



Via Electronic Submission

February 8, 2013

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ENERGY STAR Home Improvement Program
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460-0001

Subject: ENERGY STAR Program Requirements for Residential Windows, Doors, and Skylights – Version 6.0 Draft 2 Eligibility Criteria

Dear Mr. Anderson:

The Window and Door Manufacturers Association (WDMA) appreciates the opportunity to comment on EPA's ENERGY STAR Program Requirements for Residential Windows, Doors, and Skylights – Version 6.0 Draft 2 Eligibility Criteria. As you know, WDMA members have long been supporters of the ENERGY STAR program and have contributed substantially in growing the ENERGY STAR brand in the window, door and skylight sector.

In developing these comments, we have carefully reviewed the Draft 2 Eligibility Criteria, as well as the background material that supports it. We appreciate the changes that EPA has made in Draft 2 related to air leakage, installation instructions, door SHGC and other aspects of the proposed Version 6.0 eligibility criteria. We believe that these changes are significant improvements and will make the new criteria both more rigorous and easier to implement.

At the same time, we continue to have serious and specific concerns with major elements of the draft eligibility criteria. These include:

- The Effective Date – We are disappointed to see that EPA remains committed to an effective date of January 1, 2014. As we noted previously and discuss again in Section 2 of these comments, this date does not provide sufficient time for manufacturers to take all necessary steps to transition to the new specifications.
- The Draft 2 Specifications for Windows in the Northern Zones – We are deeply concerned that EPA has not modified the proposed specifications for windows (other than adding energy equivalent performance factors in the Northern Zone, which remain questionable). Based on a thorough review of available information, we find that the Northern Zone specifications do not appropriately balance the six guiding principles, appear inappropriately driven by EPA's concerns over market share, and are based on flawed analyses of both product availability and cost-effectiveness. We provide a detailed discussion of all of these issues in Section 3.

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- The Draft 2 Specification for Windows in the North-Central Zone – We believe that EPA failed to fully consider and respond to comments recommending EPA set the U-factor criteria for the North-Central Zone at 0.30 versus the proposed 0.29. WDMA believes EPA needs to reconsider the comment, its response to it and the proposed criteria for this climate zone. This concern is discussed in Section 4.
 - The Draft 2 Specifications for Skylights – WDMA is also very concerned that EPA has not modified the proposed specifications for skylights. As with windows, we find that EPA’s proposal does not appropriately balance the six guiding principles, appear inappropriately driven by EPA’s concerns over market share, and are based on flawed analyses of both product availability and cost-effectiveness. These issues are summarized in Section 5.

Section 1: WDMA’s General Concerns Regarding EPA’s Approach

Before turning to those specific issues, however, we want to provide EPA with a summary of several general concerns we have identified in the process that EPA has undertaken in developing these proposed specifications and the manner in which the Agency has conducted the important analytical and procedural tasks required to review and revise these ENERGY STAR specifications. As we have worked through this process with EPA, we have identified several areas of general concern, as described below.

1.1 Integrity of the Stakeholder Process

WDMA has been working constructively with EPA from the beginning of the ENERGY STAR Version 6.0 revision. We and our members have provided extensive comments, participated in all EPA stakeholder events, and met with EPA on more than one occasion. EPA should not be surprised that we were very disappointed when we saw that our key concerns with the Draft 1 Eligibility Criteria had not been addressed in Draft 2. What was more disturbing, however, was the inadequacy of EPA’s response to the concerns we raised.

Our specific concerns in this regard are described in more detail in Sections 2 – 5, but here we want to raise two important issues that have a direct impact on the integrity of the stakeholder process EPA launched back in 2011.

First, it is our conclusion that EPA did not engage substantively in many of the comments we provided. In fact, EPA did not provide any response to several of our significant comments. For example, one of our member companies, JELD-WEN, provided EPA with a reasoned analysis of the factors driving the increase in market share for windows between 2001 and 2011. EPA did not respond to this analysis. In other cases, EPA did respond, but their responses were general, cursory, or indicated that they had not fully understood our concern.

The integrity of the comment process is critical to the integrity of the overall stakeholder process. As EPA knows, organizations and companies expend significant resources to develop comments, and they do so because the issues at stake can have profound economic consequences. EPA needs to hold up its end of the bargain, and engage seriously and openly in the issues raised by commenters. EPA also

needs to provide significantly more detail in response to comments, to ensure that the stakeholders understand why EPA reached its decisions.

Second, and as will be discussed in more detail in Section 2 on the implementation date, WDMA is concerned that EPA had largely decided what the outcome of the Version 6.0 revision process was going to be before it began. We say this because EPA told us, in response to comments on the effective date, that stakeholders have had sufficient time to prepare for the new criteria because we have known what the eligibility criteria would be for 27 months (e.g., back to the beginning of the process). WDMA likely speaks for many stakeholders in rejecting this assumption. We engaged in the stakeholder process because we believed that EPA would be open to change if it found our views persuasive. It now appears that EPA was set on a particular value or range of values from the beginning, which means that the stakeholder process has been an unnecessary waste of time and money. There is no integrity in the process if EPA is not willing to modify the specifications in response to stakeholder input or provide adequate reasoning for why it is unwilling to do so.

1.2 Relevance of Market Share in ENERGY STAR Revisions

After careful review of the supporting material for the proposed Version 6.0 specifications, WDMA remains concerned that EPA has used market share data in a manner that is inconsistent with the ENERGY STAR strategic vision and principles. EPA's strategic vision is clear that the purpose of market share analysis is to identify whether an ENERGY STAR specification revision should be initiated. As EPA states in the Strategic Vision:

Specifications for slowly advancing products are reviewed every three years or when market share reaches 35%.¹

EPA is also clear, however, that high market share does not mean that the Agency must revise a specification, nor is EPA required to reduce market share by a particular amount through the revision. On this topic, the Agency says:

High market shares alone are not sufficient to warrant a specification revision as high market shares do not by themselves diminish the value of the program. No matter what the market share of ENERGY STAR qualified products, a consumer who purchases a labeled product gets a product that will contribute to a cleaner environment and save them money without sacrifice in performance.² ...

...[E]ven a market penetration of 50% or greater does not guarantee that a specification will be revised, or that the revision will occur immediately, as other factors are taken into consideration.³

We assume that the Version 6.0 revision should be consistent with EPA's strategic vision and follow EPA's guiding principles. On this basis, we have supported EPA's decision to initiate the revision, and we have participated at each stage of the process.

¹ US EPA, "ENERGY STAR Products Program Strategic Vision and Guiding Principles," May 2012, p. 7.

² Strategic Vision, p. 7.

³ Strategic Vision, p. 8.

At the same time, we have concluded that market share is given greater relevance than appropriate in setting the level of the revised specification, and that EPA has erred in giving this metric undue weight. EPA has made several statements in Draft 1 Criteria and Analysis Report (CAR) that indicate that it has set the proposed specifications with an eye to reducing market share. EPA has even stated that it is seeking to reduce market share by specific amounts, and evaluated the results of its proposed specifications in terms of how much market share is reduced. These issues are discussed more detail in sections 3.2 and 5.2 below.

We find EPA's use of market share data in the revision of the Version 6.0 specifications to be inconsistent with the guiding principles of the program. EPA should not set its revised specifications with an aim to reduce market share by a particular amount. The Agency should set the specifications at the point where the six guiding principles of the ENERGY STAR products program are in appropriate balance. We therefore request EPA to ensure that market share is not given undue weight.

1.3 Relevance of Product Availability in setting ENERGY STAR Specifications

WDMA notes that EPA has identified product availability as a metric that can be used to identify when the six guiding principles are in appropriate balance, and we note the following statement from EPA's Strategic Vision on this issue:

Experience has shown that it is typically possible to achieve the necessary balance among principles by selecting efficiency levels reflective of the top 25% of models available on the market when the specification goes into effect.⁴

It is for this reason that EPA needs to compile and assess data related to the availability of products that can meet a particular proposed specification. Yet in the Version 6.0 revision, as noted above, it appears that EPA has focused heavily on market share at the expense of conducting a proper product availability analysis. It is one thing to use market share to evaluate *when* the criteria should be revised. It is quite another to rely on market share to determine how dramatically the criteria should be revised. The ENERGY STAR program's guiding documents are clear that product availability, not market share, is the recommended metric for evaluating the adequacy of a product specification.

Given the important role of the product availability analysis in the revision process, we request EPA to confirm that it is using (and has used) product availability and market share data for their intended purposes.

1.4 Transparency of the Data used in its Cost-Effectiveness Analysis

Finally, WDMA also remains concerned over the transparency of the data EPA used in its cost-effectiveness analysis. EPA describes its approach in the Draft 1 CAR, but this description is very general. The Agency has explained the type of data it collected from manufacturers in terms of what types of products it asked them to focus on, and what type of cost comparison EPA was looking for. EPA has not provided any details on the data it received, however, or how it used that data to determine general cost values. All EPA has said is that, based on the data received, EPA "arrived" at the cost values presented in the CAR tables.

⁴ Strategic Vision, p. 2.

WDMA recognizes that cost information provided by manufacturers is proprietary, but that does not preclude EPA from aggregating the data in a more useful manner. WDMA asked the Agency for additional background information in its comments on the Draft 1 specification, and the Agency did not sufficiently respond. WDMA is asking again for this information in these comments, as described further in Sections 3.3 and 5.3. The cost assumptions are a key driver of cost-effectiveness, and without more information, it is impossible for stakeholders to review EPA's analysis in any meaningful way.

