

Response to U.S. EPA on New ENERGY STAR Specification for Residential Air-Source Heat Pumps and Central Air Conditioners

Paul Berkowitz – Conservation Services Group

Contact: (608) 204-0025; paul.berkowitz@csggrp.com

November 5, 2004

Thank you for the opportunity to comment on the proposed new ENERGY STAR specification for residential air-source heat pumps and central air conditioners including a potential integration with quality installation practices. Conservation Services Group (CSG) is an energy services company that works with utilities and System Benefit Charge-funded entities nationally designing and implementing residential new construction and retrofit programs. These programs typically have an ENERGY STAR HVAC component. In addition, CSG markets and deploys the CheckMe!™ third-party quality installation assurance tool to verify refrigerant charge and air flow in several of its HVAC programs.

New Equipment Specification

CSG supports the continuation of the ENERGY STAR designation for heat pumps and central air conditioners as an important component of the overall ENERGY STAR brand. We believe that eliminating ENERGY STAR branding for classes of products and equipment will diminish the value of the overall brand that has earned national recognition. We recognize, of course, that with the national specification increasing to SEER 13 on January 1, 2006, partners in northern climates will find it difficult to promote SEER levels above 13 given the limited cooling hours in this geographic area. However, hot climates should be able to support a SEER 14 and above and gain good savings, especially peak.

Although ENERGY STAR HVAC specifications for heating and cooling are applied on a national basis, there are regional (climatic) differences that affect the type (efficiency level) of equipment installed and the potential savings. The need for peak savings in southern climate zones remains a compelling reason to retain the ENERGY STAR brand. By setting the ENERGY STAR level at SEER 14 and above, partner utilities, states, and regions always have the option to market or not market/promote an ENERGY STAR level. The designation of ENERGY STAR will remain uniform nationally but some partners may be unable to justify funding (i.e., not cost-effective) to support/promote the ENERGY STAR cooling equipment levels. Consumers can still purchase ENERGY STAR qualified cooling equipment.

Most if not all of the northern tier of states have natural gas, propane, and oil as the dominant heating fuels. Increases in the costs of these fuels may spur more utilities to promote ENERGY STAR qualified heating equipment. For northern climates, EPA

can strengthen its promotion of ENERGY STAR qualified furnaces and boilers. This would provide the northern tier with an ENERGY STAR anchor with HVAC equipment since heating is the dominant energy load in these areas. From a different vantage point, utilities in the south should not and will not promote ENERGY STAR qualified heating equipment given the small heating load.

Other specification elements, such as evaporator access for maintenance and measurement, TXV for sustained performance, and on-board diagnostics are important items to consider in a specification. While evaporator access can be realized through installation practices and an automatic metering device, such as a TXV, is typically included in high SEER equipment, on-board diagnostics that send simple maintenance signals to consumers and identify equipment problems for contractors/technicians are items that CSG supports. However, on-board diagnostics will increase the cost of equipment and add more “bells and whistles” that can fail. Manufacturers require ample lead time to produce and test equipment with these features and train contractors/technicians about installation and maintenance.

The following questions need to be addressed about the impending specification changes and adding on-board diagnostics.

If the specification changes to SEER 14 and above, what is the impact on the availability of qualified equipment from manufacturers? What is the capital outlay for manufacturers and the timeframe necessary to ensure a range of available equipment in the marketplace? What is the appropriate lead time necessary to modify production lines? If on-board diagnostics are added, what impact does the addition have on consumer pricing and availability of equipment? What are reasonable phase-in periods for the specification transitions and new product availability?

Quality Installation

Quality installation is critical in all climates regardless of the SEER or HSPF for cooling equipment. Improperly installed units reduce anticipated savings for both consumers and utilities/states. Analysis of over 75, 000 in-field tests using the CheckMe! verification tool revealed that over 70% of installed cooling equipment fails to meet manufacturer specifications for air flow and refrigerant charge. Northern utilities/states should support quality installations on cooling equipment to ensure savings on SEER 13 units. To ensure proper installation both training and quality control are needed. NATE staff has stated in different forums that only 20% of HVAC technicians are NATE certified.

CSG staff agrees that the design/proper sizing of equipment, duct sealing, refrigerant charge and air flow are the correct components for a quality installations. More and more utility and state programs require quality HVAC installations in new construction, retrofit, and equipment upgrade programs. The “Achilles heal” is quality control and verification. As far as setting benchmarks for quality installation practices, a representative national group of interested parties should be convened to

set base standards for each component. Given climatic, building practices, and programmatic differences, base standards will differ for some components, such as duct sealing.

