



## ENERGY STAR® Residential Climate Controls Stakeholder Meeting

### Meeting Notes

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#### **Overview**

The U.S. Environmental Protection Agency (EPA) held a stakeholder meeting on December 14, 2010, with members of the climate controls industry, utilities, and test labs to review the draft [Usability Test Method](#) and receive industry feedback.

For a list of meeting participants and meeting agenda please see Appendices I and II.

#### **Meeting Notes**

The notes below follow the general outline of the meeting agenda and most resources are available on the ENERGY STAR website (hyperlinked where appropriate). In addition, relevant discussion topics are included in each section below.

- ***Introduction and Welcome***

Abigail Daken, EPA, welcomed all meeting attendees and outlined meeting agenda.

- ***Presentation: [Thermostat Usability Research](#)—Alan Meier***

Alan Meier, Lawrence Berkeley National Laboratory (LBNL), presented his research into climate control usability and displayed videos showing test subjects' confusion and “button mashing” behavior when requested to perform simple tasks. (*Note:* videos not yet posted at the time of this document's release.) Topics of discussion included:

- **Including product manuals in tests:** The test at LBNL did not include the product manual. Alan explicitly noted that the ENERGY STAR usability test allows the test subject to review the product manual if they choose, but the LBNL tests did not include the product manual.
- **Additional detail:** Alan, as well as a few stakeholders, noted that there is anecdotal data demonstrating people do not use the manuals when programming their thermostats, even for the very first time. Stakeholders stated approximately only one quarter of individuals actually use and keep the product manual. Stakeholders expressed interest in finding additional data and research to back up this claim to improve manual uptake by end users.
- **Correlating price and usability:** stakeholders asked if there was a correlation between shelf price and usability (i.e., graphical user interfaces are more expensive but could supply detailed graphics to improve usability). Alan responded that this correlation was not analyzed.

- **Additional detail:** Abi stated ENERGY STAR specifications aim to have consumers "pay a little more upfront" and receive a return on investment payback within one to three years if possible. Using the "setback function" programmable thermostat usually pays for itself within one to three years, but is based upon the assumption that people will actually use the setback setting.
- **Daniel Perry** from LBNL stated that in their research there was no correlation between price and usability.
- **Presentation: [Test Method and Metric](#)—Doug Frazee**  
 Doug Frazee, ICF International, presented an overview of three draft documents: [Usability Framework](#), [Test Method](#), and [sample data sheets](#).
  - **Modifying the term "panel":** stakeholders found the term "panel" confusing since a testing panel has a long-term advisory connotation (i.e., group repeatedly convenes over time to offer expert advice); the term "research subjects" was recommended.
  - **Including alternative user interfaces:** many stakeholders requested the ENERGY STAR specification include alternative user interfaces (e.g., web-based HVAC control, iPhone), which offers superior usability and is a format end users are familiar with. Stakeholders requested that the test method should incorporate these types of technologies.
  - **Gauging test costs:** manufacturers will need to cover the additional testing cost, which could significantly impact smaller companies. The test currently requires a 21-person panel and stakeholders at the meeting estimated the cost of the test, from assembling the panel to finalizing the report, could roughly cost \$1,000 per individual panelist. Stakeholders encouraged EPA to modify the test to reduce testing costs.
- **Morning Breakout Session: Test the Test**  
 Meeting participants divided up into four groups and performed the Usability Test Script on actual climate controls provided by stakeholders (four different models). This exercise was intended to "test the test" to better understand and improve both the test methodology and script. Only Tasks 1, 2, 3, & 5 were performed. Stakeholder suggestions included:
  - **Reconfiguring Task 2:** define the pre-test set temperature as a configuration item for Task 2.
  - **Modifying terms:** change the term "Away" in Task 4, as well as throughout the test method, since "Away" is a suggested term that applies only to the prescriptive path
  - **Including clarifying instructions:** add additional instructions to the Task 5 script, such as, "Please let me know when you are ready to proceed?" after providing the panelist the table with days and times.

