

Response to Comments on Draft 2 Windows Criteria

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

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Program Goals & Guiding Principles Comments

Comment 1 – Program Goals & Guiding Principles (Program Purpose)

Some commenters are concerned that there is a fundamental disconnect between commenters and EPA on the program's ultimate goals. Another commenter sees the primary purpose of changing the criteria as achieving additional national energy savings through ENERGY STAR qualified products and notes that the aggregate savings are small when compared to the last criteria revision, especially in the Northern Zone. Additionally, the commenter sees the proposed Northern Zone specification as resulting in products that are too expensive, which does not help consumers or encourage them to purchase energy efficient products.

EPA Response:

The *Introduction to Response to Comments* released in conjunction with this document offers an overview of how the ENERGY STAR program principles are generally applied. EPA agrees that there is a disconnect between some commenters and EPA regarding ENERGY STAR program goals. The *Introduction to Response to Comments* and the responses to comments seeks to help clarify the program fundamentals. EPA notes that the purpose of a criteria revision is to better ensure the program continues to identify the top-performing products on the market. Regarding the national energy savings, EPA notes that during the Version 5.0 criteria revision process, commenters stated that the aggregate national savings calculations were too optimistic. Based on this feedback, EPA chose a more conservative approach when calculating the aggregate energy savings during the current criteria revision process. Accordingly, the Version 5.0 and Version 6.0 energy savings numbers are not directly comparable. To clarify the cost-related parameters of the program, EPA notes that it seeks to establish criteria that allow consumers to recoup the incremental upgrade cost of selecting ENERGY STAR within the lifetime of the product. EPA refers commenters to the *Review of Cost Effectiveness Analysis* for additional details, including additional analyses that show payback periods of less than 10 years for low- and average-cost products across most of the cities for which EPA performed energy savings analysis.

Comment 2 – Program Goals & Guiding Principles (Maximizing Savings)

One commenter sees saving energy as the overarching goal of the ENERGY STAR program. The commenter believes this will be best achieved by making minimal changes in the Northern Zone and focusing on changes in the Southern and South-Central Zones because the cost of cooling is more than the cost of heating.

EPA Response:

EPA agrees that savings can be achieved by increasing the stringency of the criteria in the southern two zones, which is why EPA has proposed changes in both the Southern and South-Central Zones. At the same time, EPA found that revising the criteria in the Northern Zone could provide additional energy savings, which is why EPA has proposed increasing the stringency of the U-factor in the Northern Zone.

Comment 3 – Program Goals & Guiding Principles (National Savings)

Some commenters see the goal of significant savings on a national scale as conflicting with the goal to have criteria encompass only the top 25% of the market.

EPA Response:

ENERGY STAR has six guiding principles, all of which are important in selecting ENERGY STAR criteria. One of those six guiding principles is to achieve significant savings on a national scale. It is not a guiding principle of the program to have criteria encompass only the top 25% of the market (i.e., to have a 25% market share). As stated in the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles*, EPA has typically

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found that the best balance among the guiding principles may be achieved by setting specifications that recognize the top 25% of product models on the market (not that reduce market share to 25%) at the time a specification takes effect, not when revised criteria are proposed. EPA emphasizes that this figure is provided for reference and is not a goal, a guiding principle, or a rule for criteria setting.

Comment 4 – Program Goals & Guiding Principles (Affordability)

Commenters believe that affordability should be the primary driver of the ENERGY STAR program. One commenter believes a tiered approach would help solve the current conflict of affordability and transformation. Most Efficient is just the first step.

EPA Response:

The ENERGY STAR mark is intended to direct consumers to products with superior energy performance. Consumers have a range of product options at varying price points and efficiency levels. If a consumer elects to spend more to purchase an ENERGY STAR product, the incremental cost of that decision will be recouped within the lifetime of the product. EPA believes that its analyses show that the proposed criteria levels are cost effective, delivering payback well within the product lifetime. EPA refers commenters to the *Review of Cost Effectiveness Analysis* for additional details, including additional analyses that show payback periods of less than 10 years for low- and average-cost products across most of the cities for which EPA performed energy savings analysis. EPA believes that adding another tier would dilute the ENERGY STAR brand and lead to confusion in the marketplace.

Comment 5 – Program Goals & Guiding Principles (Encouraging Replacement)

Some commenters believe that ENERGY STAR aims to reduce energy consumption by replacing underperforming products, which is best served by the current criteria and the affordability and availability offered under the current criteria. Another commenter believes that purchasers will not be prompted to make needed energy-efficient retrofits when presented with an unreasonable payback length.

EPA Response:

The ENERGY STAR designation is meant to help consumers upgrade to the more energy efficient product when those consumers have already made a decision to purchase. Given this aim, the program has been successful seeking payback within the lifetime of a product. While the Windows, Doors, and Skylights program does not seek to prompt consumers to purchase new products, EPA offers revised payback periods for the proposed final draft specification that are shorter than those originally published in the *Draft 1 Criteria and Analysis Report*.

