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Building Technologies Program

Envelope & Windows R&D Forum

Posted By: P. Marc LaFrance from US Department Of Energy

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October 8,
2004

1:30
PM

ENERGY STAR Ratings Analysis - Comments Due
Nov 15, 2004

Please see the link above or the "Analysis Results for Performance-Based Ratings for the ENERGY STAR Windows Program" report under the "What's New" Header on the home page. DOE seeks comments on this latest analysis from LBNL. The deadline for comments is November 15, 2004. For historical perspectives, please look under "Get Materials" for the Windows Performance Based Ratings Topic. To get started to post comments, you just need to "login" (after you have signed up for the forum) from the home page then click on "view topic." You can then either post a comment, or initiate a new topic. You can read this topic and any responses without logging in, but you can only post your comment after you have logged in. If you have problems getting started, please call me at 202-586-9142. Thank you, Marc LaFrance, Technology Development Manager - Windows R&D

Replied By: Darrell Smith from International Window Film Asso

11 - Nov - 2004

10:16
AM

Tradeoff analyses

We agree with all the technical merits of the performance tradeoff analyses done for the program. There are three questions we would pose.

First, why does the EnergyStar program have to be confined by the IRC requirements. If one of the purposes of the program is to encourage manufacturers to look for new and innovative ways to deliver the most efficient means of meeting the energy needs of a particular building, then why should the tradeoffs be limited by the current requirements of the IRC or any other current code for that matter. The EnergyStar guidelines should be based on technical comparisons of "what if" rather than "what is" or "what is allowed by others". Based on purely technical comparisons, there is no reason to "box in" the alternatives for achieving a certain energy efficiency level by limited upper and lower limits on SHGC and U-values. If a technology (combination of technologies) could be developed which would be as energy efficient but would be outside this "box", then innovation and R&D would be stifled and the public good would suffer as a result.

The second question is one of looking only to the current "window industry" and its normal method of making a finished window for guidance on what should be guidelines. For instance, limited the visible light transmittance to, for instance ~35% would be a disservice if a consumer had southeast or southwest facing windows in Florida and wished to have less glare (and more energy efficiency) than this VLT would allow them. In Daytona Beach, there are a large number of less expensive older homes east of I-95 and close to the waterways which still prefer the 20% light transmission dark reflective or "silver" reflective films on their southerly facing windows. Mobile homes and manufactured housing are a huge retrofit market for these more energy efficient, albeit darker and/or shinier products. Why shouldn't these products be considered in a tradeoff scenario?

The third question is why tradeoffs would not be allowed in the southern zones for windows with films or solar screens or other combined technologies installed on them, possibly even before sale as a total window system, when those products could easily meet or exceed the existing total requirements for such a "window". I believe there is some confusion between a "window" and a "window system". A window is the finished product of a window manufacturer. The Energy Star program utilizes NFRC ratings, which are Fenestration System ratings, which might not just be a window itself. When looking at efficiencies of a fenestration system (or installed "window system"), there should be no limitations on qualifying for EnergyStar based merely on the fact that this might be outside cwindow manufacturer current practices.

In summary, we believe that, if a performance tradeoff is feasible under any circumstances, it should be allowed irrespective of current technologies or manufacturing practices. Else, manufacturers and the building codes process (which is not a truly "public" process) determine EnergyStar requirements, thus creating a circular reinforcing system which may thwart R&D efforts by innovators, either in or outside the existing window industry.

Replied By: Douglas Cole from Mikron

11 - Nov - 2004

3:17
PM

Energy Star Program

Dear Marc,

I would like to thank the Department of Energy for first introducing the idea of the ENERGY STAR program for windows and door. I know that at times these requirements have appeared to be difficult for the industry to meet but as of today there are many products for the consumer to chose from to enjoy the benefits of energy saving. The position of ENERGY STAR as being a leader should not be compromised by a step backward but by moving forward to even more energy savings. As the cost of energy continues to increase, the importance for conservation is more apparent. I encourage DOE to not weaken the existing program by allowing trade off values between U-factor and Solar Heat Gain.

Douglas L. Cole
Director of Product Design and Engineering
Mikron Industries

Replied By: Michael Nau from PGT Industries

15 - Nov - 2004

3:41
AM

Energy Star Program

I would like to commend LBNL for all their efforts on this analysis. It seems once again that their work validates a performance-based alternative to the existing ENERGY STAR program.

My first comment regards the Southern Zone. After all the preliminary proposals and assumptions were made, LBNL finalized their technical study showing a valid opportunity to implement a Performance-based alternative. However, their conclusion was that there are no compelling market reasons to add a trade-off in the South zone. We take exception to this conclusion. This conclusion doesn't appear to take into consideration markets such as the state of Florida, and the gulf coastal areas. While I can sympathize with the Dept of Energy's efforts in trying to come up with a simplified solution that meets majority needs, it appears this time it could result in a fairly large population being left out of the Energy Star program.

PGT currently manufactures a number of impact and non-impact vinyl and aluminum product lines. As the largest Florida based window manufacturer our effort in providing products to meet or exceed hurricane requirements is fairly extensive. On average these products cost somewhere between 15 and 20 thousand dollars per product to obtain Miami-Dade County Approval. Over the past 2 years we have been including and adding glass options in our testing to accommodate more thermally efficient products. We have also recently completed most of our NFRC certifications as well as our Partnership in the ENERGY STAR Program.

