

BLOG

How cold is it really? An intro to heating degree days

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March 3, 2014

I don't know about you, but I've been cold — cold for the last couple of months! It has me wondering whether this winter has been colder than others. I'm not an energy expert, but I took this curiosity one step further by learning about one tool, heating degree days, that might help answer this question. From one non-expert to other non-experts out there, here is a crash course in the basics.

Heating degree days are not specific days on a calendar. They're a unit of measurement used to calculate how much energy is needed to heat a building. The colder it is the more heating degree days there are for a given period of time.

Calculating heating degree days can involve a lot of nuances, but an important starting point is to know that the number we usually start with is 65 degrees. This is the base temperature – the magic outdoor temperature that allows us to be comfortable indoors, without heating or cooling. The base temperature is a pivotal part of the heating degree day calculation. Other essentials are the high and low temperatures on a given day.

NOAA offers a shorthand way of using this information to calculate heating degree days:

1. Add the high and low temperatures on a particular day. For example, on a recent day, the high was 35, and the low was 15 degrees: $35 + 15 = 50$ degrees (the calculation can be done in Centigrade, too).
2. Find the average: $50 / 2 = 25$
3. Subtract that average from the base temperature of 65 degrees: $65 - 25 = 40$ heating degree days.

What can we do with heating degree days? One thing we can do is compare the number of heating degree days from one year to the next. This data is available online from a number of heating degree day calculators. (Their numbers will vary, depending on the particular method of calculating heating degree days).

I chose NOAA's archives and looked at heating degree days for December, January, and February of 2013, 2012, and 2011.

	Winter 2013-2014	Winter 2012-2013	Winter 2011-2012
December	1059	900	865
January	1254	1116	1031
February	1119	1011	892
Total	3432	3027	2788

We can see that the total heating degree days for these three months this winter (2013 – 2014) is much higher than last winter (2012-2013): 3432 heating degree days vs. 3027 heating degree days. So according to the heating degree days, this winter has definitely been colder than last winter – 13% colder. And these three months of this winter (2013-2014) were 23% colder than the same months in winter 2011-2012.

Heating degree days are also central to the process of weather normalization. Weather normalization is a technique used to factor out the impact of weather (daily temperature variance) on energy use so we can compare use from one period to the next in a bean-for-bean way. Weather normalization is a complex topic, and DegreeDays.net offers some great explanations, if you are interested in learning more.

If heating degree days seem really interesting and you'd like a more comprehensive explanation, the following sites are some great resources:

- [GGweather.com](#) presents a thirty year comparison of average heating degree days by month.
- [Degreedays.net](#) offers a great calculator expressly for the purpose of generating heating degree data. You can set your range and base temperature and establish a time period and breakdown of data (monthly, daily, weekly, or average). It also offers clear explanations of heating degree days, weather normalization, and the challenges in calculating and using both.
- The [National Weather Service Climate Prediction Center](#) gives an overview of degree days as well as weekly, monthly, and population weighted degree day data. Comprehensive monthly data dating from 1997 is also available.
- [NOAA's explanation](#) of how to calculate heating degree days.
- [NOAA's page](#) where you can download heating degree day data.

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