1.5 What is a "Reasonable" Payback Period?

We continue to find it disturbing that EPA believes the average payback periods for all products is reasonable and acceptable to consumers and furthermore that the lifetime of a product is an acceptable payback period. As we stated in our comments on Draft 1 and the CAR, we believe a much more reasonable payback period and one that is truly acceptable to consumers is in the range of 7-10 years. That belief is based upon extensive consumer research conducted by the National Association of Home Builders (NAHB) on what an acceptable payback period is for consumers for cost-effective changes in energy efficiency building code provisions. NAHB's research identifies a maximum payback of 10 years in order for consumers to find the investment cost effective. We believe that EPA should reassess the proposed criteria based on payback that does not exceed 10 years.

Section 2: WDMA Comments on the Effective Date

During the comment period on the Draft 1 CAR, WDMA and several other stakeholders recommended that the implementation date for the final criteria be moved from January 1, 2014 to January 1, 2015. Two broad areas of concern supported this recommendation:

1. The time, financial and human resources necessary for the transition to new criteria, including modifying production, qualifying and labeling new products, market assessments, modifications to marketing plans and materials, launching new product lines, etc.
2. The unhealthy economic conditions the U.S., and this industry, are facing and expect to face for the foreseeable future.

Surprisingly, although EPA summarized the gist of these comments in its "Responses to Comments" matrix, it did not respond directly to our concerns. Instead, EPA's response stated that delaying the implementation date would make ENERGY STAR "irrelevant" in several parts of the country as more states adopt the IECC 2012. The Agency also claimed that companies had been on notice regarding what the final criteria would require for more than two years, stating:

Please note that EPA provided potential criteria ranges and new program elements in the Framework Document, which was published in October 2011, 27 months before the planned implementation date of the Version 6.0 criteria.⁵

⁵ U.S. EPA, "Responses to Comments on ENERGY STAR for Windows, Doors and Skylights Version 6.0 Draft 1 Criteria and Analysis Report," Comment #1, p. 1.

On this basis, EPA noted that the implementation date has already been pushed back and that it did “not anticipate any further delays.”

As described further below, we find EPA’s response lacking in several respects. First, EPA’s response indicates that the Agency expects manufacturers to begin implementation planning *before* the criteria changes are finalized. This raises profound concerns regarding EPA’s openness to stakeholder input throughout this lengthy revision process. Second, EPA’s response to our comments on Draft 1 does not acknowledge or address the substantive reasons the industry provided regarding why the proposed implementation date is not feasible.

2.1 EPA’s response raises doubt over the integrity of the Stakeholder Process

One of the core reasons why EPA appears to believe that the proposed implementation date of January 1, 2014, is reasonable is because EPA announced potential criteria ranges and new program elements “27 months ago.” It is true that EPA provided an outline of its proposal back in October 2011, and since that time WDMA and other stakeholders have engaged with EPA in what we thought was a robust stakeholder process on the development of the Version 6.0 criteria.

However, as previously mentioned in Section 1.1, we entered the Version 6.0 revision process assuming that our comments would be thoughtfully considered on the merits, and that EPA would modify its proposal if it found our comments persuasive. With a few exceptions, EPA’s response to the Draft 1 comments indicates that this assumption was incorrect. It now appears that EPA knew where it intended to set the specification from the beginning of the process, as far back as October 2011. Although not articulated at the time, EPA apparently went into this stakeholder process expecting manufacturers to begin preparing for implementation based on *proposed criteria*, rather than waiting for the final criteria.

EPA’s assertion that its provision of potential program elements in the October 2011 Framework Document somehow justifies a short implementation horizon is disturbing. If this is the case, it implies that the stakeholder process we took so seriously has been largely predetermined and a significant waste of our time and resources. Each time EPA has requested comments, we have provided them with the expectation that EPA would not be going through this process if it did not hold open the possibility for significant modification. It is no longer clear, however, that EPA is similarly committed.

2.2 EPA did not make its intentions clear in the Framework Document

What is equally troubling is that EPA now appears to be rewriting history with respect to the “potential criteria ranges and new program elements” described in the Framework Document. In its response to our previous comments, EPA uses the Framework Document to justify its view that stakeholders knew where the Version 6.0 criteria were likely to end up “27 months before the planned implementation.” The problem is, the Framework Document made no such statements.

As EPA stated in the first paragraph of the Framework Document:

This framework outlines EPA’s reassessment of the current ENERGY STAR Windows, Doors, and Skylights requirements and is intended to facilitate discussion of this assessment and possible resulting modifications to these ENERGY STAR requirements. ... The Agency welcomes

stakeholder comments on all topics related to this specification revision, including topics not addressed in this document.⁶

EPA further noted that “the research that underlies EPA’s findings is preliminary,”⁷ and the Agency committed to “consider all comments received carefully as it develops a Draft 1 Version 6.0 Specification for windows, doors, and skylights.”⁸

With respect to the preliminary criteria ranges for windows presented in the document, EPA explained that it “welcomes feedback on these preliminary proposed levels as well as supporting data if alternate levels are suggested.”⁹ EPA also asked in the “Items for Comment and Discussion” section:

Are there specific criteria you find particularly concerning? If so, why? (Please provide data substantiating your concerns.)¹⁰

EPA provided the same question regarding the proposed ranges for skylights.

In light of these statements, EPA’s response to our comment on Draft 1 is unsupportable. To the contrary, stakeholders engaged in EPA’s process in good faith and are reasonably waiting for the final criteria to be determined and published by EPA in order to accurately determine what changes must be made to their product designs, materials and manufacturing as well as planning for new testing, certification, marketing, etc. Unless EPA pushes the implementation date back, industry will have less than nine months, not 27, to transition to the new specifications.

2.3 The 2014 implementation date jeopardizes EPA’s review of Draft 2 comments

WDMA is very concerned that meeting the January 1, 2014, will require EPA to short-change the last phase of the stakeholder process. Under the 2005 Energy Policy Act, the effective date of a new or revised specification is to be 270 days after publication (although this date can be modified if necessary).¹¹ For EPA to meet a deadline of January 1, 2014, that means the final specification must be published no later than April 5, 2013.

Meeting this date leaves EPA only eight weeks to respond to comments, make revisions, obtain the necessary reviews and management approvals, and publish the standard. This schedule provides less time than EPA spent reviewing comments on the Framework document (10 weeks) and the Draft 1 proposal (14 weeks), which were presumably subject to less rigorous review and approval because they were drafts.

We are now entering the most critical stage of the revision process, and EPA should undertake the determination of final revisions with rigor and diligence. EPA must consider stakeholder input thoroughly, and not short-change consideration of comments because of an arbitrary scheduling

⁶US EPA, “ENERGY STAR for Windows, Doors, and Skylights Version 6.0 Product Specification Framework Document,” October 2011, p. 1.

⁷ Framework Document, p. 1.

⁸ Framework Document, p. 2.

⁹ Framework Document, p. 6.

¹⁰ Framework Document, p. 8

¹¹ Energy Policy Act of 2005, Title 1: Energy Efficiency, Subtitle C – Energy Efficient Products, Section 131.

decision. As EPA knows, the changes it is proposing will have profound implications for manufacturers, consumers, and the environment, as well as for the integrity of the ENERGY STAR program. As such, EPA's decisions should not be rushed.

2.4 EPA's response did not address specific concerns on the implementation schedule

Comments submitted by WDMA and several other manufacturers have previously explained why we have concluded that implementation of this standard is more appropriately accomplished in 18-24 months. Based on input from our members, we are providing a more detailed list of the types of activities required to transition to a new standard. The activities include:

1. Determining product re-design requirements
2. Finalizing glass options and assessing customer impact and acceptance
3. Determining the impact of product changes to manufacturing and supply chain
4. Updating NFRC Certification Authorization Reports with new product/glazing changes
5. Implementing the product, glass, supply chain, and manufacturing changes necessary to support the new performance requirements, including:
 - Product labeling/systems changes
 - Changes to product installation instructions
 - Market literature/website/point-of-purchase displays
 - Updating ordering software (used by dealers)
 - Inventory changes and transitions with dealers and big box stores

As this list indicates, successfully transitioning to the new requirements touches every aspect of a manufacturer's business: design, engineering, manufacturing, certification, and marketing. Manufacturers will need to implement changes across their organizations, while also working with dealers, consumers, and their supply chain.

Although we've previously provided information substantiating our concerns, EPA has not yet engaged in the substance of our comments. Instead, the Agency claims that the 2014 implementation date effectively provides two years to transition because the industry should have predicted two years ago what the final specifications would be. We've already described why EPA cannot expect industries to prepare to transition to specifications that are not yet final, and the detailed list of tasks that must be undertaken make our concerns even more compelling.

Finally, we note that meeting the proposed specifications will be especially problematic for windows and skylights produced for the Northern Zone markets. Despite EPA's assumptions about the use of double-pane products, the proposed criteria, if approved, will force many manufacturers into triple-pane designs requiring them to either redesign their windows to accommodate the larger triple-pane unit or find alternative ways to accommodate triple-pane units within the existing chassis designs. Redesigning an entire product family will likely take anywhere from 1 to 2 years plus hundreds of thousands of dollars in testing, tooling, equipment and implementation costs.

2.5 “Reducing market share” is not reason to impose a January 2014 deadline

We note that a few stakeholders supported EPA’s decision to require rapid implementation of the Version 6.0 specification because they believed that providing only a few months to transition would result in greatly reduced market share.¹² In its response, EPA stated that it “appreciates the support for the proposed implementation date.”