We believe a performance-based approach is necessary to provide incentive for these more energy efficient products. Contrary to the assumptions made in the LBNL white paper, we have many combinations of tints, laminates, and spectrally selective low-E coatings, which meet the 0.4 SHGC requirements with monolithic glazing, and therefore have U factors above 0.65. With the correct use of low-e coatings in monolithic laminated glazing, SHGC's below 0.4 can be achieved in our impact-resistant products with U factors above 1.0. Because SHGC is the factor of primary importance for the majority of cooling-dominated Florida, we can easily meet and exceed the annual energy usage requirements of the Energy Star program with these products. It is essential that Dept. of Energy recognize that there are compelling market reasons to add this trade-off in the Southern Zone, and implement the performance-based alternative. It is also extremely important to note that, in our experience, aluminum construction has been proven in meeting the most stringent impact standards.

The state of Florida has a performance based software package used both to comply with the State Energy Codes and to provide ENERGY STAR home ratings. It would be confusing to try to explain why we cannot provide an ENERGY STAR label for a specific product, but that the product in question is more efficient or equal to an ENERGY STAR product for that region.

With regard to the South Central Zone. Wherever possible we support the idea of a Performance based alternative. However, in the study some of the work was done with the notion that aluminum window manufacturers can produce a product with a .42 U- factor. Out of the 9 impact products we have certified only 1 (a picture window) that meets a .42 U-factor. A builder may find it difficult to complete a residence with just a picture window.

Another issue supporting the implementation of a performance based Energy Star program is related to the projects the NFRC Attachments Sub-committee and the Non-residential Sub-committee are working on. These component based approaches to fenestration systems fit very well with a performance-based tradeoff, thus driving the incentive to add more energy efficient components without penalty. Looking into the future we would be remiss in forgoing the opportunity to enhance Energy Star to work with all types of fenestration system.

Again the goal here is to increase the use of energy efficient products by increased availability. Thus, everyone wins, manufactures sell value added features, and consumers save energy at reduced cost and the Dept. of Energy moves closer to the goal of 0 energy usage.

Respectfully,
Michael Nau
PGT Industries

Replied By: Ivan Paredes from General Aluminum Co.

15 - Nov - 2004 7:46 AM Tradeoffs

November 15, 2004
Marc LaFrance
Technology Development Manager
Building Technologies Program
Washington D.C.

Dear Mark,

I was pleased to hear about the Trade-Off proposal. I know that you invested a great deal of time and effort to get the proposal considered. I believe this proposal is good in concept and I encourage you to forge ahead with the project. Having said this, I do have some comments regarding the trade-off proposal. I respectfully disagree with the figures for the U values especially for the south-central region. I would like to know the criteria for setting the U values for the Prescriptive option to 0.40 and 0.42 for the Trade Off. At General Aluminum, we manufacture both aluminum and vinyl windows and while each product has its own merits and should compete in a fair way, with these new numbers our aluminum products as well other aluminum manufactures cannot achieve these new standards even with the best of our products. One of the reasons that I hear often in the set-up of the ENERGY STAR numbers, is that they should be more stringent than the values on the codes. But the question is how much more stringent should these numbers be and why has it been done in primarily one zone (south-central)? We see that the values of the ENERGY STAR program are much too stringent in comparison to the values of the codes in other zones. For example, the U value for zone 3 on the map code (proposed) is 0.65 (which corresponds more or less to the south-central region) and on the ENERGY STAR map, the U value is 0.40. However, if we compare these numbers to the other zones, the values on the code map and ENERGY STAR map are almost identical. Problems may occur when the U values on the ENERGY STAR program are set too low. They may be mistaken as the code and enforced as such. Another thing to consider is that if the ENERGY STAR values are too low, then the code officials may decide to lower the code numbers in order to match the ENERGY STAR numbers. These new numbers would then become the new code standards.

In my opinion, there are several consequences for having the ENERGY STAR numbers unreasonable low. In setting these values, we must consider other factors, such as durability, energy savings on recycling, and the economic impact on the Aluminum Industry (whose impact has been greatly underestimated). If those factors are not taken into account, then many aluminum manufacturing companies will have to close their doors. In the end, the real losers will be the workers and their families, especially if we consider that the aluminum industry employs a large percentage of low-skilled laborers who have come to depend on the industry as their main source of income. If we displace these workers, it will ultimately have a great negative impact on our manufacturing segment of the economy. Another consequence of keeping these unrealistic numbers is that many companies will not participate in the ENERGY STAR program and the projected energy savings will not reflect your expectations.

Sincerely

Ivan Paredes
 Director of Engineering
 General Aluminum Company

Replied By: patrick muessig from azon

15 - Nov - 2004

8:54
 AM

Energy Star

Azon would like to sincerely thank the Department of Energy for directing the study of a performance based approach to the Energy Star criteria for windows. This study revealed that there is a viable trade-off between U-Factors and Solar Heat Gain Coefficients within the North, South Central, with the exclusion of California, and the Southern zones.

We would urge the DOE to implement the performance trade off criteria as shown in the study. Using the current Energy Star criteria this would allow windows in the South Central (except California) with a U-Factor as high as 0.43 to be compliant provided the SHGC was at a maximum of 0.24. The South would simultaneously be allowed a U-Factor as high as 0.75 with a corresponding maximum SHGC of 0.33 (including both Miami and Hawaii). This would allow more products that are required to meet the intense structural regulations of this zone to be rightly labeled Energy Star based on total energy savings.

