

Submitted Electronically

October 17, 2019

Doug Anderson
United States Environmental Protection Agency
1310 L Street, NW
Washington, DC 20005

Re: Comments on *ENERGY STAR[®] for Windows, Doors and Skylights Version 7.0 Specification Discussion Guide*

Dear Doug,

Thank you for the opportunity to participate in EPA's process to review the eligibility criteria and program requirements for ENERGY STAR windows and doors. I am writing to provide brief comments on behalf of Andersen Corporation regarding the *ENERGY STAR for Windows, Doors and Skylights Version 7.0 Specification Discussion Guide* ("DG").

As you know and as we have stated in past comments to EPA, the ENERGY STAR program is very important to Andersen and we value our partnership with EPA to promote energy efficient windows and doors. Specifications and program changes have a major impact on our business. That said, Andersen has supported and continues to support EPA's general objective to improve ENERGY STAR program criteria when justified over time and increase energy efficiency through this process.

We appreciate that the questions for feedback and issues outlined in the DG are intended to help EPA determine whether there is a need and/or if the time is right to pursue a Version 7.0 of the program and, if so, what issues should be considered. This is an important threshold decision. **We believe the following considerations indicate that the time is not right to embark on the process to develop a Version 7.0 Specification:**

- (1) **The current ENERGY STAR program is working well and there is no compelling reason to reopen the requirements (particularly the U-factor requirement for the Northern Zone) at this time.** A revision to the specification will impose considerable additional costs, regulatory and otherwise, on EPA, industry, and consumers, and should not be embarked upon lightly. Promoting windows and doors that meet the current ENERGY STAR specifications, particularly for replacement purposes, would be a better use of resources. Program changes often lead to confusion, particularly among consumers. EPA should avoid a change to the program until there is a clear necessity to do so – particularly when the current program is performing successfully.

- (2) **EPA should wait until after the 2021 IECC is published and is being adopted and implemented in states before considering whether to begin work on a Version 7.0 Specification.** Since national and state energy code requirements are important to EPA, EPA should at least hold off on deciding whether to reopen and consider a Version 7.0 specification until after the 2021 IECC is published and is being adopted and implemented in states. At that time, EPA could request supplemental comments on any changes in the code and how they affect ENERGY STAR. Even if the 2021 IECC were to match or exceed ENERGY STAR, it should be kept in mind that it takes most jurisdictions several years to adopt and implement the IECC after it is published. This means that ENERGY STAR Version 6.0 will still be more stringent than most jurisdictions across the US for a number of years -- until such a time as a new IECC is published, adopted and implemented that is more stringent than ENERGY STAR. Indications thus far indicate that the 2021 IECC prescriptive values will continue to be less stringent than the current Version 6.0 program in the Northern climate zone and thus not support the need to issue a Version 7.0 at this time. While other climate zones may be affected by the end results of the ICC code development process, it is unlikely that any changes would meaningfully affect actual ENERGY STAR window performance in these climate zones, since the actual windows sold in these climates typically already meet these changes.
- (3) **ENERGY STAR qualification criteria are different from the energy code prescriptive values since the ENERGY STAR U-factor and SHGC maximum values are absolute for each product and cannot be traded off based on the performance of another product.** Energy code values, unlike ENERGY STAR, are prescriptive fenestration values that are not mandatory. This provides considerable flexibility in meeting the energy code requirements as compared to ENERGY STAR, where each product must meet the criteria. As a result, these prescriptive code requirements can generally be met on a weighted average basis where some products can have worse values and some better, so long as the average performance meets the requirement. In addition, these values do not preclude the use of less efficient products, so long as the reduced efficiency is traded-off for other efficiency features through a UA (U-factor times area) or simulated performance code compliance approach. Because of the different nature of energy code prescriptive values versus ENERGY STAR values, ENERGY STAR should not immediately and automatically upgrade its requirements in lockstep to reflect or exceed changes in energy code prescriptive values.
- (4) **EPA should review ENERGY STAR market share by climate zone.** While the high national market share cited by the DG may be an indicator of the overall success of the program, we do not think it should be a key driver to modify current window and door criteria. To be more useful, EPA's market share analysis should be more granular and should assess the market share in each climate zone and by windows vs doors vs skylights. The market share for products that significantly exceed ENERGY STAR should also be determined and shown.