As explained previously, WDMA (and many other stakeholders) believe that EPA is placing too much weight on the “market share” issue and too little emphasis on other important principles like cost-effectiveness for the consumer, etc. The impact of the implementation date on market share is not relevant to the determination EPA needs to make in setting a reasonable implementation date.

Section 3: Proposed Criteria for the Northern Zone is based on Flawed Analysis

WDMA continues to have significant concerns regarding the proposed specifications for windows primarily in Northern and North-Central Zones. We further find that EPA did not properly balance the six guiding principles of the ENERGY STAR program. Finally, we are disappointed to learn that EPA did not respond completely or adequately to comments previously provided on this topic. For this reason, we must again bring our concerns to EPA’s attention.

As stated in its comments on Draft 1, WDMA believes that the proposed U-factor of 0.27 in the Northern Zone is overly aggressive and unjustified. WDMA has determined that a more appropriate U-factor would be 0.29 in this zone for the several reasons.

3.1 Product Availability

WDMA continues to have concerns regarding the product availability data relied upon to develop the proposed windows specifications. WDMA provided comments to EPA on these issues on the Draft 1 CAR, but no revisions were made to the proposed specification. We have since performed additional analysis, which indicates that EPA’s analysis has used product availability in a manner that is inconsistent with EPA’s guiding principles and does not support the specifications they have proposed.

3.1.1 EPA improperly used market share in the revision process

WDMA is concerned that EPA is using market share, not product availability, to assess the appropriateness of the proposed specification revisions. We have reached this conclusion after comparing the role of the product availability metric as described in the Strategic Vision with EPA’s discussion in the Draft 1 CAR. As previously noted, the Strategic Vision is clear that product availability is the metric used to ensure appropriate balance among the six guiding principles. EPA’s discussion of market differentiation in the CAR, however, indicates that EPA has improperly used market share to evaluate the stringency of the proposed specifications. Specifically, EPA stated in the CAR that the current market share of ENERGY STAR windows (as well as doors and skylights) was inconsistent with

¹² Response to Comments matrix, Comment #2, p. 1

the principle of product differentiation, and the Agency specified a market share reduction it believed would be appropriate:

Under the current specification, market share for Energy Star qualified windows has reached a level that no longer provides differentiation for the consumer in the market place (the sixth guiding principle). ...

In order to provide sufficient differentiation in the marketplace, EPA would like to see a market share of less than 50% after the Version 6.0 specification takes effect.¹³

In WDMA's view, this statement goes well beyond the Strategic Vision and indicates that EPA was using market share in a manner inconsistent with the guiding principles. First, we note that the discussion of the sixth guiding principle does not mention market share as a proxy for differentiation. In fact, the phrase "market share" does not appear anywhere in the discussion of differentiation in the Strategic Vision. Thus, we can find no basis for EPA's determination that a market share of "50% or less" would constitute "sufficient" differentiation.

Second, the Strategic Vision clearly states that high market shares alone are not sufficient to mandate a revision and do not by themselves diminish the value of the program. Differentiation is but one of the six guiding principles, and it is not more important than other principles, like cost-effectiveness (the second guiding principle) or product availability (the fourth guiding principle). WDMA strongly believes that EPA needs to reexamine its proposal to ensure that it is operating in a manner that is fully consistent with ENERGY STAR Product's Strategic Vision.

3.1.2 EPA's analysis of product availability was improper

As discussed in Section 1.3 of these comments, EPA's self-described process highlights product *availability* as a useful metric for assessing balance among the guiding principles. In this revision, however, EPA focused more broadly on "Technological Feasibility and Product Availability." EPA began Section 3.2 of the CAR as follows:

EPA concluded that the proposed criteria for windows are technologically feasible. Additionally, research shows that products are available for sale that can meet these criteria. To reach this determination, two sets of data were analyzed: the NFRC CPD and a database of products available for sale.¹⁴

Our issue here is that EPA appears to be giving technological feasibility more weight than product availability, when the issue of whether proposed criteria are "technologically feasible" is not an issue discussed in the Strategic Vision. Of course there are high efficiency windows that could meet the criteria specifications. DOE even has a program dedicated to reducing the cost of these products and moving them into the market place.¹⁵ However, the existence of such windows does not mean that they are broadly available in the market, nor can the Agency use "technological feasibility" to justify the

¹³ US EPA, "ENERGY STAR for Windows, Doors, and Skylights Version 6.0 Draft 1 Criteria and Analysis Report," July 2012, pp. 7-8.

¹⁴ Draft 1 CAR, p. 16.

¹⁵ USDOE, High Volume Windows Volume Purchase, <http://www1.eere.energy.gov/buildings/windowsvolumepurchase/index.html>.

stringency of the proposed specifications. When establishing or revising an ENERGY STAR specification, EPA's decisions must be justified based on the balance of the guiding principles, taking account of EPA's past experience that product availability of 25% tends to indicate the appropriate level for establishing ENERGY STAR performance criteria.

3.1.3 The CPD is not an appropriate data set for the analysis

WDMA explained its concerns regarding EPA's use of the CPD in its comments on the Draft 1 CAR. We noted that the CPD was never intended to serve as an indicator of products actually being sold, and that vast majority of products contained in the CPD were, in fact, not available on the market. We thus urged EPA to use more reliable data and asked the Agency to reconsider its proposed criteria in light of the acknowledged limitations of the CPD for this type of analysis.

EPA responded to our comments as follows:

EPA is limited in what data it can use for analysis. For this reason, EPA primarily relied on the CPD to evaluate to product feasibility and approximated product availability based on what manufacturers are marketing on their websites. EPA did not use the CPD to estimate the number of products available for sale; instead it used the CPD only to determine what products could be feasibly manufactured.¹⁶

WDMA welcomes EPA's statement that the CPD is not being used to assess product availability. At the same time, we remain confused as to how EPA is incorporating information on "what products could be feasibly manufactured" into its analysis. As previously discussed, a lot of products can be feasibly manufactured, but that doesn't mean they will ever reach the market place.

It is also not clear how EPA can justify the proposed criteria if it relies only on the 'products available for sale' analysis. The Draft 1 CAR is very inconsistent on this point. In describing its use of the CPD, EPA stated:

While the CPD provides a comprehensive view of the windows that may be technically feasible to produce, manufacturers have indicated that listed products may not be produced and should therefore not be considered "available" for consumers. To address this issue ... EPA performed the "products available for sale" analysis.¹⁷

Yet in the windows analysis, EPA said something different. In the section of the Draft 1 CAR called "Availability of Low U-Factor Windows," EPA emphasized the large number of products in the CPD (41.5%) that met the current ENERGY STAR and would also meet the proposed Northern Zone U-factor of 0.27. The subsequent mention of the "smaller proportion of qualifying windows (13%)" in the products available for sale database was provided as an afterthought.¹⁸

This second reference indicates that EPA did, in fact, use the CPD to assess product availability. Given that the Draft 2 criteria remain unchanged, WDMA must conclude that EPA is still using the CPD in a manner for which it was not intended, despite EPA statements to the contrary.

¹⁶ Responses to Comments matrix, Comment #53, p. 8.

¹⁷ Draft 1 Criteria, p. 18.

¹⁸ Draft 1 CAR, p. 20.

3.1.5 A U-factor of 0.27 in the Northern Zone is too stringent

In the Northern Zone, the proposed criteria cannot meet a 25% product availability metric based on the CPD or the 'products available for sale' analysis. The CPD indicates that 6% of products are certified for a U-factor of 0.27, and 12% of products are certified for U-factors of 0.25 – 0.27.¹⁹ The CPD does not appear to include a significant number of products that meet the combinations of U-factor and SHGC proposed as equivalency metrics.²⁰

Based on 'products available for sale' data, only 4% of available products can meet a U-factor of 0.26 or 0.27, and only 8% of products can meet any U-factor of 0.27 or below. Moreover, very few products in the database meet the combinations of U-factors and SHGC in the proposed equivalency specification.²¹

From this analysis, WDMA concludes that the proposed U-factor of 0.27 in the Northern Zone is too stringent. EPA has not demonstrated adequate product availability based on either the CPD or its 'products available for sale' analysis. We note EPA's statement that "approximately 41.5% of products in the CPD that meet the ENERGY STAR specification can meet the proposed U-factor of 0.27."²² This is true, but the analysis described in the Strategic Vision involves comparing the number of available products at a particular specification level to products "available *on the market*," not the smaller universe of products that meet ENERGY STAR specifications.

Moreover, even when EPA curtails the scope of products against which availability is assessed, the analysis does not support their position. As EPA notes, "the 'products available for sale' database indicates a smaller proportion of qualifying products (13.0%)." EPA has stated that it does not use the CPD to assess product availability, and it should therefore be guided by the results of the 'products available for sale' analysis. That analysis demonstrates that there is not sufficient product availability to justify EPA's proposed criteria in the Northern Zone.

3.1.5 The Northern Zone criteria for windows should be no lower than 0.29

WDMA again urges EPA to finalize the Version 6.0 revision with a U-factor no lower than 0.29 in the Northern Zone. We have calculated that 13% of available products meet a U-factor of 0.26 to 0.28 using 'products available for sale' analysis (and 18% using CPD), while 27% of products meet a U-factor of 0.27 to 0.29 based on 'products available for sale' analysis and CPD data.²³ A specification of 0.29

¹⁹ These estimates were developed based on the data provided in CAR Figure 8 (p. 20). They are approximations because the underlying data was unavailable. The sum of the range of U-factors was divided by the total products available with U-factors at or below 0.35. Products available at the very low U-factor values were not included in the numerator because they are unlikely to be cost-effective. Note that the CPD database included 86,000 products with a U-factor of 0.25 or below, which is more than two orders of magnitude greater than the products listed in the 'products available for sale' analysis (550). Also note that our percentage estimates are conservative, because the denominator does not represent all products found in the CPD. The data EPA provided in the Draft 1 CAR focused on products with U-factors at or below 0.35. Had the total number of products in the CPD been used, the percentages would have been much lower.