The trade-off analysis also proved viable in the North, however given the current energy code requirements within this zone it was deemed unreasonable. This opens up a much larger debate on whether saving energy is the ultimate goal or being more stringent strictly by performance numbers. This debate will probably not be solved quickly but we would like to ask that should either the Energy Star criteria or the energy codes change to allow a northern trade-off that it be implemented accordingly.

We would again like to thank the DOE for organizing this analysis, the industry asked that the feasibility of this performance based approach be examined and it was. The study proved that along with the current prescriptive requirements there are products with differing make-ups that can be equally efficient in performance and Azon would like to ask that these products with the attributes previously discussed be included in the

Energy Star program.

Respectfully,

Patrick Muessig
Azon USA Inc.

Replied By: John Batt from Arkema Inc.

15 - Nov - 2004

11:01
AM

Dear Rich and Marc:

I am writing to you regarding the recent LBNL analysis on performance-based ratings for the Energy Star Windows program. Arkema Inc. (formerly known as ATOFINA Chemicals, Inc.) has long been active in the advancement of energy efficient technologies, and is a lead supplier of low-e coating technology to the fenestration market. We applaud your work to develop performance-based ratings, which will further strengthen the credibility of the program. Performance-based rating systems are the only way to ensure fair product comparison, increase flexibility for manufacturers, and promote competition thereby providing more choices for consumers, while ensuring an energy efficient product. These are the reasons that performance-based systems are already in use in Europe, Canada, and Australia. We look forward to the U.S. also making this advancement.

Despite some of the ongoing debate, one of the most significant advantages of performance-based rating systems is that they are material-neutral. While prescriptive criteria based on individual window properties tend to favor certain materials or technologies, performance-based criteria fairly evaluate the total energy performance of the final product, regardless of what material or technology is used. Manufacturers will continue to develop and improve their product offerings while increasing energy performance. Such a rating system will assist them in their endeavor and provide them with more options as to how the total energy performance of their products is obtained.

Some critics have claimed that a performance-based rating would be overly complex. The fact that performance-based systems are already successfully used in Europe, Canada, and Australia demonstrates that this is not true. Furthermore, by providing a table of alternative criteria with equivalent energy performance, rather than an equation or computer simulation as used in these other countries, the approach being considered for the U.S. program is made even simpler. Finally, the performance-based criteria are merely an optional alternative, so only manufacturers who choose to use the performance-based criteria need deal with this so-called complexity.

With regards to the specific trade-off criteria proposed in the LBNL analysis, we believe that the performance based criteria should be implemented wherever they are technically feasible, thereby allowing the program participants and the market to make the decision whether to use the prescriptive or performance-based criteria. Therefore, we encourage the DOE to implement the proposed criteria in both the Southern and South/Central (excluding California) Zones where the LBNL study shows technical feasibility. Although the LBNL report suggested that there are no compelling market reasons to implement the trade-off criteria in the Southern Zone, this is not completely true. There are certain hurricane-

impact products that would not meet the current prescriptive requirements, but would, in fact, meet the performance-based criteria. These products should not be ineligible from qualifying for the Energy Star label if they have the same or better total energy performance. Furthermore, as mentioned previously, products and technologies continue to change and evolve, so we should not restrict the criteria based on assumptions about today's market. The LBNL report clearly indicated that trade-off criteria are technically sound in both the Southern and South/Central Zones. Therefore, the performance-based criteria should be implemented in both zones to maintain consistency of the overall program.

To be clear, in the Southern Zone, we are in support of implementing the more conservative trade-off criteria proposed by LBNL, in which U-values up to 0.75 are allowed with corresponding SHGC down to 0.33. In the South/Central Zone excluding California, we are in support of implementing the trade-off criteria in which U-values up to 0.43 are allowed with corresponding SHGC down to 0.24.

In the North/Central and Northern Zones, we believe performance-based criteria can and should be developed to maintain overall consistency of the program. However, we understand that certain issues prevent the trade-off criteria from being implemented in these regions at this time, so we agree that the initial focus must lie in the Southern and South/Central Zones. In the future, we believe the technical analysis for the North/Central Zone can be improved by reevaluation of the baseline SHGC. In the Northern Zone, the LBNL report indicates that a performance trade-off is already technically justified, but limitations of the building energy code prevent its use at this time for replacement windows. In both the North/Central and Northern Zone cases, as the Energy Star program evolves to promote ever increasing performance levels, we will be happy to work with DOE, LBNL, and industry to resolve these issues in the future.

Again, we applaud your efforts in developing performance-based ratings for the Energy Star Windows program. These efforts support the DOE's mandate to "set public policies that are in the interest of the general public, and take appropriate measures to achieve this goal." The end result will strengthen the program and provide tangible benefits to manufacturers, consumers, and the general public. As always, please feel free to contact Tom Culp or me at any time if you have any questions.

Best regards,

John Batt
 Director Product Stewardship
 Additives Division
 Arkema Inc.
 Tel: 215.419.5071

Replied By: Milan Gilmore from Alcan Primary Products Corp

15 - Nov - 2004

10:49
AM

Energy Star

Alcan would like to thank LBNL for the work that went into their analysis and also thank the Department of Energy for organizing the study of performance-based Energy Star criteria.

