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ENERGY STAR Program
US Department of Energy

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D&R International

Re: ENERGY STAR for Windows, Doors, and Skylights Criteria Revision

Mr. Karney & Ms. Zachery,

I am writing to provide comments on the proposed revision to the Energy Star Windows, Doors and Skylights criteria. As an economist who formerly managed the Electric Division for the Public Utility Commission of Texas and as a designer of energy efficiency programs for utilities, I want to provide you our perspective on the proposed changes, particularly as they affect utilities nationwide who are now in the process of developing new or modifying existing energy efficiency programs. From the perspective of electric utilities and energy efficiency programs, reducing electrical peak demand and enhancing reliability is the key consideration; we urge that DOE promote lower window SHGCs nationwide to support this important energy infrastructure concern.

Background

Utility energy efficiency programs are particularly important now. Many states have mounted substantial new efforts to encourage energy efficiency and peak demand reduction through utility programs. Utilities are looking to develop or improve incentive and market transformation programs to meet the demands of their regulators. This makes the current proposed revisions to the Energy Star Windows program a particularly important opportunity to establish criteria consistent with utility energy efficiency objectives so that utilities will choose to promote the program, rather than some other non-window program, providing a WIN/WIN situation for both Energy Star and the utilities. Because of their peak reduction potential, windows are particularly good candidates for utility programs.

While Frontier Associates is headquartered in Austin, TX, we assist electric and gas utilities with energy efficiency program design and evaluation nationwide, assisting utilities in Texas, New Mexico, Louisiana, Minnesota, Colorado, California, Oklahoma, Missouri, and Massachusetts. We also have significant familiarity with window issues, since we designed and administered the Texas Window Initiative and have supported the efforts of the Efficient Window Collaborative. The utility-sponsored Texas Window

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Initiative market transformation program was operated in 2000 and 2001 to introduce low-E windows into the Texas market.

Summary of Recommendations

We applaud the efforts of the ENERGY STAR team to continue to push for improved energy efficiency measures with relation to windows, doors, and skylights. However, we do have some specific concerns and recommendations. In our review, we have focused almost entirely on how to improve the treatment of solar heat gain from the standpoint of utilities considering adoption of energy efficiency programs for Energy Star windows. Reduction of solar heat gain in homes throughout the nation (not just in the south) during the summer is extremely important since most electric utilities peak during the summer due to air conditioning load whether they are located in Minnesota, Colorado or Texas. In fact, the only region of the country that is not summer peaking is Florida, due to electric heating. As a result, we support setting maximum SHGCs in all climates under Energy Star and strongly recommend against promoting high solar gain windows through U-factor trade-offs in northern climates.

Specifically, we offer the following recommendations for Phase 1 and 2:

- Recognize the importance of electrical peak demand as a factor for determining Energy Star windows performance criteria nationwide and specifically quantify impacts of various criteria choices on peak demand
- Set a 0.25 SHGC as the maximum for at least ES climate zones 1-2
- Set a 0.40 SHGC or preferably lower (such as 0.30 or 0.25) as a maximum for ES climate zone 3
- Set a 0.40 SHGC as a maximum for ES climate zones 4-5
- Reject any SHGC minimum or trade-off in ES climate zones 4-5

Importance of Peak Demand Reduction Nationwide

It is very important to understand that in the design of utility energy efficiency programs, particularly for electric utilities, a crucial consideration is reduction of summer peak demand. Reduction in peak demand is a high priority, whether the utility is located in the northern, central or southern regions of the US. Peak demand reduction is more important today than ever before given that the cost of new peaking generating units has risen remarkably over the past few years.

To illustrate the value of peak demand reduction, first consider that new peak generating capacity (a simple cycle combustion turbine) can easily cost $600 per kW installed. In a report to Congress in February of 2006, the U.S. Department of Energy estimated the value of one kW of peak demand reduction at $75/kW/year.[1] These estimates do not

[1] U.S. Department of Energy, *Benefits of Demand Response in Electricity Markets and Recommendations for Achieving Them* at 74 (2006).

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even factor in avoided losses and reserves. Thus, if the window choice can avoid one half of a kW of load, it can save a utility (and as a result, consumers) $45 per year per home in capacity costs (using a 20% factor to reflect avoided reserves and losses). Not surprisingly, the most substantial incentives paid by electric utilities in DSM programs are typically based on avoidance of the costs of constructing new generating capacity, which is a function entirely of peak demand. Higher incentives increase the chances of real market transformation, particularly for more expensive items like windows.

In addition to avoiding the need for new generating plants, peak reduction and reduced energy usage during on-peak times can also substantially reduce wholesale electric prices during high cost periods which typically occur when the electric system is heavily loaded due to seasonal air conditioning load. For example, the cost of electricity at peak times for a given hour can easily spike to ten times or more than the cost of energy off-peak; even a limited reduction in demand can sharply reduce this price. Even on average, the cost of on-peak energy can be double that of off-peak energy. Moreover, on-peak electric usage can drive up emissions substantially as much less efficient units are operated to meet peak power needs.

