

Response to Comments on Final Draft Windows Criteria

ENERGY STAR® for Windows, Doors, and Skylights Version 6.0 Criteria Revision

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Cost Effectiveness Comments

Comment 1 – Cost Effectiveness (Analysis)

Several commenters are concerned about EPA's exclusion of triple-pane windows in its cost effectiveness analysis. One commenter believes the exclusion leads to an understatement in the added cost of the proposed criteria, which will ultimately mislead consumers with respect to product payback. Another commenter believes the exclusion is unreasonable given that 70% of the cost estimates submitted for the Northern Zone were for triple-pane windows.

EPA Response:

EPA developed and distributed the cost data template before a potential criteria level for the Northern Zone was selected. The template instructed manufacturers to provide incremental cost data for products with U-factors between 0.20 and that of their best-selling product at increments of 0.01. This resulted in manufacturers submitting a sizeable amount of data on high-performance windows. The incremental cost data on high performance windows does not reflect the manufacturers' intent to rely on triple-pane windows to achieve the Northern Zone U-factor maximum of 0.27. The manufacturers were simply following the guidelines provided by EPA for data submission so EPA could consider a broad range of U-factors. As EPA stated in the *Review of Cost Effectiveness Analysis*, triple-pane windows were excluded from the analysis for several reasons. First, the performance of triple-pane windows typically far exceeds the Northern Zone U-factor maximum. Second, triple-pane windows are often high-end products offering non-energy features that increase product cost. Third, manufacturers do not need to rely on triple-pane insulating glass units to meet the Version 6.0 Northern Zone specification, as many other lower cost options exist for most products.

Comment 2 – Cost Effectiveness (Analysis)

One commenter believes there was no substantive basis for EPA's revisions of the marginal cost assumptions in the *Review of Cost Effectiveness Analysis*. The commenter also cites EPA's note that "most manufacturers with whom EPA discussed this issue (both in 2011 and more recently) indicated they had no marginal cost" as indicative that EPA revised its assumptions based on comments made outside of the public comment process.

EPA Response:

As stated in the *Review of Cost Effectiveness Analysis*, EPA revised the marginal cost assumptions because most manufacturers who provided the data used in the *Draft 1 Criteria and Analysis Report* indicated no marginal cost between their current best-selling ENERGY STAR window and their next poorer-performing window. As stated in the *Draft 1 Criteria and Analysis Report*, only one manufacturer had provided any data that indicated any marginal cost. EPA used that marginal cost (\$20) in the original analysis to be conservative. EPA notes that more recent feedback confirmed that many manufacturers would have little to no marginal cost, as was already indicated by the data received. In revisiting the cost effectiveness analysis, EPA decided to use all available data by evaluating scenarios using a \$0 marginal cost and a \$10 marginal cost. These marginal cost assumptions are more reflective of the original dataset.

Comment 3 – Cost Effectiveness (Analysis)

One commenter believes EPA should have used a code-compliant window for the baseline in the incremental energy savings analysis rather than a double-pane clear window.

EPA Response:

As noted in the *Review of Cost Effectiveness Analysis*, most manufacturers that volunteered marginal cost data indicated that they did not offer code windows. The one manufacturer that volunteered marginal cost was only able to provide the marginal cost over a double-pane clear window, which was the manufacturer's next poorer-performing window (i.e., this manufacturer did not offer code windows). The baseline for the energy savings needed to align with the baseline product for marginal costs, which is why EPA selected a double-pane clear rather than a code window.

Comment 4 – Cost Effectiveness (Analysis)

One commenter believes EPA should provide a more detailed explanation of the ways in which its original cost effectiveness analysis was “very conservative.”

EPA Response:

EPA details the ways in which the original analysis was “very conservative” in the *Review of Cost Effectiveness Analysis* document. Specifically, most manufacturers indicated there was no marginal cost between ENERGY STAR Version 5.0 and their next poorer-performing window, but EPA excluded these data points from its original analysis. Additionally, EPA averaged incremental costs across a wide range of products rather than focusing on products that required minimal, low-cost upgrades to reach the proposed criteria levels.

Comment 5 – Cost Effectiveness (General)

One commenter believes that consumers' opinions about paying more for ENERGY STAR products were likely different during years when the 30% tax credit was available, so EPA's assumptions about future consumer purchasing behaviors are likely erroneous if based on fenestration sales during those years. The commenter also believes the capital costs required by manufacturers to meet the Version 6.0 criteria are the same or equal to those needed to achieve Version 5.0, however, manufacturers do not have the same incentive (the 30% tax credit) to make that investment because it is unclear whether the manufacturers can recoup the capital investments through product sales.

EPA Response:

EPA notes that ENERGY STAR market share increased dramatically prior to the existence of the tax credit, reaching 76% in 2009. While market share rose to 81% in 2010, it has remained strong (above pre-tax credit levels) even after the higher-level tax credit ended (79% in 2011 and 77% in 2012).

Comment 6 – Cost Effectiveness (General)

One commenter believes the proposed specification will increase costs, lead to unreasonable payback periods, and put products out of reach of consumers.