We would urge the DOE to implement the performance trade off criteria outlined in the study, after taking into consideration the constructive issues presented by commentators that would improve on the existing Energy

Star program.

It is apparent from the non-partisan analytical approach taken by the study team that there are products that have equal or greater energy-saving performance that would be excluding unnecessarily by the current prescriptive-based window component criteria.

The Energy Star program will be enhanced by the adoption of complementary performance-based criteria that would encompass energy efficient windows and expand the availability of products to customers that meet the Energy Star criteria.

Respectfully,

Milan H. Gilmore
Alcan Primary Product Corporation

Replied By: CHARLES MCEVOY from WESTERN EXTRUSIONS CORP

15 - Nov - 2004	11:08 AM	EXEC. VICE PRES.
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I ACCEPT THE PROPOSAL AND THE MODIFICATIONS BY THE A.E.C..
I SUGGEST THAT WE MOVE FORWARD ON THIS AS QUICKLY AS POSSIBLE
I THINK THAT JANUARY 1 2005 WOULD BE A GREAT DATE.

Replied By: Douglas Harden from Atrium Companies Inc.

15 - Nov - 2004	12:11 PM	Atrium Companies Inc. Reply
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Marc LaFrance
Richard Karney
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

Dear Marc and Richard,

As one of the largest window manufacturers who produce both vinyl and aluminum windows in the United States, Atrium Windows and Doors would like to thank you for the research and development on the performance based ratings for the Energy Star Windows program. We are encouraged by the fact that the Department of Energy has begun to progress down the performance based equivalent energy approach that many of the other products in the Energy Star program now already utilize.

Even though Atrium Windows and Doors doesn't currently have the necessary aluminum product lines of residential windows to utilize the new proposed trade-off criteria in the South/Central Zone, we support the performance based ratings. As a member of NFRC and a partner to the Energy Star program we are hopeful that you will implement these changes that will allow companies, such as ours, to resurrect and return to the development of designs that will comply with the South/Central Zone. We believe that the changes to the Southern Zone will greatly enhance our energy efficient product offering in the those states that require impact glazing by allowing those products to receive Energy Star labeling.

As a company that understands the benefits of both aluminum and vinyl to the respective markets they serve, we would once again like to persuade the Department of Energy to implement the performance based ratings because the end result to the ultimate consumer is total energy performance.

Sincerely,
 Doug Harden
 Director of Engineering
 Atrium Companies Inc.

Replied By: Andy Brill from MI Windows and Doors

15 - Nov - 2004

1:50
PM

Design Engineer

November 12, 2004

Marc LaFrance
 Technology Development Manager
 US Department of Energy
 1000 Independence Avenue
 Washington, DC 20585

Dear Marc,

I would like to thank you for your time and effort in trying to improve the current energy star program. I believe this proposal is in accordance with the programs goals, but we do have some concerns with the overall analysis.

Changing the current energy star program to allow for performance based trade offs listed in Lawrence Berkeley National Laboratory's study could potentially hinder the program. The benefit of the small portion of windows (if any) that would now be labeled energy star in the south central zone would not outweigh complicating the current program. Allowing the performance-based path would take a program that is relatively simple to understand and make it more difficult for the consumer to understand. We would be going from a clear-cut definition of what an energy star window is (4 zones, 4 sets of criteria) to something very puzzling (4 zones, 3 of them you cannot use a trade off approach and the other one you can use a trade off approach if you are not in CA).

The Energy Star program rewards products that go above and beyond what is required. For the fenestration industry this means exceeding the International Energy Conservation Code (IECC), which most states have adopted. If you break down the current Energy Star zones and compare them with the IECC zones by Heating Degree Days the Southern zone would roughly encompass IECC zones 1-4; the South Central Zone 5-8; the North Central 9-11 and the Northern Zone 12-19. An Energy Star approved product should meet all the prescriptive requirements for each of the IECC zones. When you actually compare the Energy Star values with the prescriptive values it seems the South Central zone is the only zone with correct values. For the Southern Zone, a product having a U of .65 and SHGC of .4 will meet 90% of the packages in the IECC zones 1-4. The South Central zone is 100%; the North Central zone is 90% and the Northern Zone is 82% (I included zones 17,18,19 in the Northern calculations which explains the low percentage). From these values it seems that the South Central zone is the only zone that has properly assigned values.

We believe that aluminum frames and sash offer an important ingredient in

constructing homes that are price/value sensitive. We are also concerned how the IECC and Energy Star are going to deal with the increasing need for impact resistant windows. Aluminum windows offer a strong value added platform to meet wind borne debris requirements. In its current form as I stated before I don't think the trade off has a major effect on the use of aluminum windows in either the South Central or Southern zones.

