



April 7, 2005

Ms. Rachel Schmeltz  
ENERGY STAR Product Manager  
Environmental Protection Agency  
Ariel Rios Building, SW, MS 6202J  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460

Dear Ms. Schmeltz:

This letter comprises the response of the American Council for an Energy-Efficient Economy (ACEEE) to the *ENERGY STAR<sup>®</sup> Program Requirements for Air Source Heat Pumps (ASHPs) and Central Air Conditioners DRAFT 1 Eligibility Criteria*. ACEEE appreciates the opportunity to comment on your proposal, and the efforts you and your colleagues have made to solicit input from stakeholders over the past year or so.

The American Council for an Energy-Efficient Economy is a nonprofit, non-partisan, organization dedicated to advancing energy efficiency as a means of promoting both economic prosperity and environmental protection. ACEEE fulfills its mission by conducting in-depth technical and policy assessments; advising policymakers and program managers; working collaboratively with businesses, public interest groups, and other organizations; publishing books, conference proceedings, and reports; organizing conferences and workshops; and educating consumers and businesses. Our comments are divided into three parts: Major Items, Details, and Conclusions.

### **Major Items**

ACEEE strongly endorses the recommendation to move toward **emphasis on installations** in 2007 as well as lab-tested efficiency parameters in 2006. ACEEE recommends adding distribution system requirements (duct leakage and insulation) for 2008. These may need to separately address new and retrofit installations. ACEEE analyses show the potential for 20% – 25% savings with quality installations.

As a symbol of the importance of installation, ACEEE has previously endorsed EPA's original concept of moving the label from the "box" to the installation. Having discussed the issue further with many parties, we now strongly **support a 2-part label**, with one part for the qualifying equipment and the other for the installation. We stress support for a 2-part label, *not* for allowing either component to be offered by itself as having any ENERGY STAR status. We encourage EPA to adopt a graphic design that makes clear that neither part represents an ENERGY STAR air conditioning **system** by itself. For example, the equipment label might say "ENERGY STAR capable\*" with subtext: "\*When combined with an ENERGY STAR installation." The installation label might say "ENERGY STAR eligible\*" with subtext "\*When combined with ENERGY STAR

equipment.” A really outstanding label design would overlay the two label parts and thus obscure the subtext quoted above. We are convinced that the equipment part of the label is required to fully engage the manufacturers to participate. They participate not only with premier equipment, but also with key advertising, and by training contractors. The installation component is required because of its savings potential.

In addition, the equipment specifications will not have the desired effect unless the term “**matched assemblies**” is carefully defined, and checked while the installation is verified. As discussed more fully below, the term could have at least four different interpretations, with quite different efficiency and consumer price implications. As one example of the importance of the issue, we expect to see many SEER 13-rated models that are up-rated to SEER 14 when installed with specific gas furnaces that have high-efficiency air handlers. Unless the term “matched assemblies” includes the furnace, these models must not be ENERGY STAR-eligible if the integrity of the program is to be maintained.

ACEEE endorses the proposed equipment **performance specifications** (SEER 14, EER 12, HSPF 8.5).

**Packaged units**, which currently have small residential market share, still require special consideration. First, we suggest that the relaxed EER=11 for packaged units be phased out by 2008, to avoid the appearance of encouraging a shift from split units to packaged units in the new construction market. Second, ACEEE recommends against making any packaged air conditioner with a non-condensing gas heating section eligible for the ENERGY STAR program at this time. We do not believe that equipment is available with condensing furnace sections (AFUE 90 or above), so EPA would be endorsing the use of 80% furnace units in applications which compete with the AFUE 90 minimum for ENERGY STAR furnaces. This may increase market share of packaged units and increase energy consumption as a result.

### **Some Details...**

The notes below refer to numbered/lettered items in the *Draft 1 Eligibility Criteria*.

**Item 1) A.** *We recommend adding the words “single-phase,” so the lead sentence will read: “Below are brief descriptions of single-phase residential ASHPs and central air conditioners and other terms as relevant to ENERGY STAR.” We believe that some issues that would unnecessarily complicate the program will arise if the program is taken to include small, 3-phase, commercial rooftop equipment.*

**Item 2) A & B, ASHP and Central Air Conditioners.** The definitions of “matched assemblies” are ambiguous. It could be taken as:

1. “Manufacturer tested and certified matched condensing and evaporator units.” This would seem to be largely restrictive to the “most commonly sold combinations.”
2. It could extend out one step, to include OEM manufacturer-certified combinations, as per federal rating requirements. This involves computer

modeling of performance. This is acceptable for ARI certification and federal standards.

3. “*Matched assemblies*” could further extend to so-called “ICM” (independent coil manufacturer) evaporators, which are certified by the ICM as compliant. ACEEE has no test data in this area, but we have heard great grumbling over the years by OEMs and others that some ICM units with the same performance as OEM units, have significantly smaller size and other key characteristics. Correspondingly, this could allow substitution of physically smaller ICM coils in retrofits, with a potential loss of efficiency as well as reduced installation costs. The issue is complex, but warrants clear direction from EPA.
4. Finally, as noted above, ACEEE expects that in some cases achieving SEER 14 will require that the AC be installed with an air handler that includes a variable speed blower motor. Such units will be so marked in the ARI directory, and the model nomenclature for furnaces includes the appropriate information. In the field, for retrofits, the critical question is whether your “matched components” language means that the complying AC must be installed with a complying furnace when that is required by the AC manufacturer for rating at SEER 14. There are arguments on both sides, but ACEEE believes that EPA will have to establish a clear standard for program implementers and for contractors and consumers.