Comment 6 – Program Goals & Guiding Principles (Market Share)

One commenter notes that seeking to maintain a low market share is inconsistent with the *ENERGY STAR[®] Products Program Strategic Vision and Guiding Principles* and notes that this document also states that high market share alone is not sufficient to mandate a revision.

EPA Response:

EPA agrees that maintaining a low market share is inconsistent with the guiding principles and notes that the market share for windows, doors, and skylights has continued to rise over the life of the program, now reaching nearly 80%. The commenter is correct that market share is not the only prompt for a criteria revision. EPA believes the latest updates to code and technological advancements provide additional clear indicators that the specification is ready for revision.

Comment 7 – Program Goals & Guiding Principles (Market Transformation)

One commenter notes that the phrase "market transformation" does not appear in the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles* and is not one of the guiding principles. The commenter believes that if EPA is trying to achieve market transformation, it is operating outside the parameters of the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles*, and that market transformation is more appropriately handled through the Most Efficient program.

EPA Response:

EPA agrees that the term "market transformation" does not appear in the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles*. EPA notes that the process of identifying highly energy-efficient, cost effective products often has a transformative effect on the market. The ENERGY STAR program and the Most Efficient program both aid in this process.

Comment 8 – Program Goals & Guiding Principles (Support)

One commenter appreciates the opportunity EPA has created to promote industry and government cooperation in creating economical, energy saving solutions for consumers. Another commenter expresses support for EPA's goal of raising the bar for ENERGY STAR to preserve the brand and encourage energy efficiency through technology and innovation. A third commenter highly values the role ENERGY STAR plays in differentiating energy efficient products and services.

EPA Response:

EPA appreciates the support for the program's approach.

Comment 9 – Program Goals & Guiding Principles (Market Share Goal)

Two commenters note that if EPA's 25% market share goal is achieved, consumers will be buying fewer ENERGY STAR windows than they did 16 years ago, even if window sales double by 2017. Higher market share is preferable because it offers more choice for consumers.

EPA Response:

EPA notes that the 25% figure provided in the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles* is not a market share goal or target. The 25% figure refers to the percent of product models available on the market when a specification takes effect and is not intended as a requirement of any specification. As highlighted in the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles*, EPA agrees that higher market share is not inherently a detriment to the program. At the same time, ENERGY STAR is meant to offer product differentiation to help consumers easily identify the most energy efficient options in the marketplace. The consumer can then choose whether to upgrade to an ENERGY STAR product.

Comment 10 – Program Goals & Guiding Principles (Use of Market Share)

One commenter notes that the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles* states that high market share by itself does not diminish the value of the program. Market share signals when to begin a criteria revision, but should not be used when determining specification levels.

EPA Response:

EPA confirms that market share did not drive the selection of the proposed criteria levels. Code changes, energy savings, product availability, technological advancements, and other issues were considered in setting the proposed criteria levels.

Comment 11 – Program Goals & Guiding Principles (Market Share and Differentiation)

One commenter notes that the phrase “market share” does not appear anywhere in the discussion of differentiation in the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles*, so market share cannot be used as a proxy for product differentiation. The commenter believes EPA used market share improperly in the revision process by using it as a proxy for differentiation and by giving differentiation additional weight compared to other guiding principles like cost effectiveness or product availability. The commenter requests that EPA ensure that market share is not given undue weight.

EPA Response:

Current ENERGY STAR market share for windows is nearly 80%, and with the majority of products performing at the same level, there is little to no differentiation among products, which is required under the sixth guiding principle. EPA did not give additional weight to market share when determining the proposed specification levels.

Comment 12 – Program Goals & Guiding Principles (“Sufficient” Differentiation)

One commenter notes that it can find no basis for EPA’s determination that a market share of “50% or less” would constitute “sufficient” differentiation.

EPA Response:

In the *Draft 1 Criteria and Analysis Report* EPA notes that it “would like to see a market share of less than 50% after the Version 6.0 specification takes effect.” EPA would like to clarify that while lower market share will improve differentiation in the marketplace, EPA did not set the proposed specification with a goal of reducing market share and did not determine or state that a market share of 50% or less constituted “sufficient” differentiation.

Market Share Comments

Comment 13 – Market Share

One commenter believes that EPA improperly used market share in the revision process. The commenter believes that EPA used market share rather than product availability to assess the appropriateness of the proposed specification revisions. The commenter cites the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles*, which states, “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.” The commenter would prefer to see EPA compile and assess data related to the availability of products and determine the specification level at which 25% of models qualify. Given the important role of the product availability analysis in the revision process, the commenter requests that EPA confirm that it is using (and has used) product availability and market share data for their intended purposes.

EPA Response:

EPA did not use market share improperly when assessing potential criteria revision levels. EPA uses a variety of factors to establish the criteria. Establishing the specification based on market share is not EPA’s process. Further, as outlined in the *Introduction to Response to Comments* released in conjunction with this document, EPA’s guiding principles are not designed to be a checklist. The 25% figure in the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles* is provided for reference and is not a rule for criteria setting.

Comment 14 – Market Share (Current)

One commenter states that EPA’s market share graph does not tell the whole story because total window sales are down dramatically from their peak several years ago. The commenter believes current ENERGY STAR market share cannot be used to assess the program. Another commenter believes that this makes EPA’s market share graphic misleading.

