WHAT ARE HEAT PUMPS? DO THEY WORK IN SASKATCHEWAN?

There has been plenty of talk about heat pumps in the media lately. You might be wondering what they are, and what all the hype is about.

Heat pumps are not new; heat pumps for heating and cooling spaces have been around since their invention in Austria in the 1850s. A heat pump is a device that can heat or cool a space by absorbing heat from one location and releasing it to another location. Your air conditioner is a type of heat pump that only runs in one direction: it absorbs heat from inside your house and releases it outside. The heat pumps we are talking about here use the same technology, but they can run in both directions; in the summer, heat is absorbed from inside your house and released outside, and in the winter, heat is absorbed from outside and released into your house.

We won't get too far into the weeds but suffice to say that heat pumps work by using a fluid called a refrigerant flowing in a loop to move heat between an indoor unit and an outdoor unit. This is fundamentally different than how the typical heating system in Saskatchewan works! Normally, we burn something (natural gas, heating oil, electricity) to heat our homes. When we burn something to create heat, its efficiency is always 100% or less (1 kilowatt of electricity "burned" in an electric resistance space heater can only ever create 1 kilowatt of heat for us). A heat pump changes the game. Now, we are gathering and moving heat that already exists outside and bringing it inside. We can use 1 kilowatt of electricity in a heat pump to move multiple kilowatts of heat from outside. Now we have a heater that is 200% or 300% efficient!

There have been significant advances in cold climate heat pump technology in the past 10-15 years, and today's units can effectively generate heat down to -20C or even -30C. Because we get days that are colder than -30C, and because heat pumps start losing efficiency at very cold temperatures, we still need a back-up heat source such as an electric or natural gas furnace. This back-up heater doesn't need to be particularly fancy or efficient, since when we run a heat pump to -20C, it will end up providing 90% of the heat required, and our back-up heater will only run 10% of the time.

It's important to remember that a heating system can last 15-25 years, so we want to be thinking about what makes sense now, and what will make sense in the future. With some of the unknowns surrounding future energy prices and carbon pricing, one option is to replace your air conditioner when it is at the end of its life with a similarly sized heat pump. That way you may choose to just cool with it now but have the option for heating in the future.

Today, heating with a heat pump will increase your greenhouse gas emissions versus a high-efficiency natural gas furnace, because of the emissions generated by the electrical grid. However, in the next 2-3 years, as SaskPower phases out its last conventional coal power plants, the equation flips, and a heat pump ends up emitting less greenhouse gas. Based on SaskPower's grid projections, by 2030, a heat pump could cut your heating emissions in half!