- (5) **The ENERGY STAR window market share in the Northern Zone is likely substantially lower than the over 80% cited in the DG.** Based on our experience, we suspect that the share of products meeting the Northern Zone Window criteria is much lower than the 80% plus indicated in the DG for the nationwide market share. This suggests that consumers may not be willing to pay the upcharge for the increased Northern Zone window stringency adopted in Version 6.0 and that a further change in the specification is not warranted now. Further, the current Northern Zone window U-factor of ≤ 0.27 is either on the edge of dual pane performance, most commonly with either surface 4 (room side) low-e coatings or triple pane glass for certain product types such as metal clad. As surface 4 low-e coatings cause a perception among some builders/consumers of concerns with potential internal condensation due to their lower glass edge temperatures, this may also be a contributor to a lower Northern Zone market share.
- (6) **Changes to the ENERGY STAR Window Northern Zone U-factor will likely yield payback periods that are too long.** As EPA correctly recognized in developing Version 6.0, the payback period for achieving a U-factor meaningfully lower than the current Northern Zone window criteria will be substantially longer than for the current products and the payback period suggested in the DG. Such a U-factor will effectively require triple pane at a much higher cost; moreover, effectively requiring triple pane creates other significant problems, from a design, manufacturing and installation standpoint. Just as such a U-factor was not a reasonable and cost-effective option for Version 6.0, nothing has changed to make it a reasonable and cost-effective choice now. In fact, we suspect that energy prices have generally not increased significantly and have likely even decreased since the analysis for Version 6.0, which would make such products less cost-effective and create more barriers to purchase by consumers today. Further, replacement windows face an additional hurdle of limited frame depth space to accommodate triple pane glass thicknesses in many parts of the country where 2 x 4 wall construction has been predominant for many years.
- (7) **Consumer interest in triple pane products remains low.** Again, based on our experience, sales of products that meet the current ENERGY STAR Most Efficient Program indicate that there is very little consumer interest in triple pane performance given, we presume, due to the high cost and long payback period.
- (8) **California's new 0.23 SHGC should not be used to justify a change to ENERGY STAR.** While California has adopted a residential energy code with a prescriptive SHGC of 0.23, as with other energy codes as discussed above, the 0.23 SHGC is not mandatory. First, it is an area-weighted average value, which means that all products installed collectively must meet this average value. As an alternative, the builder may install and trade-off a less efficient window or glazed door for other more efficient measures (such as more insulation). Therefore, changing to a 0.23 SHGC is simply unnecessary for ENERGY STAR. The change is meaningful for the code, on the other hand, since the SHGC requirement helps to set a baseline for trade-offs. Further, any SHGC lower than 0.23 would likely result in using glass or low-e coatings in some products that would result in lower visible transmittance.

For these reasons, we urge EPA to hold off on pursuing a Version 7.0 Specification at this time. However, if EPA does intend to press forward on Version 7.0, we believe that the process would be more effective if EPA placed limits on its review, excluded certain issues from consideration at the outset, and focused everyone's efforts on those aspects of the current specification most in need of a review.

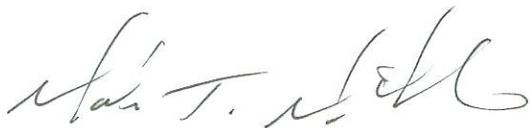
Specifically, we recommend that EPA declare at the outset that it will not review or modify the Northern Climate Zone U-factor criteria in this process. Instead, in evaluating new criteria, EPA should focus on climate zones where national model code (IECC) requirements exceed existing ENERGY STAR, now or in the near term. Traditionally, one of the most controversial issues is the criteria for the Northern Zone. This issue is particularly problematic now that any meaningful reduction (below 0.27 U-factor) would likely require triple pane in most cases, which would be an enormous technology change for the program. It would be best to close off the debate on this issue now.

