



The U.S. Environmental Protection Agency (EPA) recognizes and appreciates Residential Climate Controls stakeholders' support of the ENERGY STAR program and interest in helping EPA develop requirements for this product category. While work continues on the usability test method that will play a central role in this specification, EPA is working with stakeholders on establishment of other aspects of the specification such as those included in the attached ENERGY STAR Residential Climate Controls Discussion Document.

This ENERGY STAR Residential Climate Controls Discussion Document is intended to engage stakeholders in the further development of the ENERGY STAR Climate Controls specification. Included in this document are EPA's initial thoughts on the relevancy of remote interfaces, humidity sensing and rate tier display. EPA will host a conference call on November 2 to discuss the proposals in this document with stakeholders. EPA also welcomes written comments received via email to ClimateControls@energystar.gov; those received no later than November 11, 2011 will inform Draft 3 of the requirements. Comments received after that date will be considered as part of the Draft 3 comments process.

Considered Changes to Residential Climate Controls Requirements

EPA has evaluated stakeholder input regarding the requirements in the most recent [Draft 2 Version 1.0 Climate Controls Specification](#) and is considering the following refinements.

I. Remote Interfaces

Communicating Residential Climate Controls that may be managed by *Remote Interfaces* (RIs), such as smartphone apps and PC web browser control interfaces, have come to market in greater number over the last few years. EPA believes this emerging shift to remote energy management presents significant opportunities for energy savings. Recognizing this market shift, EPA is considering allowing Residential Climate Controls with remote interfaces to earn the ENERGY STAR.

EPA anticipates that both the performance-based and prescriptive paths, as proposed in the [Draft 2 Version 1.0 Climate Controls specification](#), the previous [Draft Usability Framework](#), and the [Draft Usability Performance-Based Test Method](#), could be adapted to allow evaluation of climate controls with RI's.

In addition, EPA is considering a modified requirement that would allow for streamlined testing of Residential Climate Controls with RIs that are qualified for usability. These Residential Climate Controls would need to be associated with one or more RI(s) that comply with performance-path tasks #1 – 5 or prescriptive path requirements #6 – 11. Such Residential Climate Controls would need to include the ability for the consumer to set the date and time and to create or modify HVAC schedules. However, required performance-based tasks would be reduced to tasks 2, 3 and 5. Task 1, Set Date & Time and Task 4, Modify Program Schedule would not be required for the Residential Climate Control. Under this proposal these functions would be provided by one or more RI(s) associated with the Residential Climate Control and demonstrated to comply with performance-path tasks 1 and 4. EPA believes these provisions will enable lower cost products by encouraging these more complex and interactive tasks to be performed from RI(s) on devices such as PCs, smartphones & tablets that are likely to foster a better user experience.

EPA is further considering additional prescriptive requirements that define suitable base levels of functionality for Residential Climate Controls qualified with RIs. For example, EPA believes that Residential Climate Controls should provide the user with control and indication of:

- room temperature,
- setpoint,
- HVAC mode,
- fan mode,
- energy saving/away mode, and
- long-term hold

EPA is considering the following RI types:

- PC RI (dedicated software or web interface),
- Mobile/Other RI (includes apps and mobile web interfaces for smartphones & tablet computers, and “other” control interfaces such as energy management displays and security systems)

In order to provide an overview of the full set of qualification criteria and how they would apply, EPA has provided Figure 1, which illustrates these requirements in a flowchart format.

Information to Consumers

To incorporate Climate Controls with RIs into the specification, EPA is considering the following packaging requirements:

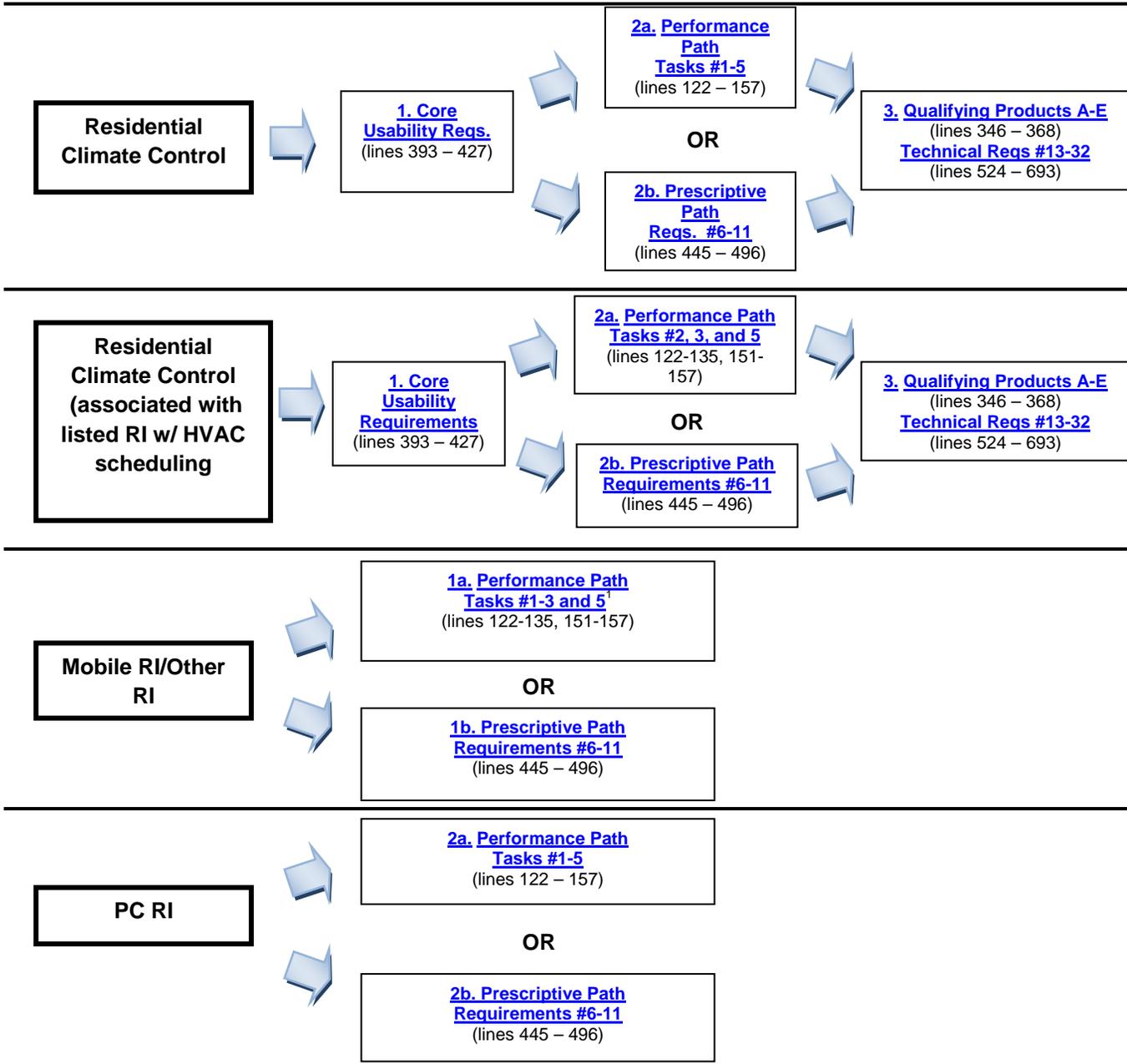
- Packaging for qualified Residential Climate Controls must identify additional hardware or software requirements to enable communications (e.g. “Must have mobile device with WiFi and running iOS x.y or later or Android z.k or later”, or “Must have an 802.11 B/G/N WiFi network in the home”).
- Packaging for qualified Residential Climate Controls evaluated to the streamlined performance-based usability path (tasks 2, 3 and 5, i.e. not including testing of HVAC programming or Date/Time adjustment), must identify one or more associated RI(s).