EPA Response:

EPA worked with manufacturers to collect data on incremental product costs and requested additional cost information with each comment period. As described in the *Draft 1 Criteria and Analysis Report* and the *Review of Cost Effectiveness Analysis*, EPA used the marginal and incremental costs volunteered by manufacturers to calculate payback periods. EPA found low- and average-cost products qualifying under the specification offered payback periods of 10 years or less in the majority of cities analyzed.

Comment 7 – Cost Effectiveness (General)

One commenter believes EPA needs to consider a middle ground on cost, payback, and efficiency levels. Another commenter feels that EPA ultimately drafted criteria representing a compromise of the commenter suggestions while achieving the ENERGY STAR goals of driving down energy consumption and reducing greenhouse gas emissions related to home energy use.

EPA Response:

EPA believes the research, analysis, and comment responses published to date illustrate that the criteria are reflective of the analyses completed and strike a balance among competing positions and the program's goal of substantive energy savings. EPA thanks the second commenter for their support of the criteria and the revision process.

Comment 8 – Cost Effectiveness (General)

One commenter wants EPA to explain why it revised the cost effectiveness analysis. The commenter also notes that no stakeholders provided input that requested or supported the lower cost assumptions developed for the new analysis.

EPA Response:

As stated in the *Review of Cost Effectiveness Analysis*, EPA revised the cost effectiveness analysis because commenters expressed concerns about the national average payback of 13 years presented in the *Draft 1 Criteria and Analysis Report*. Commenters indicated that payback periods have become a more important metric in marketing products, so EPA did an additional review of the cost effectiveness analysis to reflect other cost scenarios shown by the data originally provided by manufacturers. EPA had initially used a series of conservative assumptions to ensure that payback within the lifetime of the product could be achieved in high-cost, low-savings scenarios.

Comment 9 – Cost Effectiveness (General)

One commenter believes that EPA has not provided information to support the statement that “cost data from manufacturers indicate that it is possible to cost-effectively manufacture double-pane windows.”

EPA Response:

The *Draft 1 Criteria and Analysis Report* and the *Review of Cost Effectiveness Analysis* show the low incremental cost levels that are associated with manufacturing double-pane windows that meet the criteria in the Northern Zone. Specifically, EPA refers commenters to Table 5 of the *Draft 1 Criteria and Analysis Report* and Table 1 of the *Review of Cost Effectiveness Analysis*.

Comment 10 – Cost Effectiveness (General)

One commenter infers from Figures 6 and 8 of the *Review of Cost Effectiveness Analysis* that EPA assessed low-, average-, and high-cost scenarios for all climate zones, rather than just the scenarios and climate zones presented in these figures. The commenter requests that EPA release the results its revised cost effectiveness analysis for all climate zones and all cost scenarios.

EPA Response:

Figures 6 and 8 of the *Review of Cost Effectiveness Analysis* present the results for all climate zones and all cost scenarios for which EPA performed analyses.

Comment 11 – Cost Effectiveness (Representativeness)

One commenter notes that the data used by EPA to develop the incremental cost analysis was based on a limited number of manufacturers and is therefore not representative of the current market. Another commenter believes that EPA should release the names of the manufacturers who provided cost data so that commenters can better evaluate the representativeness of the cost data collected.

EPA Response:

EPA sent an e-mail to all stakeholders asking them to volunteer cost data, and eight organizations responded. EPA notes that this specification revision is based on a much larger, more robust data set than what was used for the previous (Version 5.0) specification. Manufacturers provided cost data with the expectation that their identities would be kept confidential, which precludes the possibility of releasing the names of the manufacturers who volunteered cost data, however, EPA offered additional information regarding the types of manufacturers who provided cost data in the *Characterization of Windows Cost Data provided by Manufacturers*.

Comment 12 – Cost Effectiveness (Data)

One commenter estimates that the incremental cost increase associated with the proposed specification will be \$85. The commenter also estimates that the proposed U-factor maximum in the Northern Zone will lead to payback periods of 21 years, which is double the time calculated by EPA. Another commenter estimates increased costs of \$25 to \$45 per product, which the commenter believes will result in payback periods of 7-171 years depending on climate zone.

EPA Response:

EPA appreciates the submission of this information, however, the data points provided are missing key information, e.g., how many products are represented by the incremental cost, the specific products represented by the incremental cost, and how the incremental cost was calculated. EPA invited stakeholders to volunteer incremental cost data early in the Version 6.0 criteria revision process and provided a template to interested parties at that time. The template was also published in the *Review of Cost Effectiveness Analysis*.

Comment 13 – Cost Effectiveness (Data)

One commenter is concerned about the absence of information regarding the underlying data and cost assumptions used in the analysis and wants EPA to provide additional information. Specifically, the commenter suggests that EPA provide a scatter plot illustrating all the cost data points received from manufacturers.

EPA Response:

EPA has released all of the details it is able to disclose while protecting the confidentiality of the manufacturers' original cost data. Manufacturers provided their cost data with the understanding that data would only be released in the aggregate, which precludes the possibility of providing a scatter plot of individual data points provided to EPA's contractor in confidence. EPA has also responded to questions from commenters about the data in comment responses, the *Review of Cost Effectiveness Analysis*, and the *Characterization of Windows Cost Data provided by Manufacturers*.