Sincerley,

Andrew Brill
Design Engineer
MI Windows and Doors

Replied By: Garrett Stone from Brickfield, Burchette, Ritts

15 - Nov - 2004

3:43
PM

Director

November 15, 2004

Marc LaFrance
U.S. Department of Energy
Building Technology Program
EE-2J, Room 1J-018
1000 Independence Avenue, SW
Washington, DC 20585-0121

Dear Marc:

On behalf of the Department of Energy, you have requested that interested industry participants comment on the LBNL paper: Analysis Results for Performance-based Ratings for the Energy Star Windows Program. We have the following comments:

Executive Summary

Most importantly, we strongly agree with the paper's conclusion that no trade-off can reasonably be implemented in the two northern zones. The U-factor requirements established by the IECC must be the absolute minimum performance level demanded by Energy Star. In this regard, we recommend that LBNL clarify that under the IECC, the prescriptive requirements, at least for replacement windows, CANNOT be traded off therefore to allow trade-offs in the North or North/Central under Energy Star would result in Energy Star windows that would not satisfy the code. The paper also correctly notes that many other reasons support no trade-offs in these zones, including occupant comfort, condensation resistance, and controlling peak demand.

We do disagree, however, with the decision to speculate in the paper on a possible future trade-off in the north, as we are not convinced that this would be justified under a truly robust analysis, reflecting the correct assumptions and using a more comprehensive methodology. In any event, that is an issue better left to future determination, if and when the

Department adopts a U-factor below the code maximum for the North Zone. At that time, hopefully the Department will have new data and assumptions to improve the rigor of its analysis. At this point, the issue is not ripe and the discussion is not only unnecessary, but may be misleading. As a result, we recommend that the Department clarify that the discussion of the North trade-off is only illustrative and that no decision is being made as to whether a trade-off might be established in the future or what trade-off might be appropriate.

Turning to the South and South Central, while we sympathize with the desire to address the predicament faced by the aluminum window manufacturer, we simply do not think that stepping on the slippery slope of trade-offs is the best course of action for the Department. In our view, the Department need not and should not determine whether the use of a trade-off approach might be warranted under some set of circumstances.

The only policy question that need be answered by the Department at this time is whether it is appropriate to exclude a 0.42 U-factor aluminum window (which has an adequate SHGC and utilizes low-E glass) from the program in the South/Central Zone simply because it is 0.02 over the standard, but is still well below the IECC prescriptive requirement of 0.50 U-factor for that zone. (Table 502.2.5, 2003 IECC.) The aluminum industry has argued that this is the best that they can cost-effectively do. If this is true, then continuing to exclude the product would reduce any incentive for that industry to produce the most energy efficient product, which is counter to the goals of Energy Star. As a result, consistent with our previous comments during this process, we do not object to raising the South/Central Zone U-factor slightly to accommodate aluminum-framed low solar gain low-E glazed products.

That said, we continue to have fundamental concerns with the validity of any trade-off approach and strongly prefer simply raising the U-factor in the South/Central Zone, without specifying any SHGC trade-off. We do not normally favor reductions in stringency, but in this particular instance, raising the U-factor by 0.02, or even all the way to 0.45, because it is still well below the code, would be an acceptable approach to addressing the concerns raised by the aluminum industry.

If a trade-off approach is nonetheless adopted for the South and/or South/Central, zones, then the Department should make it clear that this compromise action does not set a precedent in support of trade-offs for the future, but is merely to ensure the vigorous participation of the aluminum industry in the program today. The Department should also consider adopting a sunset date for any trade-off to encourage the aluminum industry to continue to work to produce lower U-factor products in the future.

Our additional observations regarding the report include:

1. The report fails to note that any trade-off would add unneeded and detrimental complexity to an otherwise simple, effective program, undercutting effective market transformation.
2. The assumptions underlying the analysis of possible trade-offs are wrong (and are wrongly based on annual energy use in a single typical house that does not really exist), and the appropriate research and analysis has not yet been completed to determine the right assumptions.
3. Total annual energy was chosen as the trade-off parameter, which does not properly account other important consequences and constraints of implementing a trade-off, i.e., peak demand (summer and winter), cost

(including HVAC sizing cost), comfort and condensation resistance, among others.

4. The Department should not adopt a minimum SHGC in any zone (which the paper suggests as a possibility for the South/Central zone).

The Program Must Remain Simple and Straightforward to Ensure Continued Success

Proponents of a trade-off have argued that the trade-off would occur behind-the-scenes, without the consumer ever having to understand it. This ignores the plain and simple fact that the best way to transform a market is for manufacturers to switch to products that qualify before they ever get to the consumer. To ensure continued success, the program must remain simple to understand and simple to implement simple for consumers, so they continue to seek out qualifying products, and, even more importantly, simple for manufacturers, so they will respond by participating and providing qualifying products. By having a single simple standard, market transformation is far more likely to result in economies of scale because the market concentrates on meeting one set of requirements. Such economies of scale will reduce the cost of these products and thereby increase manufacturer, builder and customer acceptance. By contrast, the more complicated the set of options available to manufacturers to meet the standard, the more likely that this market transformation (and resultant economies) is sacrificed.

The recent transformation of the IECC is a prime example of the perceived value of a keep it simple philosophy. Starting in 1998, the IECC incorporated a series of simple prescriptive tables for both new and existing homes, which greatly improved the usability of the code. This push toward simplicity culminated with the 2004 Supplement version of the IECC. The 2004 Supplement contains a version of the IECC substantially revised (ironically, by DOE) with the goal of drastically transforming the construction market to include a baseline level of energy efficiency in all houses of all glazing percentages by removing unneeded complexity from the IECC and providing simplified clear targets, to both builders/consumers and to the manufacturers, for envelope components. These simplified targets will result in market transformation and consumer economies. Having Energy Star in lockstep will increase such transformation and economies. Adding complexity will simply detract from the message.

