



June 23, 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[®] Program Requirements for Air Source Heat Pumps (ASHPs) and Central Air Conditioners DRAFT 2 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.

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

Installation and Verification: ACEEE agrees that there is insufficient time to move toward a specification that includes installation components for 2006. Thus, we accept the decision to move forward with an equipment-only specification, *but only for 2006*. It is unlikely that the performance improvement of this specification will lead to energy savings as large as 10%. However, because it is so well established that installation defects (sizing, refrigerant charge, and duct problems) are responsible for at least 20% - 25% excess energy consumption in both cooling and heating, our endorsement is contingent on adding a solid installation and verification component for 2007. We are convinced that verification can be done remotely, and in ways that encourage improved practices in the field.

Performance Levels: ACEEE is concerned with the proposed changes in Split System EER and HSPF from Draft 1, and by the basis for these changes. Table 1 summarizes the levels published in Drafts 1 and 2:

Table 1. Comparison of minimum efficiency levels, ENERGY STAR drafts 1 vs. 2

Spec. Draft #	Configuration	SEER	EER	HSPF (hp)
1	Split	14	12	8.5
2	Split	14	11.5	8.2
1	Package	14	11	8.0
2	package	14	11 or 12? ¹	8.0

We infer from EPA’s text that EPA based these changes on distribution of models available in 2005, and conversations with the trade association, ARI.² We respectfully suggest that this is an inadequate basis for relaxation of the standard:

The distribution of models in 2005, when the minimum legal SEER is 10, is likely to be a poor guide to the frequency distribution of efficiency levels in 2006, when minimum SEER 13 is in effect. All manufacturers have undertaken large efforts to re-engineer their product lines to match expected consumer demands. Many observers expect the old contractor presentation strategy “good-better-best=10-12-13 or 14 SEER to give way to differentiation on features (upmarket air filters, ECM motors, etc). We believe that some manufacturers will “go-to-market” with strategies that will involve fairly abundant SEER 14 models. Only time will tell, and we know no way to predict 2006 model availability from 2005 data.

To ACEEE, the ARI data for 2005 models summarized in Table 2 do not support the specification relaxation proposed in *Draft 2*. More than 9 out of 10 models available at 14 SEER would meet a 14 SEER, 11.5 EER criterion. Even at EER 12, more than 4 out of 5 models comply, so it is a weak selection criterion. On the other hand, EER 12 has significant high ambient temperature performance benefits, and thus utility peak reduction impacts. Thus, we consider EER 12 the lowest acceptable level for ENERGY STAR products.

Table 2. SEER 14 split air conditioner system model availability, from ARI data for 2005 models.

	Number	% of total
All SEER 14 split systems	15,713	
SEER 14 + EER 11.5 or better	14,336	91%
SEER 14 + EER 12 or better	12,763	81%

Table 3 looks more closely at the implications for split system air conditioners and heat pumps. For split system air conditioners, there are 12,763 models at 14 SEER /12 EER or better. As important, there are 1800 – 3400 models per size class, except the very

¹ The Table following Line 84 gives EER 11, but the narrative box following Line 85 states “*increasing the EER level of packaged units to 12.*” The discrepancy requires resolution.

² ¶ 1 of text box following Line 84 of Draft Specification 2.

smallest and the very largest. Reducing stringency to 11.5 EER has no effect on model availability for the smallest size class (no models available at either level), but would raise the availability of 5-ton models 25%, from 343 to 430 models. This is still much lower than for other classes. For all other size classes, relaxing EER from 12 to 11.5 has a small increase in numbers that are already ample. Thus, ACEEE recommends a constant performance specification (14 SEER, 12 EER), but admits some concerns about the limited availability of models in very smallest and very largest size classes. However, since many new models will enter the market for 2006 due to the new federal efficiency standard, we expect the number of 14 SEER/12 EER models to substantially increase next year.

Table 3. Number of models per capacity category available at specific performance levels, for split system A/C and heat pumps. Data from ARI.

Cooling Capacity, (kBtuh/h)								
0-16.49	16.5-21.9	22-26.9	27-32.9	33-38.9	39-43.9	44-53.9	54-64.9	Totals
Split Air Conditioners, 14/11.5=SEER/EER								
0	359	2734	2219	4022	2356	2216	430	14336
Split Air Conditioners, 14/12=SEER/EER								
0	331	2517	2100	3427	2169	1876	343	12,763
Split Heat Pumps, 14/12/8.2=SEER/EER/HSPF								
0	60	488	544	1629	306	358	16	3419
Split Heat Pumps, 14/12/8.5=SEER/EER/HSPF								
0	44	449	400	698	216	268	13	2104

In contrast, for split heat pumps the story is different (Table 3). In this case, for 2005 the number of available models falls off substantially if HSPF is raised from 8.2 to 8.5. However, availability is likely to increase with the 2006 SEER standard. Under these circumstances, either level could be reasonable for 2006, depending on the Program's estimate of the number of models per capacity class required.. Table 4 summarizes the availability of 14 SEER split heat pump models in 2005, varying HSPF and EER in sequence.

Table 4. Availability of split heat pump models (all capacities) at 14 SEER and 12 EER, for 8.2 and 8.5 HSPF, and of split heat pump models at 14 SEER and 8.2 HSPF, for 11.5 and 12.0 EER. Data from ARI.

