



**REQUEST FOR PROPOSAL
CLIMATE CONTROLS USABILITY ROUND ROBIN
TESTING FOR ENERGY STAR®**

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Scope

General Description of Service

Three Contractors shall conduct usability testing of three Residential Climate Control models using a specified test procedure as defined by this Request for Proposal (RFP) and the applicable documents, referenced below. The testing shall:

- 1) determine the reproducibility of the test procedure across laboratories; and
- 2) determine the ability of the test to differentiate products based on usability

The testing is also expected to help answer the following questions:

- » Are the test procedure and administrative scripts well written and complete?
- » Is the test repeatable?
- » What are expected test cost and test burden for manufacturers?

Preliminary work may begin as soon as the contract is awarded, including training of test administrators. The Contractors may begin recruiting the user group for testing as soon as the appropriate documents are reviewed and the test approach is approved by the Central Department of Energy Institutional Review Board (CDOEIRB). Testing shall be scheduled so that the client may be present during a pre-determined part of the set-up and testing. All work shall be under quality control. Documentation shall be comprehensive, covering all aspects of the evaluation.

Background

The Contractors and a selected, diverse group of individual users will perform Residential Climate Control usability testing. This testing is intended to distinguish Residential Climate Controls that are easy to use and program from the rest of the Residential Climate Controls on the market. These products are expected to facilitate energy saving behavior through increased adoption of program modes and other energy saving features.

References

Definitions

Client:	DOE, EPA, Navigant, and/or ICF
DOE:	U.S. Department of Energy
EPA:	U.S. Environmental Protection Agency
HVAC:	Heating, Ventilation, and Air Conditioning
LBNL:	Lawrence Berkeley National Laboratory
Residential Climate Control:	A device that controls HVAC equipment to provide interior heating and/or cooling to dwellings. Programmable thermostats perform similar functions.
Test Administrator:	The individual(s) conducting Residential Climate Control usability testing
User Group:	A group of persons recruited by the test laboratory in accordance with selection criteria included in the Group Composition section of this Request for Proposal
Individual User:	A member of the User Group
UUT:	Unit Under Test

Applicable Documents

- 1) - *ENERGY STAR Program Requirements Product Specification for Residential Climate Controls: Test Method – Usability*: Used for determining product compliance with the Performance-Based Usability Requirements in the ENERGY STAR Eligibility Criteria for Residential Climate Controls.¹
- 2) - *ENERGY STAR Residential Climate Controls Draft Specification Framework Version 1.1 – Performance Based Usability Requirements*: Detailed proposed usability requirements for ENERGY STAR Residential Climate Controls, including revised language of the performance-based usability test methodology, including a detailed script for test administrators to follow in order to provide instructions to test subjects.²

¹ Section 6 of the document is the test procedure. -

² An updated version of the *Performance Based Usability Requirements* will be distributed prior to the start of testing. -

Test Requirements

Unit Under Test (UUT) Types and Quantities

The Contractor shall administer the testing of the three UUTs shown below.

Appliance Model

UUT 1: Honeywell RTH7600D 7-Day Programmable Thermostat

UUT 2: 3M Filtrete WiFi Enabled Programmable Thermostat

UUT 3: HAI Omnistat2 Thermostat RC-1000

UUT 2 will be tested using its web-enabled, alternative interface.

Navigant will purchase and ship the units to the Contractors' facilities. The Contractors shall conduct usability testing on at least one unit per model. The Contractors may propose purchase of additional units of the same model to facilitate an accelerated test schedule. One or more additional units shall be available as backup in the event that any of the originals malfunction. The Contractors is responsible for providing all other equipment necessary to conduct the test, including operating UUT2 through its alternative interface. This includes, but may not be limited to , a Windows XP based PC with a minimum resolution of 640x480 and an external mouse for navigating the alternative interface. UUT2's interface shall be run in Internet Explorer 8. The router must be within 100 feet of the UUT during testing.

