

Understanding the Real Costs of Installation



Energate takes the smart grid beyond the meter, to where demand is rooted — in the home. Energate's home energy management solutions, including smart thermostats, let consumers and utilities manage energy use and reduce peak demand without sacrificing comfort and convenience.

Energate's family of smart thermostats have been designed by a team of experts with over 30 years of experience in HVAC control whose knowledge and expertise can help utilities avoid many hidden costs associated with installation.

Summary

There is a great diversity in the installed base of HVAC equipment. Not only are many systems 15 or more years old, but with only a loose set of de facto standards for HVAC wiring and equipment interfaces, there is a great deal of variability in terms of how they were installed. As such, utilities need to fully understand the costs associated with installing new state-of-the-art thermostats being deployed in conjunction with Demand Response programs.

By having a single platform that is able to control the majority of HVAC systems, utilities reduce the number of devices that need to be stocked and supported in the field. As well, there are fewer failed installations where an installer is unable to install a thermostat on the customer's premises and fewer disappointed customers who cannot participate in the program. While other thermostats require careful reading of manuals and configuration via jumpers, Energate's thermostat is easily configured through plain language menus. This speeds installation and reduces the likelihood of mistakes and equipment damage.

Two of the more common HVAC installation problems are short circuits and missing common wires. These installation problems, discovered only when the installer is on site, can cause costly delays and longer installation times, or even prevent installation entirely, such that a utility incurs all of the costs of an installation without getting any of the benefits. Program costs can quickly rise as installations need to be repeated or installers spend hours at each residence. Energate's unique solution addresses these problems in almost all installations, allowing utilities shorter, more predictable deployment times and reduced costs. The following sections describe the challenge and how Energate has solved the problem.

Short Circuits

• Problem

Most thermostats use electro-mechanical relays to switch the control signals to HVAC equipment. If a thermostat is improperly wired during installation, relay-based HVAC equipment can immediately short circuit, causing either a fuse to blow or breaker to trip. The result is a long and more difficult installation. This can happen to even the most experienced HVAC installers because of the improper application of wire color-coding and terminal labeling standards in HVAC systems — especially with older systems.

• Energate's Solution

Energate thermostats use a patent-pending solid-state switching technology that includes immediate detection of short circuits caused by improper wiring, and automatically shuts down the switch before a breaker trips or fuse blows. The thermostat then displays a message to the installer indicating the wiring problem.

Missing Common Wire

Older mercury switch thermostats did not require a common wire because there were no electronics to operate in parallel with the bi-metallic mercury switch. As a result, many homes (~30% in many jurisdictions) do not have a common wire at the thermostat.

Other thermostat manufacturers have gotten around this problem in one of three ways:

• **Battery Power**

Battery powered thermostats have been a standard method of solving this problem in the traditional HVAC market; however, Demand Response applications involve frequent radio communications resulting in increased power requirements, which translates into larger battery packs, shorter battery life, or constrained communications.

• **Power Stealing**

The other standard approach to the missing common wire problem is to rely on the fact that, often, older HVAC equipment has a large relay that is triggered by the signal coming from the thermostat. These large relays allowed a small amount of power to be pulled from the signal line without triggering the relay and turning on the equipment. Again, the problem with this solution is two-fold:

- Newer HVAC equipment often no longer employs direct relay control. Instead, it uses electronics to detect thermostat signals, thereby eliminating the possibility of using a power-stealing thermostat.
- Higher power requirements from radios in DR thermostats increase the power consumption, which increases the likelihood that the power draw from the thermostat will engage the HVAC equipment. “Chattering relays” is a commonly described symptom of this problem.

• **Add-a-Wire Kits**

Diode-based “add-a-wire” kits can be used as accessories at the furnace where many wires have been run, yet a common wire is missing (e.g., 4 wires are available but 5 are needed). These kits do not solve the problem if only two wires are available.

Energate’s Solution

Energate’s patent-pending switching technology allows it to use an auxiliary switch which multiplexes control signals over as few as two existing wires, without any limitation on power consumption at the thermostat. This solution is ideal to ensure that the utility has a reliable communication link to the thermostat and can deploy in any of its customers’ homes.



Auxiliary switch allows a control signal (W,Y, or G) to be multiplexed over common wire.

This is the future of energy management. Let us show you what our products can do for you.

About Energate

Energate is a leading provider of advanced energy management solutions for residential and small business applications. Our products interface to the smart grid in support of demand response programs.

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