EPA Response:

EPA has reviewed the data submitted and carefully considered this argument. Market share is an important indicator for when criteria may be reviewed. EPA appreciates the feedback on its market share graph and notes that the data underlying it is sound and directly pertinent as a prompt for reviewing the specification.

Comment 15 – Market Share (Future)

One commenter believes market share will decline to 60% even without a specification revision because the upswing in the windows market will decrease demand for ENERGY STAR windows.

EPA Response:

The criteria levels are driven by code changes, product availability, and technological advancements. Market share is used only as a prompt to decide whether criteria may be reviewed. EPA appreciates this commenter’s input. EPA notes that it did not use market share to determine the proposed criteria levels and market share was not the only prompt that led to the initiation of this process.

Comment 16 – Market Share (Affect of Unit Sales)

One commenter believes its representation of market share and window sales is more telling than the market share chart presented by EPA in the *Draft 1 Criteria and Analysis Report*.

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EPA Response:

EPA does not use unit sales data as a prompt for reviewing product specifications. EPA notes the *ENERGY STAR[®] Products Program Strategic Vision and Guiding Principles* identifies market share, not unit sales, as a metric used by the program.

Implementation Date Comments

Comment 17 – Implementation Date (Support)

One commenter supports the current implementation date of January 1, 2014, because market share is currently too high for some energy efficiency program sponsors to effectively leverage ENERGY STAR. Delaying implementation prolongs this situation, and EPA's research indicates that many models already meet the proposed specification.

EPA Response:

EPA appreciates the support for the originally proposed implementation date. Based on commenter feedback, EPA has decided to propose an implementation date of January 1, 2015. This change will allow manufacturers more time to transition to the proposed Version 6.0 specification.

Comment 18 – Implementation Date (Alternative Dates)

Several commenters seek a later implementation date. Recommendations include July 1, 2014, January 1, 2015, and waiting until 2015 to select an implementation date.

EPA Response:

EPA appreciates the feedback on the proposed implementation date and the specific recommendations offered by commenters. The final draft criteria propose an effective date of January 1, 2015, to allow partners more time to transition to the proposed requirements.

Comment 19 – Implementation Date (Support Postponement, Part 1)

Commenters prefer postponing implementation until the economy and the housing industry have recovered and stabilized so that manufacturers can invest gradually in retooling, and homeowners and manufacturers can be more able to absorb additional costs.

EPA Response:

EPA understands that commenters are concerned about the economy and the housing industry. EPA notes that there are always consumers seeking the most energy efficient products, and ENERGY STAR aims to help those consumers identify those products. EPA's additional cost effectiveness analysis indicates that the proposed criteria levels offer payback periods for consumers of less than 10 years for low- and average-cost products for most cities analyzed (see the *Review of Cost Effectiveness Analysis* for additional details). Additionally, EPA has proposed an implementation date of January 1, 2015, to allow manufacturers more time to transition to the proposed specification.

Comment 20 – Implementation Date (Support Postponement, Part 2)

Some commenters cite the amount of time necessary to redesign, retool, and invest to reach the Northern Zone criteria with double-pane windows without fourth-surface coatings. Others believe that payback periods may improve if the criteria are delayed.

EPA Response:

EPA has revised the implementation date to January 1, 2015, to allow manufacturers more time to transition to the proposed specification. This will also allow more manufacturers to get more product lines ready before the proposed specification takes effect. EPA neither requires nor expects that every partner will have every product

line modified to enable ENERGY STAR qualification across all zones when the proposed criteria take effect. EPA agrees that the payback periods are likely to improve given the extension to the implementation date.

Comment 21 – Implementation Date (Support Postponement, Part 3)

Some commenters note that a later implementation date gives them the opportunity to exceed the minimum ENERGY STAR criteria when they take effect or to bring products to market that can meet the new trade-offs in the Northern Zone.

EPA Response:

EPA has proposed a new implementation date of January 1, 2015, which should provide manufacturers with additional opportunity to exceed the proposed criteria and design products that meet the new proposed trade-offs in the Northern Zone.

Comment 22 – Implementation Date (Support Postponement, Part 4)

Several commenters see a 2015 implementation date as aligning better with the International Energy Conservation Code (IECC) revision cycle and ENERGY STAR Canada.

EPA Response:

The new proposed implementation date of January 1, 2015, aligns better with codes and ENERGY STAR Canada and will make it easier for manufacturers to transition to all three specifications.

Comment 23 – Implementation Date (Support Postponement, Part 5)

Commenters prefer postponing implementation because some states will wait to adopt IECC 2012.

EPA Response:

EPA notes that the ENERGY STAR mark must be associated with products that meet or exceed minimum requirements, such as national model codes. While EPA understands that some states may wait to adopt IECC 2012, it is important that the ENERGY STAR mark remain a symbol of superior efficiency. If the code approaches or exceeds the ENERGY STAR specification in some regions, as is the case with the current specification, EPA strives to exceed that code.