²⁰ Draft 1 CAR, Figure 8, p. 20.

²¹ These estimates were calculated using the approach described in footnote 19. The data was obtained from Figure 9 of the CAR, p. 21.

²² Draft 1 CAR, p. 20.

²³ Note that we excluded the extremely low U-factors from these calculations as described in footnote 19.

ensures that sufficient products will be available, and as discussed later, other important principles, like cost-effectiveness, are also improved.

We hope the Agency will take this recommendation seriously. To that end, we note that EPA highlights the importance of ensuring product availability in the Strategic Vision's discussion of technological advancements.

On rare occasions, it is brought to EPA or DOE's attention that product availability is severely limited at the Energy Star performance level. In this case, a change in the specification, making it less stringent, may be warranted to ensure adequate selection of Energy Star qualified products.²⁴

It is clear EPA recognizes that overly stringent performance levels can be detrimental to the program. This is precisely what we are urging the Agency to avoid. EPA should not finalize a standard that is too stringent, less cost effective and less affordable for consumers, especially in the current economic climate. Instead, EPA should follow its programmatic guidelines.

3.2 Market Share

WDMA remains concerned that EPA is overemphasizing the reduction of market share rather than seeking an appropriate balance among ENERGY STAR's six guiding principles. EPA seems to believe that the value and credibility of the program hinges on maintaining a small market share for ENERGY STAR products. This is clearly inconsistent with EPA's own assertion in the guiding principles that, "high market shares alone are not sufficient to warrant a specification revision as high market shares do not by themselves diminish the value of the program." Moreover, at least with respect to the revision of this specification, the Agency appears willing to sacrifice both cost-effectiveness for consumers and a broad and timely national transition to higher efficiency windows, doors and skylights.

The two figures presented in Attachment A to this document provide the background for why we are so concerned with EPA's direction in this respect. The first figure was developed by EPA and included as Figure 1 in the Draft 1 CAR. The second figure was developed by JELD-WEN, who as the Agency knows is a leading manufacturer of energy efficient windows and WDMA member, and it was submitted to EPA as part of JELD-WEN's comments on the Draft 1 specification for windows.²⁵ These two figures depict the same data in different ways. We believe that examining them together provides a more accurate picture of historic trends in market share for ENERGY STAR windows than EPA's figure alone.

3.2.1 EPA's figure does not tell the whole story

In Figure 1 of the Draft 1 CAR, EPA provides data on the market share for ENERGY STAR windows from 2000 to 2010. On its face, this figure appears compelling and unambiguous, with market share steadily increasing over time, from about 35 percent in 2001 to slightly over 80 percent in 2010. EPA draws the following conclusion from the market share trajectory:

This ever-increasing market share suggests that innovation and/or cost-effectiveness in the market place is outpacing the specification revision cycle. In order to provide sufficient

²⁴ Strategic Vision, p. 9.

²⁵ JELD-WEN, "Re: ENERGY STAR Version 6.0, Draft 1 Criteria and Analysis Report," September 28, 2012.

differentiation in the marketplace, EPA would like to see a market share of less than 50% after the Version 6.0 specification takes effect. ... This is a dramatic change, but EPA sees this as an important step away from the industry perception of ENERGY STAR as de facto code. ENERGY STAR seeks to identify the most energy-efficient products available. Not all products should qualify for ENERGY STAR, especially immediately after a specification revision.²⁶

JELD-WEN's figure provides essential additional information by revealing the market dynamics at work over this period. As JELD-WEN explained in its comments, "while the market of ENERGY STAR qualified windows has increased since 2006, the number of ENERGY STAR windows sold has declined." In fact, JELD-WEN's figure clearly shows that from 2005 to 2009, the overall market for windows declined by 44 percent, and the market for ENERGY STAR windows declined by 29 percent.

On EPA's figure, this period is depicted as a sharp increase in market share, which EPA attributes to innovation and/or cost-effectiveness improvements. On JELD-WEN's figure, it is clear that far fewer windows of all types were purchased and that 10 million fewer ENERGY STAR windows were purchased in 2009 as compared to 2005. Note that this sustained drop was not the immediate result of the ENERGY STAR specification revision of 2005. Instead, it is best explained as a result of the overall decline in the housing market due to a poor economy.

From the JELD-WEN analysis, it is clear that ENERGY STAR windows gained market share as the housing market (and with it the windows market) collapsed. It is well known that the decline of the housing sector, combined with unemployment levels not seen since the Great Depression, have left many consumers unable to sell their homes, renovate their homes, or buy new homes. It is also understood that consumers were not equally affected by these events. Many people with good secure jobs and solid mortgages did not experience a financial downturn, and some even benefited. Those on lower rungs of the economic ladder have suffered, however, and have had to dramatically reduce their spending on a wide array of goods, including home improvement.

Fortunately, it appears that the US economy is beginning to turn around, and the housing market along with it. It is against this backdrop that the proposed revision to the ENERGY STAR specification must be evaluated. EPA has indicated that it would like to reduce the market share for ENERGY STAR windows to below 50 percent, measured against current sales, from the current level of around 80 percent.²⁷ EPA acknowledges that the revised specifications must be stringent in order to achieve this drop in market share, and it has proposed stringent specifications as a result.

Based on the market share data presented by EPA in the CAR, it appears that the Agency is convinced that the ENERGY STAR market share will remain at about 80 percent as the window market expands if the specification is not revised. WDMA's concern is that EPA has repeatedly side-stepped the implications of the recent market decline on the validity of its conclusions. EPA has not presented the market share data in a way that makes it clear what was going on in the underlying windows market and the Agency has not seriously engaged in the content of the comments provided by stakeholders on these issues. Instead, it has focused solely on the market share trajectory laid out in Figure 1 of the Draft 1 CAR without regard or response to other significant market factors brought to the Agency's attention.

²⁶ Draft 1 CAR, p. 8

²⁷ Ibid.

WDMA does not find it reasonable to assume that ENERGY STAR windows would retain a market share of 80 percent during a market rebound in the absence of the Version 6.0 specification revision. It is our view that two forces will drive lower ENERGY STAR market share in the next few years: (1) an overall upswing in the windows market, as projected by Ducker and (2) a more stringent standard. EPA is currently assuming that new participants in the windows market will select ENERGY STAR in the same proportion as occurred at the height of the recession, when windows were primarily purchased by economically secure consumers. We believe that ENERGY STAR's market share will be more comparable to the levels observed from 2003 to 2005, or about 60 percent. At this market share, EPA would still need to consider increasing the stringency of the specification, but would not need to make it as stringent as currently proposed, assuming such a determination is made that an increase is otherwise justified.

It is also important to note that EPA's market share analyses are made without consideration of cost. As described in more detail in Section 3.3 of these comments, under the proposed specifications we expect the incremental cost of purchasing ENERGY STAR windows to increase and cost-effectiveness to be significantly reduced, both of which would reduce ENERGY STAR's market share.

3.2.2 EPA provided inadequate response to stakeholder comments on market share

As a related point, we are concerned that EPA failed to respond to the main thrust of stakeholder comments expressing concern over EPA market share assumptions and the Agency's use of them. Citing JELD-WEN's comments as just one example, EPA responded to their comment as follows:

Comment: One stakeholder comments that while the market share of ENERGY STAR windows has increased since 2006, the total number of ENERGY STAR windows sold has declined. If EPA achieves its goal of a 25% market share by 2017, consumers will be buying fewer ENERGY STAR windows than they did in 2001. Significant savings on a national scale will not be realized if the criteria encompass only the top 25% of the market.

Response: EPA's goal with ENERGY STAR is to achieve market transformation through increased energy efficiency for all products on the market. By improving the overall efficiency of products on the market, ENERGY STAR has a much more significant impact on national sales than if its primary goal were to increase unit sales of ENERGY STAR qualified products.²⁸

As noted above, JELD-WEN identified an important weakness in the analysis performed by EPA. It is thus of great concern that EPA's response was incomplete and superficial.

First, the Agency did not acknowledge or respond to JELD-WEN's analysis of the market share data. Instead, we note EPA responded elsewhere in the Response to Comments matrix by saying "EPA uses market share, not unit sales numbers, to evaluate when the criteria need to be revised."²⁹ If that is why EPA did not review or respond to JELD-WEN's figure summarizing historic sales data, they clearly do not understand the point JELD-WEN was making. JELD-WEN was not promoting unit sales as a metric. It was explaining why the market share increased so dramatically between 2005 and 2009.

²⁸ Responses to Comments matrix, Comment #88, p. 14.

²⁹ Ibid., Comment #54, p. 8.

Second, EPA's response appears to be inconsistent with the goals laid out in the Strategic Vision. Nowhere does that document claim that "market transformation through increased energy efficiency for all products on the market" is the goal of the program. In fact, the phrase "market transformation" is not found in the Strategic Vision, and it is not one of the six guiding principles of the ENERGY STAR program. If EPA is arguing that its objective in revising the specifications for windows, doors, and skylights is "market transformation," it is operating outside the parameters established in the Strategic Vision. It is our view that this type of market transformation would be more appropriately addressed through ENERGY STAR's Most Efficient programs, an approach prominently endorsed by EPA in the Strategic Vision and now being implemented for windows.