Comment 14 – Cost Effectiveness (Data)

One commenter believes that EPA has not demonstrated that releasing manufacturers' cost data risks competitive harm, so the data should be published.

EPA Response:

The ENERGY STAR manufacturer partners who volunteered cost data have indicated that they believe releasing their cost data would cause competitive harm, so EPA has deferred to the partners' judgment with respect to this issue.

Comment 15 – Cost Effectiveness (Data)

One commenter believes that EPA's decision to exclude triple-pane windows appears inconsistent with the instructions provided to manufacturers who submitted data. The commenter believes that EPA should not have excluded these windows without specific evidence that they were not "the best-selling or cheapest" windows or unless these cost estimates were not consistent with the guidance provided.

EPA Response:

EPA describes the reasons that triple-pane windows were excluded from the analysis in the *Review of Cost Effectiveness Analysis*. The purpose of the instructions provided to manufacturers was to ensure that EPA acquired the most useful data available for the analysis.

Comment 16 – Cost Effectiveness (Data)

One commenter notes that although EPA excluded triple-pane windows to be consistent with how cost effectiveness analyses are conducted for other product categories, the commenter was unable to identify another criteria revision where EPA chose to exclude an entire category of products because they were too expensive.

EPA Response:

As noted in the *Review of Cost Effectiveness Analysis*, triple-pane windows were not excluded from the analysis just because they were too expensive. EPA excluded triple-pane windows from the analysis because a variety of other lower cost approaches and technologies exist to meet the criteria for the vast majority of products. Therefore, triple-pane windows are not needed to meet the specification. Additionally, triple-pane windows often have non-energy features that contribute to the cost and the majority of triple-pane windows for which cost data was received had performance levels that far exceeded the performance level ultimately proposed.

Comment 17 – Cost Effectiveness (Data)

One commenter wants EPA to explain why additional data points provided by commenters have not been integrated into the existing analysis.

EPA Response:

EPA appreciates the submission of this information, however, the data points provided are missing key information, e.g., how many products are represented by the incremental cost, the specific products represented by the incremental cost, and how the incremental cost was calculated. EPA invited stakeholders to volunteer incremental cost data early in the Version 6.0 criteria revision process and provided a template to interested parties at that time. The template was also published in the *Review of Cost Effectiveness Analysis*.

Comment 18 – Cost Effectiveness (Payback Periods)

Several commenters believe that payback within the lifetime of the product is not reasonable or acceptable to consumers. One commenter believes EPA should consider revising the definition of "reasonable payback" presented in the *ENERGY STAR Products Program Strategic Vision and Guiding Principles* to ensure that specifications offer shorter payback periods for qualifying products.

EPA Response:

EPA accepted comments on the *ENERGY STAR Products Program Strategic Vision and Guiding Principles* when the document was revised in 2012. Although the Version 6.0 criteria revision process does not encompass revisions to the *ENERGY STAR Products Program Strategic Vision and Guiding Principles*, EPA will consider the commenter's feedback about payback within the lifetime of the product. EPA also notes, however that while the lifetime of windows is at least 20 years, the final draft criteria typically offer payback periods of less than 10 years (often less than 7 years) for low-cost products, as described on page 11 of the *Review of Cost Effectiveness Analysis*.

Comment 19 – Cost Effectiveness (Payback Periods)

One commenter believes that the phrase “generally between 2 to 5 years” in the third guiding principle of the *ENERGY STAR Products Program Strategic Vision and Guiding Principles* is a caveat, indicating that the ENERGY STAR program did not originally envision payback periods of 10, 15, or 20 years. The commenter also notes that EPA decided not to move forward with a revision for the ENERGY STAR specification for residential gas furnaces in 2009 because the payback period was longer than five years.

EPA Response:

The term "generally between 2 to 5 years" was meant to be illustrative of products with much shorter lifetimes, such as lighting and consumer electronics. Windows are fundamentally different from other ENERGY STAR product categories because windows do not consume energy. Further, as described on page 11 of the *Review of Cost Effectiveness Analysis*, the final draft criteria typically offer payback periods of less than 10 years (often less than 7 years) for lower-cost products. Lastly, EPA opted not to revise the ENERGY STAR specification in 2009 for residential furnaces for several reasons, just one of which was the longer payback period. At the time, market share for gas furnaces was relatively low and the products still offered substantial energy savings over the minimum Federal standard. This meant the products offered sufficient differentiation in the market place. EPA notes, however, that the specification for gas furnaces has since been revised because of increases in market share and revisions to the Federal minimum standard.

Criteria Comments

Comment 20 – Criteria (Northern Zone)

Several commenters suggest that EPA set a U-factor maximum of 0.25 in the Northern Zone. One commenter notes that the proposed 10% improvement in U-factor is not a significant change given that the current specification will have been in place for six years once the new requirements take effect. The other commenter notes that a U-factor maximum of 0.27 doesn't provide sufficient performance improvement and energy savings to be useful, especially in the Pacific Northwest. The commenter goes on to note that typical area-weighted U-factors for both new construction and retrofit applications in the Pacific Northwest currently range from 0.28 to 0.30, and many custom homebuilders are using triple- and double-pane windows with U-factors of 0.25.

