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November 18, 2011

Doug Anderson

ENERGY STAR® Program

U.S. Environmental Protection Agency

Washington, DC 20460

Dear Doug,

The Alliance to Save Energy appreciates the opportunity to comment on the *ENERGY STAR for Windows, Doors, and Skylights Version 6.0 Product Specification Framework Document* released in October 2011.

The Alliance to Save Energy is a nonprofit organization that promotes energy efficiency worldwide through research, education and advocacy. We encourage business, government, environmental and consumer leaders to use energy efficiency as a means to achieve a healthier economy, a cleaner environment and greater energy security. The Alliance has supported the ENERGY STAR brand since its inception and values its significant contribution to educating consumers' and businesses' energy efficiency choices and promoting the advancement of energy efficient designs and innovations in the market.

The *Version 6.0 Product Specification Framework Document* addresses many interesting areas for potential improvement of the ENERGY STAR for Windows, Doors and Skylights program. We commend EPA on presenting a strategy for moving forward and on providing stakeholders with the rationale for its proposed framework. While each of the areas presented in the document merits discussion and stakeholders with expertise in specific areas will provide constructive comments, we would like to focus our comments on just four points that we feel deserve particular attention:

- a) Emphasize ENERGY STAR's role in supporting energy code compliance
- b) Recommend that EPA explore a Most Efficient program for windows
- c) Suggest studying possible condensation concerns
- d) Point out problems with the way dynamic glazing is currently handled by ENERGY STAR

ENERGY STAR's role in supporting code compliance

We would like to emphasize the role ENERGY STAR can play in supporting compliance with advanced code requirements, such as those of the 2012 International Energy Conservation Code (IECC).

As a voluntary program, ENERGY STAR generally promotes energy performance beyond what's required by building energy codes. As energy code requirements advance, less room remains for ENERGY STAR criteria to reach beyond code requirements. In our view, this does in no way diminish the role of ENERGY STAR.

The 2012 IECC sets strong energy performance requirements for windows in new construction and replacement windows. However, it will take several years for the 2012 IECC to be adopted by the majority of states, and even after adoption, code compliance will likely lag behind. In the replacement windows market in particular, codes are rarely enforced. For these reasons, ENERGY STAR will keep adding energy efficiency benefits even if the requirements of the 2012 IECC approach or match ENERGY STAR criteria in certain climate

zones. If, for example, EPA determined that there is little room for Southern zone criteria to exceed the 2012 IECC requirements for climate zone 2 (U-factor 0.40, SHGC 0.25), ENERGY STAR would still play a very important role in promoting demand for and supply of code compliant windows in that zone. For this reason we think it is acceptable if ENERGY STAR does not exceed the 2012 IECC in all climate zones, and the determination of appropriate levels should be based on other factors.

The room for ENERGY STAR criteria to exceed code requirements is larger in the heating-dominated climate zones, where further U-factor improvements can save significant heating energy – though at a cost. Encouraging the use of windows with U-factors that are significantly lower than code may be best achieved with a Most Efficient program for windows.

Exploring a Most Efficient program for windows

We suggest that EPA explore a Most Efficient program for windows that helps consumers with a preference for exceptional energy performance identify relevant products while promoting further advancements in the marketplace.

Advancing window energy performance significantly beyond current ENERGY STAR criteria is technically feasible but in some climate zones – particularly the North and North-Central zones – it may come at a significant cost. Since the current criteria for the North and North-Central zones already set a U-factor limit that is stringent for double-pane windows, even small stringency increases can make the program less inclusive. This represents a trade-off between more inclusive criteria that ensure energy efficiency for a larger share of the market and more exclusive criteria that save more energy per window. Our position is that both goals are desirable. We recommend retaining relatively inclusive criteria for all climate zones, allowing a large share of the market to qualify without creating too high a price barrier for less affluent consumers. At the same time, we suggest that EPA explore a Most Efficient program for windows with more exclusive criteria that allow promotion of significantly advanced window energy performance and encourage innovation.

The purpose of the ENERGY STAR program is to save consumers money and to protect the environment. In order to achieve this purpose, ENERGY STAR should encourage substantial energy savings for a large share of consumers. For many consumers, this means that the price difference between ENERGY STAR windows and conventional double-pane windows must not be too big. Since energy code requirements for replacement windows are not commonly enforced and since windows – unlike appliances – are not governed by minimum energy efficiency standards, many consumers could default to conventional windows if the price premium for ENERGY STAR windows was unattractively high. On the other hand, consumers with a preference for high energy performance and comfort may benefit from leading-edge products that substantially exceed current ENERGY STAR criteria. Since such products are available, are gaining market share from a small basis, and are becoming increasingly affordable due to increasing experience and volume, it would further the ENERGY STAR purpose to designate windows with leading-edge energy performance as Most Efficient.

