KINCO

March 16, 2004

Mr. Richard H. Karney, Manager
Energy Star Program
Department of Energy
Office of Building Technologies Program
1000 Independence Avenue, SW
Washington, DC 20585

Subject: Energy Star Performance Based Rating System for Windows

Dear Rich:

My letter will address the Energy Star design based standard vs. the performance based standard rating system for windows. I will focus on the Lawrence Berkeley National Laboratory (LBNL) Analysis Results for Performance Based Ratings for the Energy Star Window Program Report dated January 23, 2004. I will organize my comments by the four climate zones following my overview of the LBNL Report.

Overview of LBNL Report

After reading and studying this LBNL Report I believe their analysis went beyond the directives discussed at the workshop and those outlined in both the August 1, 2003 paper entitled "Performance Based Ratings for the Energy Star Windows Program: A discussion of issues and future possibilities", and the October 30, 2003 memo to "Those interested in the Development of a Performance Based Rating System for Energy Star Windows".

Clearly, they decided a performance based alternative must result in equal or greater energy savings for each specific city analyzed within a climate zone. The regression equation developed for each of the four climate zones yields results on a city by city specific basis. In my opinion, the results must be weighted by population so energy savings on a climate zone level can be obtained. The fact of the matter is that performance based standards should provide overall energy savings for the zone equal to or better than the existing Energy Star design based standards.

The method of analysis LBNL pursued focused entirely on U-factor and SHGC options for each city and if an option was not feasible for each city in the climate zone, then a performance based option was not acceptable to them. This approach is not a fair comparison between design based standards and performance based standards within the Energy Star program. In other words, this is an "apples to oranges" comparison. It is my understanding the existing Energy Star design based standards were not developed in this manner. Thus, the performance based standards should not be developed this way either.

Under the existing design based standard, Energy Star windows installed in different cities within a climate zone do not save the same amount of energy. The Energy Star windows program was not intended to provide the optimum window choice on a city by city basis, but instead, the design based standards enacted provide a balance between a number of climate factors within a climate zone to provide overall energy savings within the zone.

As I understand it, the existing design based standards in the latest revision to the Energy Star standards were evaluated against one another by calculating population weighted energy savings for each climate zone. In other words, you did not compare performance on a city by city basis, but instead, on energy savings within each climate zone. This is how a performance based alternative should be evaluated, too.

Southern Climate Zone

LBNL believes that selecting a SHGC lower than the required 0.40 might allow an increase in U-Factor while maintaining constant energy use.

I agree with their findings.

South Central Climate Zone

LBNL feels the climate variations with this region are too complex to produce a technically defensible single trade-off equation.

However, while this is a valid scientific point about the climate variability, this also holds true for the existing design based standard, but it's presumed to be ignored. As I've pointed out previously, we need an "apples to apples" comparison, not an "apples to oranges" comparison.

From a slightly different perspective, these climate zone boundaries as originally established by Energy Star are flawed based upon this same LBNL analysis of wide climate variability within the same zone.

There are a great many cities in this climate zone where a trade-off equation is viable such as Dallas/Fort Worth, TX, Austin, TX, San Antonio, TX, El Paso, TX,

Tucson, AZ, Phoenix, AZ, San Diego, CA, Riverside, CA Sunnyvale, CA, Oakland, CA, Las Vegas, NV, as well as many other cities that were not analyzed. In most of these cities there are also very large population centers. Thus, as I've previously stated, the results must be weighted by population so that energy savings on a climate zone level can be obtained and a performance based standard on average would still give equivalent performance.

Alternatively, shift the Southern Climate Zone boundary to the north so that cities such as Dallas, Phoenix, Tucson, Riverside, San Diego, Riverside, Oakland, etc. are then included in the Southern Climate Zone.

South Central and North Central Climate Zones (Request DOE Comments)

Currently, there is no distinction between U-Factors in the South Central and North Central Climate Zones. Also, the change for the South Central Climate Zone was extremely aggressive.

I think it's a normal reaction to wonder why this occurred; especially, since there was such a large U-Factor change in the South Central Climate Zone compared to what existed before in that region of the county. The U-Factor performance standard changed from 0.75 to 0.40 for the geography that is now known as the South Central Climate Zone, which represents a U-Factor improvement of almost 50%.

As you know, this one change created a tremendous problem for aluminum windows since the most energy efficient and cost competitive residential window can achieve a 0.42 U-Factor based upon a design based standard.

These facts motivate me to recommend that Energy Star increase the U-Factor from 0.40 to 0.42 in South Central Climate Zone, unless a performance based standard alternative is implemented.

North Central Climate Zone

LBNL believes that small increases in U-Factors can be offset with relative large increases in SHGC. Because the cities analyzed had either no solution or small negative trade-offs, they do not believe that a trade-off equation is technically defensible.

Once again, the regression equation developed for this climate zone yields results on a city by city specific basis. In my opinion, the results must be weighted by population so that energy savings on a climate zone level can be obtained. To repeat for emphasis, like you did during the development of the existing design based standard.

LBNL is not optimistic about a performance based standard in the North Central Climate Zone because the cities analyzed had either no solution or small negative trade-offs, they do not believe that a trade-off equation is technically defensible. Nevertheless, I believe the performance based alternative should be available for selected cities and in case future research and development produces enhancements that will make this approach very feasible in most cities.

North Climate Zone

LBNL believes the U-Factor in this zone should be 0.35 or below and thus no trade-off is possible in terms of SGHC. In other words, they have made a unilateral decision that the 0.35 U-Factor is unchangeable no matter what happens.

I believe the LBLN position of meeting existing code requirements that in themselves vary widely and dictating a 0.35 U-Factor with no specified SHGC is totally arbitrary. This imposes a restraint on the performance based alternative that is not justifiable.

It is still my belief the North Climate Zone should have a SHGC standard. I have been shown independent research indicating in a sample of 9,300 windows with U-Factors and SHGC's in the NFRC database that the largest percentage of windows with U-Factors at or below 0.35 had a SHGC of less than 0.30. Therefore, I recommend a base SHGC of 0.30 for the North Climate Zone.

My support of a SHGC standard is validated by using performance based alternative U-Factors higher than 0.35 since the energy savings through the use of such windows will meet or exceed energy savings of windows currently having an Energy Star label.

If DOE decides the 0.35 U-Factor is not changeable in the North Climate Zone to permit a performance based standard, then I believe the performance based alternative should be available for the three other Climate Zones based upon what I have outlined previously.

Energy Star Precedent

Finally, I'd like to add that it is a fact 43 of 46 other Energy Star programs are on a performance based standard with only three established on a design based standard. It is my belief fenestration products and especially aluminum fenestration products as well as consumers are placed at a disadvantage under a design based standard.

Recommendations

In spite of my constructive and critical comments regarding the LBNL analysis I still believe based upon my comments, which recommend a different application of their findings, that a performance based alternative is viable and total energy savings will be at least equivalent to existing Energy Star design based standards.

While the city by city evaluation showed variations in energy savings, on a population weighted approach the overall energy savings are equivalent when using a performance based alternative. As I have reiterated throughout this letter, the performance based standard should be evaluated just like the design based standard that Energy Star used to establish the existing standards.

Thank you for considering my input.

Sincerely,

John P. O'Connell

Copy:

Senator Nelson
Senator Graham
Marc LaFrance