Split Heat Pumps, 14 SEER or better	Number	% of total
8.2 HSPF, 12 EER	2104	33%
8.5 HSPF, 12 EER	1565	25%
11.5 EER, 8.2 HSPF	3419	54%

In an overall perspective, 2005 availability is ample at EER 12, and there is no justification for the relaxation proposed by EPA.³ ACEEE agrees that there is a problem with HP availability for 54 – 64.9 KBtuh heat pumps, but this is true for all options considered, with total models available varying only from 9 to 16 for the choices tabulated by ARI. These large units seem to be a niche market with little market presence now.⁴ Also, for 14/12/8.5 equipment, there are only 44 models with capacity less than 22 KBtu (that is, units smaller than 2 tons). However, dropping to 8.2 HSPF only brings the small models (< 2 tons) up to 60.

To summarize, ACEEE finds that there is no reliable source of information on what will be marketed in 2006. Absent such information, we suggest that ENERGY STAR for split system air conditioners and heat pumps be set at the following specifications (Table 5).⁵

Table 5. ACEEE recommendations for split system efficiency levels for 2006.

	SEER	EER	HSPF
Air Conditioners	14	12	N/A
Heat Pumps	14	12	8.2 or 8.5

Performance when ambient conditions are hottest (EER), is very important, so we urge EPA to maintain the 12 EER requirement for all split systems. The EER requirement will reduce emissions at the margin on the worst days of Summer, by not requiring the dispatch of some obsolete generator(s).

If there are remaining concerns, EPA should examine model availability in 2006 to see if any refinements to the criteria are required.

Packaged Units: Packaged units currently have a small residential market share nationally, but still require special consideration because of their importance in some warm climates (California). SMUD estimates that >25% of units sold in the Sacramento area are packaged, and ENERGY STAR has made substantial inroads in the air conditioning market there. However, the heating sections of these units are essentially weatherized gas furnaces. To the best of our knowledge, *none* are offered with condensing furnace sections (AFUE 90 or better); all are AFUE ~78 – 81. Certainly, weatherized condensing furnaces pose significant design challenges. All other things being equal, installation of an AFUE 80 unit instead of a condensing furnace will increase winter gas use by about 11%, which may be \$100/yr or more in many areas of the US.

³ ACEEE has been unable to reconcile the data in the box following line 85 of the Draft 2 Eligibility Criteria (“...3.4%” to close of parentheses) with the ARI data in Table 4.

⁴ We believe that proper sizing would lead to even lower demand for the largest products.

⁵ Alternatively, it may be acceptable to adopt the slightly reduced stringency Draft 2 levels for models smaller than 2 tons and/or those larger than 4 tons. Product availability appears to be excellent in all other classes.

At a time when natural gas is in high demand, this would offset the benefits of the air conditioner program in much of the country. Modifying our earlier blanket opposition to ENERGY STAR labels for packaged units with non-condensing furnace sections, we now propose that such units be allowed *if and only if* the label and all marketing information prominently note that this equipment is ENERGY STAR-eligible for installation in areas with less than 3000 heating degree days in 2003-2004. Such equipment would be eligible in the 9 states with the warmest winters: Alabama, Arizona, California, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas. These lie in two contiguous groups, Southwest (California and Arizona), and Southern (all the others). This reduces distribution issues for manufacturers.

We also suggest the ENERGY STAR brand is a carrot that can lead manufacturers to increase EER and HSPF levels for packaged units to the levels required for split systems by 2007 or 2008. This may modestly increase unit size, but this should not be a major issue for roof-top and similar weatherized equipment. For some housing types, packaged units may offer advantages to builders. We find no public purpose served by perpetuating weak expectations for packaged units, which may give a relative economic advantage for these units. Therefore, we recommend that EPA indicate *now* that the split system specifications will also apply to packaged systems effective January 1, 2007 or 2008.

Labels: When an installation component is adopted, ACEEE continues to support a 2-part label, with one part for the qualifying equipment and the other for the installation. We do not support proposals that would allow either component (equipment or installation) to be offered by itself as having any ENERGY STAR status at that time. 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.

Some Details...

The notes below refer to numbered/lettered items in the *Draft 2 Eligibility Criteria*.

Definitions, part I. The definition of “matched assemblies” is very good now. We are concerned about one word (Italicized): “A matched assembly *should* also include the air handler, furnace, or 60 other component that is used to determine the rating according to ARI 210/240.”⁶ Under Item 2, **Qualifying Products**, parts A and B, the word *shall* is used instead of *should*.⁷ We recommend that *shall* be used in both places.

Conclusions

EPA has made great progress in developing this specification. In addition, we are pleased with the opportunities for stakeholders to comment and help shape the program.

⁶ Lines 59-60.

⁷ Lines 65 – 75.

We regret the necessity of deferring the installation program for a year, but very pleased that EPA has recognized the importance of installation quality (sizing, charge, and air flow). We also hope to see this extended to duct quality in a reasonable time frame. We regard the 2006 program as a “placeholder” for greater change in 2007, changes with the potential to greatly accelerate market transformation in the residential HVAC market. Ultimately, we believe that the installation requirement will prove to be a more important lever for improvement than the change in performance parameters, because it will synergistically support industry efforts for contractor accreditation and installer certification.

In the meantime, we stress the importance of maintaining the 14 SEER/12 EER performance level for split systems, and to close the gap between split system and packaged system performance by 2007 or 2008.

Thank you for your insights and leadership.

A handwritten signature in dark ink, reading "Harvey M. Sachs". The signature is fluid and cursive, with the first name "Harvey" being the most prominent.

Harvey M. Sachs, Ph.D.

Director, Buildings Program.