A Most Efficient program for windows would most likely have to focus on U-factor, given that the regular ENERGY STAR criteria already approach the feasible limits for SHGC criteria in the South and South Central zones without significantly affecting visible transmittance. Substantial U-factor improvements over current ENERGY STAR criteria are technically feasible, and windows with a U-factor of 0.22 or lower are available at a price premium that is cost-effective in locations with significant heating seasons and relatively high local energy prices. Because it is a higher tier program, Most Efficient criteria do not necessarily have to be the most economical choice in all situations, even though it should be cost-effective in some locations.

An important reason for having a Most Efficient designation is to provide utility programs with an easy method for incentivizing windows with advanced performance. If the criteria of the general ENERGY STAR windows program remain relatively inclusive, market penetration will remain high. While this will generally benefit consumers, Utilities are often looking for incentivizing higher-tier criteria that are less common in the market as this reduces free ridership. As it is much easier for programs to promote performance levels that are backed by an official designation, a Most Efficient designation for windows could greatly enhance the effectiveness of utility programs for advanced windows. Successful promotion of Most Efficient windows by utilities would in

turn offer an avenue for manufacturers to lower marketing overhead, invest in further innovation, increase production volume, and thereby reduce the incremental cost of highly efficient windows.

We suggest that EPA seriously consider establishing a Most Efficient program for windows using a U-factor limit between 0.20 and 0.22. Windows with this performance have been promoted by the DOE High Performance Windows Volume Purchase Program, which has included products with a U-factor of 0.22 or lower from more than 50 window manufacturers since its start in May 2010. With some of these products, the price premium over their counterparts with a 0.30 U-factor has been less than \$4 per square foot, making them an attractive choice in locations with higher energy prices and significant heating seasons. Regarding SHGC, a Most Efficient program could simply specify that the maximum SHGC for a given climate zone set by the regular ENERGY STAR criteria be met.

Possible Condensation Concerns

We recommend that EPA study possible condensation concerns and consider ways to address such concerns.

The Version 6.0 Product Specification Framework Document suggests U-factor criteria “that recognize the highest performing doubles and bring a greater number of triple pane windows into the mainstream.” It is likely that such criteria will lead to increased use of double-pane options with low-E coatings on surface #4. These options have a lower U-factor than low-E glazing with coatings just between the panes but offer a lower condensation resistance. A concern is that the increased use of glazing options with surface #4 low-E coatings as a result of ENERGY STAR criteria revision could lead to unintended consequences due to real or perceived problems with condensation. We do not have enough information to make specific recommendations on this issue, but we suggest that EPA seriously study the issue and examine potential remedies.

One possible way to address condensation concerns is to offer consumers information about the conditions under which condensation may occur, about the possible problems it may cause, and about the remedies consumers may apply. The question remains whether such information would reach consumers effectively. Another way of addressing concerns is to set minimum condensation resistance criteria based on the NFRC condensation resistance rating. Since this would exclude certain products that would otherwise qualify for the program, such criteria would have to be based on a thorough assessment of the possible need.

Without further information we cannot give particular recommendations on how to address the issue of condensation, but in order to protect consumers and the ENERGY STAR brand, we do recommend that EPA examine the issue of potentially increased condensation risks from new glazing options and communicate their findings to stakeholders.

Problems with the way dynamic glazing is currently handled by ENERGY STAR

Currently, ENERGY STAR it effectively penalizes glazing for being dynamic. We suggest that EPA examine possible solutions to this problem.

The program requirements of Version 5.0 of the ENERGY STAR for Windows, Doors and Skylights program state that the eligibility of dynamic glazing products is based on “the minimum tinted state for switch-able glazing products or the full “OPEN” position for internal shading systems.” This means that dynamic glazing products that offer a great SHGC variation are unlikely to qualify for ENERGY STAR in the South or South-Central climate zones. This seems to be based on the legitimate concern that the glazing’s dynamic capabilities are not optimally applied. Nevertheless, it is problematic to exclude glazing solely on the basis of its capability to vary between low and high SHGC.

ASHRAE Standard 90.1-2010 and the commercial chapter of the 2012 IECC and base the code compliance of dynamic glazing on the low end of the rated SHGC (see C402.3.3.5 of the 2012 IECC). We are aware that conditions in commercial buildings in terms of schedule, occupant expectations and automation capabilities are different from homes, for which the ENERGY STAR windows program is created. So it may not be the best idea to directly transfer examples from the commercial to the residential sector. Nevertheless, it seems desirable to identify ways to create an avenue for dynamic glazing with a wide SHGC range to qualify for ENERGY STAR.

Thank you again for the opportunity to comment. We hope that these comments and suggestions constructively contribute to the discussion about ENERGY STAR program revisions. If you have any questions regarding these comments, please contact me at npetermann@ase.org or at 202-530-2254.

Best regards,

A handwritten signature in black ink, appearing to read 'N. Petermann', with a long horizontal flourish extending to the right.

Nils Petermann
Program Manager