3.3 The Cost-Effectiveness Analysis

WDMA continues to have significant concerns with various aspects of EPA's cost effectiveness analysis. We note that EPA did not fully respond to many of our previous comments, and we have seen no indication that the Agency made any revisions to the analysis in light of the input provided by WDMA or its member companies. We are therefore providing additional comments on these issues.

3.3.1 EPA's average incremental cost for manufacturers is too low

After thoroughly reviewing the information provided by EPA, commenting on the Draft 1 CAR, and examining EPA's responses to the comments provided by us and other stakeholders, WDMA remains convinced that the incremental cost factor determined by EPA for manufacturers is too low in the Northern Zones. In our previous comments, we explained why the data set EPA relied upon was too limited. We also stated that EPA's description of the cost surveying process it employed was extremely limited and did not provide a basis on which stakeholders could reasonably assess the approach or conclusions.

EPA did not respond to our request for additional background information regarding the collection and analysis of data provided by manufacturers. This is unfortunate, because the description provided in the CAR is insufficient. Thus, it appears that EPA expects stakeholders to evaluate their analysis based on the following information, presented in the CAR:

Eight manufacturer partners provided basic product data for best-selling ENERGY STAR-qualified double-hung windows and the added cost to consumers to achieve 0.01 incremental improvements in U-factor and SHGC. All incremental costs were to be for the same size window as the best-selling product and manufactures were asked to provide product data for the best-selling or cheapest window at each incremental U-factor or SHGC. *Based on this data, EPA arrived at the incremental costs in Table 5.*³⁰ (emphasis added)

EPA's description of its approach is clearly inadequate. It is nice to know that eight manufacturers provided data, and that EPA asked all of them to evaluate the same size window, but it is not enough. EPA needs to explain how it "arrived at the incremental costs in Table 5."

This is an important issue because incremental cost estimates, along with energy savings, drive overall cost-effectiveness. If the input data are not accurate, the conclusions of the cost-effectiveness analysis

³⁰ Draft 1 CAR, p. 27.

will also be flawed. It is thus imperative that EPA provide additional information to enable stakeholders to better understand both the nature of the data manufacturers provided to the Agency and how that data was used to develop the average values provided in Table 5.

Specifically, WDMA requests that EPA provide the following additional information:

- How much cost information was provided by the manufacturer partners? Did each company provide a single estimate or did some provide multiple estimates?
- What was the range of costs, as well as the mean and median, in the data set?
- How did EPA use the data to generate different average costs by climate zone?
- What was the range of costs, as well as the mean and median, in the data sets used to develop the average costs for each climate zone?
- How many manufacturers provided cost data for triple-pane windows? What was the range of costs, as well as the mean and median, in that data set?
- Did EPA use all of the data provided by manufacturers in its analysis? If not, what data was excluded and why?

WDMA recognizes that specific cost information provided by manufacturers is proprietary. However, as long as there are at least three data elements from different manufacturers in a data set, EPA can provide aggregated data to its stakeholders. There is no reason why EPA can't share aggregated data, if that data cannot be traced back to specific manufacturers.

3.3.2 EPA's assumed marginal cost increases cannot be evaluated by stakeholders

In its comments on the Draft 1 CAR, we asked EPA to provide more information to support its assumptions on the marginal cost to consumers of purchasing Version 6.0 qualified windows. We made this request because we found EPA's explanation vague and inadequate. As EPA described it Draft 1 CAR:

Based on feedback from manufacturers, the current marginal cost between their current best-selling ENERGY STAR qualified window and the next poorer-performing window (sometimes IECC 2009-compliant, sometimes double-pane clear) is about \$20.³¹

On this basis, EPA has assumed that the marginal cost to consumers of moving to the revised Version 6.0 specification will be \$20, for all types of ENERGY STAR-qualified windows across all climate zones.

We note that EPA did not respond to our comment on this issue, did not revise its assumption, and did not provide any additional explanation of how the value was derived. Thus, we remain concerned about the reasonableness of EPA's analysis. It is essential that EPA provide stakeholders with sufficient information to enable a thorough review of proposed specification revisions. As noted previously, we understand that actual cost data from individual manufacturers is proprietary, but EPA can and should

³¹ Draft 1 CAR, p. 28.

provide more detail than it has to date. As long as at least three estimates were used by EPA in developing its cost estimate, providing aggregated information would not reveal proprietary information or jeopardize the confidentiality of those who supplied it.

More detailed information on how EPA developed its estimate should be made available to stakeholders *before* the Version 6.0 criteria are finalized. To assist EPA in promptly providing such information, we've identified the specific information that should be made public:

- How many specific estimates of marginal cost did EPA receive?
- What was the range, mean and median of these estimates?
- Was all of the data received from manufacturers taken into account by EPA in concluding that the current marginal cost is "about \$20"?

In addition, we request that EPA address two broader methodological issues regarding development of the marginal cost estimate. First, is it reasonable to assume that the marginal cost to consumers will be constant across all climate zones? Each zone has a different specification, and the modifications required to transition from Version 5 to proposed Version 6.0 are not of similar magnitudes. In addition, the nature of the changes required in the Northern Zones are acknowledged to be more expensive for manufacturers (as shown in Table 5 of the CAR), which would tend to indicate that the marginal cost to consumers would also be higher.

Second, on what basis did EPA assume that the marginal cost associated with moving to Version 6.0 would be the same as the current marginal cost of moving from the "next poorest-performing window" to ENERGY STAR Version 5.0? Has EPA determined that the specification changes associated with the transition to Version 5.0 and the transition from Version 5.0 to Version 6.0 are similar in magnitude and "technical effort"?

WDMA strongly believes that EPA should make the data supporting of its marginal cost assumptions more transparent, and we urge the Agency to seriously consider and respond to our questions and concerns.

3.3.3 EPA improperly excluded triple pane windows from the cost-effectiveness analysis

WDMA also remains concerned that the cost-effectiveness analysis for windows in the Northern Zone improperly excludes triple-pane windows. Since the beginning of the revision process, EPA has been focused on the extent to which the revised criteria will drive penetration of triple-pane windows in the Northern Zone. In the Framework Document, for example, EPA stated the following:

At the same time, triple pane products are still relatively uncommon and, based on our preliminary cost analysis, may not be cost-effective. EPA is looking to establish criteria that recognize the highest-performing doubles and bring a greater number of triple pane windows into the mainstream.³²

³² Framework Document, p. 6.

EPA did not quantify the cost differential between double-pane and triple-pane windows in the Framework document, but the Agency clearly signaled its interest in setting a revised specification that would increase the market penetration of triple-pane windows.

In the Draft 1 CAR, EPA provided cost information on the differential between double- and triple-pane windows. We've summarized our concerns with this cost data above, but note here that EPA's analysis confirmed that triple-pane windows were significantly more expensive (\$173 as compared to \$34). EPA did not include more expensive triple-pane windows in the cost-effectiveness analysis presented in the CAR, however, instead explaining:

Similarly, double-pane windows are typically much more cost-effective than triple-pane windows. ... As such, *EPA has not considered the incremental costs of triple pane windows since the program focuses on promoting cost-effective products for consumers*. As previously noted in this document, EPA is interested in promoting enhanced performance of double-pane windows while also acknowledging those manufacturers who have already made the shift to triple-pane windows, especially those that have found away to do so in a cost-effective manner. The data in Table 5 demonstrates that the additional cost to manufacturers is reasonable.³³ (emphasis added)

WDMA is not convinced by EPA's justification. We agree with EPA that triple-pane windows are significantly more expensive than double-pane windows, but we do not agree that EPA can, on that basis, decide not to *consider* the possibility that triple-pane windows will be widely used to meet the revised Northern Zone specification. Yet this is what the Agency said. Because EPA wants to promote cost-effectiveness for consumers, they have excluded triple-pane windows from the analysis.

This approach might be justified if EPA had provided compelling evidence that manufacturers would be able to produce cost-effective ENERGY STAR-qualified double-pane windows in the Northern Zone, obviating the need for triple-pane windows. EPA did not make this case. Instead they simply took the issue off the table by assuming that manufacturers will be able to provide cost-effective double-pane windows.

In fact, EPA's response to a comment on this issue confirms that the Agency is not sure that triple-pane windows won't be required. They said:

EPA did not assume that fourth surface or triple-pane IGUs would not be necessary, but no manufacturers volunteered cost data for fourth surface products and *EPA hopes to improve double-pane performance with the Version 6.0 criteria*. Double-pane windows will be a more cost effective option for most manufactures, other than those that are already successfully selling triple-pane windows.³⁴ (Emphasis added.)

EPA may hope that double-pane products will be available to meet the revised criteria, but it has not demonstrated that this will be the case, and ENERGY STAR specification revisions should not be based on wishful thinking or speculation.

³³ Draft 1 CAR, pp. 27-28.

³⁴ Responses to Comments matrix, Comment #62, p. 9.

Had EPA evaluated the cost-effectiveness of triple-pane windows, they would have concluded that they are not cost-effective for consumers. JELD-WEN provided such an analysis in its comments on the Draft 1 CAR, and they found that the payback time for triple-pane windows in the Northern Zone ranges from 18 to 105 years, and averages about 50 years.³⁵ EPA did not acknowledge or respond to JELD-WEN's comments on this issue.

Given the stringency of EPA's proposed specification, WDMA believes the Agency has erred by excluding triple-pane windows from the analysis. Because EPA's cost-effectiveness analysis ignores the possibility that triple-pane windows will be needed, it does not provide an accurate assessment of potential costs of the proposed specification. Thus, WDMA concludes that EPA does not have a sufficient basis on which to conclude that the proposed specification is cost-effective. The Agency needs to revise its proposal and set the Northern Zone specification at a level where it is clear that triple-pane windows will not be required. As previously stated, WDMA believes that the EPA should set the U-factor at 0.29 for the Northern Zone.

