

## The Live Net Zero Heating & Cooling Challenge

**Heating, Ventilation, and Air Conditioning are collectively known as HVAC and help keep your home warm in the winter, cool in the summer, and the air in your home fresh.**

In Canada, heating our homes accounts for 16% of the carbon emissions in our country. Improving the energy efficiency of your home heating and cooling is one positive way you can take action and make your home smarter in the process.

A home uses energy to heat, cool, light and power your daily life. There are different “fuels” or energy types that can power your home. For example, we commonly use electricity, natural gas, furnace oil, and propane to heat our homes. All of these energy types have different carbon footprints, and some are much more environmentally-friendly than others. Additional energy sources, such as solar, wind, or geothermal, have little or no carbon footprint at all.

## Heating & Cooling Challenge

While improving the environment can feel like an invisible action, the more tangible benefits of upgrading your home's energy efficiency include improving your home's comfort level in cold winters and hot summers, saving money on energy, and ultimately increasing your home's resale value.

### Start the Live Net Zero Heating & Cooling Challenge

**The Challenge: Perform an audit of your heating systems – both home heating and hot water – and air conditioning if you have it.**

How old or inefficient is your furnace? Does it produce heat using electricity, natural gas, propane, or heating oil? Look into heat pumps and see if that might be a good option in your climate zone. If fans just aren't cutting it on those hot days anymore, explore the different space cooling solutions available and weigh their efficiency and related carbon footprint. Are there simple things you could do to heat or cool your house more efficiently?

If you have a natural gas hot water heater, does it have a constantly burning pilot light or use electric ignition? Should you replace it with an electric or tankless heater? Where you live, is solar hot water heating a viable option to help decarbonize your home? Evaluate your family's hot water habits and find ways to limit your litres.

To start, in the Heating & Cooling Challenge, we want you to explore easy, low-cost measures to help reduce the household emissions related to heating and cooling of your home.

Low-cost solutions include actions such as:

- Installing a smart thermostat system that allows control of heating and cooling by room
- Servicing and cleaning ducts/vents to improve the efficiency of heating and cooling appliances
- Using drapes to reduce heat loss in colder months and keep heat out in summer months

Here are some additional considerations to get keep you going...

### Heating and cooling systems

Home heating accounts for over 63% of the energy used in the average Canadian home and space cooling is 1.6% of household energy use. The options for your home heating will depend on where you live and what works best for your climate.

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**Forced-air:** A furnace uses a fan to blow warm air through ductwork and vents to distribute it throughout your house. High-efficiency gas furnaces are quiet, reliable, and effective at maintaining a comfortable home, and they can reduce your energy bill by up to 45%. Other types of forced air furnaces can heat the air burning propane or heating oil, or using electric coils which reduces your fossil fuel emissions.

**Multi-purpose heat:** A hydronic heating system circulating water heated by a boiler can provide space heating, hot water, and have other potential applications such as heating your pool and de-icing your driveway. It distributes warmth using radiators or in-floor radiant heating, eliminating the need for pre-existing duct systems. Newer models have electronic ignition, which means no pilot light burning all the time. New combustion technologies extract more heat from the same amount of fuel, resulting in more energy savings and lower operating costs, while sealed combustion uses outside air to fuel the burner, reducing drafts and improving safety.

**Hot and cold:** Heat pumps are known to be very efficient at both heating and cooling for year-round comfort, and can greatly reduce your energy costs and related carbon emissions. How do they work? Heat naturally flows from higher temperature locations to lower temperature locations. At a very basic level, a heat pump uses a small amount of energy to switch this into reverse, pulling heat out of a relatively low temperature area like the outside air or underground, and pumping it into a higher temperature area. In this case, your home. And since heat pumps are reversible, they can also extract heat from inside your home and send it outside, ultimately cooling the indoors without the need for a separate air conditioner.

**Go electric:** Depending on the price of electricity where you live switching from natural gas to electricity will likely increase your monthly bills, but it is an effective way to cut your heating emissions. This is especially true if electricity in your region is produced using hydro, or other renewables. If installing electric room heaters such as baseboard heaters it is easy to control the temperature by room instead of a central thermostat. Without combustion there is no need for a chimney flue so it can be insulated and closed off to reduce heat loss. This also means there is no heat lost due to the venting of exhaust from a furnace burning fossil fuels.

**Cool it on the A/C:** Although space cooling accounts for only 1.6% of home energy use in Canada, the amount of air conditioners is growing as the summers get hotter, and globally the number of A/C units is projected to explode exponentially in the regions that need it most. Installing the most-efficient air conditioner possible will help slow the growth in related emissions. Another way you can reduce your A/C footprint is to only take the edge off the heat, using the recommended temperature of 25-27° C for cooling your home.

### Hot water

Your hot water system keeps your shower and taps running hot, and is the second largest consumer of energy in most homes after heating, at an average of 17% of a household's total energy. An outright switch to a cold water lifestyle would be a very effective decarbonization action, but isn't remotely practical so let's look at some other options to reduce your hot water footprint.

**Toss the tank:** Tankless or instantaneous hot water systems use 50% less energy than most conventional tank systems because you heat the water on demand instead of maintaining a large tank of hot water at the ready.

**Electrify your hot water:** Switching from a natural gas hot water heater to electric can reduce your household emissions. Especially true if your power is from hydro, wind, or solar, but even if your electricity is produced by a natural gas fired power plant, they are using technology and scrubbers to reduce and capture emissions that are simply vented out of your home when burning natural gas to heat your water.

