ENERGY STAR® Program Requirements for Programmable Thermostats

Partner Commitments
DRAFT 1

Commitment

The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified programmable thermostats. The ENERGY STAR Partner must adhere to the following program requirements:

- comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be met for use of the ENERGY STAR certification mark on programmable thermostats and specifying the testing criteria for programmable thermostats. EPA may, at its discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at EPA's request;

- comply with current ENERGY STAR Identity Guidelines, describing how the ENERGY STAR marks and name may be used. Partner is responsible for adhering to these guidelines and for ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance;

- qualify at least one ENERGY STAR qualified programmable thermostat model within one year of activating the programmable thermostat portion of the agreement. When Partner qualifies the product, it must meet the specification (e.g., Tier 1 or 2) in effect at that time;

- provide clear and consistent labeling of ENERGY STAR qualified programmable thermostats. The ENERGY STAR mark must be clearly displayed on the front/inside of the product, on the product packaging, in product literature (i.e., user manuals, spec sheets, etc.), and on the manufacturer's Internet site where information about ENERGY STAR qualified models is displayed;

> **Note:** EPA requires the labeling of all ENERGY STAR qualified products according to one or more of the following options, depending on product design and visibility at both the time of sale and over the use of the product: on the product; in product literature; and on the manufacturer's Internet site. The ENERGY STAR mark is well known by consumers and large purchasers as the symbol for energy efficiency. The ENERGY STAR mark should be placed in an area of high visibility, preferably on front of the product, so that the purchaser and end users can see that by purchasing and using an ENERGY STAR qualified programmable thermostat, they are helping to reduce air pollution and greenhouse gases through energy efficiency. EPA is open to discussing additional placement options.

- provide to EPA, on an annual basis, an updated list of ENERGY STAR qualifying programmable thermostat models. Once the Partner submits its first list of ENERGY STAR qualified programmable thermostat models, the Partner will be listed as an ENERGY STAR Partner. Partner must provide annual updates in order to remain on the list of participating product manufacturers;

- provide to EPA, on an annual basis, unit shipment data or other market indicators to assist in determining the market penetration of ENERGY STAR. Specifically, Partner must submit the total number of ENERGY STAR qualified programmable thermostats shipped (in units by model) or an

equivalent measurement as agreed to in advance by EPA and Partner. Partner is also encouraged to provide ENERGY STAR qualified unit shipment data segmented by meaningful product characteristics (e.g., capacity, size, speed, or other as relevant), total unit shipments for each model in its product line, and percent of total unit shipments that qualify as ENERGY STAR. The data for each calendar year should be submitted to EPA, preferably in electronic format, no later than the following March and may be provided directly from the Partner or through a third party. The data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner;

Note: As noted above, EPA is willing to work through a third party to obtain programmable thermostat shipment data. This data may be masked and provided in an aggregate form so as not to be able to identify specific manufacturer data. This data is being collected as a tool to gauge the penetration of ENERGY STAR qualified products in the marketplace and to determine if changes to the program would yield increased penetration of efficient products.

- notify EPA of a change in the designated responsible party or contacts for programmable thermostats within 30 days.

Performance for Special Distinction

In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures and should keep EPA informed on the progress of these efforts:

- consider energy efficiency improvements in company facilities and pursue the ENERGY STAR for buildings;
- purchase ENERGY STAR qualified products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR qualified product information to employees for use when purchasing products for their homes;
- ensure the power management feature is enabled on all ENERGY STAR qualified monitors in use in company facilities, particularly upon installation and after service is performed;
- provide general information about ENERGY STAR to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR qualified product models;
- feature the ENERGY STAR mark(s) on Partner Web site and in other promotional materials. If information concerning ENERGY STAR is provided on the Partner Web site as specified by the ENERGY STAR Web Linking Policy (this document can be found in the Partner Resources section on the ENERGY STAR Web site at www.energystar.gov), EPA may provide links where appropriate to the Partner Web site;
- provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate, communicate, and/or promote Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR Web pages, etc. The plan may be as simple as providing a list of planned activities or planned milestones that Partner would like EPA to be aware of. For example, activities may include: (1) increase the availability of ENERGY STAR qualified products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrate the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) provide information to users (via the Web site and user's manual) about energy-saving features and operating characteristics of ENERGY STAR

qualified products, and (4) build awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event;

- provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and its message.