Quality installation guidelines should be promoted as a “win-win” value proposition for all parties involved in HVAC market transactions. Proper installations provide consumers with savings through reduced operating costs, contractors with fewer callbacks and thus higher margins on the installation, manufacturers with fewer warranty claims, and utilities/states with the expected peak and energy savings.

Training and Certification

Trained and certified installers are another key component of building a market infrastructure. NATE and BPI are two entities that train HVAC technicians about the intricacies of quality installations. A field component or lab environment would be a very important part of training to ensure that the technicians can apply what is learned in the classroom. Since all parties (contractors via ACCA, manufacturers, utilities, and states) have stated their support for quality installation practices, they should work together in a campaign to train and certify contractors/technicians. Each could provide a small subsidy to offset the costs of training and certification.

Verification and Quality Control

Verification is critical for utility and SBC-funded programs that rely on savings for cost-effectiveness and to report to regulators or legislatures. Many existing programs have some form of installation verification. Some require a percentage of on-site inspections, with either a hired contractor or utility staff performing the work. Others require an air flow and refrigerant charge test from a third-party verification tool, such as CheckMe!, Enalysis, or Service Assistant. And finally, a few programs require verification by contractor self-certification with visual or testing results reported to program sponsors in a defined format. Based on our experience the market is not ready for self-certification.

Trained quality control staff is essential for verification. Quality control of equipment sizing entails a review of a contractor’s design and sizing work with Manual J, T, S, and D. Duct sealing quality control requires testing for duct leakage with diagnostic equipment. Refrigerant charge and air flow verification depends on trained staff with proper tools to check the charge and flow.

As an example of implementing a third-party verification approach, CSG recruits contractors/technicians for CheckMe!. Interested contractors/technicians enroll in full day training on all facets of the CheckMe! tool and field implementation. An exam is given after the coursework is completed. Wherever possible, a trainer or senior staff will accompany the technician on a few of the initial CheckMe verifications. System testing is completed by the technicians and results of the refrigerant charge and air flow tests are called-in to the CSG call center for validation. “Real time” telephone

technical support is provided to newly certified CheckMe! technicians when they submit their first few test results. The data provided by the technicians is entered into a software program that compares the result to manufactured specifications. If the CheckMe! results match (within +/- 5%) the manufacturer specifications, the system passes and a certificate is mailed to the customer. If the results are outside the manufacturer specifications, the technician is provided guidance on bringing the system into conformance. The refrigerant charge and air flow tests are repeated and the data is resubmitted for verification.

Consumers

The weak link in HVAC transactions are consumers. The components of a quality installation are hard to describe to consumers, especially in an environment where a large percentage of HVAC installations in existing homes are the result of system failure. There is little time to educate the consumer about the nuances of equipment purchasing and installation. In addition, there is little brand loyalty among consumers, and price is often the key purchase driver. A mid to long-term solution is consumer education (both direct and through contractors), and contractor tools that assist consumers to understand differences in contractor bids and the benefits of selecting a certified contractor that provides a quality installation.

Summary and Recommendations

CSG strongly believes that it is important to have an ENERGY STAR specification for cooling equipment. The differentiation of equipment maintains a category for ENERGY STAR and provides a platform for partners to market and sell qualified equipment. The brand continues to be reinforced in the HVAC marketplace. While a SEER 14 is not cost-effective for utilities and states in the northern regions, partners in hot climates that need peak savings can continue to move consumers to ENERGY STAR qualified equipment. ENERGY STAR qualified heating equipment promotion can become more of a focal point for partners with heating dominated climates. EPA should develop tools and messaging for this effort.

Quality installation practices are important for cooling equipment in all geographic regions. Improperly installed equipment doesn't deliver expected savings and can result in equipment failure. Proper refrigerant charge and air flow, system sizing, and duct sealing are key elements of quality installations. Many partner utilities, states, and regions are already designing and implementing quality installation protocols for their HVAC programs. EPA should gather information on all the existing or emerging program designs and compare components, technical requirements, type of quality control/verification, and training requirements. This information will provide EPA with guidance on the elements for a national program and the base technical thresholds for each quality installation component. Given the complexity of this effort – technical thresholds, acceptable training/certification, data collection & review, infancy of existing programs, lack of trained/certified technicians, etc., CSG suggests that quality installation practices be phased-in as an ENERGY STAR activity in 2007.