**Bigger isn't better:** If purchasing a new traditional hot water heater, consult a professional to determine the most efficiently sized tank for your household's hot water demands. It may be tempting to default to a big tank to ensure you will never run out of hot water even in extreme circumstances, but you will be spending unnecessary money on energy to constantly heat more water than you need and creating more emissions to boot.

**Plug the energy drain:** A drain water recovery unit is a simple device that transfers the heat from hot water going down the drain to preheat the water coming into your house before it enters your hot water tank. Recovering this energy works best when you have a lot of warm water going down the drain while simultaneously drawing cold water into your hot water tank, like when taking a shower.

**Do your research:** Look for the ENERGY STAR® symbol to be sure your heating, cooling, and hot water systems have met their strict efficiency standards. You can also use the voluntary EnerGuide label to compare energy consumption between comparable models.

### Quick hits

If you aren't ready to replace your HVAC and hot water tank, reconsider and try the low and no cost solutions to lower your energy bills and reduce your carbon footprint

- Lower your thermostat levels during the winter and raise the set point during the summer. Getting your home to that last degree of warming or cooling is the most expensive.
- Install a smart thermostat system that allows you to control your heating and cooling by room.
- Insulate your hot water pipes as they leave your hot water tank. Insulating the first few feet (even with an old pool noodle!) can save you \$10 a month and reduce water-heating emissions.

### Did you know...

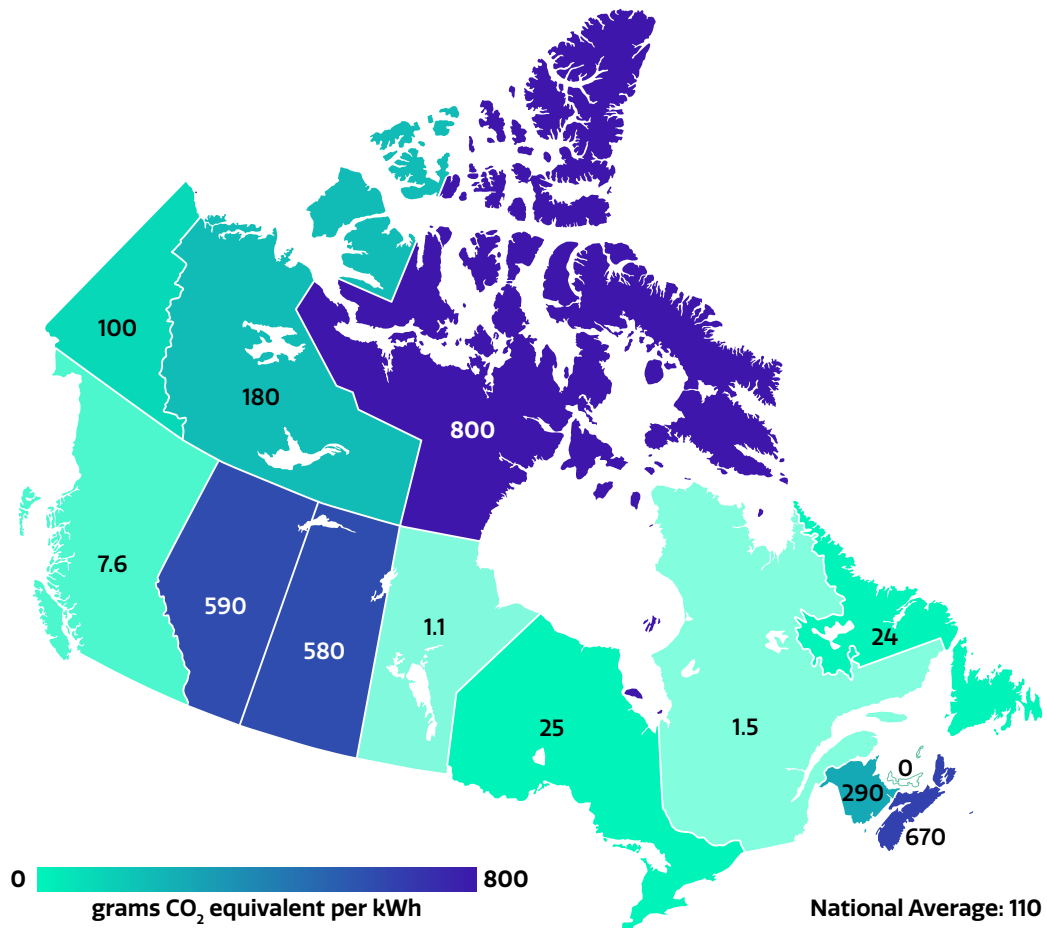
- Fans in newer, higher efficiency furnaces are designed to run 24/7 which helps maintain a more even temperature throughout your home and maximizes the efficiency of your furnace.
- In Canada, water heating accounts for 21% of residential greenhouse gas emissions.
- To receive the full benefit from a new furnace or heat pump, you need to have a well-sealed building envelope.

## Supporting tools:

### Electricity carbon intensity, 2020 (grams CO<sub>2</sub> equivalent per kWh):

National Average: 110; British Columbia: 7.6; Alberta: 590; Saskatchewan: 580; Manitoba: 1.1; Ontario: 25; Quebec: 1.5; Newfoundland and Labrador: 24; New Brunswick: 290; Nova Scotia: 670; Prince Edward Island: 0 (zero); Yukon: 100; Northwest Territories: 180; Nunavut: 800.

Source: [Canada Energy Regulator](#)



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### Sources:

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