Comment 24 – Implementation Date (Support Postponement, Part 6)

Several commenters describe the activities required to transition to a new standard, which take 18-24 months and touch every aspect of a manufacturer's business and require coordination with dealers, consumers, and supply chains. These commenters see an implementation date of January 1, 2014, as providing less than 9 months to transition to the new specification. Other commenters cite the time required to modify production, label new products, perform market assessments, modify marketing plans and materials, launch new product lines, etc. as making it difficult to meet a January 1, 2014, implementation date.

EPA Response:

EPA recognizes that companies choosing to participate in ENERGY STAR will have many tasks to undertake to transition to the proposed criteria. EPA has revised the proposed implementation date to January 1, 2015, to allow manufacturers more time to transition to the proposed specification.

Comment 25 – Implementation Date (Selection of Date)

One commenter states that EPA cannot expect manufacturers to begin implementation planning before the criteria changes are finalized because that raises profound concerns regarding EPA's openness to commenter input throughout this lengthy revision process. This commenter also states that market share cannot be taken into consideration when EPA is selecting an implementation date.

EPA Response:

EPA did not expect manufacturers to begin implementation with the publication of the *Version 6.0 Product Specification Framework Document*. EPA notes that many manufacturers requested that EPA provide potential criteria levels as early in the process as possible so that they could plan accordingly. EPA has held dozens of conversations with manufacturers in addition to offering several rounds of comment periods and formal comment response documents such as this one. EPA has revised the implementation date to January 1, 2015, to allow more transition time in light of comments received.

Cost Effectiveness Comments

Comment 26 – Cost Effectiveness (Northern Zone)

One commenter believes the proposed Northern Zone criteria are too stringent, resulting in less cost effective and less affordable products for consumers, which is especially problematic given the current economic climate.

EPA Response:

EPA believes that its analyses show that the proposed criteria levels are cost effective, delivering payback well within the product lifetime. EPA has also done additional analysis on payback periods for the proposed final draft specification. These analyses indicate payback periods of 10 years or less for low- and average-cost products in most of the cities for which EPA performed energy savings analysis. EPA refers commenters to the *Review of Cost Effectiveness Analysis* document accompanying the responses to comments for additional details.

Comment 27 – Cost Effectiveness (Length of Payback Periods, Part 1)

One commenter believes a U-factor of 0.27 in the Northern Zone is too stringent and that the U-factor should be no lower than 0.29 to ensure that important principles, such as cost effectiveness, are upheld. The commenter believes that payback periods within the lifetime of the product are not reasonable. The commenter also believes the payback periods presented in Table 8 of the *Draft 1 Criteria and Analysis Report* are not consistent with the third guiding principle.

EPA Response:

EPA believes that its analyses show that the proposed criteria levels are cost effective, delivering payback well within the product lifetime, which is the timeframe outlined in the third guiding principle. EPA has also done additional analysis on payback periods for the proposed final draft specification. These analyses indicate payback periods of 10 years or less for low- and average-cost products in most of the cities for which EPA performed energy savings analysis. EPA refers commenters to the *Review of Cost Effectiveness Analysis* document accompanying the responses to comments for additional details.

Comment 28 – Cost Effectiveness (Length of Payback Periods, Part 2)

Several commenters express concern that the payback periods are too long. One commenter states that the payback period should be no longer than 7 years, and another requests that payback periods not exceed 7-10 years. The latter commenter states that research from the National Association of Home Builders (NAHB) found that customers will only accept payback periods of 10 years or less.

EPA Response:

In the *Review of Cost Effectiveness Analysis* document accompanying the responses to comments, EPA offers additional payback analysis. This analysis found a payback of less than 10 years for low- and average-cost products in most of the cities for which EPA performed energy savings analysis.

Comment 29 – Cost Effectiveness (Payback Period Analysis)

One commenter performed its own analysis of payback periods for the North-Central Zone using aggregate energy savings and estimated aggregate manufacturer cost to redesign.

EPA Response:

EPA has revised the U-factor maximum in the North-Central Zone to 0.30 based on stakeholder feedback and believes this change will shorten payback periods for consumers.

Comment 30 – Cost Effectiveness (Payback Period Analysis)

One commenter offers its own estimates of payback. One set of payback periods uses a manufacturer-developed dataset for incremental cost increase to evaluate payback in Boston. The other analysis uses EPA's incremental cost data for triple-pane windows for Boston.

EPA Response:

In response to specific, industry-generated estimates of payback periods, EPA notes that the commenter has not provided sufficient data for EPA to evaluate the analysis. EPA chose a criteria level for the Northern Zone to ensure that triple-pane windows are not required to meet the proposed specification and that there are multiple pathways for double-pane windows to qualify. EPA reviewed the National Fenestration Rating Council's (NFRC) Certified Products Directory (CPD) and developed a Products Available for Sale Database of more than 17,000 products by collecting product data from the websites of the top 20 manufacturers. These databases indicate that there are products currently available that meet the proposed specification using double-pane windows. In addition to analyzing these two databases, EPA reviewed and discussed current technological advancements with product manufacturers, component manufacturers, and testing organizations to confirm availability, performance, and manufacturing costs. Cost data from manufacturers also indicate that it is possible to manufacture cost-effective double-pane windows that meet the proposed specification.