As a result, Energy Star windows are far more likely to be promoted in utility programs if Energy Star vigorously promotes reduced electric usage at peak times and reduced peak demands. In no event do we believe that Energy Star should promote increased peak demands.

In reviewing the DOE Draft Criteria and Analysis, while we see peak demand mentioned occasionally, we do not see a vigorous analysis and estimation of potential peak demand savings/impacts from various scenarios. In fact, we have seen far more analysis of this factor in past Energy Star analyses. For example, the Department's analysis in February 2003 discussed energy supply and peak demand issues. The analysis specifically examined the impact of a 0.15 SHGC difference for the climate zone from 3,600 to 5,400 HDD and concluded that in that region alone, the lower SHGC potentially could save 4612 MW of load and one 115 MW power plant per year.[2] As the report correctly noted at page 9, "Peak energy savings have other impacts beyond the need for new power plants. Peak reduction has the potential to impact, positively, energy prices and electric system reliability."

We think that the potential effects of peak demand should be quantified for each region of the country using various SHGC levels (including the kW peak demand difference per home, regional potential peak demand impacts and regional potential increased capacity cost). While we understand the importance of Btu savings, not all Btus are equal. The timing of energy use is critical as discussed above. DOE should also include in its analysis an evaluation of energy cost reflecting the different value of energy depending on time-of-use.

[2] An Evaluation of Alternative Qualifying Criteria for Energy Star Windows: February 2003 at 8-9.

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Southern Climate Zones ES 1 - 2

We support the proposal to lower the solar heat gain coefficient for windows in the southern regions. However, we encourage the ENERGY STAR program to be more aggressive on SHGC in this part of the country. When the 2009 IECC is printed, it will set a standard of 0.30 SHGC in 3 southern climate zones (roughly comparable to DOE's climate zones 1-2). While DOE has proposed 0.25 in climate zone 1, it has adopted 0.30 in climate zone 2. It is our opinion that ENERGY STAR should strive to go beyond IECC, and promote at least an SHGC of 0.25 in both of these southern climate zones. Utility regulatory commissions often will not allow utility energy efficiency measures to be funded unless they are better than code. For example, the Texas PUC will not allow a utility to include an energy efficiency measure in its DSM programs if the measure simply meets code. We would like to see an Energy Star Windows program included in Texas energy efficiency programs. Using a 0.25 SHGC for climate zones 1 and 2 would increase the chances of achieving this objective. Moreover, by using the same standard for zones 1 and 2, this would increase competition, enhance economies of scale, and reduce confusion because there would be a single specification for a large part of the southern US and, closer to home, for at least most of Texas. We urge the ENERGY STAR program to be as aggressive as possible in lowering the SHGC standards for windows in the southern regions without significantly negatively affecting visibility.

Central Climate Zone ES 3

Turning to the center of the country, we support the institution of a maximum SHGC of no greater than 0.40 in Energy Star climate zone 3. While we strongly encourage DOE to consider an even lower SHGC requirement, such as 0.30 or even 0.25 (increasing the potential incentive that a utility can pay), a 0.40 would at least be a step in the right direction. It is our understanding that most windows that will meet 0.40 will also meet 0.35 or even 0.30, so why not be more aggressive here?

Northern Climate Zones ES 4 - 5

Turning to the northern climate zones, we would continue to support a reasonable SHGC maximum such as 0.40. However, regardless of the SHGC maximum in these climates, we strongly disagree with allowing for a trade off of U-factor for a higher SHGC. A trade-off, by definition, promotes the higher value. Otherwise, why offer the trade-off? When a higher U-factor is allowed with a higher SHGC, the northern zones will see a higher summer peak due to air conditioning needs. There also will also be a higher peak demand on gas utilities during winter in order to heat the house during the coldest times – at night – with windows that have less insulating value. In reviewing your analysis, we see no assessment of these issues. Higher peak demands should not be promoted by Energy Star.

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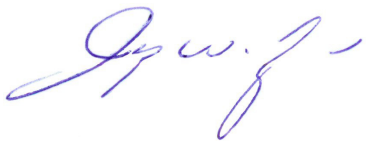
While a straight Btu energy analysis may show that a trade-off of a higher U-factor for a higher SHGC is energy neutral, this approach does not factor in the peak demand issues. By definition, such an approach encourages higher SHGCs resulting in higher peak demands. Moreover, the Btu analysis does not factor in time differentiated energy prices. Finally, even the Btu analysis depends on the series of assumptions which may not be borne out in actual homes. For example, assumptions as to the placement of windows, the operation of shades and the operation of heating and cooling equipment will substantially affect the results in each house.

Conclusion

Based on the above, we again urge you to carefully consider the impact of Energy Star windows criteria on peak demand (particularly electric peak demand) in all climate zones. Based on peak demand and other considerations, we hope you will consider more aggressive SHGC maximums in southern and central climates and reconsider your proposal to allow for U-factor/SHGC trade-offs in northern climates. If properly designed, Energy Star windows can be an ideal component of utility energy efficiency programs. Please let me know if you have any questions or comments.

Sincerely,



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