- **Reordering tasks:** switch order of Task 3 and Task 1 (identify and read aloud room and set temperatures), since the users will already have discerned this data from performing prior tasks.
- **Minimizing negative “failure” effects on test panelists:** stakeholders noticed that if a panelist fails an initial task, they could promptly “give up” and not try to complete the rest of the tasks, thus jeopardizing the entire test (and “pass/failure” of the unit under test). This exact phenomenon occurred during one of the stakeholder breakout groups in the 12/14 meeting: the stakeholder could not perform the first task and, for all subsequent tasks, said, “I won’t be able to do this; I’ll have to give up.” Stakeholders suggested randomizing the order in which the six tasks are given to each panelist to try and negate this issue.

<b>“Test the Test” Results</b>	
<b>Task 1 Scores</b>	<b>Task 2 Scores</b>
➤ Lowest – 0	➤ Lowest – 0
➤ Highest – 86.7	➤ Highest – 66.9
➤ Average – 53.3	➤ Average – 17.6
<b>Task 3 Scores</b>	<b>Task 5 Scores</b>
➤ Lowest – 29.6	➤ Lowest – 0
➤ Highest – 75.5	➤ Highest – 0
➤ Average – 58.4	➤ Average – 0

Testing results and discussion topics are also available [here](#).

## **Lunch Break**

- **Presentation: ADT Pulse User Interface for Heating and Cooling—Steve Shapiro**  
Steve Shapiro, ADT, demonstrated the Pulse system, which integrates home security, automated lighting and communicating thermostats. Users may log into the system to easily program setpoints, schedules, and remotely control their HVAC from an iPhone or other web-enabled device. (Note: presentation content is business sensitive and is not available online.) Other points of note include:
  - **“Setpoint” terminology:** ADT research indicates public has little understanding of the term “set-point”; they understand up and down but not the concept of setpoint.
  - **Program cost:** ADT Pulse monthly home energy monitoring and remote accessibility costs \$5 to \$15 per month above and beyond their security service but demonstrate significant monthly energy bill savings.
  - **Adaptive recovery:** one stakeholder asked if the Pulse system supported adaptive recovery, since this is part of the ENERGY STAR climate controls specification. There

was concern that a consumer could become impatient when returning to a cold home and override the programmed schedule, thus wasting energy. This is especially true for heat pump and electric resistance backup systems. Stakeholders also noted that this is a concern with “Away Mode” as well.

- **Presentation: Repeatability, Panel Size, and the Reference Device Concept—Abigail Daken**

This session, presented by Abi Daken of EPA, reviewed EPA's efforts to ensure the usability test is repeatable and somewhat standardized across different panels and different labs. To do this, Ms. Daken discussed panel size and a “reference device” concept. This reference device could be used as a “yardstick” with which to gauge testing results between individual panelists to minimize testing variability.

After the presentation, stakeholders separated into groups for discussion and also took a short poll. Key points from this discussion are outlined below.

- **Afternoon Breakout Session: Referenced Device and Panel Size Discussion**

Following are comments from the afternoon session:

- **Setting panel size:** stakeholders thought the panel size should be established thru statistics to minimize statistical error in test results.
- **Including non-native English speakers in the panel:** stakeholders commented that, while everyone has a right to conserve energy in the home, incorporating into the panel individuals that “speak English less than well” (U.S. Census designation) would be expensive and challenging, in-part, because term is not well defined.
- **Selecting panel members:** meeting attendees stated that panel demographics should be based upon energy use rather than U.S. Census data (i.e., homeowners rather than age and education).
- **Finding a standard reference action:** meeting participants discussed measuring usability through a “standard reference” action instead of using a reference device. Examples from the driver safety/distraction testing include comparing any new action or device interaction is measured against the simplicity of “turning a radio dial” while driving. Abi Daken stated EPA could review this as an option.
- **Omitting reference device:** some stakeholders thought that a reference device would not be necessary once the usability test was vetted and finalized; they thought it would add complexity to the testing process and confuse stakeholders.
- **Developing a reference device—Industry:** stakeholders commented that creating a reference device through industry channels would be challenging: each business is incentivized to make the reference device interface look like their own climate control. This could significantly stall development and slowdown the specification development process.