Comment 31 – Cost Effectiveness (Incremental Costs)

Several commenters believe that EPA has underestimated the incremental cost for manufacturers to qualify products under the proposed criteria. One commenter performed its own survey and found the incremental cost to be \$85.38 not \$34, which it is concerned risks putting these products out of reach of consumers who have been affected by the recession.

EPA Response:

The commenter has not provided sufficient background data for EPA to evaluate the incremental cost provided. Based on the data EPA received, the incremental cost provided by the commenter does not appear to be representative of best-selling or lower-cost products.

Comment 32 – Cost Effectiveness (Incremental Cost Data Set)

Some commenters believe the incremental cost is too low because of the small dataset.

EPA Response:

EPA sent an e-mail to all stakeholders asking them to volunteer cost data, and eight organizations responded with 92 data points, 80 of which EPA used in its analyses (12 data points were excluded from the dataset because either the datasets were incomplete or the ratings were achieved using an attachment product). 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. EPA refers commenters to the *Review of Cost Effectiveness Analysis* document for additional details.

Comment 33 – Cost Effectiveness (Exclusion of Triple-Pane Windows)

Some commenters believe the estimated incremental costs are too low because EPA excluded triple-pane windows. One commenter believes EPA improperly excluded triple-pane windows because EPA has decided not to consider the possibility that triple-pane windows may be widely used to meet the specification simply because triple-pane windows are more expensive. The commenter believes that EPA can exclude triple-pane window data only if it can provide compelling evidence that manufacturers would be able to produce cost-effective double-pane windows.

EPA Response:

EPA specifically chose a criteria level for the Northern Zone that could be met by double-pane windows. Analysis of the CPD and the Products Available for Sale Database indicate that there are products that meet the proposed specification using double-pane glass. Cost data from manufacturers indicate that it is possible to manufacture cost-effective double-pane windows that meet the proposed specification. Conversations with manufacturers confirm that this is the case. EPA refers commenters to the *Review of Cost Effectiveness Analysis* document accompanying the responses to comments for additional details on EPA's rationale for not including triple-pane windows in its analysis.

Comment 34 – Cost Effectiveness (Presentation of Data)

One commenter notes that payback periods should be presented in a bar chart rather than a table. The commenter also notes that payback periods including recoup costs based on the sale of the home (such as those provided in Table 8 of the *Draft 1 Criteria and Analysis Report*) should not be presented without expressly and obviously indicating substantiating data within the body of the table.

EPA Response:

EPA appreciates the feedback and has presented payback periods in a bar chart in the *Review of Cost Effectiveness Analysis* document accompanying the responses to comments. EPA notes that a footnote for Table 8 in the *Draft 1 Criteria and Analysis Report* provided the requested data, but EPA appreciates the feedback and will take these comments into consideration the next time EPA produces such tables.

Comment 35 – Cost Effectiveness (Request for Additional Data 1)

One commenter requests that EPA release additional data used in determining cost-effectiveness, specifically, how much cost information was provided by the manufacturer partners? Did each company provide a single estimate or did some provide multiple estimates?

EPA Response:

EPA's technical contractor received 92 incremental price points from eight manufacturers for differences between best-selling ENERGY STAR (V5) product and products with better performing U-factors and/or Solar Heat Gain Coefficients (SHGCs). For additional information, including the manufacturer input template showing data types provided by manufacturers, EPA refers commenters to the *Review of Cost Effectiveness Analysis* document accompanying the responses to comments.

Comment 36 – Cost Effectiveness (Request for Additional Data 2)

One commenter requests that EPA release additional data used in determining cost-effectiveness, specifically, what was the range of costs, as well as the mean and median, in the data set?

EPA Response:

For double-pane windows only, incremental cost to get from the best-selling ENERGY STAR qualified window to one with a U-factor of 0.27 OR LOWER:

Range: \$20-\$65

Mean: \$34

Median: \$25

For double-pane and triple-pane windows, incremental cost to get from the best-selling ENERGY STAR qualified window to one with a U-factor of 0.27 OR LOWER:

Range: \$20-\$543

Mean: \$173

Median: \$122

Comment 37 – Cost Effectiveness (Request for Additional Data 3)

One commenter requests that EPA release additional data used in determining cost-effectiveness, specifically, how did EPA use the data to generate different average costs by climate zone?

EPA Response:

All incremental cost data points supplied by manufacturers were entered into an Excel spreadsheet that included U-factor, SHGC, incremental costs, and other data. The sheet was then filtered by U-factor and SHGC (less than or equal to the proposed criteria). The remaining values were averaged. EPA refers commenters to the *Review of Cost Effectiveness Analysis* accompanying the responses to comments for additional details and explanation.

Comment 38 – Cost Effectiveness (Request for Additional Data 4)

One commenter requests that EPA release additional data used in determining cost-effectiveness, specifically, 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?