3.3.6 The payback periods presented in Table 8 are not reasonable and are not consistent with the Strategic Vision's 3rd Guiding Principle

In the end, EPA uses "payback periods" to assess cost-effectiveness. As such, its findings should be consistent with the third guiding principle of the Energy Star program, which states that "purchasers will recover their investment in increased energy efficiency within a reasonable period of time."³⁶ EPA goes on to explain:

ENERGY STAR specifications are set so that if there is a cost differential at time of purchase, that cost is recovered through utility bill savings, within the life of the product, generally between 2 and 5 years.³⁷

EPA received several comments from stakeholders concerned that payback periods in the North and North-Central Zones were too long. In response, the Agency said "EPA believes that payback within the lifetime of a product represents a reasonable payback period."³⁸ EPA's position may be appropriate for products with shorter lifetimes, but it is not appropriate when applied to windows, which have a lifetime of 20 – 30 years, or longer.

WDMA recognizes that the payback period for windows will likely exceed 2 – 5 years, but we do not agree with EPA's assertion that payback periods of 20 – 30 years are reasonable or that the 14- to 16-year paybacks calculated in EPA's cost-effectiveness analysis are acceptable. When looking for the ENERGY STAR label, consumers do not assume that payback will take more than a decade. They reasonably expect to recover their investment more quickly. Because the payback period is so long, WDMA thus requests that EPA make the Version 6.0 specifications less stringent in the North and North-Central Zones.

³⁵ JELD-WEN comments, p. 4.

³⁶ Strategic Vision, p. 4.

³⁷ Strategic Vision, p. 4.

³⁸ Responses to Comments matrix, Comment #63, p. 10.

Section 4: WDMA Concerns Regarding the Proposed Specification for Windows in the North-Central Zone

As with EPA's response to stakeholder comments discussed in Section 3.2.2, WDMA is concerned the Agency failed to respond to the substantive arguments being made by one commenter in their Draft 1 comments in support of their recommendation to set the U-factor criteria for the North-Central Zone at 0.30 versus the proposed 0.29. The comment and EPA response are as follows:

Comment: A stakeholder comments that the U-factor in the North-Central Zone should be 0.30. The proposed criteria require significant product redesign with minimal benefit to consumers. This 0.01 difference increases energy savings by 0.16 trillion Btu (7.2% of total savings), but costs an additional \$112 million, resulting in a 38.9 year payback. Setting the criteria at 0.30 generates more than \$37 million in annual energy savings over V5.0 with virtually no incremental cost.

Response: EPA's cost-effectiveness analysis found the payback period in the North-Central Zone to be much shorter (13-20 years). EPA welcomes any additional cost data that manufacturers would like to volunteer.³⁹

The comment identified yet another weakness in the analysis performed by EPA with respect to consumer payback and cost effectiveness, however this time for the proposed window U-factor criteria for the North-Central Zone. However, based on EPA's response, the concern raised and the reasoning behind appeared to have been disregarded or found unpersuasive but the Agency doesn't explain why.

As noted above, the commenter very clearly stated that, "The proposed criteria of 0.29 will require significant product redesigns with minimal benefit to consumers. Setting the criteria to 0.30 will allow manufacturers to continue providing existing, affordable product to the market." Using data from the CAR the commenter then methodically substantiated the basis for their concern. Rather than responding to the concern raised in the comment and the substantiation of it, EPA simply stated "EPA's cost-effectiveness analysis found the payback period in the North-Central Zone to be much shorter (13-20 years)."

As with other comments, we find EPA's response to also be superficial and incomplete. Citing our concerns raised in Section 1.1 with respect to the integrity of the stakeholder process, the commenter in this example engaged the Agency in good faith and equally important, out of concern that the ENERGY STAR program criteria should result in cost-effective options for consumers. If the Agency has found the commenters reasoning flawed or otherwise non-persuasive, it needs to clearly state why and how it reached that conclusion which it has failed to do. WDMA believes the EPA must provide a more detailed response that makes it clear the Agency fully considered the comment and that provides sound reasoning for finding it non-persuasive if that is EPA's determination.

WDMA also urges EPA to reconsider the noted comment and the proposed window U-factor specification for the North-Central Zone.

³⁹ Responses to Comments matrix, Comment #64, p. 10

Section 5: WDMA’s Concerns Regarding EPA’s Proposed Specifications for Skylights

WDMA continues to have significant concerns regarding the proposed specifications for skylights across all climate zones. As discussed in more detail below, we find that the proposed specifications for these zones are overly stringent and not cost-effective. We further find that EPA did not properly balance the six guiding principles of the ENERGY STAR program. Finally, we are disappointed that we learn that EPA did not respond completely or adequately to comments previously provided on this topic. For this reason, we must again bring our concerns to EPA’s attention.

5.1 Product Availability

As with windows, WDMA, and VELUX (one of WDMA’s member companies) continue to have significant concerns regarding the product availability data EPA relied on to develop the proposed skylight specifications. Both WDMA and VELUX provided comments to EPA on these issues on the Draft 1 CAR, but no revisions were made to the proposed specification. As a result, we are compelled to submit additional comments on this issue.

5.1.1 EPA’s analysis of product availability was improper

As discussed previously in Section 1.3, EPA’s Strategic Vision identifies product availability as a useful metric for assessing balance among the guiding principles. As EPA has said:

Experience has shown that it is typically possible to achieve the necessary balance among principles by selecting efficiency levels reflective of the top 25% of models available on the market when the specification goes into effect.⁴⁰

In the current revision, however, EPA has focused more broadly on “Technological Feasibility and Product Availability.” For example, EPA began Section 5.2 of the Draft 1 CAR as follows:

Based on analysis of the NFRC CPD, EPA concluded that the proposed criteria for skylights and tubular daylighting devices (TDDs) are technologically feasible. In addition, research demonstrates that products available for sale can meet these criteria. To set the appropriate skylight criteria, EPA analyzed two datasets: the NFRC CPD and a database of products available for sale.⁴¹

EPA’s introduction appears to indicate that technological feasibility carries more weight than product availability, even though there is no discussion of “technological feasibility” in the Strategic Vision. We are not surprised that EPA identified high efficiency skylights that could meet the criteria specifications. EPA should recognize, however, that the existence of such skylights does not prove that they are currently (or will ever be) available in the market, especially if they are not cost-effective for consumers.

⁴⁰ Strategic Vision, p. 2.

⁴¹ Draft 1 CAR, p. 16.

Conclusions regarding “technological feasibility” – as opposed to actual product availability – cannot serve as a justification for the proposed criteria. The proposed criteria must be justified based on the balance of the guiding principles, taking account of EPA’s past experience that product availability of 25% tends to indicate what an appropriate performance level should be when setting Energy Star eligibility criteria.

5.1.2 The CPD is not an appropriate data set for the available analysis

In comments on the Draft 1 CAR, both WDMA and VELUX identify significant concerns with EPA’s reliance on the use of the CPD in the product availability analysis. We noted that the CPD was never intended to serve as an indicator of products that were actually being sold, and that vast majority of products contained in the CPD are not, in fact, available on the market. We thus urged EPA to use more reliable data and asked the agency to reconsider its proposed criteria in light of our concerns regarding the CPD.

EPA responded to these comments by stating that “EPA does not use the CPD as a surrogate for availability. CPD data was used to evaluate technological feasibility.”⁴² WDMA welcomes EPA’s statement that the CPD is not being used to assess product availability. We remain confused, however, as to how EPA is incorporating information on technological feasibility into its analysis. As previously discussed, many products can be feasibly manufactured but that doesn’t mean they will ever reach the market place.

In addition, when we went back to the Draft 1 CAR, we found that its discussion of the CPD does not hew to the “bright line” EPA described in its response to our comments. For example, EPA stated with respect to Figure 25 (Range of Performance for Skylights in the CPD):

This figure shows a significant performance difference between double- and triple-pane skylights, however, there are double-pane products which are easily able to meet the proposed criteria.⁴³

This statement is inconsistent with EPA’s assertion that it only uses the CPD to assess technological feasibility. A product must be available in the market in order to meet the proposed criteria. As EPA admits, the CPD does not provide useful information regarding products available in the market. For this reason, EPA cannot conclude that double-pane skylights will “easily meet” the proposed criteria based on a review of CPD data.

5.1.3 EPA’s products available for sale analysis confirms that the proposed criteria are too stringent

As noted above, EPA has stated in its Strategic Vision that a product availability of 25% generally indicates an appropriate balance among the guiding principles. A review of Figure 27 of the Draft 1 CAR confirms that this standard is not met for the Northern Zone (~12% availability) or the North-Central Zone (~13% availability), based on EPA’s ‘products available for sale’ analysis. EPA reached a different conclusion, however, stating:

⁴² Response to Comments matrix, Comment #82, p. 13.

⁴³ Draft 1 CAR, p. 42

Figure 27 shows that although the products available for sale had a narrower range of U-factors than the CPD listings, the percentage of products at various U-factors is roughly equivalent. EPA believes that this demonstrates that the CPD is generally representative of products available for sale. This distribution also demonstrates that the skylight criteria is in line with EPA's goal of reducing market share, particularly since the Energy Star market share for glass skylights is estimated to be 99%.⁴⁴

There are two significant problems with these conclusions. First, EPA's claim that the distribution across U-factors reported in the CPD and the 'products available for sale' analysis are "roughly equivalent" is incorrect and misleading. As compared to the 'products available for sale' analysis, the CPD has almost 50% more products available at a U-factor of 0.45, and appears to contain 80-90% more products at a U-factor of 0.47. These differences are not trivial. To the contrary, they confirm that the CPD should not be used to assess product availability.