ENERGY STAR® Program Requirements for Programmable Thermostats

Eligibility Criteria – Version 2.0

DRAFT 1

Below is the **DRAFT 1** product specification (Version 2.0) for ENERGY STAR qualified programmable thermostats. A product must meet all of the identified criteria to earn the ENERGY STAR.

1) **Definitions:** Below are the definitions of the relevant terms in this document:

   A. Programmable Thermostat: A device that enables the user to set one or more time periods each day when a comfort setpoint temperature is maintained and one or more time periods each day when an energy-saving setpoint temperature is maintained. This device enables the user to save energy as the heating and cooling equipment is not running needlessly at a comfort temperature setpoint 24 hours per day. A programmable thermostat may be capable of controlling one or more zones of a conditioned space.

   B. Comfort Setpoint Temperature: The temperature setting in degrees Fahrenheit (F) or degrees Celsius (C) for the time period during which the residence and/or building is expected to be occupied, e.g., the early morning and evening hours.

   C. Comfort Time: The time period during which the conditioned space is expected to be occupied, e.g., the early morning and evening hours.

   D. Conventional Recovery: A feature of a programmable thermostat that activates the heating or cooling system at the comfort time set by the user.

   E. Cycle Rate: The number of times the heating or cooling unit goes on and off in a given hour. This is measured when the heating and air-conditioning equipment is operating at a 50% load condition, as measured under the National Electrical Manufacturers Association (NEMA) DC-3 standard titled "Residential Controls- Electrical Wall-Mounted Room Thermostats." (Available for purchase at www.nema.org).

   F. Default: Default features should be activated when a power connection is made. Features that are shipped as defaults should be shipped pre-programmed and activated.

   G. Energy-Saving Setpoint Temperature: The setpoint temperature for the energy-saving periods usually specified for both the heating and cooling seasons.

      - Setback Temperature: The setpoint temperature for the energy-saving periods during the heating season, generally at night and during unoccupied hours. This is a lower setpoint temperature than the comfort setpoint temperature.

      - Set-Up Temperature: The setpoint temperature for the energy-saving periods during the cooling season, generally at night and during unoccupied hours. This is a higher setpoint temperature than the comfort setpoint temperature.

   H. Events: The time period where the thermostat's temperatures are either set-back or set-up. There are four energy saving set-backs/set-ups under ENERGY STAR, as defined below:

      A. Morning: The time period when the user rises in the morning.

B. Day: The time period where the dwelling is unoccupied during the day hours.
C. Evening: The time period where the user returns at night.
D. Night: The time period where the user retires at night

Note: In the Draft proposal, distributed to industry stakeholders on May 21,2003, EPA had proposed the following terminology under the definition for Events: "wake," "leave," "return," and "sleep." However, after receiving a number of comments from industry stakeholders, EPA decided to revise the terminology to be consistent with what is commonly used in the marketplace and what has been proven by manufacturer research to be intuitive for consumers.

I. Multistage Heat Pump Recovery: A feature of a programmable thermostat that allows the heat pump to recover gradually from an energy-saving setpoint temperature to a comfort setpoint temperature. The heat pump recovery feature is designed to minimize the use of auxiliary heat while also minimizing the on-time of the system.

J. Programming Periods: This feature allows the user to program different setback/setup schedules. Usually this feature is used to allow for different settings for weekday and weekend programming.

K. Setpoint Temperature: The temperature setting in degrees Fahrenheit (F) or degrees Celsius (C) for any given time period.

L. Setback: This action allows the consumer to decrease the heating temperature.

M. Setup: This action allows the consumer to increase the cooling temperature.

N. Temporary Program Override: This feature enables the user to override the programmable thermostat's temperature and time settings and choose a different temperature until the next part of the program begins.

O. Long-Term Hold: A long-term hold may allow the user to set the programmable thermostat at a temperature for a fixed period of time (e.g., vacation, override, etc.).