EPA Response:

Five manufacturers provided cost data for triple-pane windows, though each of these companies also supplied data for double-pane windows. For triple-pane windows only, incremental cost to get from the best-selling ENERGY STAR qualified window to one with a U-factor of 0.27 OR LOWER:

Range: \$57-\$543

Mean: \$234

Median: \$200

Comment 39 – Cost Effectiveness (Request for Additional Data 5)

One commenter requests that EPA release additional data used in determining cost-effectiveness, specifically, did EPA use all of the data provided by manufacturers in its analysis? If not, what data was excluded and why?

EPA Response:

Of the 92 data points received from manufacturers, 12 were excluded because either the datasets were incomplete or the performance ratings were achieved using an attachment. All other data points were used in EPA analysis. EPA refers commenters to the *Review of Cost Effectiveness Analysis* accompanying the responses to comments for additional details.

Comment 40 – Cost Effectiveness (Request for Additional Data 6)

One commenter believes that EPA's assumed marginal cost increase cannot be evaluated by stakeholders without additional information. Specifically, how many specific estimates of marginal cost did EPA receive?

EPA Response:

EPA received three marginal cost estimates from manufacturers.

Comment 41 – Cost Effectiveness (Request for Additional Data 7)

What were the range, mean, and median of manufacturers' marginal cost estimates?

EPA Response:

To protect the confidentiality of the data provided by manufacturers, EPA cannot provide range, mean, and median because too few manufacturers offered marginal costs estimates. EPA directs commenters to Comment 40 for additional information on marginal cost.

Comment 42 – Cost Effectiveness (Request for Additional Data 8)

One commenter believes that EPA's assumed marginal cost increase cannot be evaluated by stakeholders without additional information. Specifically, was all of the data received from manufacturers taken into account by EPA in concluding that the current marginal cost is "about \$20?"

EPA Response:

Most manufacturers that responded to EPA's request for marginal cost data indicated that they did not offer code windows or that they offered code windows for about the same cost as their current best-selling ENERGY STAR V5 windows. In either case, this makes the marginal cost effectively \$0. Only one manufacturer offered an incremental cost difference between a code window and an ENERGY STAR V5 best-selling window. That manufacturer estimated a \$20 upgrade charge to go from a code window to an ENERGY STAR qualified window (V5). EPA used the conservative estimate of \$20 in its initial cost effectiveness analysis.

Comment 43 – Cost Effectiveness (Request for Additional Data 9)

One commenter believes that EPA's assumed marginal cost increase cannot be evaluated by stakeholders without additional information. Specifically, 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 5.0 to Version 6.0 are not of similar magnitudes.

EPA Response:

There were two sets of incremental costs provided in the report: the incremental cost and the marginal cost. The incremental cost is the difference between a manufacturer's current best-selling ENERGY STAR V5 window and one that meets the proposed Version 6.0 specification. Incremental cost estimates are provided in Table 5 on page 27 of the *Draft 1 Criteria and Analysis Report* and vary by climate zone. Marginal cost is the difference between a code window and a manufacturer's current best-selling ENERGY STAR V5 window. EPA notes that a majority of manufacturers providing data indicated that their current best-selling ENERGY STAR Version 5.0 product qualifies in all climate zones. Therefore, the marginal cost is estimated to be the same in all zones.

Comment 44 – Cost Effectiveness (Request for Additional Data 10)

One commenter believes that EPA's assumed marginal cost increase cannot be evaluated by stakeholders without additional information. Specifically, on what basis did EPA assume that the marginal cost associated

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with moving to Version 6.0 would be the same as the current marginal cost of moving from the "next poorest-performing window" to 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?"

EPA Response:

EPA encourages commenters to review the *Review of Cost Effectiveness Analysis* that accompanies the responses to comments. In brief, EPA did not assume that the marginal costs 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 Version 5.0. EPA understands that the specification changes associated with the transition to Version 5.0 and the transition from Version 5.0 to the proposed Version 6.0 are not similar in magnitude or technical effort. As noted in the response to Comment 43, there were two separate sets of incremental costs collected: one for the change from code to Version 5.0 and one from the manufacturer's current best-selling ENERGY STAR Version 5.0 window to the proposed Version 6.0 levels. These incremental costs were added to get the total marginal costs (or total additional costs) that are provided in Table 8 on page 31 of the *Draft 1 Criteria and Analysis Report*.

Northern Zone Prescriptive Criteria Comments

Comment 45 – Criteria (Northern Zone Prescriptive U-Factor)

Many commenters would prefer to see a change in the prescriptive U-factor in the Northern Zone.

EPA Response:

EPA appreciates the variety of criteria levels suggested by commenters. EPA believes its research and analysis indicate that 0.27 and the associated trade-offs are the most appropriate criteria for the Northern Zone at this time.

Comment 46 – Criteria (Northern Zone Prescriptive U-factor Too High)

Half of commenters who suggested alternate criteria seek a lower U-factor (such as 0.24 or 0.25). One commenter sees a lower U-factor as necessary because of the 10% tolerance allowed under the NFRC Independent Verification Program (IVP), which will allow a 0.27 window to pass IVP testing with a 0.30, which is the current criteria level. As such, a U-factor of 0.25 will effectively be a U-factor of 0.28. Additionally, the commenter sees the U-factor criterion of 0.25 in ENERGY STAR Canada's most populous region as an indication that this U-factor is technically possible and that products will be equally available in the United States. Finally, there will be at least one proposal for the 2015 International Residential Code that includes a 0.25 U-factor with SHGC trade-offs in the Northern Zone.