In short, as an unintended consequence, if the Department adopts trade-offs, it will likely be inducing the wrong behavior by creating a moving target, thereby causing fewer economies of scale benefits for manufacturers as they migrate away from the clear and concise targets in the current program. Reduced economies of scale are likely to result in higher consumer prices and less conversion to energy efficient products.

The California nuance noted in the LBNL analysis is a prime example of adding unneeded complexity to a simple program. The analysis confirms that no increased U-factor trade-off is warranted for California. In fact, if a trade-off is ultimately included in the South/Central program, one solution proposed by LBNL would be to exclude California entirely not just from the analysis, but from the trade-off option. This adds further confusion for a manufacturer that might take advantage of the trade-off for some areas, but then must maintain a separate Energy Star qualifying product line for California. The program would clearly be sending the wrong message to manufacturers by instituting such a confusing trade-off. As mentioned above, a moving target detracts from the effort to achieve economies of scale through widespread market adoption of a technology.

The Trade-off Analysis Has Been, and Continues To Be, Based Upon the Wrong Approach and Wrong Assumptions

When the Department first announced its intention to pursue a trade-off and held initial meetings to explore its feasibility, a universal concern expressed by the industry focused on the underlying assumptions to the program (and RESFEN). There is concern because key policy decisions should not be made based upon outdated and incorrect underlying assumptions. The paper continues to rely upon the outdated assumptions from the early 1990s, which were wrong then and are certainly still wrong. This problem is further exacerbated by the assumption that a single typical house can properly be used as the basis for determining energy savings for all houses (rather than a sensitivity-type of analysis methodology looking at multiple housing types, orientations, variations in shading and other occupant behavior) and the notion that the only appropriate parameter to assess trade-offs is annual energy use.

NFRC has begun to try to analyze the assumptions in RESFEN's typical house and to determine the correct assumptions. However, at this time, NFRC has found that it is unable to endorse the existing assumptions or produce recommended new ones without significant new research, likely to take years.

Among the assumptions that are under scrutiny include: (1) new and existing home size; (2) the use of insulation levels from the 1993 MEC rather than the 2003 IECC; (3) internal heat gain; (4) shade usage by the occupant and internal shading scalars; and (5) temperature set points for summer and winter. These parameters have an enormous impact on overall energy use and would substantially affect any trade-offs.

We caution the Department to at least await the results of the NFRC-led process before deciding if and how any trade-off will be best implemented. In the interim, the Department can provide some relief to aluminum manufacturers by simply raising the U-factor in the South Central zone.

Energy Star Must Always Exceed the IECC Prescriptive Requirements for Both Replacement Windows and Windows in New Houses

One item of certainty in the analysis is that energy codes have always been, and must continue to be, the metric against which the Energy Star program is measured, i.e., above all else, the program should meet minimum IECC requirements.

For example, there is no opportunity for a trade-off in the Northern Zone because the maximum U-factor in the IECC is 0.35. The 0.35 U-factor is the upper limit in both the 15% window-to-wall ratio prescriptive table for windows in new homes, and in the simplified prescriptive requirements for all replacement windows. (A 0.35 maximum U-factor is also the upper limit for the northern US climate zones in the 2004 IECC for both new and replacement windows, which has no window-to-wall area limitations.)

The paper indicates that a precedent exists in the current code so the prescriptive requirements for windows should not prevent a performance-based rating system from going forward. (LBNL paper at page 8.) This is an incorrect statement if it is meant to justify a trade-off above the prescriptive U-factor requirements in the code.

Put simply, there is no opportunity under the IECC to take advantage of

performance trade-offs (or any other kind) for replacement window U-factor. The only option under the code for replacement windows is to meet the simplified prescriptive U-factor requirements in the IECC: 0.35 for the North; 0.40 for the North/Central; 0.50 for the South/Central; 0.75 for the South. (Table 502.2.5, 2003 IECC.) There simply is NO trade-off option, performance or otherwise, in the IECC for these requirements.

Over half the windows sold in the US, and presumably half the Energy Star labeled windows are new windows for existing homes. As such, the program should use the IECC replacement window prescriptive-only requirements as the yardstick against which all trade-offs must be measured. So long as these upper limits are not exceeded, raising the U-factor in either of these zones above the current Energy Star limitations would still beat the code without adding complexity or relying upon flawed assumptions.

The Department Should Not Adopt a Minimum SHGC Limitation

The LBNL analysis raises the question whether the Energy Star program should incorporate a minimum SHGC requirement in the South and South/Central. We do not believe this advisable or appropriate for the program. All analysis, even based upon flawed assumptions, indicates that lower SHGC in the South and in the large majority of the South/Central is more energy efficient. There should never be a floor on energy efficiency. If the program is concerned about appearance and consumer satisfaction, it could consider setting a minimum VT requirement. However, before the Department chooses to go down this path, more comments and suggestions from the industry are warranted to determine what an appropriate minimum might be.

Conclusion

The Department should not establish trade-off approaches at this time. Instead, it should address the aluminum window/south central issue directly and wait until NFRC research is complete before proceeding further with any trade-off approach. Addressing the aluminum industry's concerns could easily be done by raising the South and/or South Central prescriptive U-factor criteria in the current Energy Star Windows Program. We do not suggest what that revised U-factor should be. Our only stipulation is that any exception or revised U-factor criteria for these zones must not exceed the IECC simplified prescriptive replacement window requirements of 0.75 in the South and 0.50 in the South/Central.