EPA Response:

Analysis, research, and commenter feedback assembled to date indicate that a U-factor maximum of 0.27 offers the best balance between technological advancements, energy efficiency, cost effectiveness, and product availability at the time of implementation.

Comment 21 – Criteria (Northern Zone)

Several commenters request that EPA eliminate the equivalent energy performance criteria in the Northern Zone. One commenter believes that the energy savings could be offset by an excess of solar heat gain. The commenter recommends that instead of establishing trade-off criteria, EPA consider ways to provide useful guidance to consumers and contractors about where and how to install low- and high-gain windows.

EPA Response:

EPA, with the assistance of Lawrence Berkeley National Laboratory (LBNL), determined that the trade-off criteria will offer equivalent energy performance. Based on LBNL's analysis, the reduction in heating resulting from additional solar heat gain in winter more than offsets the increase in summer cooling as a result of the increased solar heat gain. EPA is in the process of developing consumer materials that provide additional information on high-gain windows.

Comment 22 – Criteria (Northern Zone)

Several commenters support the proposed U-factor maximum of 0.27 in the Northern Zone. Though one commenter requests a U-factor maximum of 0.25, the commenter recognizes that a U-factor maximum of 0.27 is a significant movement toward increased stringency.

EPA Response:

EPA appreciates the commenter's support of the U-factor maximum of 0.27 in the Northern Zone.

Comment 23 – Criteria (Northern Zone)

Several commenters request a revision of the Northern Zone U-factor maximum to 0.29. The commenters believe that establishing a maximum U-factor of 0.29 greatly exceeds the stringency of the 2009 International Energy Conservation Code (IECC) prescriptive requirement of 0.35 and considerably exceeds the 2012 IECC requirement of 0.32. One commenter suggests revising the Northern Zone U-factor maximum to 0.29 or higher.

EPA Response:

EPA appreciates the commenters' suggestion and notes that manufacturers can continue to qualify windows with U-factors as high as 0.30 in the Northern Zone under the Version 6.0 criteria using the equivalent energy

performance criteria. In the Draft 1 specification, EPA initially proposed only a single set of equivalent energy performance criteria. Based on comments received, EPA expanded the equivalent energy performance criteria (or trade-offs) in the Draft 2 specification. Manufacturers can now qualify products in the Northern Zone with U-factors of 0.27, 0.28, 0.29, or 0.30. EPA has also delayed implementation of the Version 6.0 Northern Zone criteria until January 1, 2016, to allow manufacturers more time to prepare to meet the more stringent U-factor requirement in the Northern Zone.

Comment 24 – Criteria (Northern Zone)

One commenter believes EPA has not provided specific rationale for maintaining the proposed U-factor maximum in the Northern Zone. Two other commenters believe EPA's decision to maintain the Northern Zone U-factor maximum at 0.27 will require significant manufacturer investments, resulting in increased product costs and substantial increases in consumer payback periods, while offering non-substantive energy savings over the Version 5 criteria.

EPA Response:

EPA provided extensive documentation for its rationale in selecting a U-factor maximum of 0.27 in the Northern Zone in the *Draft 1 Criteria and Analysis Report* and provided additional documentation in the *Review of Cost Effectiveness Analysis*. EPA believes that the resulting criteria strike a balance among competing positions and the program's goal of substantive energy savings. EPA expanded the trade-off criteria to support those manufacturers who wish to continue qualifying windows with U-factors as high as 0.30 in the Northern Zone. EPA has also delayed implementation of the Version 6.0 Northern Zone criteria until January 1, 2016, to allow manufacturers more time to prepare to meet the more stringent U-factor requirement in the Northern Zone.

Comment 25 – Criteria (Northern Zone)

One commenter believes that EPA's claim that the proposed criteria do not require triple-pane windows is unreasonable given that almost 70% of the cost-estimates submitted were for triple-pane windows. The commenter further notes that EPA should explain how it knows these windows will not be needed to meet the Version 6.0 specifications.

EPA Response:

EPA developed and distributed the cost data template before a potential criteria level for the Northern Zone was determined. The template instructed manufacturers to provide incremental cost data for products with U-factors between 0.20 and that of their best-selling product at increments of 0.01. This resulted in manufacturers submitting a sizeable amount of data on high-performance windows and should not be interpreted as manufacturers' intent to rely on triple-pane windows to achieve the Northern Zone U-factor maximum of 0.27. EPA demonstrated in the *Draft 1 Criteria and Analysis Report* that there are double-pane products in the National Fenestration Rating Council (NFRC) Certified Products Directory (CPD) and on the market that meet the proposed criteria levels in the Northern Zone. Specifically, Figures 10 and 11 of the *Draft 1 Criteria and Analysis Report* show that in 2010 the vast majority of windows meeting the proposed Northern Zone specification were double-pane. EPA has also delayed implementation of the Version 6.0 Northern Zone criteria until January 1, 2016, to allow manufacturers more time to prepare to meet the more stringent U-factor requirement in the Northern Zone.

Comment 26 – Criteria (North-Central Zone)

One commenter does not support the change in the North-Central Zone U-factor maximum. The commenter prefers the originally proposed U-factor maximum of 0.29 because the market share of windows with a U-factor of 0.30 is already large.