EPA Response:

EPA will evaluate results of the IVP as they become available. If the IVP results indicate that a significant number of products are failing IVP testing, EPA will revisit this issue. EPA appreciates the fact that some companies sell products in the United States and Canada. EPA's analysis shows that a U-factor of 0.25 is not cost-effective in the United States at this time. EPA continues to monitor the code process and will make adjustments or revisions to the proposed criteria as necessary.

Comment 47 – Criteria (Northern Zone Prescriptive U-factor Too Low)

Half of commenters who suggested alternate criteria seek a higher U-factor (such as 0.28 or 0.29). Some commenters believe that the proposed specification will require many manufacturers to move to triple-pane windows, which could take 1-2 years and hundreds of thousands of dollars.

EPA Response:

EPA specifically chose a criteria level for the Northern Zone that would ensure that triple-pane windows are not required to meet the proposed specification and that there are multiple pathways for double-pane windows to qualify. Analysis of the CPD and the Products Available for Sale Database indicate that double-pane windows can meet the proposed specification. Cost data from manufacturers indicate that it is possible to manufacture cost-effective double-pane windows that meet the proposed specification. Conversations with manufacturers confirm that this is the case.

Northern Zone Equivalent Energy Performance Criteria Comments

Comment 48 – Criteria (Support Northern Zone Equivalent Energy Performance)

Several commenters support the revised equivalent energy performance criteria (trade-offs).

EPA Response:

EPA appreciates the support from the commenters regarding the trade-offs.

Comment 49 – Criteria (Consumer Education on High-Gain Products)

One commenter notes that the expected energy performance of these products is achievable only in applications with direct exposure to the sun and EPA should therefore consider what measures are necessary to mitigate the risk of inappropriate application of higher SHGC products to achieve the intended energy savings and avoid negative consumer experiences.

EPA Response:

EPA is currently conducting energy savings analysis, which has so far indicated that the energy performance of today's moderate gain products is less sensitive to the effects of orientation than that of true high-gain windows (which are relatively uncommon in today's marketplace). EPA will take this analysis into consideration during the next specification revision.

Comment 50 – Criteria (Northern Zone Equivalent Energy Performance Alternative Proposals)

Several commenters request revisions to the trade-offs based on their prescriptive U-factor maximum proposals. One commenter who requests a prescriptive U-factor of 0.25 would prefer five trade-offs with U-factors from 0.26-0.30 and SHGCs minimums from 0.22-0.42. For a prescriptive U-factor of 0.28, one commenter seeks two trade-offs: a 0.29 U-factor with a 0.30 SHGC and a 0.30 U-factor with a 0.35 SHGC, while another commenter suggests a 0.29 U-factor a 0.37 SHGC and a 0.30 U-factor with a 0.43 SHGC. For a prescriptive U-factor of 0.29, one commenter would prefer a trade-off for a 0.30 U-factor with an SHGC minimum of 0.42.

EPA Response:

EPA appreciates the variety of trade-off levels suggested by commenters. EPA believes that the proposed prescriptive U-factor for the Northern Zone (and the corresponding trade-offs) are the most appropriate choice based on its analysis, conversations with manufacturers, and the wide variety of comment received.

Comment 51 – Criteria (Northern Zone Equivalent Energy Performance Alternative Proposal with Justification, Part 1)

One commenter requests that only one trade-off be offered: U-factor of 0.28 with an SHGC minimum of 0.40 because trade-offs do not account for seasonal comfort.

EPA Response:

EPA appreciates the commenter's suggestion for an alternative approach to trade-offs. EPA notes that there are no robust studies indicating that the proposed trade-offs would have a negative impact on seasonal comfort.

Comment 52 – Criteria (Northern Zone Equivalent Energy Performance Alternative Proposal with Justification, Part 2)

One commenter requests that only one trade-off be offered (U-factor of 0.28 with an SHGC minimum of 0.40) because the current trade-offs allow a higher U-factor in the Northern Zone than in the North-Central Zone.

EPA Response:

EPA appreciates the commenter's suggestion for an alternative approach to trade-offs. EPA has modified the U-factor in the North-Central Zone so that it matches the highest U-factor offered as a trade-off in the Northern Zone.

Comment 53 – Criteria (Northern Zone Equivalent Energy Performance Alternative Proposal with Justification, Part 3)

One commenter requests that only one trade-off be offered: U-factor of 0.28 with an SHGC minimum of 0.40 because the Lawrence Berkeley National Laboratory (LBNL) analysis is not based on the IECC 2012 building operational assumptions (i.e., temperature set point and interior shading scalar).

EPA Response:

EPA appreciates the commenter's suggestion for an alternative approach to trade-offs. EPA asked LBNL to re-evaluate the assumptions it used in the previous criteria revision to determine if any changes were necessary. LBNL determined that revisions were not necessary. The analysis looked at incremental differences in energy consumption, with both the baseline and proposed levels modeled with RESFEN assumptions.