Note: EPA has added the following definitions to further clarify terms that are used throughout the specification: default programming, programming periods, and zoning system. **EPA would also like to work with industry to learn more about the terms "building control systems" and "home automation" and determine whether or not they should be included in this specification. Manufacturers are encouraged to provide feedback on these terms.**

2) **Qualifying Products:** In order to qualify as ENERGY STAR, a programmable thermostat must meet the definition in Section 1A and the performance and testing requirements provided in Sections 3 and 4, below. For the purposes of ENERGY STAR, programmable thermostats shall have at least two different programming periods and four possible temperature settings (i.e., events). Qualified models must be shipped with the aforementioned settings as the default setting. Zoning systems, building control systems, and home automation systems cannot qualify under this specification at this time. A zoning system usually includes a programmable thermostat, zoning panel, and dampers to separately control sections of a residence.

Note: To move forward with a specification for zoning, building control systems, and home automation, additional research would need to be conducted on how these systems/products operate, including their potential energy savings, differentiation in the marketplace. EPA will not address zoning, building control systems, or home automation in the programmable thermostat specification to allow for EPA and manufacturers to allow a timely completion of the programmable thermostat specification.

3) **Performance Specification and Energy-Efficiency Requirements for Qualifying Products:**

A. Core Features

ENERGY STAR qualifying models shall possess the following core features:

- Two different programming schedules, including one for weekdays and a second for weekends.
- **At least four possible** programming events per weekday (i.e., morning, day, evening, night). See Tables 1 and 2 for suggested setpoint temperatures.
- **At least two possible** programming events per weekend day (i.e., morning, day, evening, night). See Tables 1 and 2 for suggested setpoint temperatures.
- Each setback/setup period should be at least eight hours long.
- The programming period and events must be shipped as the default program.
- ENERGY STAR qualified programmable thermostats must be able to simultaneously hold separate heating and cooling programs, including temperatures and times. No additional programming shall be needed when switching from heating to cooling and vice-versa.

Note: EPA has included the first three features to ensure ease of use and flexibility for the consumer. The fourth bullet reflects EPA's understanding that setbacks/setups must be at least eight hours to ensure a high level of energy and monetary savings. The fifth bullet reflects EPA's concern that there are ENERGY STAR qualified programmable thermostats in the marketplace that do not ship with the programming periods and events set as the default program. EPA believes that this is one of the most significant requirements of the specification; therefore, programmable thermostats that do not ship the times and temperatures as a default program will be removed from the ENERGY STAR qualified products list under the Version 2.0 specification. EPA feels that this feature is important because it ensures that the consumer can easily activate the programming features.

Based on stakeholder input, in the last bullet above, EPA has made the following addition to what was presented in the Draft proposal: programmable thermostats must hold separate programs for heating and cooling based on stakeholder input. In the past, many programmable thermostats have only been capable of holding one program (either heating or cooling). EPA believes that ensuring that the consumer has both programs for heating and cooling, will allow for year-around-savings and will ensure that consumers will not have to spend time continuously fixing the program (which often leads to the use of the "hold" setting).

Lastly, EPA received a number of requests to allow additional programming flexibility on the weekends. EPA understands that this will allow for increased flexibility in design for manufacturers and will conform more closely to consumers' weekend schedules. Therefore, EPA will no longer require manufacturers to have four events on the weekend. EPA's objective is to ensure that consumers will decide to use the ENERGY STAR features by EPA creating a program for the weekends, which is already similar to their normal schedule.

B. Setting and Interface Requirements for Core Features

The following setting requirements denote the default adjustments that would need to be implemented by the manufacturer with no input required from the consumer at the time of purchase and installation. In addition, the default program must be readily identifiable, so that the consumer can revert back with ease.

1. **Default Program**. The setbacks and setups periods are required to be a **minimum of** 8 hours, but may exceed 8 hours. Partners must have four events on the weekday and two on the weekend, partners may choose to add additional setbacks and/or setups as long as the setback/setup period is at least eight-hours long. Listed below are the suggested events along with setbacks/setups and appropriate temperatures (Tables 1-3).