Group Composition

The user group for each UUT shall be comprised of a specific number of people (defined by the scenarios listed below) and shall meet the following requirements:

- » Represented Age Group
 - Age 21-34: 28.6³% of users
 - Age 35-49: 28.6% of users
 - Age 50-64: 28.6% of users
 - Age 65-79: 14.2% of users -
- » Gender -
 - Male: 50% of users
 - Female: 50% of users -
- » Level of Education -
 - Less than High School Education: 14% of users
 - High School Graduate and Less than Bachelor's Degree: 57% of users
 - Bachelor's Degree or Higher: 29% of users

A more detailed breakdown of the user group is defined in the Proposal Acceptance Criteria section of this RFP.

³ Round to the nearest integer. See below for specific user group breakdown.

All individual users must meet each the following requirements:

- » U.S. resident
- » No prior experience with the UUT or alternative user interface
- » No association or prior involvement with the HVAC or related industries, including family members associated with the UUT or its manufacturer, including stocks, bonds, or other investments (mutual funds exempted)
- » No other conflict of interest that could unfairly influence test results

Work Scope

For each UUT assigned to the Contractor, the Contractor shall provide the following:

- » Allow and assist with on-site visits and inspections, which may include representatives from DOE, EPA, Navigant, ICF, and/or LBNL:
 - On-site inspection and approval of test set up and instrumentation prior to onset of testing
 - Participation in a pre-test forum in which all contractors agree on changes and clarifications to the test procedure and associated documents. The intention of this forum is to ensure that the testing is performed the same way by all contractors.
 - Possible additional on-site meetings/inspections to review test procedures and practices
- » UUT storage until scheduled testing is initiated
- » Unpacking and visual inspection of UUTs
- » Usability testing of the UUTs in accordance with the applicable test methods listed in *Test Methods and Metrics* above, as modified by this RFP
- » **Task 6 shall not be performed during testing because the UUTs do not have the specified capability. Task 5 may not be performed on all UUTs, depending on the capabilities of the UUTs.**
- » Re-packaging for shipment of all UUTs. The Contractor may be required to store UUTs for up to 90 days after all testing is complete and all reports are delivered
- » All deliverables as specified in the Deliverables section below

Deliverables

Before initiating testing, the Contractor shall create a survey, which will ultimately be distributed to the user group. Information solicited from the user group shall include, but should not be limited to:

- » Age
- » Gender
- » Level of Education
- » Familiarity with HVAC systems
- » Vision impairments
- » Arthritis
- » Upper mobility impairments
- » English proficiency (i.e., English as a first language, English as a second language, etc.)

The Contractor shall use its usability testing expertise to propose other information that would be useful in evaluating the usability of Residential Climate Controls.

Following testing, each user shall complete the survey. The Contractor shall compile the responses and create a test report documenting the recommended composition of the user group based on survey and test results.

The Contractor shall also provide the following deliverables for this assignment:

Product Description

Product Make (name of manufacturer)

Product Model Name (if available)

Product Model Number

Product Serial Number

Laboratory Details

Laboratory Name

Laboratory Address

Test Administrator(s) (identified by name or unique identifier)

Dates Test Conducted (mm/dd/yyyy)

Test Room Characteristics (for each day of testing)

Ambient Temperature (°F)

Relative Humidity (%)

Ambient Noise (db)

User Characteristics (for each user)

Unique Identifier

Home Zip Code

Additional Information Solicited in Survey

Test Results (for each user)

User (identified by name or other unique identifier)

Test Start Time

Task 1 Success (s=0 if task completed incorrectly, s=1 if task completed correctly)

Time to Complete Task 1, if s=1

Task 1 Metric, M₁

Task 2 Success (s=0 if task completed incorrectly, s=1 if task completed correctly)

Time to Complete Task 2, if s=1

Task 2 Metric, M₂

Task 3 Success (s=0 if task completed incorrectly, s=1 if task completed correctly)

Time to Complete Task 3, if s=1

Task 3 Metric, M₃

Task 4 Success (s=0 if task completed incorrectly, s=1 if task completed correctly)