- ***Anonymous Poll Results***

Individuals participating in the meeting, both on the phone and in person, filled out an anonymous poll and submitted it to EPA. Eighteen individuals submitted answers and the poll results are:

<p>Panel size:</p> <ul style="list-style-type: none"> <li>- Too Large: <b>3</b></li> <li>- Just Right: <b>9</b></li> <li>- Too Small: <b>6</b></li> </ul>	<p>Panel specified too tightly?</p> <ul style="list-style-type: none"> <li>- Yes: <b>9</b></li> <li>- No: <b>9</b></li> </ul>
<p>Does the panel cover necessary demographic divisions?</p> <ul style="list-style-type: none"> <li>- Yes: <b>6</b></li> <li>- No: <b>12</b></li> </ul>	<p>Preferred reference option:</p> <ul style="list-style-type: none"> <li>- Option 1: no reference: <b>4</b></li> <li>- Option 2: physical device: <b>0</b></li> <li>- Option 3a: virtual reference (DOE developed): <b>9</b></li> <li>- Option 3B: virtual reference (industry developed): <b>0</b></li> </ul>

- ***Reconvene, Share Results of Discussion...Final Wrap up and Farewell***

Everyone reconvened, reviewed the poll results listed above, held a brief discussion for next steps and timeline (outlined below and in slide 17 of Abi Daken's presentation), and bid farewell.

<b>Climate Control Specification Timeline</b>	
January 30, 2011	Draft Usability Test comments due
February 2011	Draft 3, with usability metric and enhanced testing
April 2011	Final draft specification
May 2011	Final Version 1.0 Residential Climate Controls specification
May 2011	Specification effective

## Appendix I: Stakeholder Meeting Participants

Below is the list of meeting attendees, both in person and via conference call, listed in alphabetical order by company:

In-Person Attendees	
<i>Name</i>	<i>Organization</i>
Steve Shapiro	ADT
Maxine B. Siegel	Consumer Reports
Nelson Bender	Controlled Air Systems
Quinto Petrucci	Ecobee
Andy Martin	Energy Hub
Abigail Daken	EPA
Jeffrey Clark	ICF International
Rebecca Duff	ICF International
Doug Frazee	ICF international
Trae Vassallo	Kleiner Perkins Caufield & Byers
Perry Daniel	LBNL
Steve Millheiser	Lux Products Corp.
Erik Charlton	MantisLabs
Debra Brunk	Navigant
EJ Schuck	Navigant
David Sloo	Nest labs

Conference Call Attendees	
<i>Name</i>	<i>Organization</i>
John Taylor	Consortium for Energy Efficiency
Andy Martin	Energy Hub
Michele Tepper	Energy Hub
Dan O'Donnell	Honeywell
Pat Tessier	Honeywell
Marco Pritoni	LBNL
Chris Rockwell	Lextant
Nicak Barliga	Lux
Roslyn Cochrane	Natural Resources Canada
Sherri Hu	PG&E
Tim Storm	Trane
Bob Brown	Water Furnace

## Appendix II: Stakeholder Meeting Agenda

### ENERGY STAR Residential Climate Controls *Usability Test Method Stakeholder Meeting*

Washington, DC  
December 14, 2010

## Agenda

9:00 – 9:15 AM	Introduction and Welcome	Abigail Daken
9:15 – 9:45	Thermostat usability research	Alan Meier
9:45 – 10:15	Present test method and metric	Doug Frazee
10:15 – 11:00	Breakout: pairs or small groups run tasks (take breaks as needed) <i>Focus questions:</i> Requirements clear, relevant? Tasks appropriate? Test script issues? Setup/UUT configuration issues? Metric & pass/fail criteria OK?	Doug Frazee
11:00 – 11:15	Break	
11:00 – 11:45	Reconvene, review anonymized scores, and discuss	Doug Frazee
11:45 AM – 12:45 PM	Lunch on your own – recommendations provided	
12:45 – 1:15	Stakeholder presentation: ADT Pulse System	Steve Shapiro
1:15 – 1:45	Repeatability, panel size, and the reference device concept	Abigail Daken
1:45 – 2:30	Breakout: discuss reference device options (~5 people per group) <i>Focus questions:</i> Panel size right? Too tightly specified? Did we miss anything? Which reference device options do you favor?	Abigail Daken
2:30 – 2:45	Break	
2:45 – 3:30	<ul style="list-style-type: none"><li>– Reconvene</li><li>– Share results of discussion</li><li>– Outline next steps for test method and larger Climate Control specification</li><li>– Final wrap up and farewell</li></ul>	Abigail Daken