EPA Response:

EPA appreciates the commenter's support of a more stringent U-factor maximum in the North-Central Zone. EPA notes that most commenters providing input support a revision in this criterion, and EPA concurred that revising the North-Central Zone U-factor maximum simplifies the specification for manufacturers by allowing them to qualify a single product over a larger geographic area.

Comment 27 – Criteria (North-Central Zone)

Several commenters support the proposed U-factor maximum of 0.30 in the North-Central Zone.

EPA Response:

EPA appreciates commenter support of the North-Central U-factor maximum of 0.30.

Comment 28 – Criteria (South-Central Zone)

One commenter does not support the decision to lower the U-factor maximum in the South-Central Zone from 0.31 to 0.30. The commenter believes EPA based this decision on confidential comments because there are no public comments supporting a lower U-factor. Several commenters suggested that EPA raise the U-factor maximum in the South-Central Zone to 0.32.

EPA Response:

While EPA does talk with a wide variety of stakeholders about possible program changes, this criteria adjustment was made by EPA in conjunction with the adjustment in the North-Central Zone based on EPA's review of product data from the NFRC CPD and the Products Available for Sale Database. This data indicates that a wide variety of windows have a U-factor of 0.30. Additionally, the manufacturers who volunteered cost data indicated that their best-selling windows under the current criteria have a U-factor of 0.30. This information indicates that a shift from a maximum U-factor of 0.31 to 0.30 will have minimal impact on most manufacturers. Additionally, setting the U-factor maximum at 0.30 in the South-Central Zone simplifies the specification for manufacturers by allowing them to qualify a single product over a larger geographic area and the program recovers some energy savings lost by the adjustment in the North-Central Zone.

Comment 29 – Criteria (South-Central Zone)

One commenter believes that EPA's statement about commenters not providing "specific information explaining their rationale" for increasing the U-factor maximum in the South-Central Zone is inaccurate due to the comments received on the long payback periods in the Southern Zone [sic].

EPA Response:

EPA believes the commenter meant to reference comments on payback periods in the South-Central Zone. In a second review of the comments received on the Draft 2 criteria, EPA confirmed that no commenter made any comments regarding the payback periods for windows in the South-Central Zone and that the commenters requesting a higher U-factor in the South-Central Zone did not provide any rationale for the proposed change.

Comment 30 – Criteria (General)

One commenter believes the criteria are not stringent enough.

EPA Response:

EPA appreciates the commenter's input and notes that EPA has selected the proposed criteria based on comprehensive market analysis and extensive commenter feedback.

Comment 31 – Criteria (General)

One commenter supports the criteria as proposed, but would also support more stringent criteria.

EPA Response:

EPA appreciates the commenter's support for the current proposal and for the prospect of more stringent criteria. EPA's market and cost effectiveness analysis indicate that the selected criteria levels offer the optimal balance at this time.

Comment 32 – Criteria (General)

One commenter believes that EPA should establish separate high-gain criteria for windows with a southern orientation (plus or minus 20°) because these windows have the highest potential for energy savings with proper exterior and/or interior shading.

EPA Response:

EPA appreciates the commenter's suggestion. Preliminary analysis indicates that today's more moderate-gain windows provide heat gain benefits regardless of orientation or shading. EPA hopes to publish additional information on this topic in the future.

Transparency Comments

Comment 33 – Transparency (Confidential Comments)

One commenter believes that EPA's comment responses indicate that more weight was given to comments provided confidentially. The commenter also sees the response to Comment 70 of the *Response to Comments on Draft 2 Windows Criteria* as relying heavily on conversations conducted outside of the public process.

EPA Response:

Other than protecting confidential cost data, EPA has been as open and transparent as possible during the revision process and has not given more weight to confidential comments when selecting the criteria. The primary purpose of EPA's conversations with knowledgeable stakeholders was to confirm the data, analyses, and conclusions EPA has published on the criteria revision website. EPA has an on-going interest in feedback from stakeholders to ensure that the revision process results in the best criteria.

Comment 34 – Transparency (Inadequate Reasoning Provided)

One commenter believes that EPA has not provided adequate reasoning for its decisions on key technical and analytical issues.

EPA Response:

EPA has strived to clearly communicate its decisions and the data and analyses underlying those decisions. In addition to distributing documents such as the *Draft 1 Criteria and Analysis Report* and the *Review of Cost Effectiveness Analysis*, EPA held a public stakeholder meeting and offered seven formal comment periods to give commenters the opportunity to seek clarification at every step in the process. EPA has made every effort to be responsive to commenter requests for additional information, including performing additional analyses when warranted.

Comment 35 – Transparency (Inadequate Data Provided)

One commenter believes that EPA has not provided commenters with enough data with which to evaluate EPA's decisions.

EPA Response:

All research, analyses, decision documents, public stakeholder meeting presentations, comments, and EPA responses to comments are posted online. EPA has notified commenters when new documents are available. While EPA relied on proprietary cost data (provided voluntarily by manufacturers) to calculate cost effectiveness, EPA has shared the results of its analyses with commenters in the *Draft 1 Criteria and Analysis Report* and the *Review of Cost Effectiveness Analysis*. EPA also responded to additional questions posed by commenters regarding this data in the *Characterization of Windows Cost Data provided by Manufacturers*.

