

## Home Heating Systems and Fuel Types

All heating fuels contain energy, but the fuel and heating system that you choose to deliver that energy into your home can make a big difference to your budget.

The total cost of heating a home is based on a variety of factors, including the purchase and maintenance cost of the heating appliance, the cost and energy content of the fuel, how efficiently the heating appliance converts the fuel to heat, and how well the house retains the heat.



There are a number of factors to consider when choosing a heating system for a home: the combustion efficiency of the appliance, the energy content of the fuel, the cost of the fuel now and the anticipated cost into the future.

Not all of the energy in a fuel can be converted into heat. The amount of usable energy depends on the kind of fuel (i.e., oil, propane, wood), the kind of appliance used to convert the fuel into heat, and how well that heating appliance is maintained.

“It is important to understand that when you buy a litre of fuel, such as propane or oil, you are buying heat energy and different fuels have different energy concentrations,” says Juergen Korn, Research & Development Project Manager at the Yukon Housing Corporation.

For example, propane contains 7.1 kilowatt-hours of energy per litre, compared to

10.7 kilowatt-hours of energy per litre for heating oil (about 50 percent more).

The energy content of wood depends on the dry weight of the wood and the amount of moisture in it. The energy in one kilogram of dry wood is about 3.9 kilowatt-hours regardless of the type of wood. However, the moisture in green wood can absorb as much as 20 percent of the wood’s heat energy. Also, as wood absorbs moisture it becomes more difficult to burn.

The combustion efficiency of the heating system is also important to consider. While some systems can achieve over 90 percent efficiency, an old or poorly maintained heating system can be operating at as low as 50 percent efficiency. This compares to modern, well-maintained heating systems, which typically have efficiencies of approximately 85 percent. Also, like an oversized muscle-car, an oversized heating system will use more fuel than necessary.

Wood heating efficiencies vary widely depending on the characteristics of the wood and the woodstove design and operation. Wood is currently the least expensive heating fuel in the Yukon but wood heating has some disadvantages. An oversized wood heater can be very inefficient. Wood handling can be dirty and labour-intensive, and burning wood can affect both indoor and outdoor air quality.

Electrical heat is 100 percent efficient because 100 percent of the electrical energy is converted into heat. However, electricity is still the most expensive option because of the high average

cost of electricity when used in the quantity that is required for heating a home.

It is also important to consider the source of the electricity. Hydro generation is a relatively clean and efficient process, unlike diesel-generation of electricity. If the electricity is diesel-generated, as it is in many Yukon Communities, the heat is ultimately coming from the diesel fuel through a very inefficient process of converting chemical to mechanical to electrical and finally to heat energy.

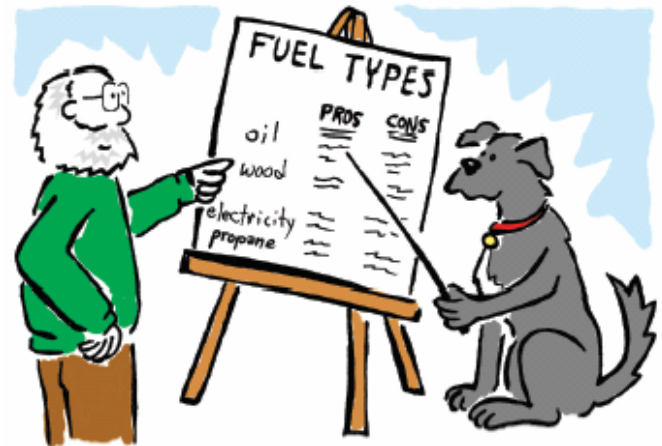


Illustration: Tanya Handley

Another complication in deciding what kind of heating system to choose is the fact that fuel prices keep changing – and they change more quickly than you can feasibly change your home heating system. In other words, at the time of installation, you can never precisely anticipate the full future costs of heating your home.

However, no matter what heating system you select your heating costs will generally be lower if you purchase the most efficient system (so that you use less fuel each year) and use the heat you generate efficiently within your home. Installing good insulation, sealing air leaks, and providing effective ventilation

can reduce the amount of heat that must be generated to sufficiently heat the home.

And then there is the option of using the sun’s energy directly to heat your home.

“One often-overlooked source of heat is from solar radiation,” Korn says. “With proper window orientation, sizing, and glazing selection, it is relatively easy and inexpensive to capture over 30 percent of the annual heating needs for the house directly from the sun.”

Yukon-specific information about current fuel options and more information on the relative merits of various heating systems is available at the Yukon Housing Corporation and the Energy Solutions Centre.

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