If EPA decides to move ahead with Version 7.0, we also strongly recommend that EPA establish a longer timeline for both the revision process and the implementation process to allow adequate time to fully evaluate any proposals and for ultimate implementation of a revised specification.

As a supplement to this communication, we offer our preliminary perspective and recommendations on the requests for feedback and some of the other issues outlined in the Discussion Guide. We have attached our brief comments on these requests to this letter for EPA to consider when and if it moves forward on a Version 7.0.

We thank you for listening and carefully considering our comments and concerns and hope you will adopt our recommendations. We reserve our right to update and change our views on these and any other issues as this matter progresses. Please let me know if you have any questions or comments or would like to discuss any of our views.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark T. Mikkelson". The signature is fluid and cursive, with a large, stylized initial "M".

Mark T. Mikkelson
Director, Corporate Regulatory Affairs

Andersen Corporation's Supplemental Comments and Responses to the EPA's Requests for Feedback in the EPA ENERGY STAR Windows, Doors and Skylights Version 7.0 Specification Discussion Guide

October 17, 2019

Andersen offers the following comments in response EPA's specific requests for feedback and other issues addressed by EPA in its Discussion Guide (our feedback responses are in highlighted in blue following each request and we reserve the right to modify our views after additional consideration and based on additional information):

Andersen comments in response to EPA Discussion Guide ("DG") questions:

1. Are there better data sources for available products than those proposed in this Discussion Guide?

The NFRC values that are subject to FenStar (as a proxy) are likely the best public source for products that are theoretically "available". It should be recognized, however, that "availability" does not necessarily mean that any significant number of these products are produced, sold, or that they are cost-effective. The individual manufacturer should be able to provide more information as to the "availability" of specific individual products upon request.

2. What are the most common pathways (component combinations) that manufacturers use to make ENERGY STAR certified products?

- In general and by climate zone, here are the likely common pathways:

- Northern Zone Window – Likely a clad (clad wood or some type of composite or fiberglass) product using a dual pane multiple silver layer low-e product and a surface 4 low-e coating
 - Aluminum clad may need to use the alternate performance path with a high solar low-e or possibly triple pane
- North Central – Clad product with dual silver low-e
- South Central – Most framing materials with a triple silver low-e to meet the SHGC
- Southern – Same as South Central

3. Are there pathways represented in the NFRC CPD that should not be considered viable pathways?

Nothing to add at this time.

4. Among the most common pathways, which (if any) energy performance ratings should EPA consider to be outliers?

Most likely those with exotic gas fills such as krypton. Triple pane is also not widely utilized except for those products aimed at ENERGY STAR Most Efficient.

5. What sources should EPA consider when evaluating what is a reasonable payback period for building materials like WDS?

First, the difference in price actually paid by the consumer for a current ENERGY STAR Version 6.0 certified product compared to a product meeting any proposed ENERGY STAR Version 7.0 criteria should be the “price” used to determine any payback periods.

At a minimum, the payback period should not exceed any of the following:

- (1) the average number of years a homeowner stays in a typical home (we think this is generally 7 - 10 years; the time frame should not just include newly constructed homes, but also consider existing homes which may have a different average);
- (2) the number of years such products are typically warranted and/or expected to provide such energy efficiency; and
- (3) the number of years over which a typical consumer replacing their windows would expect to recoup their investment in new windows.

6. What other methods for estimating the incremental costs of energy performance improvements for windows, doors, and skylights should EPA consider?

In our view, it is the incremental cost to consumers of an ENERGY STAR product compared to the cost of a current energy code compliant product that is the most appropriate metric; this cost is the street or retail price/cost increase. Any proposed methodology to determine incremental costs for purposes of cost-effectiveness, therefore, should be measured against how well it captures the incremental cost/price increase to retail consumers. While some manufacturers may be able and willing to provide street pricing to D & R International confidentially, this pricing may vary from the actual price paid by a given consumer given that retail pricing may vary due to discounts or promotions.