Comment 36 – Transparency (Similar Process)

One commenter believes EPA should provide specific information demonstrating that the program analysis for windows is the same as for other ENERGY STAR product categories.

EPA Response:

While all product categories follow a similar specification process, every product category is unique. Differences between product categories and available data for these products must be taken into account during the criteria

revision process. The *ENERGY STAR Products Program Strategic Vision and Guiding Principles* document provides the general framework for ENERGY STAR criteria revisions.

Comment 37 – Transparency (Limited Comment Responses)

One commenter believes EPA has failed to fully engage in the substance of stakeholder comments, instead responding with general statements of limited relevance, especially in the case of alternative analyses submitted by commenters. The commenter gives as an example Comment 70 of the *Response to Comments on Draft 2 Windows Criteria*. The commenter believes that EPA only casually acknowledged the commenter's analysis of product availability in the Northern Zone and did not address the commenter's specific concerns. The commenter believes EPA should have directly responded to or rebutted the issues raised rather than restating basic information that is not relevant to the commenter's specific concern.

EPA Response:

EPA appreciates the feedback on its responses to comments. EPA notes that the analysis provided by the commenter restated data originally provided by EPA in the *Draft 1 Criteria and Analysis Report*, which is why there was no specific response to the data itself. EPA refers commenters to Comment 41, where EPA discusses the issue of product availability in more detail.

Comment 38 – Transparency (Limited Comment Responses)

One commenter believes EPA should provide more than a general description of approach and sources used when commenters ask for additional information on EPA analyses. The commenter believes EPA should explain how the available data supports its conclusions. Specifically, the commenter believes that EPA has not explained how it concluded that there would be sufficient availability of qualifying windows in the Northern Zone based on the NFRC CPD data and the Products Available for Sale Database. The commenter believes that EPA responded to Comment 68 of the *Response to Comments on Draft 2 Windows Criteria* with a very general summary of EPA's process when the response should have discussed the actual information and analyses upon which EPA's conclusions were based. The commenter notes that it was seeking a more detailed explanation of EPA's product availability assessments.

EPA Response:

EPA appreciates the feedback on its responses to comments and refers the commenter to Comment 41, where EPA discusses the issue of product availability in more detail.

Comment 39 – Transparency (Limited Comment Responses)

One commenter believes EPA's responses to comments on the Northern Zone specification were overly general, especially with respect to Comment 47 of the *Response to Comments on Draft 2 Windows Criteria*. The commenter believes that in EPA's response to this comment, EPA should have provided a more specific response rather than justifying EPA's decision with general statements and references to confidential discussions. Specifically, the commenter believes that EPA has failed to demonstrate the following three claims regarding the Northern Zone specification: that triple-pane windows will not be required to meet the specification, that cost data from manufacturers indicate that it is possible to cost-effectively manufacture double-pane windows that meet the specification, and that a sufficient supply of qualifying double-pane windows will be available when the specification takes effect.

EPA Response:

EPA appreciates the feedback on its responses to comments. EPA notes that Figures 10 and 11 in the *Draft 1 Criteria and Analysis Report* illustrate that in 2010 there were already double-pane windows in the NFRC CPD and on the market that meet the final draft criteria levels in the Northern Zone, which demonstrates that triple-pane windows are not required to meet the specification. With regard to the cost-effectiveness of double-pane windows that meet the specification, Table 5 of the *Draft 1 Criteria and Analysis Report* shows the low incremental cost levels that are associated with manufacturing double-pane windows that can meet the criteria in the Northern Zone. With respect to product availability, EPA refers commenters to Comment 41, where EPA discusses product availability in more detail.

Comment 40 – Transparency (Support)

One commenter commends ENERGY STAR for a thorough, transparent, and well-documented process of updating the window specifications, including detailed public responses to commenter concerns submitted on Draft 1. Another commenter feels that EPA should be applauded for the open and collaborative process by which it conducted this criteria development, further noting that EPA heard all sides, offered thorough responses to questions from commenters, and ultimately drafted criteria which represent a compromise of the commenter suggestions, while also achieving the ENERGY STAR goals of driving down energy consumption and reducing greenhouse gas emissions related to home energy use. A third commenter notes that the final draft criteria were developed by EPA in an open and collaborative environment in which all commenters were given generous periods of time and numerous opportunities to be heard. The commenter goes on to note that throughout the process EPA evidenced a willingness to consider and, where appropriate, resolve commenter concerns by modifying the criteria. A fourth commenter thanks EPA for its full and thorough consideration of comments and offers appreciation of EPA's effort and diligence.

EPA Response:

EPA appreciates the commenters' support regarding the transparency and thoroughness of the Version 6.0 criteria revision process.