Furthermore, EPA's statement that product availability levels are in line with EPA's goal to reduce market share is also highly inappropriate. As discussed in more detail in the section on market share below, nothing in EPA's strategic vision or guiding principles implies that EPA's goal during specification revisions is to reduce market share. The Strategic Vision makes it clear that the Agency's goal is to balance the guiding principles, and that market share is not a guiding principle.

WDMA finds that Figure 30 provides the most compelling case for raising the specification in most climate zones. In this figure, EPA examines the distribution of skylights by U-factor and SHGC using data from the 'products available for sale' analysis, and finds that product availability is below 20% in every zone except the Southern, where it is 38%. Thus, WDMA concludes that the proposed specification for skylights is too stringent in the North, North-Central and South-Central Zones. Product availability levels below 20% indicate – at a minimum – that the guiding principles may not be appropriately balanced.

We hope the Agency will take this recommendation seriously. To that end, we note that EPA highlights the importance of ensuring product availability in the Strategic Vision's discussion of technological advancements:

On rare occasions, it is brought to EPA or DOE's attention that product availability is severely limited at the Energy Star performance level. In this case, a change in the specification, making it less stringent, may be warranted to ensure adequate selection of Energy Star qualified products.⁴⁵

EPA clearly acknowledges that ENERGY STAR specifications can be set a performance levels that are overly stringent and detrimental to the program. As with windows, this is precisely what we are urging the Agency to avoid. EPA should not finalize specifications that are too stringent for several reasons. First, the small number of products available overall indicates that this is a thin market as compared to windows. There are not a lot of product options and if EPA acts too forcefully, the market for skylights could be adversely affected. Second, the analysis indicates that this is not a close call. EPA's proposed specifications are not a little too low, they are significantly too low. Finally, there are other significant

⁴⁴ Draft 1 CAR, p. 43.

⁴⁵ Strategic Vision, p. 9.

concerns with EPA's proposal that need to be addressed through appropriate revisions. The most significant of these is cost-effectiveness, and it is discussed in section 4.3 of this document.

5.2 Market Share

5.2.1 EPA improperly used market share in the skylight revision process

As described in the EPA's Strategic Vision, if a product's market share is over 35%, a specification revision might be required.⁴⁶ EPA noted in the Draft 1 CAR that the market share for glass skylights is 99%. While we don't agree with EPA's numbers, we do agree that the market share of ENERGY STAR skylights exceeds 35%. On this basis we support EPA's decision to initiate the revision, and we have participated at each stage of the process. At the same time, however, we believe that the ENERGY STAR program has been clear that market share should not be used as a primary benchmark when setting *the level* of the revised specification. As explained in our comments above, product availability is the metric EPA should use to evaluate whether ENERGY STAR specifications appropriately balance the six guiding principles.

In this revision WDMA believes that EPA has improperly used market share to drive the subsequent level of the specification. Our conclusion is based on EPA's discussion of market differentiation in the CAR. There, as noted below, EPA asserted that the current market share of ENERGY STAR windows – as well as doors and skylights – was inconsistent with principle of product differentiation. Furthermore, EPA indicated that it would like to see a market share of less than 50% after the Version 6.0 specification takes effect in order to provide sufficient differentiation in the marketplace.⁴⁷

In WDMA's view, EPA's approach goes well beyond the Strategic Vision and is inconsistent with the guiding principles. We note that EPA's description of the sixth guiding principle in the Strategic Vision fails to even mention market share, and we are unaware of any Agency document that indicates that EPA intended for market share to serve as a proxy for differentiation. Thus, we can find no basis for EPA's determination that a market share of "50% or less" would constitute "sufficient" differentiation.

Moreover, in the product availability analysis for skylights, EPA confirms that it is relying on market share to set the specifications. EPA concluded its description of the "products available for sale" analysis, by stating:

This distribution [e.g., the distribution of products "available" at different U-factors, as provided in Figure 27] also demonstrates that the skylight is in line with EPA's goal of reducing market share, particularly since the ENERGY STAR market share for glass skylights is estimated to be 99%.⁴⁸

WDMA is not aware of any document in which EPA articulates that its goal in undertaking ENERGY STAR revisions is to reduce market share. In fact, the Strategic Vision clearly states that high market shares

⁴⁶From the Strategic Vision, p. 7: Specifications for slowly advancing products are reviewed every three years or when market share reaches 35%.

⁴⁷Draft 1 CAR, pp. 7-8.

⁴⁸Draft 1 CAR, p. 43.

alone are not sufficient to mandate a revision and do not by themselves diminish the value of the program. In EPA's own words:

High market shares alone are not sufficient to warrant a specification revision as high market shares do not by themselves diminish the value of the program. No matter what the market share of Energy Star qualified products, a consumer who purchases a labeled product gets a product that will contribute to a cleaner environment and save them money without sacrifice in performance.⁴⁹ ...

...[E]ven a market penetration of 50% or greater does not guarantee that a specification will be revised, or that the revision will occur immediately, as other factors are taken into consideration.⁵⁰

Somewhere along the way, EPA appears to have gotten confused about the goals of ENERGY STAR and the purpose of the Version 6.0 revision. We understand that EPA wants to promote the market penetration of efficient products, and we fully support sensible efforts to do so. At the same time, however, the Agency must accomplish its mission in a manner consistent with the ENERGY STAR principles, which recognize that many factors must be considered when promoting products to consumers.

WDMA sincerely hopes that EPA will more appropriately balance its focus on market share, and evaluate its specifications against the six guiding principles. We believe that this will lead EPA to different conclusions.

5.3 Cost Effectiveness

5.3.1 EPA has not adequately responded to comments on the proposed SHGC criteria for skylights

In WDMA comments submitted on Draft 1 CAR, we stated that there was no apparent substantive analysis justifying the proposed SHGC criteria for any of the four climate zones, especially for the Northern Zone. We pointed out that nowhere in the CAR is there a discussion or evidence of why SHGC requirements are for the first time being proposed for the Northern Zone or why the far reaching SHGC changes proposed for the North-Central Zone are lower than those for windows in that zone. In addition, we noted that not only are both inconsistent with established energy codes and green building program requirements, they ignore the daylighting benefits as well as the passive solar heating benefits skylights provide in these climate zones. Similar comments were also submitted by other stakeholders. Instead of responding to the lack of substantive analysis to justify the proposed skylight SHGC criteria, EPA simply stated the following:

- "EPA is concerned about heat gain and possible consumer discomfort, especially in the summer months, because skylights receive more direct sun than windows."⁵¹
- "EPA expects skylights to have higher SHGC due to the direct sun they receive."⁵²

⁴⁹ Strategic Vision, p. 7.

⁵⁰ Strategic Vision, p. 8.

⁵¹ Responses to Comments matrix, Comment #73, p. 11.

⁵² Responses to Comments matrix, Comment #75, p. 12.

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- “EPA seeks to exceed the 2012 IECC SHGC requirement set for skylights.”⁵³
 - “EPA seeks to set criteria that can deliver energy savings in typical residential skylight applications. It is not clear from the stakeholder’s comments in what applications lower SHGC does not result in better energy performance in the two ENERGY STAR southern zones or at what frequency these applications occur.”⁵⁴

WDMA finds these statements wholly inadequate in response to the comments provided and summarized above. Given that no sound analysis is provided by EPA, the proposed skylight SHGC criteria are unjustifiably subjective in our view. If that is not the case, EPA needs to make the technical analysis or other data on which it made its determination available to stakeholders and allow them adequate time to evaluate and respond to the information. The proposed specification should not be finalized with the current SHGC values without giving stakeholders an opportunity to conduct a proper review.

5.3.2 EPA’s incremental costs are too low and not adequately supported

WDMA is concerned that EPA has provided a vague and inadequate description of the process it used to generate the “average cost increase” for skylights and also finds the ranges EPA developed to be too low. In the Draft 1 CAR, EPA provided the following description of its analysis:

EPA contacted manufacturers last year and extended an invitation to directly participate in the criteria revision process by volunteering incremental cost data to achieve various levels of thermal performance. EPA requested basic product data for best-selling Energy Star qualified skylights and the added cost to consumers to achieve a 0.01 incremental improvement in the U-factor and SHGC. Based on this data, EPA arrived at the incremental costs in Table 18.⁵⁵

On this basis, EPA has assumed that the marginal cost to consumers of moving to the revised Version 6.0 specification will be \$0 - \$20 in the Northern and North-Central Zones, and \$20 - \$40 in the South-Central and Southern Zones.

WDMA finds that EPA has provided an inadequate description of its approach for estimating the cost to manufacturers because EPA has failed to explain how it “arrived at the incremental costs in Table 18.” This is an important issue because incremental cost estimates, together with energy savings, drive of overall cost-effectiveness. If the input data are not accurate, the conclusions of the cost-effectiveness analysis will also be flawed. It is thus imperative that EPA provide additional information to enable stakeholders to better understand both the nature of the data manufacturers provided to the Agency and how that data was used to develop the average values provided in Table 18.

To assist EPA in promptly providing such information, we’ve identified the specific information that should be made public:

- How many specific estimates of marginal cost did EPA receive?

⁵³ Ibid.

⁵⁴ Ibid.

⁵⁵ Draft 1 CAR, p. 47.