Time to Complete Task 4, if s=1

Task 4 Metric, M₄

Task 5 Success (s=0 if task completed incorrectly, s=1 if task completed correctly)

Test Results (for each user)

Time to Complete Task 5, if s=1

Task 5 Metric, M₅

One Draft and One Final Report Outlining

Issues that arose in attempting to perform the test procedure

How these issues were resolved

Suggestions for minimizing variability in:

- 1) - how the test is performed
- 2) - the test results, in accordance with both the draft usability framework document and the draft test method

Recommendations for improving the test procedure

Suggestions for improving test script and the metric calculations and summation

Recommendations for appropriate user group size

Recommendations for target time to complete tasks

- Is target time to complete tasks necessary?
- If so, what should the target time to complete each task be documented in the test procedure as?

Estimated cost for product qualification testing

Other relevant information and professional opinions to improve the test

Test results and calculations shall be provided on a standardized template for each UUT tested. -

The Contractor shall track issues and questions that arise while performing the test, as well as suggestions for improving the test method. -

The Contractor shall have periodic informal email and telephone communications with Navigant. -

Any deliverables associated with this RFP may not be disclosed to third parties or made public. -

Laboratory Requirements

Confidentiality

The Contractor shall not consult with the appliance manufacturer, or other parties having a business interest in the appliance under test, unless specifically authorized by Navigant. If authorized, such contact shall be for the purposes of obtaining information needed to reset the UUT in accordance with the proposed test procedure.

The Contractor shall keep confidential the nature of the testing, the appliance being tested, and all test results.

Impartiality

All testing must be conducted by parties having no vested interest in the results of the tests. The Contractor shall certify its impartiality as to the results of the test.

Testing Location(s) and Use of Second-Tier Subcontractors

The Contractor shall conduct all testing at test facilities that the Contractor rents or owns and operates within the continental U.S. or Canada. The Contractor shall not subcontract the testing work or otherwise assign third parties to conduct testing work.

Project Furnished Materials, Equipment, or Services

- » All UUT delivered to the Contractor for testing will be provided -
- » UUT shipping or removal after testing is completed will be provided -

Period of Performance / Schedule

Preliminary work may begin as soon as the contract is awarded, including training of test administrators. The Contractor may begin recruiting the user group for testing as soon as the appropriate documents are reviewed and the test approach is approved by the Central Department of Energy Institutional Review Board (CDOEIRB).

All work must be completed by **November 23, 2011**. The Contractor shall deliver according to the dates listed below.

Date	Deliverable Due
August 29, 2011 (12:00 noon EDT)	Proposals
6 weeks after receipt of CDOEIRB approval, or November 9, 2011, whichever is sooner	Data sheets and draft test reports for each device tested*

Date	Deliverable Due
6 weeks after receipt of CDOEIRB approval, or November 9, 2011, whichever is sooner	Draft report of issues that arose in attempting to perform the test procedure and how they were resolved, as well as recommendations for improving the procedure and minimizing variability in how the test is performed. Note: include time for client to hold one to two debriefings with Contractor regarding draft report findings.
Two weeks after draft report or November 23, 2011, whichever is sooner	Final test reports for each device tested

* The draft test reports shall be final in form and include all test data and initial recommendations. The Contractor shall be available for one month following the submission of the draft test reports to answer questions and before submitting the final test reports, which shall incorporate Client feedback.

Personnel Qualifications / Laboratory Accreditation

In conducting this assignment, the Contractor shall use test administration personnel who are trained in and are familiar with:

- » Laboratory testing practices, instrumentation, data acquisition, data analysis, and reporting
- » The use of applicable test methods, including all calculations required
- » Protection of human subjects

Lab accreditation to ISO 17025, while not required, will be considered strongly in selection of vendors. Applicants may submit alternate accreditations and/or certifications for consideration, which it believes to be equally relevant in indicating lab competence and impartiality.