*ACEEE recommends restricting this program to combinations for which a formal program of testing samples in the laboratory is available.<sup>1</sup> ACEEE further recommends that EPA develop language that requires a matched air handler or furnace if that is required for the SEER 14 rating. In practice, this would make retrofits with otherwise complying air conditioners ineligible unless the furnace is replaced simultaneously. Otherwise, the customer will not get ENERGY STAR performance.*

**Item 2) C, Gas/Electric Package Units.** We assume that the intent is to restrict the program to single-phase equipment. This matters because packaged units are weatherized units, as we understand the definitions. As such, we do not believe that condensing furnace sections are available, so products are limited to AFUE 80. We urge that this not be considered acceptable for single phase/residential units, where ENERGY STAR now requires condensing units (AFUE 90). Market share of condensing furnaces is above 50% in several areas now. Programs that allow lower-performance products with lower costs to be considered for ENERGY STAR seem highly undesirable at a time when gas prices are very high – and predicted to go higher. At this time, ACEEE recommends excluding packaged units from the ENERGY STAR program, since their national market share is said to be <5% (although higher in California, where non-condensing furnaces may be more acceptable because the climate is relatively mild).

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<sup>1</sup> This is not intended to disqualify ICM evaporators, but to subject combinations with these evaporators to sample-based verification analogous to that required for OEM most commonly used combinations. Developing such a program would be the responsibility of the interested members of the industry.

**Item 3) Energy-Efficiency Specification (Table).** As discussed above (Item 2, A and B), the requirement of a “matched assembly” is very important, and we are pleased that you have included it. However, we have concerns about the requirement as stated:

1. The requirement of matched assemblies should take effect in 2006 instead of 2007. This corresponds to the effective date of the equipment standards changes. This will minimize contractor and customer confusion and to assure that customers receive the efficiency that they bought. (to the extent possible without formal attention to quality installations).
2. As noted under *Major Issues* above, ACEEE believes that packaged units with gas heating sections should be ineligible, unless there is good market availability of these units with condensing furnace sections (AFUE=90 or above). In addition, some word-smithing of the table would help: the HSPF requirement is obviously irrelevant for gas/electric package units.
3. ACEEE recommends that the sizing requirement for 2007 be expanded to include critical details. For example, the (outdoor) design temperature must be chosen from a specific source relevant to that location, and the indoor temperature must also be specified to limit opportunities for oversizing. Sizing should be subject to verification, just like charge and air flow. Various utility programs, such as those in New Jersey, have developed procedures that have been adequate and acceptable to contractors.
4. ACEEE appreciates the careful approach to the critical issue of charge and air flow verification in the 2007 specification.

*The “Notes” below refer to the boxed Note on pages 2 – 3 of the Draft Specification.*

1. Duct (air distribution) performance is the single most important factor not addressed in the draft specification, and represents significant challenges. The field data are probably not yet adequate to claim a sound understanding of duct deficiency effects for all distribution system types. In particular, duct leakage in attics exterior to the thermal envelope will have different effects from duct leakage from basement ducts that are effectively inside the conditioned space. However, research in this area is progressing. ACEEE proposes that EPA announce now that there will be consideration of a duct testing requirement to be implemented in 2008, and that it is likely to address several segments separately. For example, an absolute leakage requirement (such as leakage <6%) would be appropriate for new construction, but retrofits might only be able to require a percentage reduction, and that might differ depending on accessibility (e.g., attic v. crawl space ducts).
2. ACEEE supports the EER=12 requirement for split systems.
3. We recommend that the difference in allowed EER between packaged and split systems should be eliminated for 2008 (to allow more time for product development), in favor of EER=12 for all equipment. We recognize that this may mean somewhat larger units, but expect that these will carry over to the commercial product lines. In the long run, it is unseemly at best for EPA to encourage a shift to less efficient products by allowing inferior peak performance.

## Conclusions

EPA has made tremendous progress in developing this specification. In addition, we are pleased with the opportunities for stakeholders to comment and help shape the program. We are pleased that EPA has recognized the importance of installation quality (sizing, charge, and air flow), and hope to see this extended to duct quality in a reasonable time frame. With careful attention to “filling in the blanks” by appropriate definitions and program specifications, this program has the potential to greatly accelerate market transformation in the residential equipment market. In part this is due to the equipment specification. We believe that the installation requirement will prove to be a more important lever for improvement in this case, because it will synergistically support industry efforts for contractor accreditation and installer certification.

Thank you for your insights and leadership.

A handwritten signature in cursive script, reading "Harvey M. Sachs". The signature is written in dark ink on a light-colored background.

Harvey M. Sachs, Ph.D.

Director, Buildings Program.