Topic	Draft 1 Version 1.0 Climate Controls Specification Comments	EPA Response / Draft 2 Version 1.0 Climate Controls Specification Proposal
General	Is ENERGY STAR "assessing the potential energy savings associated with Non-Residential Climate Controls"? Has ENERGY STAR assessed the energy savings from Residential Climate Controls?	EPA has assessed the energy savings potential and the expected payback period of Residential Climate Controls. Consumers who use the (now very accessible) scheduling capabilities of qualifying Residential Climate Controls may expect payback in less than 3 years. EPA intends to consider similar products in light commercial installations following this development process.
Definitions	**Demand Response -** The support of Demand Response (DR) should be initiated by a pricing signal and the homeowner should decide to opt-in or not. The DR description seems to give the utility control of these events – rather than making it about pricing signals.	Communication capabilities are specified to maximize compatibility with consumer installed Energy Management Systems, Utility AMI and DR deployments and 3rd party applications alike. How this communications capability is used by these systems is largely outside the scope of ENERGY STAR. However, one of the basic principles of ENERGY STAR is to offer consumers choices. EPA envisions the Residential Climate Control as a device that will enable consumer to choose to participate in energy saving programs or connected applications that will reduce their residential HVAC consumption.

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Definitions	Recommend that EPA require endorsement by a true standards organization, not an Alliance. Why did EPA base its definition on the EU Open Standard definition? EPA should consider the ANSI definition. EPA should maintain a list of acceptable Open Standards.	Although EPA continues to encourage stakeholder use of open communications standards, the Draft 2 Residential Climate Controls specification has been revised to no longer require their use. The requirement to release a Software Development kit or Interface Control Document is considered sufficient at this time to promote interoperability with 3rd party applications and devices.
Usability Requirements	Is the requirement for a "single button push" literal or representative? It is suggested the wording be changed to "single action".	It was intended to be literal. The Draft 2 specification proposes new language to clarify that "Away" mode must be both enabled and cancelled by a single user operation.
Usability Requirements	The proposed prescriptive requirements seem unnecessarily restrictive. EPA should critically evaluate the need for—and possible unintended consequences of—prescriptive requirements and incorporate less prescriptive wording whenever possible.	Manufacturers will have the choice of either taking a performance path or prescriptive path toward qualification. If the prescriptive requirements present challenges then manufacturers do have the option of using the performance metric instead. However, EPA does not intend to restrict innovation with prescriptive requirements and as such, in several cases revised wording of these requirements to allow greater flexibility in stakeholder implementation. Also, the Draft 2 specification includes fewer core prescriptive requirements that are applicable to both the performance-based and prescriptive paths.

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Usability Requirements	Usability should be demonstrable via a Web-enabled interface because communicating thermostats create the opportunity to use the thermostat by entirely bypassing the device's own hardware interface. Thermostats that do not permit such programming directly at the device should still be eligible for ENERGY STAR certification if they can pass such testing via these other interfaces. Other interfaces such as gestures (both with cameras or Wii style motion sensors) and speech recognition/ speech output, occupant/cell phone location tracking systems, verbal commands, should be acceptable ways to override a setback status.	Qualified Climate Controls may consist of multiple units, for example a wall-mount unit with temperature and humidity sensors and a remote unit with user interface. In regards to evaluating conformance to the performance-based metric, the device under test shall be limited to the Climate Control, as packaged and distributed. Usability testing may not utilize additional devices and/or services, e.g. internet connection, PC, web tablet, smart phone, etc. The specification does not place specific limits on how the user may interact with the Climate Control. Voice and gesture recognition are acceptable.
Usability Requirements	EPA should modify the requirement such that no user input is required to maintain the time, however some user input should be allowed to set the time and date. There should be a modification to allow the user/installer to set the time once to save hardware costs.	The Draft 2 specification has been revised to require accuracy consistent with quartz timekeeping and that the date/time be maintained through week-long outages and daylight savings time periods. In response to stakeholder concerns for cost differential and reliability of time signal reception, the requirement that the product automatically set the date and time has been removed.
Usability Requirements	The "back-up heat" standardized indication requirement is ambiguous. There is no certainty as to what 'standardized' means in this context. Instead, it should be defined as a LED or LCD visual indicator. A few more options such as "EM Heat", "Aux Heat" or "Gas Fuel" should be allowed.	The Draft 2 specification includes substantial revision of this requirement that allows stakeholders flexibility in its implementation. The Climate Control must include visual indication when HVAC systems are active. For heat pump systems with electric resistance auxiliary heat, this indication must also convey high relative cost.
Usability Requirements	To further ensure that ENERGY STAR program requirements are not stifling innovation for the long term, the EPA should eliminate prescriptive requirements once a performance-based usability benchmark becomes available.	For this Version 1.0 specification, EPA is providing stakeholders an alternate, possibly lower-cost prescriptive path for demonstrating acceptable usability. EPA may consider reducing the number of prescriptive requirements and/or mandating usability testing of all qualified products in subsequent versions of the specification.