Table 1: Programmable Thermostat Setpoint Temperatures		
Events	**Setpoint Temperature (Heat)**	**Setpoint Temperature (Cool)**
Morning	≤70°F (≤21.1°C)	≥75°F (≤25.6°C)
Day	setback at least 8°F (4.4°C)	setup at least 8°F (3.8°C)
Evening	≤70°F (≤21.1°C)	≥75°F (≤25.6°C)
Night	setback at least 8°F (4.4°C)	setup at least 3°F (2.2°C)

Table 2: Acceptable Weekday Setpoint Times and Temperature Settings			
Events	**Time**	**Setpoint Temperature (Heat)**	**Setpoint Temperature (Cool)**
Morning	6 a.m.	≤70°F (≤21.1°C)	≥75°F (≤23.9°C)
Day	8 a.m.	≤62°F (≤16.71°C)	≥83°F (≤29.4°C)
Evening	6 p.m.	≤70°F (≤21.1°C)	≥75°F (≤23.9°C)
Night	10 p.m.	≤62°F (≤16.71°C)	≥78°F (≤25.6°C)

Table 3: Acceptable Weekend Setpoint Times and Temperature Settings			
Events	**Time**	**Setpoint Temperature (Heat)**	**Setpoint Temperature (Cool)**
Morning	8 a.m.	≤70°F (≤21.1°C)	≥75°F (≤23.9°C)
Day	10 a.m.	≤62°F (≤16.71°C)	≥83°F (≤29.4°C)
Evening	6 p.m.	≤70°F (≤21.1°C)	≥75°F (≤23.9°C)
Night	11 p.m.	≤62°F (≤16.71°C)	≥78°F (≤25.6°C)

Note: Based on comments received from a number of stakeholders, EPA has revised some of the setpoint temperature settings. It is EPA's understanding that some of these temperatures are too extreme, resulting in consumers not using the default program. In order to alleviate this, EPA has slightly modified the cooling setpoints in order to ensure that the program defaults appeal to a wider regional audience. Current cooling setpoints in Version 1.0 of the specification, include: Morning at 78°F, Day: setup of at least 7°F (≤85°F, Evening: at ≤78°F, and Night: setup of at least 4°F (≤82°F). EPA has not modified the heating setpoints because EPA believes that the setpoints are less extreme and that there are additional options for the consumer when it comes to increasing warmth.

EPA also understands that there are differences in consumer's schedules as people work from home or come home during the day for errands/caregiving. While, EPA realizes that the programming schedule set forth in Tables 1-3 is not applicable to all consumers the intent was to create a program that most consumers will use, with the understanding that some consumers will not be able to use the program to the greatest extent.

Also, please note that Table 1 provides manufacturers a roadmap to assist the manufacturer in designing qualified products with the appropriate default settings. Manufacturers to not need to follow Tables 2 and 3 absolutely; rather, these programs are to assist in clarifying Table 1 and not meant to detract from flexibility in programming.

2. **Recovery System**. All programmable thermostat models shall be equipped with a conventional recovery system. Programmable thermostat models marketed and sold for use with multistage heat pump systems shall be equipped with a multistage heat pump recovery system.

Note: EPA has received conflicting views on recovery systems, especially with regard to Intelligent Recovery Systems. A number of programmable thermostat manufacturers have claimed that Intelligent Recovery Systems help save money and energy, while also providing additional comfort. According to these manufacturers, the thermostat "anticipates" the consumers' need for heating or cooling, providing comfort and convenience, while ensuring that the consumer does not touch the program. However, other manufacturers have voiced differing opinions in that Intelligent Recovery Systems are confusing to consumers leading to dissatisfaction with the programmable thermostat. EPA continues to encourage stakeholders to provide additional information and potential requirements for Intelligent Recovery Systems.

3. **Hold Feature**

Programmable thermostats may have a hold feature that allows the user to temporarily override the program for a specified period, such as a vacation, without deleting the program. The programmable thermostat shall have more than one way to override the program. For instance, a long term hold (vacation) and short term hold (override to the next setpoint, such as "up" and "down" arrows) is recommended.