Questions for Discussion

1. What are the perceived implications of allowing RI(s) into the Climate Controls specification?
2. The previously proposed prescriptive-path includes ‘single user action’ requirements intended to ensure quick access to setpoints and Away mode. To ensure quick access to these settings from an RI, should EPA retain ‘single user action’ requirements, after the RI is launched?
3. EPA understands that it would be possible for one company to produce the hardware of a Climate Control (OEM) and another to write an RI to control it (3rd party). If sufficient information on the Climate Control is publicly available, the 3rd party could write an RI independent of the OEM. What are the advantages and disadvantages of limiting listing of 3rd Party RIs to only to those approved by the OEM? What would be an appropriate mechanism for OEMs to indicate approval?
4. What is the appropriate minimum functionality for a Climate Control intended to be paired with one or more RI?
5. Climate Controls associated with listed RI(s) may be eligible for evaluation to a streamlined version of the usability test. EPA envisions defining a subset of tasks to perform locally on the Climate Control. What are the implications of this approach?
6. For streamlined qualification of Residential Climate Controls to the performance-based path, EPA is proposing waiving Task 1, Set Date & Time and Task 4, Modify Program Schedule. Is this a reasonable approach that will encourage qualification of lower cost products? When paired with an RI, is it likely this combination would provide a high quality package to the consumer?

7. In the absence of external connectivity, should Residential Climate Controls continue to run an HVAC program schedule?
8. Should EPA require specific documentation/labeling on product packaging, documentation, and/or on the product itself?

Figure 1 – Overview of Climate Control/RI Criteria



II. Humidity Sensors

The requirement to monitor & display humidity levels may pose a financial burden for climate control manufacturers and only facilitates seasonal energy savings in certain regions. Therefore, EPA is considering removing the requirement to display and control relative humidity in the 'Technical Requirements' section of the [Draft 2 Version 1.0 Climate Controls Specification](#).

EPA notes that there is significant individual savings potential associated with Residential Climate Controls that include the ability to control HVAC equipment based on temperature and humidity in certain use cases, e.g. unoccupied homes in hot humid regions. Thus, EPA proposes encouraging manufacturers to include this feature set in certain models, and is considering including information on it on the Qualified Product List.

Questions for Discussion

9. Do humidity sensors pose a financial obstacle to thermostat manufacturers?
10. Would highlighting this capability on the QPL and educating consumers about its value in some climates and circumstances help consumers save energy?

III. Rate Tier Requirement

EPA received feedback from stakeholders indicating that energy rate tiers may not be widely available for a considerable amount of time, thus reducing this requirement's applicability and usefulness. Given that, EPA is considering removing task #6 in the [performance-based test](#), which instructs users to identify and read aloud the current energy rate tier as displayed on the climate control and requirement #12 in the [prescriptive usability requirements](#), which requires the product to provide green, yellow and red color-coded rate tier indications.

Question for Discussion

11. Should EPA retain the rate tier requirement in the prescriptive/performance paths to qualification?

IV. External Connectivity

EPA is considering mandating that Residential Climate Controls be delivered with fully functional bi-directional communications, external to the HVAC system. This would encourage energy savings by ensuring Residential Climate Controls, as delivered, are able to communicate with utilities and external systems. EPA believes that communicating Residential Climate Controls can enable significant energy savings through remote energy management, automation, and utility Demand Response (DR) participation. Clearly, Climate Controls evaluated to the streamlined performance-based usability path (tasks 2, 3 and 5), will need to have external communications enabled at time of sale so that RI(s) can interact with them.

Questions for Discussion

12. EPA first proposed Climate Control communications requirements in spring 2010, and received numerous stakeholder comments about its rate of adoption. However, this is clearly a fast-changing market, and we would like updated feedback about the current market for, and availability of, communicating Climate Controls. How is the market anticipated to change by spring of 2012? What are cost implications of this requirement?
13. Should EPA mandate that all Residential Climate Controls be sold with communications enabled?

Stakeholder Feedback

Stakeholders are encouraged to provide feedback on the concepts presented in this document and other input EPA should consider at this time. EPA also invites stakeholders to provide additional product and market data, including information on forthcoming models, which could help inform this specification development process. Suggestions for improvements to the basic approach outlined in this document will be considered for inclusion in future specification drafts. EPA will host a conference call on November 2 to discuss the proposals in this document with stakeholders. EPA also welcomes written comments received via email to ClimateControls@energystar.gov; those received no later than November 11, 2011 will be considered in Draft 3.

If you would like to share plans about upcoming products that may be eligible for inclusion or to discuss this discussion document, please contact Abigail Daken (EPA) at (202)-343-9375 or Daken.Abigail@epamail.epa.gov, or Doug Frazee (ICF International) at (443)-333-9267 or dfrazee@icfi.com.