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- What was the range, mean and median of these estimates?
 - Was all of this data taken into account by EPA in concluding that the current marginal cost ranges?

We also find the low-end marginal cost of \$0 in the Northern Zone to be implausible. On what basis did EPA assume that manufacturers can dramatically reduce their product specifications at no cost to consumers? Given the limited availability of products that can meet these specifications, as evidenced by EPA's 'products available for sale' analysis, it is clear that manufacturers will need to make product design modifications, modify assembly lines, conduct new testing, secure new certifications, etc., all of which are extremely costly.

Finally, we find it surprising that average costs are the same within the Northern Zones and the Southern Zones despite the fact that the stringency of the proposed criteria is different in each zone. In the windows analysis, each zone had a unique average cost which appeared to recognize that some specifications will be harder (and more costly) to meet than others. In the skylight analysis, however, the same costs are provided in the North- and North-Central Zones, even though it is clear that the Northern Zone proposed specification requires an additional 0.02 improvement in U-factor.

5.3.3 EPA's failure to consider sub-types results in overly optimistic payback periods

WDMA is also concerned that the cost-effectiveness analysis is overly optimistic because EPA did not conduct a sub-type analysis. EPA received comments on its treatment of this issue in the Draft 1 CAR, and responded:

EPA evaluated all skylight product types because of the relatively small dataset available for these products. EPA had to limit the windows analysis because of the large quantity of data involved. EPA would have used the entire windows data set when selecting criteria, but that approach was not feasible.⁵⁶

This response does not address the issue raised by the commenter. WDMA and other stakeholders are concerned that the EPA analysis is not accurately reflecting the cost of its proposed specifications because of simplifying assumptions like this one. First, EPA has assessed the costs of the Version 6.0 revision against a high performing skylight, which leads to lower cost impacts and higher cost effectiveness.

Even more significantly, EPA's analysis fails to capture the fact that skylight sub-types exist to meet different requirements. Skylights are not interchangeable, and if a particular type of skylight cannot be reasonably redesigned to meet the revised specification, it will be very expensive to meet that need with a different sub-type. Given the stringency of the specifications, it appears that this will be the case. An analysis conducted by VELUX indicates that double-pane fixed curb-mounted skylights will be unable to meet the new criteria. If VELUX is right, the cost of customizing a different type of product to meet that need will be far higher than the ranges EPA has assumed.

⁵⁶ Response to Comments matrix, Comment #79, p. 12.

For these reasons, WDMA respectfully requests EPA to review its assumptions, provide more information to stakeholders, and revise the proposed specifications.

5.3.4 The payback periods presented in Table 20 are not reasonable and are not consistent with the Strategic Vision's 3rd Guiding Principle

As discussed previously in our comments on windows, in the end, EPA uses the “payback period” to assess cost-effectiveness. As such, its findings should be consistent with the third guiding principle of the ENERGY STAR program, which states that “purchasers will recover their investment in increased energy efficiency within a reasonable period of time.”⁵⁷ EPA goes on to explain:

ENERGY STAR specifications are set so that if there is a cost differential at time of purchase, that cost is recovered through utility bill savings, within the life of the product, generally between 2 and 5 years.⁵⁸

EPA received feedback during the comment period that the payback periods for skylights were too long, indicating that the proposed criteria are not cost effective. EPA responded as follows:

EPA sees the low energy savings as a greater contributor to the longer payback periods for skylights. A smaller shift in the criteria would have resulted in even smaller energy savings.⁵⁹

WDMA finds the response off-point in several respects. First, the commenter was not asking for EPA's opinion on why the payback periods are so long. They were pointing out that long payback periods demonstrate that the proposed criteria are not cost-effective. WDMA agrees. In fact, the likely payback period is at least 23 years in the South-Central Zone, 35-70 years in the South-Central Zone, and a whopping 44-88 years in the Southern Zone.

These types of payback periods are unacceptable to consumers and should be unacceptable in the ENERGY STAR program because they violate the brand promise. If EPA's proposal is not changed, the only place where the consumer stands a chance of saving money by purchasing an ENERGY STAR skylight is in the Northern Zone (and it is clear that there are few products available to meet the specification even there.) Everywhere else in the country, people will lose money with ENERGY STAR.

The fact that EPA does not acknowledge that this is an unacceptable outcome creates grave concerns regarding the Agency's objectives with the program. EPA has spent significant resources building a credible brand that consumers understand, while also involving many manufacturers in the pursuit of ever-more efficient products. To proceed with the proposed specifications betrays both consumers and the manufacturers and would irrevocably undermine the integrity of the ENERGY STAR program.

5.3.5 Summary

For all of these reasons, WDMA believes that it would be inappropriate and misguided for EPA to finalize the Version 6.0 specifications as proposed. EPA needs to consider the comments it has received, review its analyses and provide it where it is lacking, and ensure that the Version 6.0 revised

⁵⁷ Strategic Vision, p. 4.

⁵⁸ Strategic Vision, p. 4.

⁵⁹ Responses to Comments matrix, Comment #76, p. 12.

specifications appropriately balance the program's guiding principles. We hope that the comments we have provided will help EPA in this regard.

Section 6: Conclusion

In conclusion, WDMA greatly appreciates the opportunity to provide these comments, and we hope that you will find them useful as you consider the Version 6.0 revisions for windows, doors and skylights further. In addition, we would welcome the opportunity discuss our comments further with you in person prior to the Agency finalizing the revisions. I will be contacting you separately on that request.

In the meantime, please let me know if you have questions on any of the matters raised in our comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey T. Inks". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Jeffrey T. Inks
Vice President, Code and Regulatory Affairs

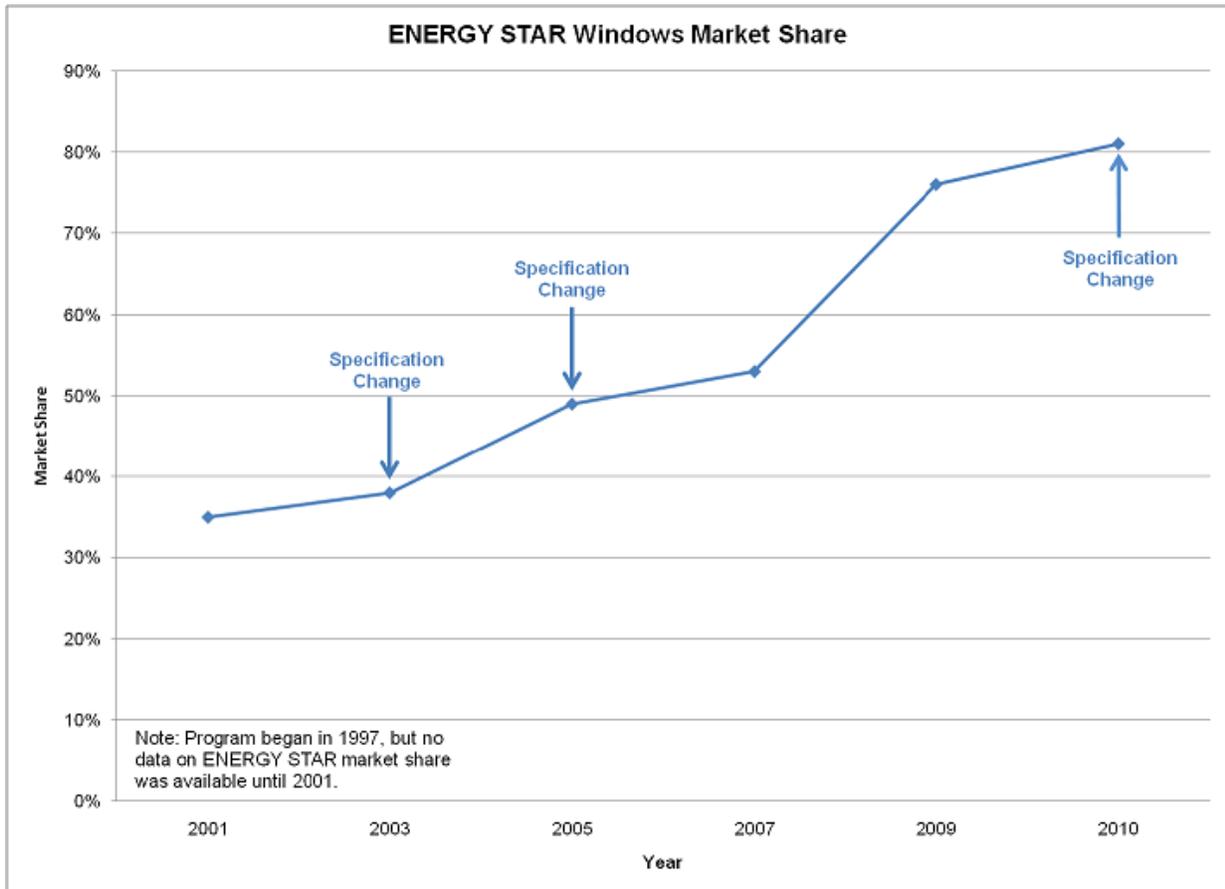
cc: WDMA Exterior Products Code Committee
WDMA Regulatory Affairs Steering Committee

Attachment A:

Market Share Data provided by EPA and JELD-WEN

EPA Figure 1 – Draft 1 CAR, Pg. 8

Figure 1: ENERGY STAR Market Share 1999-2010



**JELD-WEN Figure 1 – Comments on Draft 1 CAR,
submitted September 28, 2012**

Figure 1: Total Windows Sold in North America vs. Total ENERGY STAR Windows Sold