7. Which incremental cost estimation methods are the most accurate?

As noted above, EPA should use the best approach available to determine typical/average retail cost/price to consumers for the product upgrade necessary to achieve the corresponding efficiency benefit:

- We assume that the Manufacturer Costs approach is intended to obtain these price increase estimates from the manufacturer (not the increase in the cost to the manufacturer, but the increase in cost to consumer).
- In principle, while we believe that the retail/list/street cost/price data obtained from the manufacturer is a reasonable starting place, the actual price paid by the consumer as part of a “Mystery Shopping” exercise could yield the best data.
- We do not recommend relying on the Component Bill of Materials approach. We would be surprised if suppliers or manufacturers would be willing to share this information, even confidentially.

- Most importantly, this method will not produce the retail consumer cost of any incremental upgrade. It will, at best, provide the price charged by component manufacturers (we assume EPA will seek the component manufacturer price, not that component manufacturer's cost to produce the component), which ignores the additional window manufacturer cost/upcharge to the consumer. At a minimum, the component upgrade price will need to be adjusted upward to reflect the difference between component supplier charges and retail window manufacturer prices to consumers for such upgrades. However, it will likely be difficult to determine the appropriate adjustment.
- The Retail Pricing and Mystery Shopping approach outlined by EPA, if successful, could provide the best and most important data (since it properly appears to seek price differences to consumers), even though it suffers from the limitations already identified by EPA.

8. Are there any additional component categories that EPA should consider researching?

No other comment at this time.

9. Should EPA consider combining the ENERGY STAR Southern and South-Central climate zones?

Yes.

This proposed simplification is a good idea. Fewer climate zones will result in less consumer confusion and make it easier to participate. Improving the U-factor for windows sold in what is currently the Southern zone will produce additional energy savings (although these savings are likely already occurring in most cases due to the types of products that meet the current criteria). There is no good reason for a separate Southern climate zone with the only difference a 0.40 U-factor rather than a 0.30 U-factor. Given the SHGC requirement, most windows that meet the 0.40 U-factor requirement should find it relatively easy to also meet a 0.30 U-factor.

10. What impact would the potential merging of these climate zones have on consumers and partners?

While there may be some slight increase in cost for some windows, as noted above, we expect that most of the ENERGY STAR windows in the market already meet the 0.30 U-factor. Consumers will benefit from assured energy savings. For partners, this would allow them to streamline their offerings, simplify their marketing message and reduce consumer confusion in southern states.

11. Should EPA consider setting a minimum SHGC in the Northern climate zone?

No.

This is a very bad idea. EPA has rejected this idea in the past and should not revisit or consider this issue again:

- Nothing has changed that would support this idea since previous EPA decisions not to establish a minimum SHGC. Such proposals have also been consistently rejected

in the code development process. In fact, changing weather/climate data suggests that an even greater emphasis should be placed on reducing (not increasing) solar gain today.

- Given the importance of ENERGY STAR to existing homes and the replacement window market, a minimum SHGC would be a very bad answer for most existing homes that are not designed for passive solar. For example, certain orientations, particularly west (and to a lesser degree east and south without an overhang) will, in addition to increased energy use, have a likelihood of significant consumer discomfort due to the increased solar gain. Since the orientation of the window is not known in advance, it would be far better to leave it to the consumer to choose the correct SHGC for their home in the Northern climate zone. As we view the ENERGY STAR program as primarily for replacement products (energy codes drive new construction); assuming the home is adequately designed for passive solar is not appropriate.
- Peak demands for most electric utilities in the northern US are typically driven by summer peak cooling loads. Requiring a higher window SHGC will result in:
 - (a) more electrical peak demand leading to the construction of more power plants,
 - (b) higher HVAC costs (due to sizing); and
 - (c) summer discomfort (potentially leading to changing the thermostat and using even more electricity to achieve comfort)

EPA should factor in the consumer cost for larger HVAC units and a likely consumer response to discomfort into any analysis of a minimum SHGC.