If the programmable thermostat has a permanent "hold" button or "manual" setting, the manufacturer must include an indicator that the thermostat is in the "hold" or "manual" mode (e.g., a "hold" on the LCD display or a LED light on the thermostat). It is recommended that programmable thermostat models should not have button/feature called "hold" or setting called "manual." If the programmable thermostat has "up" and "down" arrows, buttons, or other controls for temporary adjustment, the arrows must be on the outside of the thermostat for thermostats with doors. For thermostats without doors (e.g., screen-driven thermostats), the controls should be easily visible to the user. This will allow the user to temporarily override the program without changing the default program.

<u>Tier II</u>
The programmable thermostat shall no longer have a long-term hold feature, designated as "hold." Thermostat manufacturers may denote the long-term hold feature using other terms like "vacation," "override," or other designation. In addition, this feature must offer a user-setting requirement that includes a finite ceiling of hours or days for a long-term hold period. This suggestion is intended to

convince users to not use the hold/vacation feature as the means to manage the day-to-day temperature settings. Programmable thermostats should also have a temporary hold feature, which will return to the program at the next event; use "up" and "down" arrows to achieve this. However, this feature should be distinguishable from the long-term hold feature.

Note: According to industry research and published studies, consumers are not using the programming feature of their programmable thermostat to the greatest extent possible. Research demonstrates that consumers choose the "hold" button in lieu of program default options. By phasing out the "hold" button, EPA believes that consumers will use the product as intended.
It is EPA's hope that through this process, a specification can be developed that spurs the introduction of products that consumers will use.

Per feedback from stakeholders, EPA also added the word "days" under the Hold Section,Tier II. EPA believes that this will give manufacturers flexibility in designing the finite period of time for the long-term hold period. In addition, as manufacturers pointed out, entering days rather than hours is much more convenient for consumers. However, EPA would like to hear feedback about setting a limit to the number of days that a consumer could put the programmable thermostat in the "hold" mode.

In this Draft 1 specification, EPA suggests the use of a term other than "hold" in order to assist consumers in making better choices. EPA believes that a term such as "override" or "vacation" is much clearer in describing the mode of the programmable thermostat. EPA's goal is to assist consumers in choosing the program to manage their day-to-day temperature settings, rather than the "hold" button. Based on industry feedback, EPA has made some slight clarifications to the above requirements to address programmable thermostats that do not have doors (e.g., driven by LCD display) and to generalize the types of controls for temporary adjustment.

In developing ENERGY STAR specifications for programmable thermostats, EPA strives to set performance levels that achieve energy savings via ease of use. Manufacturers are encouraged to provide feedback and other ideas on the requirements of this section in addressing ease of use.

4. **Memory and Backup Systems**

All programmable thermostats must have technology that stores the ENERGY STAR default settings permanently so that, in the event of power loss or battery failure, program information is retained (e.g., permanent program memory).

Tier II
In addition to permanent program memory, all programmable thermostats must be capable of storing the ENERGY STAR default settings permanently, in the event of power loss or battery failure. In addition, programmable thermostats shall have a method to store the users' program on power loss or battery failure.

Note: EPA has added "a method to store the users' program in the case of on power loss or battery failure" for a number of reasons: (1) Most programmable thermostats already have the feature (2) consumers will not have to reprogram as often, and (3) by saving their program consumers will be less likely that the consumer will put the programmable thermostat in the "hold" mode, where no energy savings would be realized.

EPA decided to add this feature as a Tier II requirement to allow for time in adjusting and redesigning products to meet this requirement.

5. **Battery Powered Thermostats**

Programmable thermostats that rely on batteries shall have a "low battery" LED light or other indicator

(e.g., “low battery” on the LCD screen, etc.) to protect against thermostat outage. Battery-powered programmable thermostats shall have a minimum two-month low-battery and a minimum of a two-minute memory retention during battery change to maintain user and ENERGY STAR settings. Lastly, battery-powered programmable thermostats will use AA batteries to ensure long-life, ease of use, and easily replaceable batteries.

Note: EPA has included additional requirements for battery-powered thermostats. It is EPA’s intention to craft a specification that addresses ease of use issues for consumers, quality, and ensuring battery life and operability is extremely important to this end.

