mixed and sprayed out as a combustible mist, much like the process in an aerosol spray can. An electrode ignites the mist and flame shoots into the combustion chamber inside the furnace.

The hot gases inside the combustion chamber are dangerous, but they don't enter the stream of warm air that carries heat through the house. Instead, they pass through the pipes of a heat exchanger and out of the house through the chimney.

The house itself is heated by sucking cold return air into the furnace, blowing it through and around the heat exchanger, and sending the warmed air through the house by way of the duct system.

An oil furnace is a much safer and more efficient way of turning fuel into usable heat than the old open fire. However, its safety and efficiency depend on how each of its components works. Watch for the next column in this series, two weeks from now, to learn more about chimneys and other components of the exhaust system that carries dangerous combustion products safely out of the house.

*This column was prepared by Clair Eamer on behalf of the Energy Solutions Centre and Yukon Housing Corporation.*