



January 2022

ZUBA Heat Pump Operation

The ZUBA cold climate hyper heat pump works to – 30 C. The performance at different outdoor temperatures is shown below. We keep the house temperature set at 21 C day and night. Using a nighttime setback under Time of Use billing ends up costing more and takes a while to come back to temperature in the morning on cold days.

When it is warmer, the heat pump cycles about 3 times an hour and has a power consumption of 2 to 3 kW. The circulation fan runs all the time at 70 Watts then increases to about 350 Watts regardless of heat output.

When it gets colder the cycling goes to almost every hour and runs for longer periods. A second stage of heat is added to a little under 4 kW after running at the first stage. When really cold, the duration of the second stage is increased. At the coldest temperature, the heat pump would run continuously at 4 kW.

4 kW at 240 Volts draws about 17 amps and heats the whole house which has 3800 square feet of heated area. You can compare this to baseboard electric heaters in each room that would be about 2 kW each and about 20 kW for ten rooms. Or you could use plug in 120 Volts heaters at 1 kW and need 20 of them.

So, even at cold temperatures, the heat pump consumes much less energy than resistance heating. On an overall heating season, the heat pump uses 1/4 to 1/3 as much electricity as electric resistance heaters. This is often referred to as the Coefficient of Performance of 3 to 4.

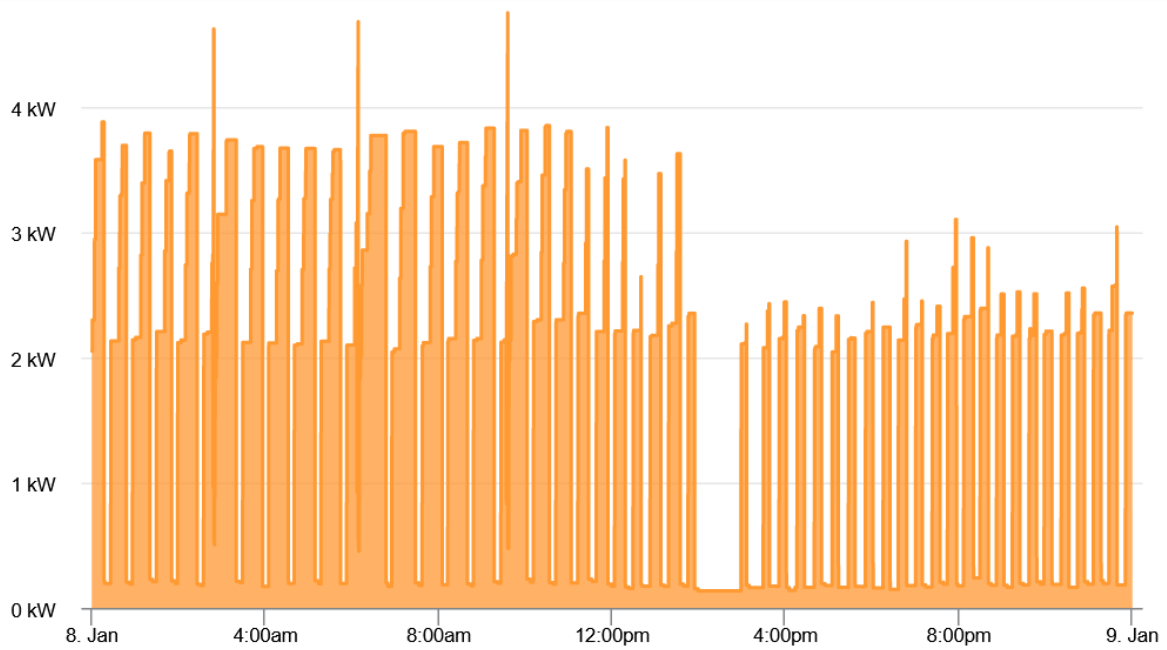
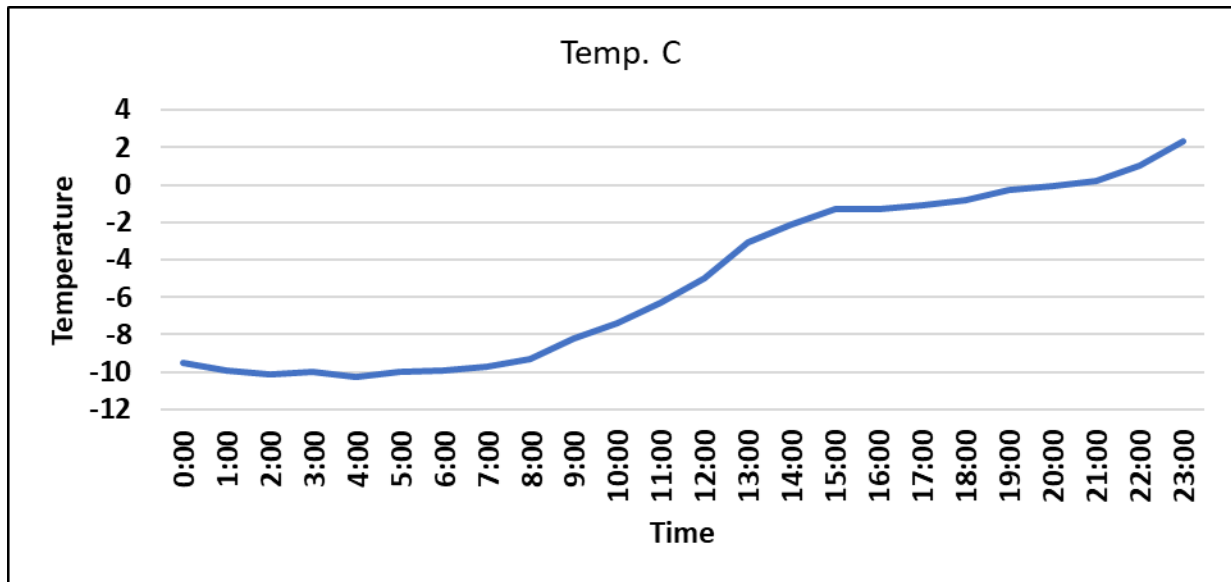
This is a full heat pump with no backup heating. For homes with electric baseboard heating, adding mini-split heat pump units typically reduces the electric bill by 50%. This is because heating represents about 60% of the home's electricity consumption and when the heating is reduced by 3 to 4 times, the overall result is about 50% savings. The built-in bonus is that the homes gets cooling as well.

The Ontario Liberal government used to provide a \$5000 rebate for adding heat pumps to baseboard heated homes. This represented a bit less than half the installation cost. The Ford government cancelled this but is now being lobbied to provide low interest loans to homeowners.

Going with a heat pump for electrically heated homes will not save much greenhouse gas emissions. It will be as much as the electricity savings.

But adding a heat pump to a gas furnace can save 90% of the heating pollution. A hybrid heat pump can be added to an existing gas furnace for under \$5000 and only use gas for heating about 5% of the time on the coldest days. The cost of energy going forward with the carbon tax results in a significant savings over the life of the equipment.

January 8, 2022



January 15, 2022