It is EPA’s understanding that there are manufacturers that continue to use AAA batteries. AAA batteries are often difficult to find and are not equal to the battery life that is generated by AA batteries. Often AAA batteries do not perform as well as AA batteries under high use characteristics. Since many homeowners are looking for ease of installation they choose a battery-powered thermostat rather than a hard-wired one. In meeting consumer expectations of ease of use and convenience for these thermostats, EPA would like to ensure that choosing a battery-powered thermostat is indeed a convenient solution and homeowners will not have to constantly change batteries. While, EPA agrees that AA batteries are the best solution in the marketplace to date. **EPA has some concerns that new technologies may emerge and specifying AA may be too restrictive. EPA is interested in hearing feedback from manufacturers on this matter.**

In addition, EPA has added a “two-minute” retention time during battery replacement to ensure that: (1) the convenience of these products is maintained and, (2) that battery-powered programmable thermostats offer a similar memory feature to the hard-wired thermostat.

6. **Accuracy**

Heating Anticipator: The heating anticipator setting shall be easy for installer/consumer to adjust and must remain at the installed setting in the case of an external power outage or battery failure that causes the programmable thermostat to be de-programmed. The heating anticipator must maintain a differential within ± 2°F. The cooling anticipator setting can be fixed or non-adjustable, but must maintain a differential within ± 2°F.

Operational Differential: Programmable thermostat shall be capable of maintaining room temperature differentials within ± 2°F of the setpoint temperature.

Temperature Reading: Programmable thermostat shall be capable of reading ambient room temperature within ± 1°F.

Note: EPA has removed "cooling anticipator" which appeared in the Draft proposal in the above anticipator requirements. It is EPA's understanding that most programmable thermostat manufacturers do not have an adjustable anticipator for cooling. EPA also added an accuracy level of ± 2°F for the cooling anticipator.

EPA changed the terminology from "swing" to "operational differential" to remain consistent with NEMA DC-3 standard.

EPA also added a "temperature reading" requirement to ensure the thermostat's ability to accurately read ambient room temperature. It is EPA's understanding that there are many types of accuracy issues that are not addressed in the current Version 1.0 specification. From discussions with manufacturers, EPA believes that there have been issues with programmable thermostats being inaccurate with reading room temperature, which has caused consumer confusion. EPA believes that by addressing each layer within accuracy that the overall product will meet or exceed consumer expectations. **EPA is interested in hearing feedback on the above definitions from manufacturers, as well as any other accuracy issues that should be addressed in the future specification.**

7. **Screen Size**

- The programmable thermostat's screen shall be large enough to show the full program including heating and cooling modules and both weekend and weekday settings.
- The user shall be able to simply scroll through each setting and use the "up" and "down" buttons to change each setting.
- The default ENERGY STAR program must be easily identifiable, so that the consumer can simply choose to run the program without any inputs, other than defining time and day.
- The programmable thermostat's screen will also include a menu that allows the user to set the program, heat or cool, day/time, and the fan. The partner shall make it easy for the consumer to scroll through the program with the use of a "select" button or by some other simple means. The manufacturer will also include a "home" button to make it easy for the consumer to return to the main menu.

Note: EPA realizes that there is disagreement in terms of implementing the best method to create intuitive programming. EPA's overall objective is to encourage manufacturers to create user-friendly designs. While EPA understands that there is a correlation between screen size, font size, readability, and ease of use. EPA understands that there are different opinions in how to achieve this goal. EPA is willing to work with manufacturers and other interested parties to determine if there are other requirements or features that can be implemented to achieve this goal, while continuing to allow flexibility in design.

8. **Backlighting**

Tier II
The programmable thermostat will provide backlighting for the screen for ease of programming in low-light settings. Backlighting should be set so it is operational when the user touches any key or manufacturer can choose to create a specific button to turn on the backlighting feature.

Note: Based on stakeholder feedback, EPA is interested in working with industry to **determine a finite number (e.g., 5 seconds, 10 seconds etc.)** for the backlighting to time out. This is to adhere to the energy-efficiency philosophy of ENERGY STAR, while ensuring convenience for consumers.

9. **Filter**

If the programmable thermostat has a "change" or "check" filter feature it must provide a default setting (i.e., runtime hours), so that the consumer and/or contractor could easily activate this feature. It is recommended that the filter runtime not be shipped as an activated default setting for ease of use purposes.