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Usability Requirements	In regard to the minimum font size, EPA should implement a minimum of 5mm for both primary and secondary characters on QVGA or better technology. 5mm represents a font size of 14pt which is larger than any standard publication within North America.	EPA believes the minimum character size requirement is both reasonable and necessary. Additional wording has been added to clarify that primary characters be used to display room temperature.

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Usability Requirements	Price signals should be conveyed in the LCD display, rather than with LED lights to be more cost-effective and less confusing.	After careful consideration of numerous stakeholder comments on TOU pricing indication, EPA has elected to propose a slightly modified requirement in the Draft 2 specification. EPA considers the Climate Control to be an ideal candidate for ambient display technology that unobtrusively delivers at a glance TOU Price Tier information to users with no intention of receiving it. Revision to this requirement retains the 3-color display, but additionally requires a flashing red indication to support 4-Tier implementations. It is further required that implementations be usable by individuals with color vision deficiency. Use of text is permitted, so long as the color requirements are simultaneously met. .
	Having a visual cue to the consumer of the current rate being applied to their energy consumption is interesting, but the LED indicator as prescribed (green, yellow, red) will not be usable for color blind individuals if a single light is used.	
	Implied in the described user interface there is an assumption that the users are literate in English, have full visual acuity, have cognitive abilities for document literacy, have full color vision and full physical mobility/dexterity. This will limit the number of users who can use the systems. Some individuals find LEDs intrusive, especially in the bedroom as some individuals find any light source to interfere with sleep. Alternative interfaces should be allowed.	
	ENERGY STAR intends these indicators to be available and used if a utility Time of Useprogram is in place. While this goal is laudable, it is clear that there are local and regional infrastructure requirements that would apply beyond the Climate Control itself. It is unclear how ENERGY STAR can require such a specific indicator feature that may not beusable or compatible in different parts of the U.S.	
	Does displaying the actual text in lieu of LED qualify as an equivalent implementation? It's arguable that plain English text (i.e. On peak, off peak) is far more intuitive then colored LED. If text is not allowed, this requirement should be expanded to broaden the methods to alert consumers of pricing level.	
	Some utilities choose their own colors for tiers. There have been 2, 3 and 4 tier programs. EPA should use Green, Yellow, Orange and Red for Lo, Mid, Hi, Critical.	

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Technical Requirements	It is unclear which specific Restriction on Hazardous Substances (RoHS) requirements are being incorporated by reference here. Is ENERGY STAR referring to those maintained by the European Union? The requirement has nothing to do with energy efficiency and is thus misplaced in this “Energy Efficiency Criteria” section.	In response to this comment, the subject requirement has been revised to clarify that it references the European Union RoHS Directive. The requirement was relocated from Energy Efficiency Criteria to a new Other Criteria section.
Technical Requirements	"Adaptive Recovery" will only work when the schedule is local, not when it is changed remotely, i.e. by an EMS. It can also be confusing to consumers and is probably subject to IP rights. Suggest that Adaptive be optional.	Implementation of Adaptive Recovery by default will help to ensure clear and consistent operation amongst qualified Climate Controls that deliver comfort setpoints during scheduled comfort periods. In regards to integration into an EMS, this requirement applies to the as-shipped product. If the Climate Control is integrated into an EMS, not supplied as part of the Climate Control, that remotely manages schedule programming and execution, it is understood that the EMS may override execution of Adaptive Recovery by the Climate Control. If stakeholders can verify that IP rights are inhibiting their ability to implement Adaptive Recovery, please contact the EPA Climate Controls team to discuss and include these points in written comments.