Proposal Acceptance Criteria

A laboratory will be chosen to perform the work described above, based on cost of services, time to complete usability testing and required documentation, and former experience with similar testing. The proposal shall include a test protocol describing the lab’s approach and timeline for recruiting the user group and completing the required tasks.

The proposal shall include cost and schedule information for **each of the following scenarios** (Navigant will decide which scenario to fund after evaluating cost and schedule proposals):

Scenario 1

UUTs 1, 2, and 3 will be evaluated. Each UUT will have a unique user group of 28 people, for a total of 84 users.

Scenario 2

UUTs 2 and 3 will be evaluated. Each UUT will have a unique user group of 28 people, for a total of 56 users.

Scenario 3

UUTs 1, 2, and 3 will be evaluated. Each UUT will have a unique user group of 100 people, for a total of 300 users.

Scenario 4

UUTs 2 and 3 will be evaluated. Each UUT will have a unique user group of 100 people, for a total of 200 users.

Note that in all cases additional users should be recruited to account for dropouts or unusable test data. Results are required for each person for the total number of people requested.

The user group must be broken out as follows. Numbers are provided for scenarios where 28 users are required and for scenarios where 100 users are required.

User Description	With 28 Users	With 100 Users
Age 21-34 Male Less than High School Education	1	2
Age 21-34 Male High School Graduate and Less than Bachelor's Degree	2	8
Age 21-34 Male Bachelor's Degree or Higher	1	5
Age 21-34 Female Less than High School Education	1	2
Age 21-34 Female High School Graduate and Less than Bachelor's Degree	2	8
Age 21-34 Female Bachelor's Degree or Higher	1	4
Age 35-49 Male Less than High School Education	0	2
Age 35-49 Male High School Graduate and Less than Bachelor's Degree	3	8
Age 35-49 Male Bachelor's Degree or Higher	1	4
Age 35-49 Female Less than High School Education	0	2
Age 35-49 Female High School Graduate and Less than Bachelor's Degree	3	9

User Description	With 28 Users	With 100 Users
Age 35-49 Female Bachelor's Degree or Higher	1	4
Age 50-64 Male Less than High School Education	1	2
Age 50-64 Male High School Graduate and Less than Bachelor's Degree	2	8
Age 50-64 Male Bachelor's Degree or Higher	1	4
Age 50-64 Female Less than High School Education	1	2
Age 50-64 Female High School Graduate and Less than Bachelor's Degree	2	8
Age 50-64 Female Bachelor's Degree or Higher	1	4
Age 65-79 Male Less than High School Education	0	1
Age 65-79 Male High School Graduate and Less than Bachelor's Degree	1	4
Age 65-79 Male Bachelor's Degree or Higher	1	2
Age 65-79 Female Less than High School Education	0	1
Age 65-79 Female High School Graduate and Less than Bachelor's Degree	1	4
Age 65-79 Female Bachelor's Degree or Higher	1	2

Acceptance of Services

The Contractor shall correct any deficiencies identified through on-site visits and inspections before the onset of testing (or the resumption of testing, if applicable). The Contractor shall submit to Navigant a Corrective Action Report upon correction of any deficiencies identified. Corrective Action Reports are due prior to the start of testing (or resumption of testing, as appropriate).

Final Acceptance Method

Navigant will determine whether deliverables are acceptable. The Contractor shall revise and/or correct deliverables, as needed, to secure Navigant's acceptance.

Attachments

- 1) *ENERGY STAR Program Requirements Product Specification for Residential Climate Controls: Test Method – Usability*: Used for determining product compliance with the Performance-Based Usability Requirements in the ENERGY STAR Eligibility Criteria for Residential Climate Controls.
- 2) *ENERGY STAR Residential Climate Controls Draft Specification Framework Version 1.1 – Performance Based Usability Requirements*: Detailed proposed usability requirements for ENERGY STAR Residential Climate Controls, including revised language for prescriptive usability requirements and new performance-based usability test requirements. Includes a detailed script for test administrators to follow in order to provide instructions to test subjects.