Note: It is EPA's understanding that manufacturers have received callbacks on programmable thermostats that have shipped with the check filter setting runtime as a default. EPA believes that this feature is an important one; however, it should be up to the consumer to decide if they want to use it.

Tier II

The programmable thermostat must have a "change" or "check" filter feature. The feature does not have to be activated as a default feature.

If the programmable thermostat has a change filter function, it must have an indicator to inform the user of a filter change. Ideally, when the filter requires changing, this status would be displayed on the product screen or via an indicator light.

10. **Indicator for Auxiliary/Emergency Heat**

Heat pump programmable thermostats will have a "back up heat" LED, or similar technology light or other indicator (e.g., "back up heat" on the LCD or similar technology screen) to notify the consumer that emergency heat or auxiliary heat is in use.

Note: EPA believes that this indicator can inform the consumer that (1) an equipment failure has occurred or (2) the consumer must take action and change the programmable thermostat settings. Both situations will ensure that consumers realize the savings that ENERGY STAR and manufacturers claim. Utility groups have mentioned that having a light on the programmable thermostat could aid in protecting savings for the consumer. EPA agrees that an indicator light is important in providing the consumer with the appropriate information to save money and energy. EPA received feedback from the proposal process, which suggested that the light should flash. From discussions with manufacturers, EPA understands that a flashing light is an expensive feature to add and therefore has chosen to give the manufacturer flexibility in designing this feature to minimize expense.

11. **Consumer Information**

Manufacturer should provide easy access to, in the minimum, one of the following: a permanent customer hotline number, product manuals via manufacturer's Web site, "Frequently Asked Questions" on Web site, troubleshooting guides or an interactive demonstration for programming to help customers with questions.

Tier II
Partner shall provide a customer support number, Company Web site, or other location for consumer information on the programmable thermostat and in the directions for installation, programming, or other locations, as appropriate.

12. **Consumer Instructions**

Tier I
Simple Instructions: Partner will be required to provide simple instructions in the product packaging.

The simple instructions provided should complement the owner's manual and other detailed instructions that manufacturer's already provide. EPA recommends that the partner provide permanent simple instructions on the programmable thermostat itself. Simple instructions should be sufficient enough for the user to complete programming, including running the ENERGY STAR default program, program settings, adjusting the setpoint temperature, time of day, and temporary override.

Tier II
Permanent Simple Instructions: Manufacturer should provide easy access to permanent simple instructions. These instructions are intended to instruct the user as to how to take advantage of the "core" energy savings features and should be in the packaging and on the product or another method to have the thermostat's simple instructions adhered near the product.

Permanent Expanded Instructions: Manufacturer will provide permanently affixed (i.e., non-removable) expanded instructions on the programmable thermostat. These instructions may include how to take full advantage of additional energy saving features beyond the core energy savings program in the simple instructions. Manufacturer will be provided flexibility as to how to best integrate these instructions into the packaging and on the product. Acceptable methods may include: (1) affixing instructions on the inner side of the door; (2) providing a pullout card from the programmable thermostat (e.g., also found used on phones and home security systems); or other easily accessible electronic means, or (3) other methods that the manufacturer can implement to permanently secure directions to the programmable thermostat.

Note: EPA's objective in providing permanent simple and expanded instructions is three-fold: (1) provide instructions to easily re-program the thermostat and use the thermostat for the first time (2) provide instructions in the event that the home exchanges hands, assisting the new homeowner in using the thermostat; and (3) provide instructions in the event of a power outage. In order to allow for flexibility in design, additional methods of affixing permanent simple and permanent expanded instructions will be accepted. **EPA would like to request additional feedback from stakeholders on this issue.**

Lastly, based on manufacturer comments, EPA has further clarified what information should be included in the simple instructions and made some minor edits to the permanent simple instructions.

13. **Copy Function**

Tier II
For programmable thermostats with 7-day programming, manufacturer must provide a copy button, a built-in memory feature, or other built-in programming to assist in ease in programming. It is EPA's understanding that many thermostats already have this feature, and believes that the feature helps to ensure quick and easy programming for the user.