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Technical Requirements/Humidity	Independent temperature and humidity control is of prime importance when a home is vacant for extended periods during humid conditions. Such conditions exist in a large percentage of the heavily populated east and south but are not uncommon in other areas of the country. EPA should include independent humidity and temperature control in the specifications. Also note that while HVAC equipment sometimes include an additional dehumidifier the overwhelming majority of homes with air conditioners do not and therefore, the Climate Control thermostat must be able to control the air conditioner to provide dehumidification. Humidity sensors - 3% accuracy is very difficult for an accurate measure of humidity. 5% typical 10% maximum is recommended.	EPA considered implementation of a required Vacation mode with both maximum temperature and humidity setpoints in order to reduce consumption. However, implementation of this requirement would add complexity that may frustrate users and subsequently limit use of energy saving modes. Although not mandated by the specification, EPA encourages stakeholders to consider implementing vacation modes with appropriate default temperature and humidity limits designed to save energy, while protecting the home from mold growth. Required humidity measurement accuracy has been relaxed from 3% to 5% in response to stakeholder cost concerns.
	Humidification and dehumidification adds significant cost to the thermostat, assuming the customer has the wiring to support such features. This item should be optional and not a requirement in the specification.	
Technical Requirements	This access to outdoor temperature data should not come from a proprietary sensor, but should be available from the internet or other network.	Outside temperature data may be sourced from a connected sensor, data feed or other means.
Technical Requirements	Remote reporting needs to be 0.1°F resolution, but the display requirement is only 1F resolution. EPA should change this requirement to 1 degree F resolution.	Reporting of room temperature to a 0.1°F resolution may be useful for energy analysis applications and other implementations. Consequently, the 0.1°F remote reporting requirement has been retained.

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Technical Requirements	Are communicating climate controls exempt from the 0.5 watt power limitation? 0.5w is much lower than the power consumption of communicating thermostats with graphical UI currently on the market. Compliance with UI requirements requires graphical displays and faster processors which consume more power. A 3 watt power limit should be applied only when the climate control is operating, but not interacting with the user or external communication.	Specific power consumption requirements are retained in the Draft 2 specification since their inclusion provides EPA with assurance that the energy draw of the unit itself is considered in product design. However, in response to stakeholder concerns about minimum energy required for basic operations, these consumption limits have been relaxed slightly. EPA is also proposing separate limits and methods of measurement for Climate Controls versus Communicating Climate Controls.
Technical Requirements	If ENERGY STAR is going to require a unit to be capable of maintaining room temperature within ± 1 degree Fahrenheit (F) of the setpoint temperature in accordance with NEMA DC-3-2008, ENERGY STAR should require units to also operate in Celsius (C).	The Draft 2 specification retains the referenced temperature differential test requirement. The draft 2 specification permits Climate Controls that do not support Celsius operation to qualify.
Communication Requirements	Due to the limited market demand for communicating interfaces and the large number of possible communicating protocols, it is difficult to justify the development costs of a communicating interface. The future upgradeability requirement should clearly indicate that manufacturers must demonstrate the capability of future communications, but are not required to develop the interface until justified by market demand.	EPA is in agreement with this comment and has provided clarification, in Section 2 (Qualifying Products), that compatible communication modules need not be available at the time of purchase for a Climate Control to qualify.

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Communication Requirements	Some stakeholders have concerns about the quantity of data the specification requires that thermostats be capable of communicating. Though their sentiment is appreciated, the following must be taken into consideration: 1) The cost to create a "field-upgradeable" device will be the same regardless of the frequency with which the device is capable of sending and receiving signals. There is no meaningful way in which this requirement affects the cost of base-configuration hardware. 2) The cost of the hardware required to build a communicating thermostat capable of exchanging messages with a network once per minute should be no different than the cost of hardware that can only communicate once every five minutes. 3) The fact that the specification requires that thermostats be capable of exchanging messages once per minute does not mean that they must always actually do so.	EPA would like to clarify that communication requirements contained within the draft Residential Climate Controls specification pertain only to the Climate Control. EPA understands that there may be other limiting factors such as bandwidth and data storage issues that result in system level implementations with decreased Climate Control data resolution. Climate Control data requirements have been retained in this Draft 2 specification to ensure that the Climate Control itself is not a limiting factor that will decrease the effectiveness of energy analysis and energy management applications that analyze this data.
	The recommended interval of recording data every 60 seconds and transmitted every 5 minutes is excessive. This represents a large amount of data per thermostat that needs to be stored.	
Ease of Installation	"No New Wires" This requirement is critical to rapid adoption in the 125 million existing homes and should be reinstated.	This requirement was not included in the Draft 1 Residential Climate Controls specification in response to numerous stakeholder comments, including higher product cost and operational reliability concerns. Although EPA has decided not reinstate "No New Wires" as a requirement, we encourage stakeholders to qualify Climate Controls that include design features that simplify retrofit installations in existing homes.
	Energy Star's recognition that its previous proposal for a "No New Wires" installation requirement should be removed was a good decision.	