The amount of energy needed to heat a home for a year depends on how many cold days there are in the year and on how cold it gets on each of those days. When the weather is slightly cool, a little bit of heat might be needed for a few hours in the evening or early morning to stay comfortable. On a very cold day, a lot of heat will be needed all day and all night. A day's average temperature gives some idea of how much heat will be needed on that day.

Climatologists use a measurement known as heating degree-days (HDDs) to estimate heating needs more precisely. They assume that people will use at least some heat on any day that has an average outdoor temperature of less than 18°C. They then calculate the heating needs for each day by subtracting the day's average temperature from 18. The result is the number of heating degrees for that day or HDDs.

Cooling requirements, known as cooling degree-days or CDDs, can be measured in much the same way. The assumption this time is that there is some need for cooling on days when the average temperature is above 18°C. Subtracting 18 from the day's average temperature thus gives the number of cooling degrees for that day or CDDs.

When the heating or cooling degrees for each day are added up for a season or year, the result is a very useful statistic that indicates how much demand there is for heating or cooling as a result of different climate conditions. The amount of energy actually needed to heat or cool a particular building will, of course, depend on many other factors, such as how well the building is insulated and the temperature that it is kept at.

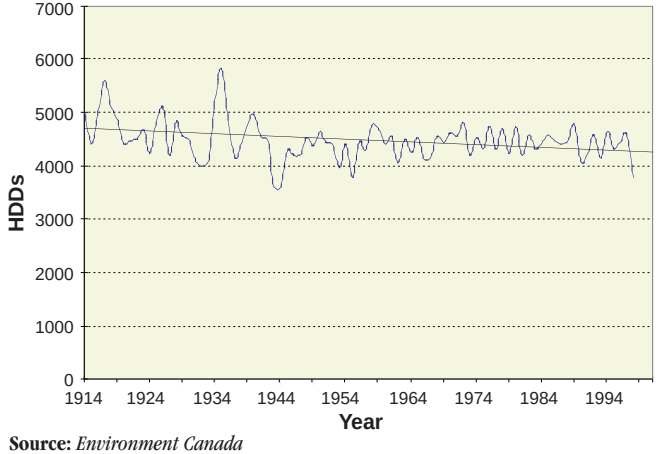
FOCUS: Drummondville, Quebec

In Canada, heating is always a bigger concern than cooling, and Drummondville is no exception. The city, 100 km northeast of Montreal, averages about 4500 HDDs a year, but with 250 CDDs a year (about the same as Montreal and Toronto) it still has plenty of hot summer days when air conditioning is welcome.

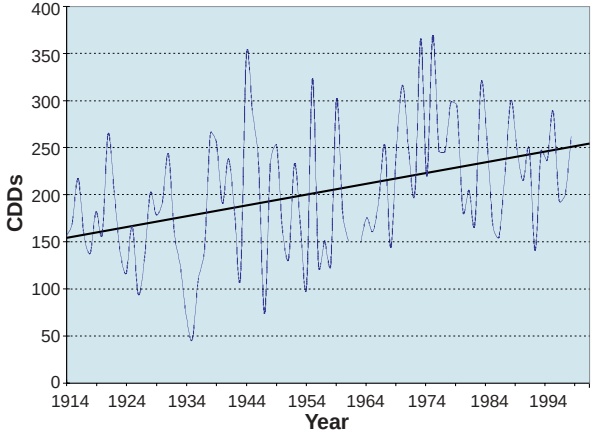
Over the past century, the average annual temperature in the Drummondville area has warmed by about 0.5°C – less than in some other parts of Canada but still enough to have had a noticeable impact on heating and cooling needs. At the beginning of the twenty-first century, Drummondville now averages 445 fewer heating degree-days per year than it did in the early twentieth century and has 100 more cooling degree-days. Those figures amount to a 9.5% decrease in HDDs and a 65.5% increase in CDDs.

Because the need for heating is much greater than the need for cooling, the energy savings from lower heating requirements are still more significant to the average person than any additional energy costs from higher cooling requirements. In fact, cooling becomes a significant cost only when people switch from electric fans to air conditioning to meet their cooling needs. As the cooling degree-day trend rises, however, more people may be inclined to make that change, and at that point cooling degree-days will begin to have an important impact on their budgets.

Heating Degree-Days for Drummondville



Cooling Degree-Days for Drummondville



Source: *Environment Canada*

Because it is a large change in a small number, the increase in CDDs looks more important than the decrease in HDDs. However, the decrease in HDDs has had a greater impact on people's energy needs in Drummondville, simply because heating needs there are much greater than cooling needs.

THE BIGGER PICTURE

Heating degree-days in Canada vary from about 3,000 a year in balmy Victoria to about 13,000 in the Far North. Over the past century, HDDs have declined significantly in most of Canada.

Cooling degree-days range as high as 400 per year in the Windsor area of southwestern Ontario but average fewer than 100 in many parts of the country. Increases in cooling degree-days have been smaller and less widespread than the decreases in heating degree-days. Nevertheless, significant increases have occurred over the past century in southern B.C. and parts of the Prairies as well as in southern Quebec and the Maritimes. These trends are consistent with the way that our climate is changing – that is, both winters and summers have been getting warmer, but winters have warmed more.

In cities, these trends may also be affected by what is known as the heat island effect. City surfaces, like roads, buildings, and rooftops, absorb large amounts of heat from the sun during the day and then release it at night as they cool. Cars, furnaces, air conditioners, and other heat-producing equipment also add warmth to city air. As a result, temperatures within a city, especially a densely built downtown core, are often noticeably warmer than temperatures recorded on the city's outskirts. As a city grows, the heat island effect grows with it. Consequently, heating needs can decrease and cooling needs increase simply because a place is becoming more urbanized. It is a difficult task, however, to determine just how much of the warming in our cities is due to the heat island effect and how much is due to climate change.

HEATING AND COOLING DEGREE-DAYS ACROSS CANADA

The table gives heating and cooling needs for locations in each of the ten provinces and three territories. Heating needs in Vancouver are about half those in Winnipeg, although differences between other cities in southern Canada are less dramatic. Cooling needs, on the other hand, differ much more widely across the country.

Heating and Cooling Degree-Days for Selected Canadian Cities (Average Annual Totals, 1971–2000)

	HEATING DEGREE-DAYS	COOLING DEGREE-DAYS
St. John's, Newfoundland & Labrador	4,881	32
Charlottetown, Prince Edward Island	4,715	100
Halifax, Nova Scotia	4,367	104
Saint John, New Brunswick	4,754	37
Montreal, Quebec	4,575	235
Toronto, Ontario	4,066	252
Winnipeg, Manitoba	5,777	186
Regina, Saskatchewan	5,661	146
Edmonton, Alberta	5,708	28
Vancouver, British Columbia	2,926	44
Yellowknife, Northwest Territories	8,256	41
Whitehorse, Yukon	6,811	8
Resolute, Nunavut	12,526	0

Source: *Environment Canada*