Note: It is EPA's understanding that manufacturers have varying features to allow users to copy the programming from day-to-day. Given that there are multiple ways to achieve the same feature, EPA has rewritten the requirements above to include additional flexibility in the design of a copying feature. In addition, EPA has struck the holiday key based on programming difficulties reported by manufacturers.

EPA is looking for manufacturer responses to the following questions: Will adding the copy function help to differentiate an ENERGY STAR qualified programmable thermostat, or is this a standard feature already? EPA believes including this function will help to make the product more user friendly, but is interested in learning more about it before making a decision.

Per manufacturer feedback, EPA has decided to remove the requirement for consumer and contractor information. EPA would, in turn, like to work closely with industry to determine educational information for both the consumer and contractor that Partners will agree to use on their Web site and in their product packaging.

4) **Testing and Reporting Procedures:** Manufacturers are required to perform tests on each representative model that they intend to qualify as ENERGY STAR. Manufacturers must use NEMA's DC-3 test procedure to determine if a model meets ENERGY STAR requirements. The manufacturer provides these results to EPA when submitting a model to EPA as "qualified." (Note: NEMA DC-3 is available for purchase at www.nema.org). Manufacturer may self-certify the performance of each qualifying model and submit to EPA.

> **Note**: EPA feels that product testing is extremely important in maintaining the credibility of the ENERGY STAR mark and delivering performance consumers have come to expect from ENERGY STAR qualified products.
>
> EPA's goal here is to formalize testing requirements for programmable thermostats in order to preserve the integrity of the ENERGY STAR mark. **EPA would like to discuss testing at the industry meeting.**
>
> EPA continues to receive conflicting feedback on NEMA's DC-3 testing guidelines. Stakeholders have mentioned that NEMA's DC-3 guidelines are not a true test of programmable thermostat performance, since they are placed in an airstream that is unlikely to be replicated during an actual installation. Their suggestion is to remove all reference to DC-3 and replace with testing criteria developed by EPA in conjunction with industry.
>
> Generally, EPA uses existing test procedures or standards when developing a specification; however, manufacturers who feel that a new test procedure is needed are encouraged to submit draft criteria to EPA for review. In addition, EPA may consider third-party testing requirements in future specification revisions**. EPA would like to discuss the pros and cons of third-party testing.**

5) **Effective Date:** The date that manufacturers may begin to qualify products, as ENERGY STAR, under the Version 2.0 specification, will be defined as the *effective date* of the agreement. The ENERGY STAR Programmable Thermostat (Version 2.0) specification shall go into effect on **November 1, 2004**. Any previously executed agreement on the subject of ENERGY STAR qualified programmable thermostats shall be terminated effective October 31, 2004.

A. Tier I – The first phase, Tier I, shall go into effect on November 1, 2004 and conclude on November 1, 2005. Upon signing the agreement, the Partner may begin to use the ENERGY STAR mark.

B. Tier II – The second phase of this specification, Tier II, shall commence on **November 1, 2005**. All products, including models originally qualified under Tier I, with a date of manufacture on or after **November 1, 2005**, must meet Tier II requirements in order to bear the ENERGY STAR on the product or in product literature.

> **Note**: EPA would like to complete this specification revision as soon as discussions with stakeholders are complete. In moving to bring closure to the specification process, EPA would like feedback and comments from manufacturers regarding the proposed effective dates. In addition, EPA would be interested in learning more about production cycles and timelines for re-programming, in order to determine whether or not these are reasonable effective dates.

C. Qualifying and Labeling Products Under the Version 2.0 Specification: All products, including models originally qualified under Version 1.0, with a **date of manufacture** on or after **November 1, 2004**, must meet the Version 2.0 requirements in order to bear the ENERGY

STAR mark on the product or in product literature. The **date of manufacture** is specific to each unit and is the date (e.g., month and year) of which a unit is considered to be completely assembled.

D. Elimination of Grandfathering: EPA will not allow grandfathering under this Version 2.0 ENERGY STAR specification. **ENERGY STAR qualification under Version 1.0 is not automatically granted for the life of the product model.** Therefore any product sold, marketed, or identified by the manufacturing partner, as ENERGY STAR must meet the current specification in effect at that time.

6) **Future Specification Revisions:** ENERGY STAR reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through industry discussions.