12. What impact would a minimum SHGC have on product availability, consumer expectations, and the veracity of the ENERGY STAR label in the window market?

Depending on the level of the minimum SHGC, it could significantly affect product availability and require manufacturers to offer a significantly different window than for other climate zones. Consumers expect ENERGY STAR windows to perform and be comfortable in all seasons and for all orientations. A high SHGC product would not meet this standard; such a departure from past practice would lead to consumer confusion and could potentially mislead the consumer. Consumer dissatisfaction is likely to lead to negative impacts on the ENERGY STAR brand.

13. Should EPA consider moving IECC Zone 5 out of the ENERGY STAR Northern climate zone and into the North-Central climate zone?

Yes.

This would be a good idea. Moving IECC CZ5 into the North-Central with IECC CZ4 would simplify the program in a positive way provided the current North-Central criteria remained the same. With this change, and combining the Southern and South-Central zones, EPA can set same U-factor requirements for most of the country, leading to more efficiency at a lower cost. Moreover, CZ5 is closer to CZ4 than CZ6 from a climate perspective when establishing window performance criteria. We believe that

solar control (similar to CZ4) makes much more sense for this zone than a high solar gain trade-off or the 0.27 U-factor. Further, it would align with the door criteria which has a maximum SHGC.

14. What impact would changing climate zone boundaries have on consumers and partners?

By combining CZ5 with CZ4 in the North-Central climate zone, consumers and partners would benefit from criteria and performance more appropriate for their climate. Given the high population of IECC Zone 5, the ENERGY STAR program may become more relevant for major population zones in this climate that have both cooling and heating requirements.

15. What characteristics are most common among ENERGY STAR certified windows sold in IECC Zone 5?

Windows designed to meet code requirements in IECC Zone 5 typically use moderate to low solar gain, low-e double pane glass with argon. To meet the current ENERGY STAR 0.27 U-factor, the windows would typically add a fourth surface low-e or possibly switch to a higher solar gain low-e (to utilize the trade-off). We would support maintaining the current requirements for the expanded North-Central zone.

16. Should EPA consider including full-lite sliding patio doors in the ENERGY STAR Windows specification?

No.

The current system works well with the current U-factor and SHGC requirements and is more simplified.

17. What impact would this potential change have on consumers and partners?

This potential change (including full-lite doors under the window requirements) would create unnecessary confusion and require a substantial change in labeling and marketing without any real benefit. The U-factor requirement would be weakened in the Southern climate zone (from 0.30 to 0.40) and slightly strengthened in the Northern climate zone (from 0.30 to 0.27) for those that do not use the SHGC trade-off. The lower U-factor would exclude some products in the Northern zone and/or make the products more costly. Additionally, patio doors (sliding or hinged) commonly have low profile sills with durable materials to account for frequent foot traffic or wheelchairs and as such the lower height of a patio door sill can result in higher U-factors than comparable windows.

18. Should EPA consider sunsetting the ENERGY STAR specification for swinging doors if the analysis does not reveal significant cost-effective energy savings for consumers?

EPA should maintain the current approach to glazed swinging and sliding doors (> ½-Lite). We do not have a position on opaque doors and/or doors with less than ½-Lite.