Product Availability Comments

Comment 41 – Product Availability (Products in Northern Zone)

One commenter believes that EPA has not demonstrated adequate product availability for products meeting the proposed Northern Zone U-factor. The commenter believes that the proposed criteria will limit product availability and does not believe that EPA has provided specific rationale for why the proposed specification level will not limit product availability. The commenter believes that EPA has never explained how the NFRC CPD data and the Products Available for Sale Database support the conclusion that there will be a sufficient supply of double-pane windows in the Northern Zone with a U-factor maximum of 0.27. Another commenter notes there are currently more than 600,000 individual window products with U-factors of 0.25 or less in the NFRC CPD, with the majority of those products being double-pane. The commenter goes on to note that its ongoing market research suggests that double-pane product availability should not be an issue, even with a U-factor maximum as low as 0.25.

EPA Response:

As stated in the *Response to Comments on Draft 2 Windows Criteria*, EPA's concern is product availability at the time the specification takes effect. While current product availability can be estimated through analysis of the NFRC CPD and products available for sale on manufacturers' websites, product availability at the time of implementation must be predicted by supplementing available data with experience from previous specification revisions. First, manufacturers have a variety of low cost pathways to meet the new criteria. Second, market share for windows is currently strong (77%) with high consumer awareness because the label is widely used and marketed. Third, ENERGY STAR market share has remained strong after previous criteria revisions. When all these market conditions are present, experience shows that the market will respond rapidly to the new criteria. EPA has also delayed implementation of the Version 6.0 Northern Zone criteria until January 1, 2016, to allow manufacturers more time to prepare to meet the more stringent U-factor requirement in the Northern Zone.

Comment 42 – Product Availability (Conflict with Guiding Principles)

One commenter believes the proposed criteria will reduce market share by 25%, which will drive up the cost of qualifying products. The commenter sees the reduction in product availability and corresponding increase in costs as conflicting with the guiding principle to “help consumers upgrade to the more energy efficient product when those consumers have already made a decision to purchase.”

EPA Response:

As noted in Comment 41, product availability at the time of implementation is typically predicted by supplementing available data with experience from previous specification revisions. Market share for windows is currently strong (77%) with high consumer awareness because the label is widely used and marketed. ENERGY STAR market share has remained strong after previous criteria revisions, which indicates that the industry responds rapidly to changes in the ENERGY STAR specification.

Comment 43 – Product Availability (Approach)

One commenter believes EPA is downplaying the importance of product availability in setting revised specifications by asserting in Comment 70 of the *Response to Comments on Draft 2 Windows Criteria* that “this figure [product availability of 25%] is provided as a reference and is not a goal, metric, or rule for criteria setting.”

EPA Response:

EPA did not intend to imply that product availability at the time of implementation is not an important aspect of the criteria revision process. Rather, EPA was trying to emphasize the flexibility provided across product categories with respect to the 25% product availability figure offered in the *ENERGY STAR Products Program Strategic Vision and Guiding Principles* as EPA strives to strike a balance among competing positions and the program's goal of substantive energy savings when setting specifications.

Comment 44 – Product Availability (Increase)

The commenter wants EPA to explain how manufacturers will get from the current situation (extremely low product availability) to sufficient supply by the time the specification goes into effect. The commenter believes EPA needs to describe the process by which qualified products will come on line in time.

EPA Response:

ENERGY STAR market share has remained strong after previous criteria revisions, which indicates that the industry responds rapidly to changes in the ENERGY STAR specification. EPA has confidence in ENERGY STAR manufacturer partners' ability to identify the best ways for their companies to pursue ENERGY STAR certification under the new specification. Manufacturers who don't already have products that qualify have indicated that they will be able to bring products online given the revised implementation date of January 1, 2015, and the expanded trade-offs in the Northern Zone. In addition, EPA has provided more time for manufacturers to meet the specification by delaying the implementation of the Version 6.0 Northern Zone criteria until January 1, 2016.

Implementation Date Comments

Comment 45 – Implementation Date (Support of January 1, 2015)

Several commenters support the implementation date of January 1, 2015. One commenter notes, however, that EPA should monitor changes to the 2015 IECC and establish a timeline for the Version 7.0 specification revision that aligns with any proposed revisions to the IECC windows criteria.

EPA Response:

EPA appreciates the commenters' support of the implementation date of January 1, 2015. EPA will continue to monitor the 2015 IECC development process and will take any revisions into consideration when evaluating potential timelines for future criteria revisions. EPA notes that it has delayed implementation of the Version 6.0 Northern Zone criteria until January 1, 2016.

Comment 46 – Implementation Date (Support of Earlier Implementation)

Several commenters suggest that EPA implement the Version 6.0 specification earlier than January 1, 2015. One commenter sees the specification revision as long overdue and believes EPA should implement the Version 6.0 specification 270 days after it is finalized. One commenter proposes an implementation date of July 1, 2014. The commenter believes the currently proposed implementation date of January 1, 2015, will degrade the value of the ENERGY STAR label with consumers because local and state governments are already adopting the 2012 IECC. Another commenter supports the previously proposed implementation date of January 1, 2014. A fourth commenter supports “timely” implementation of the specification to better ensure differentiation in the marketplace.

EPA Response:

EPA appreciates the commenters' sense of urgency with respect to implementation of the Version 6.0 specification. Based on industry feedback, EPA has opted for an implementation date of January 1, 2015, for most climate zones (North-Central, South-Central, and Southern). EPA has, however, delayed implementation of the Version 6.0 Northern Zone criteria until January 1, 2016, to allow manufacturers more time to prepare to meet the more stringent U-factor requirement in the Northern Zone.