Respectfully submitted,
Garrett Stone
Brickfield, Burchette, Ritts & Stone, PC

Replied By: Joe Hums from Mikron

15 - Nov - 2004

4:49
PM

LBNL Analysis

The recent LBNL trade-off analysis for the DOE Energy Star Program has been informative and beneficial to the window and door industry. LBNL concludes that trade-offs would only be feasible in the South Central Region and then, only if trade-offs in California are not allowed. With trade-offs only feasible for a portion of one zone there appears to be no compelling reason to implement this change. While an annual energy usage

format could be useful in the future as DOE explores even more stringent thermal performance requirements for windows, it does not benefit the window and door industry at this time.

Replied By: BOB POOL from THERMAL WINDOWS, INC

15 - Nov - 2004 5:27 PM comments

THE OFFICERS AND EMPLOYEES OF THERMAL WINDOWS, INC. ENDORSE THE POSITION OF THE AEC FOR A PERFORMANCE BASED RATING FOR THE ENERGY STAR PROGRAM..

HOWEVER, I HAVE A PROBLEM WITH STATEMENTS MADE IN THE OCTOBER 1, 2004 ANALYSIS.

THE LAST LINE OF PAGE 2, PARAGRAPH 1 THAT STATES THAT ALUMINUM FRAMING INDUSTRY MEMBERS HAVE INDICATED THAT THEY CAN ACHIEVE A .42 U VALUE. THIS STATEMENT IS REPEATED ON PAGE 18.

I HAVE NOT PREVIOUSLY BEEN AWARE OF THIS AND AFTER 40 YEARS OF MANUFACTURING THERMALLY IMPROVED ALUMINUM WINDOWS, I BELIEVE A .45 U FACTOR IS A MORE REALISTIC NUMBER FOR A QUALITY ALUMINUM PRODUCT.

IF YOU BELIEVE THE .42 U FACTOR STATEMENT, WHY IS THE CRITERIA THEN SET AT .40 U?? IS THIS TO ELIMINATE ALUMINUM FROM THE POSSIBILITY OF ACHIEVING ENERGY STAR CERTIFICATION EXCEPT IN THE LOWER 10% OF THE USA???

I DO BELIEVE THAT MORE FACTORS THAN THE FRAME U FACTOR, THAT MAKES UP LESS THAN 30% OF A WINDOW, AND THE SHGC SHOULD BE USED TO DETERMINE THE VALUE OF A WINDOW.

WHAT ABOUT AIR INFILTRATION??

ENVIROMENTAL CONSIDERATIONS??

SAFETY AND SECURITY??

LONG TERM VIABILITY??

WHEN THE ABOVE ARE INCLUDED IN REQUIREMENTS FOR WINDOWS RECOMMENDED BY THE DOE, THEN WE WILL HAVE SOMETHING.

THANK YOU,

THERMAL WINDOWS, INC.
BOB POOL, CHAIRMAN

Replied By: David Thoman from Thermal Windows Inc.

15 - Nov - 2004 10:00 PM VP

Marc LaFrance

Richard Karney
U.S. Department of Energy

Dear Marc and Richard,

I support the adoption of a performance based criteria for the Energy Star program. The Energy Star program can and should be built around actual total energy performance. This will leave the market free to invent new and better ways to meet the needs of the market. A performance based criteria will provide the best choices for the consumer now and into the future.

As the program is developed further I hope that it will be possible to address such important factors as long term durability and air infiltration in a differential temperature environment.

We manufacture both Vinyl and Thermally Improved Aluminum windows. Our customers are able to choose the window that best suit their needs. Providing accurate energy information will help our customers to make an informed decision. Lets not decide for them.

David Thoman
VP Mfg.
Thermal Windows Inc.

Replied By: Greg Patzer from Aluminum Extruders Council

16 - Nov - 2004 12:03 PM comments

Dear Marc and Rich:

We commend you and LBNL for your hard work in developing trade-off criteria based on equivalent energy performance. This effort represents an important advancement of the Energy Star Windows program, and we encourage the Department to implement the trade-off criteria developed by LBNL for the South Central and Southern zones as shown in the table in the [attached letter](#).

Greg Patzer
Director of Communications and Government Relations Aluminum
Extruders Council

Replied By: Keith Christman from The Vinyl Institute

17 - Nov - 2004 3:56 AM Vinyl Institute Comments

Vinyl Institute Comments on Analysis Results for Performance-based Ratings for the ENERGY STAR Windows Program prepared by Lawrence Berkeley National Laboratory for DOE October 1, 2004

Thank you for the opportunity to comment on the Lawrence Berkeley National Laboratory (LBNL) report Analysis Results for Performance-based Ratings for the ENERGY STAR Windows Program and the Department of Energy's consideration of trade-offs in the DOE window program.

We are opposed to trade-offs in the ENERGY STAR window program currently being considered by DOE.

