Is It OK to Love a Programmable Thermostat?

Programmable thermostats (PTs) can save energy. If a conditioned space's temperature is automatically adjusted for when the occupants are not home, adjusted for bedtime conditions, and is allowed to rise in the summer or decrease in the winter, less energy will be required to cool or heat the house.

But because of human meddling, most programmable thermostats aren't saving much energy. Overriding settings and then forgetting to turn the temperature back at a later date or failing to program settings in the first place is problematic. In fact, several studies by the Environmental Protection Agency and Department of Energy have led to the Energy Star label being revoked for PTs.

Most PTs are just a clock with digital switches. For a typical PT to work flawlessly, your life needs to be predictable. They are available with different configurations like 7-day (each day can be uniquely programmed); 5-2 (the weekend days are different than the weekdays); or 5-1-1 (Saturday differs from Sunday). But today's PTs have more features, are much easier to program, and can be controlled via a Web portal or smartphone app.

Nest Learning Thermostat ($249; nest.com) programs itself by tracking user interaction and adjustment patterns, usage activity and temperature sensors, and monitoring weather. Change the temperature a couple of days in a row and the Nest will adjust its programming accordingly. It takes the Nest about a week to learn and set up a temperature protocol. You control the Nest by turning or pushing the outer dial in response to its full-color screen's questions or prompts. You can also control the Nest remotely online.

Before you buy, visit the company website and answer a few questions about what thermostat wires you have and it will tell you whether or not the Nest will work with your HVAC system. You can buy the Nest online, or through Best Buy, where you can have it installed by their Geek Squad for $120.

Nest encourages do-it-yourself installation, even providing a screwdriver and all the mounting hardware for installation in any kind of wall, including cover plates if the hole left by your previous thermostat is too big for the Nest to cover. I was planning to install the Nest myself, but since I pre-ordered very early, they offered free installation. The tech was in and out in 25 minutes, and that included me picking his brain for this article. He had installed at least 100 already.

As for problems, he said that one came with a dead battery that he recharged via a USB cable from a laptop computer. He had also cleaned up after do-it-yourselfers, who had neglected to turn off the power to the furnace as directed in the manual. The 24-volt thermostat circuit hurt neither the do-it-yourselfer nor the Nest, but crossing some wires can burn out the HVAC transformer. The tech liked Nest Lab's factory support, though he preferred the paper manual over the online version. I thought my Nest might be misbehaving and leaving the heat on at night, but in fact it was accurately sensing my insomniac house guest walking by on the way to the kitchen to make a pot of midnight tea.

Courtesy Nest Labs

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It may be time to re-apply Energy Star ratings for PTs—at least for the Nest. While the newer and more expensive PTs are easier to program, only the Nest does the programming itself. It's as close to idiot-proof as you can get.

—Andy Kerr

Thermostat Potential

Energy Star estimates that the average U.S. household spends $2,200 per year on heating and cooling bills. Further assuming a typical single-family home with a 10-hour daytime setback of 8°F in winter and set-"up" of 7°F in summer, along with an 8-hour nighttime setback of 8°F in winter and a setup of 4°F in summer, they estimate a savings of about $180 per year, or a little more than 8%.

The experts at BuildingGreen.com say that for every 1°F you turn down the thermostat, you save about 2% on heating costs. So, if you normally keep a house at 70°F and drop the setting to 65°F, you'll reduce heating costs by about 10% (5 × 2%). If you lower the thermostat for a portion of each 24-hour day during the heating season, say at night when many people like it cool for sleeping, there will be proportional savings. For example, if your thermostat is set to reduce your house temperature by 10°F for eight hours each night (one-third of the 24-hour day), your annual savings would be about 7% (10 × 2% ÷ 3).

Although the Energy Star program no longer labels PTs, the program has good information about them and how they can save energy, *if* you set them up and use them properly (energystar.gov). You can also download an Excel file that will estimate your potential savings.

After you determine your estimated annual savings, divide it into the cost of buying and installing a PT to determine simple financial payback. If you are persistent and disciplined, you can buy a cheap PT and get some energy savings. But for the best savings, if you're like the rest of America, you may want one that does the programming—and maybe also the thinking—for you.