Air Leakage Comments

Comment 47 – Air Leakage (Labeling)

Several commenters support the air leakage labeling requirements as proposed.

EPA Response:

EPA appreciates the commenters' support of the revised air leakage labeling requirements.

Comment 48 – Air Leakage (Requirements)

One commenter suggests that EPA revise the air leakage requirement to less than or equal to 0.25 cfm/ft².

EPA Response:

EPA appreciates the commenter's suggestion. Currently, NFRC only permits labeling to one significant digit for air leakage. EPA encourages commenters to work with NFRC if they are interested in revisions to NFRC policy.

Comment 49 – Air Leakage (Requirements)

One commenter supports the air leakage requirement of less than or equal to 0.3 cfm/ft².

EPA Response:

EPA appreciates the commenter's support of the air leakage requirement for windows.

General Comments

Comment 50 – General (Discrepancy between NFRC CPD and Products Available for Sale)

One commenter drew a different conclusion with respect to Comment 73 of the *Response to Comments on Draft 2 Windows Criteria*, where EPA cited Figure 7 of the *Draft 1 Criteria and Analysis Report*. The commenter is concerned about the discrepancy between the Products Available for Sale Database and the NFRC CPD data with respect to products with U- factors from 0.25 – 0.27 (there are ~700 products, or 2.2%, of products available for sale, but ~70,500, or 11.3% of the NFRC CPD represented by this U-factor range).

EPA Response:

EPA notes that in Comment 73 of the *Response to Comments on Draft 2 Windows Criteria*, EPA inadvertently referenced Figure 7 rather than Figure 11 of the *Draft 1 Criteria and Analysis Report*. EPA believes that Figure 11 of the *Draft 1 Criteria and Analysis Report* does clearly show that triple-pane windows will not be required to meet the Northern Zone specification, which was the original issue raised in Comment 73.

Comment 51 – General (Installation Instructions)

One commenter supports EPA's decision to include requirements for installation instructions in the Version 6.0 specification and suggests revisiting the issue in the next specification revision to assess how the requirement to include manufacturer installation is furthering the goal of quality window installation.

EPA Response:

EPA appreciates the commenter's support of the installation instructions included in the Version 6.0 specification and the suggestion to revisit the issue during future criteria revisions.

Comment 52 – General (Independent Verification Program)

One commenter expressed strong support for the Independent Verification Program (IVP).

EPA Response:

EPA appreciates the commenter's support of the IVP.

Comment 53 – General (Early Promotion of Version 6.0)

Several commenters believe EPA should allow manufacturers to promote products that qualify under the Version 6.0 specification before the specification takes effect. One commenter wants EPA to promote these products on the ENERGY STAR website, provide special labeling for products that meet the Version 6.0 specification, offer point-of-sale materials for use by retailers, and provide other incentives to support manufacturer marketing programs for those that already meet Version 6.0 or are identified as Most Efficient. Another commenter wants EPA to consider requiring, encouraging, or rewarding manufacturers that begin posting installation instructions in January 2014.

EPA Response:

EPA appreciates the feedback and may consider developing an effort to assist those manufacturers who are ready to meet the Version 6.0 specification before it takes effect. EPA appreciates the suggestion regarding promotion of early posting of installation instructions and will take this suggestion under advisement.

Comment 54 – General (Most Efficient)

One commenter notes that the proposed Version 6.0 SHGC criteria for the Southern, South-Central, and North-Central Zones match the corresponding criteria for Most Efficient and recommends that the 2014 Most Efficient criteria focus on improvements in those regions.

EPA Response:

Although EPA has already posted the final Most Efficient recognition criteria for 2014, EPA notes that the Version 6.0 specification for the Southern, South-Central, and North-Central Zones is not slated to take effect until January 1, 2015, and welcomes the commenter to submit feedback during the next Most Efficient comment period in 2014.

Comment 55 – General (Recycled Materials Requirements)

Several commenters suggest that the ENERGY STAR page on window recycling (http://www.energystar.gov/index.cfm?c=windows_doors.pr_recycling) include a link to the EPA's Building Materials Reuse Center website due to the varying fenestration materials and product types recognized by the ENERGY STAR program.

EPA Response:

EPA appreciates the suggestion, but notes that the EPA Building Materials Reuse Center website does not currently include information specific to windows, doors, and skylights. ENERGY STAR Program staff will contact staff from EPA's Office of Solid Waste to see if additional guidance can be added on recycling windows, doors, and skylights to the www.epa.gov web site.

Comment 56 – General (Extending Revision Process)

One commenter recommends extending the criteria revision process so that EPA can have a more informed and in-depth conversation with retailers regarding the relationship between product value proposition and consumer acceptance. The commenter believes there are more effective ways to incrementally increase product efficiency without pricing consumers out of the market.

EPA Response:

EPA welcomes retailer engagement in the criteria revision. Although EPA is nearing the end of a three-year criteria revision process, EPA hopes to hear more from the retail industry about their concerns as EPA looks to the program's future.