The trade-off scheme does not promote DOE's public policy interest of saving energy since none of the alternatives considered result in a net decrease in energy use. Thus, any tradeoffs under the current plan represent a diversion of attention from DOE's primary goal for ENERGY STAR of reducing energy use. This action would be a diversion from the goal at a time of high energy prices and global security concerns that are aggravated by US dependence on foreign energy sources. DOE should only consider tradeoffs that result in net decreases in energy use. None of the options being considered would result in lower net energy use. DOE has stated an ENERGY STAR goal of moving towards u-factors of 0.1. Weakening the u-factors would be counterproductive to achieving this longer-term goal.

On page eight of the report, LBNL discusses the use of existing energy codes as a constraint. We agree that tradeoffs that do not meet this constraint should not be considered.

We agree with LBNL's conclusions for the North/Central and North Zone that no tradeoffs are feasible or desirable for these regions.

We also agree with LBNL that there is no compelling reason to add a tradeoff in the South Zone since products meeting the SHGC requirement routinely meet the U factor requirement. If DOE believes that there is some other compelling reason for implementing a tradeoff in this region, we would urge DOE to use the more conservative approach developed by LBNL. This more conservative approach would provide energy reductions in virtually all cities in the Southern Zone rather than having consumers in other cities pay for energy savings in Honolulu and Miami which is implied by the analysis.

LBNL's analysis tries very hard to find a feasible tradeoff scheme for the South Central region. However, despite LBNL's best efforts, LBNL has ultimately failed to develop a technically feasible tradeoff scheme that does not change the ENERGY STAR zones. Recall that one of the constraints discussed early in this process was that the ENERGY STAR zones not be changed. LBNL's development of a technically feasible solution excluding California violates this constraint of leaving the ENERGY STAR zones unchanged. Excluding California from a region fundamentally changes zones. Furthermore, excluding California from the rest of the South/Central zone would unnecessarily complicate the ENERGY STAR program and does not result in net energy savings that might justify such an approach.

Although LBNL was able to develop an energy neutral tradeoff for the South Central region excluding California, a detailed look at the 9 cities left in the analysis after California is excluded shows that tradeoffs don't really work well in the rest of the South Central zone either. Of the nine cities remaining in the analysis, a U-0.42 and SHGC-0.31 tradeoff only saves significant energy in Phoenix. Charleston and Fort Worth might offer very minor savings. In Birmingham, Atlanta, Oklahoma City, Memphis and El Paso this tradeoff would actually increase energy use (Figure 23). Figure 23 suggests the only place in South Central where there are truly beneficial tradeoffs is Phoenix. If DOE feels compelled to implement unjustifiable tradeoffs in South Central, rather than excluding California from the South Central region as LBNL has considered, the technical analysis suggests a better approach would be to allow tradeoffs only in Phoenix. However, we do not support this approach because it would unnecessarily complicate the ENERGY STAR program and in effect change the zones.

DOE should also consider that LBNL has used the bright lines of the ENERGY STAR program for this analysis for the South Central region. DOE

should recognize that many products being sold in the South Central region to meet the u-factor of 0.40 actually perform significantly better than this limit. We believe if actual performance of the ENERGY STAR windows sold in the South Central zone were used in the analysis rather than the minimum requirement of the standard, the analysis for South Central excluding California would also be unable to find energy neutral solutions. Allowing tradeoffs that might barely meet u-factors of 0.42 would actually result in increased net energy use.

In summary we are opposed to allowing tradeoffs in any of the ENERGY STAR zones. This conclusion is supported by LBNL's analysis and we commend them for their work. DOE should now conclude that tradeoffs in the current ENERGY STAR zones and program for windows are not feasible or beneficial to consumers. Tradeoffs in the existing program do not further DOE's goals for the ENERGY STAR program. We encourage DOE to conclude this effort and move on to other activities that will further DOE's ENERGY STAR goal of saving energy.

Sincerely,

Keith Christman
Director of Industry Affairs

Replied By: Multiple Window Companies

19 - Nov - 2004	4:15 PM	Joint Vinyl and Aluminum ENERGY STAR Letter
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November 18, 2004

Marc LaFrance
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy
1000 Independence Ave SW
Washington, D.C. 20585

Dear Marc:

We are a group of window manufacturers who produce both vinyl and aluminum framed windows, and we are writing in support of the adoption of performance-based ratings for the Energy Star program. Much of the debate around the performance-based ratings has focused on the relative strengths and weaknesses of vinyl and aluminum, and the potential impact on market share for these materials. We believe these arguments are misplaced and counterproductive. In fact, several of our companies manufacture more vinyl windows than aluminum, but we recognize that each material has its place in the market, serving specific needs or applications based on the relative attributes of each material. We support the use of performance-based ratings because, in the end, qualification for the Energy Star should be based on total-energy performance. Regardless of what framing material is used, if a window has a combination of U and SHGC properties which gives equivalent total energy performance as the current criteria, it should also qualify.

Sincerely,

Doug Harden
Atrium Companies, Inc.
Dallas, TX

Ralph Zuckerberg
Champion Window LP
Houston, TX

Steve Lewis
Croft Metals
McComb, MS

Mike Loter
The Don Young Company
Dallas, TX

Ivan Paredes
General Aluminum
Carrollton, TX

Darrel Booth
Jordan Company
Memphis, TN

Michael Nau
PGT Industries
Nokomis, FL

David Thoman
Thermal Windows, Inc.
Tulsa, OK

Mike Manteghi
TRACO
Cranberry Township, PA

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