Heat Pump Basics for Canadian Climates

Common Types:

- **Air-Source Heat Pumps** – **Cold Climate** versions now able to operate down to -30C!
- **Ground Source Heat Pumps** (also known as geothermal or geo-exchange systems) - they use pipes buried in trenches or vertical wells to exchange heat with the ground. (Pros: More efficient; cheaper to run. Cons: more expensive to install)
- **Hybrid Heat Pumps** – on coldest days uses a backup heat source like natural gas or propane. (Pros: can use cheaper heat pump models which don't operate at temperatures below -10C or -15C. Cons: not as good for the environment; Cannot remove natural gas / propane from the home).

Indoor portion. Two common options:

- **Centrally Ducted** – often a drop-in replacement for the fan & burner portion of a natural gas furnace
- **Mini-Splits** – Refrigerant lines from the outdoor compressor unit run to one or more wall mounted indoor units. No ducting is required.

Overall Pros and Cons of Heat Pumps

Pros:

- **Can be cheaper to operate** - This is especially the case if starting with baseboard electric or propane heating. As the carbon tax increases, the savings for a heat pump will increase. If coupled with an electric water heater (or better still a heat pump electric water heater), it allows natural gas to be removed from the home increasing the savings (and leaves you with fewer bills to pay!).
- **Great for the environment**. Two reasons for this -
    1. **Clean Energy:** Ontario has a clean electrical grid (~88% carbon free) so heating your home with a heat pump means very little greenhouse gas is emitted.
    2. **Efficiency:** A Heat Pump *moves* heat (vs creating it by burning) so 1 unit of electrical energy results in ~2 to 4 units of heat entering the home.
- **Handles both heating and cooling** with one system.
- **More Comfortable** – many heat pumps are variable speed and provide more uniform temperatures.
- **More efficient air conditioning** – most heat pumps have a better efficiency rating than the average air conditioner.

Cons:

- **Higher up-front cost**
- **Noise**: can be a pro or a con depending on the model, location in the house and season. Outdoor unit has a compressor and is much like an air conditioning unit (that it would be replacing!). The indoor noise level is usually low and consistent unlike the on / off noise associated with a gas furnace.

- **Cannot handle extreme temperatures** – however the most capable units heat down to -30C before backup heat is needed.
- **Electrical requirements** – code requirement for a backup heat source often means the central “furnace” needs an electrical heating section. For old homes with 100 Amp service this could mean extra expense.

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