

ENERGY EFFICIENCY PROGRAM SPONSOR

FREQUENTLY ASKED QUESTIONS ABOUT ENERGY STAR SMART THERMOSTATS

What are the key criteria for ENERGY STAR smart thermostats?

Table 1: Connected Thermostat Device Criteria	
Parameter	Performance Requirement
Static temperature accuracy	$\leq \pm 2.0$ °F
Network standby average power consumption	≤ 3.0 W average
Time to enter network standby after user interaction (on device, remote or occupancy detection)	≤ 5.0 minutes

Table 2: Connected Thermostat Energy Savings Criteria		
Metric	Statistical Measure	Performance Requirement
Annual % run time reduction, heating	Lower 95% confidence limit of weighted national average	$\geq 8\%$
	Weighted national average of 20th percentiles	$\geq 4\%$
Annual % run time reduction, cooling	Lower 95% confidence limit of weighted national average	$\geq 10\%$
	Weighted national average of 20th percentiles	$\geq 5\%$
Average resistance heat utilization for heat pump installations	National mean in 5 °F outdoor temperature bins from 0 to 60 °F	Reporting Requirement

Additional details about these criteria can be found at the following: [Smart Thermostats Key Product Criteria](#).

What is the difference between an ENERGY STAR smart thermostat and other smart thermostats?

To earn the ENERGY STAR, smart thermostats must demonstrate annual savings based on installations in homes across the United States. This ensures that savings claims are based on real-world data and user interaction with the product, something lacking in previous efforts to recognize thermostat efficiency. In addition, ENERGY STAR smart thermostats are independently certified by EPA-recognized certification bodies.

How much will the average ENERGY STAR smart thermostat save?

On average, savings are approximately 8% of heating and cooling bills or \$50 per year. Savings may be greater depending on climate, personal comfort preferences, occupancy, and/or heating/cooling (HVAC) equipment.

How does ENERGY STAR criteria for smart thermostats differ from other ENERGY STAR product categories?

Most ENERGY STAR product criteria are based on engineering estimates and demonstrated performance of key criteria. In these cases, the product criteria apply to the hardware and the ENERGY STAR partner is a manufacturer. ENERGY STAR smart thermostats are a combination of hardware and service. The service provider is the ENERGY STAR partner since the service is central to delivering savings. Rather than laboratory testing, real-world data from a large sample of

homes that use the product is analyzed and aggregated to show savings that reflect the actual energy usage associated with the product. For each product family, EPA software analyzes data from randomly selected sample homes to show effective performance.

How are energy savings determined? What is the test method for ENERGY STAR smart thermostats?

Savings from ENERGY STAR smart thermostats and the test method used to determine these savings are closely tied together. Together with interested stakeholders, EPA created a repeatable test procedure that determines whether or not a smart thermostat meets a minimum threshold of HVAC savings (e.g., percent runtime reductions) compared to the installed base of all other thermostats in the United States. The [test method](#) defines an auditable process to select a sample of homes spread across the country. It also specifies how to use EPA-provided software to analyze a year of data from each sample home and to aggregate the data from all homes. The results are submitted to a third-party certification body. This process ensures that savings aren't simply the effects of regional over-representation. ENERGY STAR smart thermostats save energy -- regardless of climate zone.

Can I have access to the data for the smart thermostats installed in my service territory? How should I address concerns about data privacy with my customers?

Access to customer data remains solely in control of the smart thermostat service providers. EPA's process is intentionally confidential. Data analysis and aggregation is done by service providers using EPA-provided software to protect privacy and proprietary information. Certification bodies receive aggregated data only. If the smart thermostat's aggregate data meets or exceeds EPA's savings requirements, EPA receives only final overall scores.

Customers should be encouraged to consult their smart thermostat provider about data security and privacy, but can be assured that the federal government does not receive personally identifiable information or individual usage data from anyone that uses an ENERGY STAR-certified smart thermostat. Energy efficiency programs that have direct data sharing agreements with smart thermostat providers should consult with their legal and corporate communications departments to determine the best way to communicate data privacy issues with their customers.

Does EPA specify that ENERGY STAR smart thermostats must have geo-fencing?

No, geo-fencing is not a mandatory part of the ENERGY STAR criteria, but ENERGY STAR partners may choose to include geo-fencing as an energy-saving strategy or as one of many ancillary convenience features ENERGY STAR smart thermostats offer.

Are ENERGY STAR-certified smart thermostats suitable for demand response programs?

Yes. ENERGY STAR smart thermostats must be able to work with utility demand response programs, but there are no specific required responses. In addition, the functions need not be in use in every installation for ENERGY STAR certification or for energy savings.

What is the effective date of the specification? When will there be sufficient product available to transition existing smart thermostat programs to ENERGY STAR?

The ENERGY STAR specification became effective in December 2016. As of June 2017, there were seven certified models from a variety of manufacturers (Nest, Ecobee, EcoFactor, Bryant, and Carrier). For the most up-to-date list of available products, visit [the ENERGY STAR Certified Product List](#).

As of June 2017, several energy efficiency program sponsors rely on ENERGY STAR criteria for their smart thermostat incentive programs or have submitted regulatory filings to do so. Many more program sponsors are expected to follow suit in the coming months.

How are energy efficiency programs going to market with smart thermostats programs?

Based on a recent canvass of existing programs, smart thermostat energy efficiency programs are numerous, growing, and diverse in design. The majority of rebate programs nationwide are residential and do not require participation in demand response programs. Some utility rebate programs have created their own online marketplace for their ratepayers to purchase an instantly rebated smart thermostat directly. However, the overwhelming majority of rebate programs ask consumers to 'bring-your-own' thermostat, with a downstream mail-in or online form. Rebate programs that allow DIY installation and those that can be installed by an HVAC professional are split approximately 50/50 across the country.

Are there certain customer types or home/equipment characteristics that are likely to yield greater or lesser energy savings?

Yes, homes that experience extreme changes in temperature over the course of a year will generally see greater savings with ENERGY STAR-certified smart thermostats. Temperate climates usually spend less on HVAC bills and thus, savings are generally slightly lower. Regardless of climate, homes that are always occupied will see less savings. In addition, homes with variable capacity (as opposed to single-speed) heat pumps or air conditioning will generally perform best with a manufacturer-recommended thermostat regardless of whether it is ENERGY STAR certified.

What is the difference between a smart thermostat and a programmable thermostat?

Programmable thermostats require user programming that is static until manually adjusted. Based on the latest research, homeowners generally don't understand how programmable thermostats work and may not program them at all, which can lead to higher utility bills. Smart thermostats, by contrast, are designed to learn user preferences and/or automatically adjust settings based on occupancy and indoor and outdoor temperature. The reliance on field data to demonstrate savings of ENERGY STAR smart thermostats ensures that they will work with user preferences to achieve savings.

How do energy efficiency programs estimate savings from ENERGY STAR smart thermostats? What evaluation approaches are currently in use?

EPA does not recommend that energy savings be deemed based on *national* estimates of energy savings from ENERGY STAR certification, given the significant variation in heating and cooling degree days, HVAC equipment, and home characteristics from one region to the next.

As with most new initiatives, evaluation, measurement and verification (EM&V) approaches are still evolving. The following are links to relevant resources:

- [NEEP Guide to Claiming Savings from ENERGY STAR Certified Smart Thermostats](#)
- States such as [Illinois](#) have already begun to incorporate savings from smart thermostats into technical resource manuals.