19. Should EPA sunset just part the criteria if additional cost-effective energy savings are only possible for some products, such as glass-only doors?
Regardless whether EPA decides to sunset part of the criteria, it should maintain and not sunset the criteria for glazed doors (> ½-Lite).
20. Should EPA consider including skylights in the ENERGY STAR Windows specification?
ENERGY STAR skylights should have a separate specification from windows to avoid confusion.
21. What significant technical and market differences between windows and skylights should EPA consider in its analysis?
No comments to offer at this time.
22. Should EPA consider sunsetting the ENERGY STAR specification for skylights if the analysis does not reveal significant cost-effective energy savings for consumers?
No comments to offer at this time.
23. What is the market penetration of products with dynamic glazing or integrated shading systems for residential applications? Do stakeholders expect the market for such products to expand in the next few years?
We do not have specific market penetration data, but we expect market penetration to remain low.
24. How should the process for certifying and listing dynamic and/or integrated products be revised to better evaluate the performance and availability of such products?
These types of products should only get credit for performance that is automatic, saves equivalent energy, and cannot be overridden by the operator of the product.
25. What share of residential WDS are sold in places where high-altitude and/or impact-resistant products are necessary?
We do not have specific data responsive to this question. However, even if these areas represent a fairly small portion of windows sold, it is important that these areas have a reasonable, cost-effective ENERGY STAR Windows designation (like the rest of the country). One way to think about this issue is to consider that setting criteria for these areas is similar to differentiating products based on climate zone.
26. Should EPA reconsider allowances for high altitude and/or impact resistance in a potential revised specification, and why or why not?
Yes.
ENERGY STAR should adopt a window specification for such products, with a less stringent U-factor requirement to reflect the adjustments made in these products to meet high altitude and/or impact resistance considerations. The 2021 IECC will have an allowance of an extra 0.02 U-factor for such products (installed above 4000 feet in elevation or where impact resistance is required), allowing 0.32 U-factor for such products in climate zones where a 0.30 is otherwise required. (This new IECC proposal

is now final since there was no public comment submitted on it after it was recommended favorably by the IECC residential code development committee.)

27. Should EPA consider extending the effective date beyond the typical 9 to 12 months after release of a final specification?

Yes.

A longer implementation period would facilitate an easier transition, allow stakeholders to more easily clear out existing inventory that is labeled and provide an opportunity to conduct advance marketing and education on any changes. Implementation should begin with a new calendar year and at least 12 -18 months advance notice. If there are significant changes to criteria, considerable additional time may be necessary to respond to changes. It would also be beneficial if there is a two-month window for an early to latest deadline for labeling implementation, similar to what Canada has established for their ENERGY STAR Version 5.0 Specification.

28. How would an extended implementation schedule make it easier to meet a potential revised specification?

As stated previously, it would give companies time to prepare and have product ready for sale on opening day of a new specification. An effective date close to the beginning of a calendar year would be best given business and marketing preparations for website, product literature, systems and pricing updates, builders shows, etc.

In addition to the questions by EPA above, we offer the following additional comments on certain other issues addressed in the DG:

Comment on the appropriate approach to analyzing energy savings of various options (DG at page 8):

We are not familiar with the specific computer building energy models/analysis approaches (by LBNL and NREL) that are referenced by EPA; however, we do support a move away from outdated approaches like RESFEN and other analysis methods used previously.

In principle, we support use of the:

- (a) most updated state-of-the-art building simulation model (which we understand to be Energy Plus);
- (b) most updated weather data; and
- (c) building modeling assumptions and approach consistent with the most recent IECC (simulated performance compliance method) and used by PNNL in its IECC model code determinations.

We recommend that EPA release/make available to the public its assumptions, data and models with sufficient time allotted for stakeholder review, input and analysis prior to EPA reaching any conclusions based on such modeling.

Comment on aligning with ENERGY STAR Canada (DG at page 4):

In the DG, EPA briefly discusses ENERGY STAR Canada specifications and then notes that EPA “must evaluate a potential specification revision in the United States on its own merits.” We support EPA’s approach on this issue. While as a philosophical concept it might seem appealing to “align” EPA’s specifications with ENERGY STAR Canada, we do not believe that the Canadian program, climate, market and focus on heating-related issues are particularly comparable, relevant or useful to the US market and program. Obviously, the U.S. is different (with a much larger, different and more diverse market and climate) and cannot simply follow Canada’s direction.

As for Canada’s upcoming Version 5.0 specification effective January 1, 2020, the 0.21 U-factor is far too low and aggressive for the northern U.S. – it is essentially the current US ENERGY STAR Most Efficient U-factor.

As for Canada’s alternative ER approach, the reliance on high solar heat gain for energy savings is simply not a reasonable approach for US climates and building practices and would create electrical peak demand and discomfort issues. U.S. homes, even in the Northern Climate Zone, are generally cooled as well as heated.