Comment 54 – Criteria (Northern Zone Equivalent Energy Performance Alternative Proposal with Justification, Part 4)

One commenter requests that only one trade-off be offered: U-factor of 0.28 with an SHGC minimum of 0.40 because the benefits of trade-offs depend on orientation.

EPA Response:

EPA appreciates the commenter's suggestion for an alternative approach to trade-offs. EPA is currently conducting energy savings analysis, which has so far indicated that the energy performance of today's moderate-gain products is less sensitive to the effects of orientation than that of higher-gain products.

Comment 55 – Criteria (Northern Zone Equivalent Energy Performance Alternative Proposal with Justification, Part 5)

One commenter requests that only one trade-off be offered: U-factor of 0.28 with an SHGC minimum of 0.40 because SHGC trade-off increments of 0.05 can be easily "gamed" by modifying window size, frame widths, grid bars, etc.

EPA Response:

EPA appreciates the commenter's suggestion for an alternative approach to trade-offs. EPA notes that there are many window features that manufacturers can modify to achieve the various levels established across the proposed ENERGY STAR criteria levels. ENERGY STAR criteria are based on the performance of the window as a whole. Window manufacturers may use whatever materials or technologies they choose to achieve the criteria for a given zone. ENERGY STAR does not address what specific technologies a window must use to meet the ENERGY STAR criteria.

Comment 56 – Criteria (Northern Zone Equivalent Energy Performance Alternative Proposal with Justification, Part 6)

One commenter requests that only one trade-off be offered: U-factor of 0.28 with an SHGC minimum of 0.40 because an SHGC of 0.40 is the value used as the baseline for trade-offs in IECC, ENERGY STAR Homes, and HERS.

EPA Response:

EPA appreciates the commenter's suggestion for an alternative approach to trade-offs. EPA is not aware of any analysis that was performed in selecting the 0.40 baseline for IECC, ENERGY STAR Homes, and HERS. A window with an SHGC of 0.40 and a U-factor of 0.28 exceeds the performance of a typical window qualifying under the proposed prescriptive criteria, which means it is not an equivalent energy trade-off.

Comment 57 – Criteria (Elimination of Northern Zone Equivalent Energy Performance)

Some commenters would prefer that EPA eliminate all trade-offs because there is no foundation for allowing higher SHGC in the North based on HERS and REM/Rate analyses. Based on these analyses, a higher SHGC will result in substantially higher energy costs for consumers in Nebraska. Other commenters are concerned that the proposed trade-offs create real potential for homeowner discomfort, increased air-conditioning costs, and peak demand implications for utilities.

EPA Response:

EPA appreciates the feedback from commenters regarding eliminating the trade-offs. EPA's analysis covered various cities across the Northern Climate Zone, including Kansas City, MO, which is roughly 100 miles from southern Nebraska and represents a very similar climate (though slightly warmer). The results of the Kansas City analysis show a slight, consistent benefit from an increased SHGC (0.20-0.40) when U-factor is kept constant. While a decreased U-factor shows a more significant benefit, both variables independently result in lower energy costs. Additional modeling using REM/Design and NEAT for the southern Nebraska region confirms that a constant U-factor with an increased SHGC results in a slight improvement in energy costs. Further, EPA notes that REM/Rate is typically used to model new homes, not as a window modeling tool. EPA notes that there are no robust studies indicating that the proposed trade-offs would have negative impact on seasonal comfort. Though some homeowners may find that their air conditioning costs are higher with higher gain windows, overall yearly energy costs will be lower. The cause of increased peak load for utilities discussed in the report cited by the commenter is not clear.

Other Criteria Comments

Comment 58 – Criteria (Meeting or Exceeding Model Code)

One commenter sees the effort to exceed the 2012 IECC as adding unnecessary cost to qualifying products because it will be at least 2016 before 50% of states adopt IECC 2012.

EPA Response:

EPA notes that the ENERGY STAR mark must be associated with products that meet or exceed minimum requirements, such as national model codes. While EPA understands that states may wait to adopt IECC 2012, it is important that the ENERGY STAR mark remain a symbol of superior efficiency. If the code approaches or exceeds the ENERGY STAR specification in some regions, as is the case with the current specification, EPA strives to exceed that code. The current ENERGY STAR specification is significantly behind the 2012 IECC in some zones and the International Code Council is already working to develop IECC 2015.

Comment 59 – Criteria (Definitions)

One commenter requests a change in the definition of excluded products by adding "residential buildings four stories or more in height or" after "that are intended for installation in."

EPA Response:

EPA finds the current language appropriate, noting that the title of the specification includes the term "residential" and that "residential building" is defined on page 2 of the specification as "A structure used primarily for living and sleeping that is zoned as residential and/or subject to residential building codes." For the purposes of ENERGY STAR, "residential building" refers to buildings that are three stories or less in height.

Comment 60 – Criteria (North-Central Zone)

One commenter prefers a U-factor maximum of 0.31 in the North-Central Zone, while several others request a U-factor of 0.30. One commenter states that manufacturers currently make 0.30 products and the additional miniscule benefit at 0.29 doesn't justify the substantial investment in resources necessary to achieve the major reconfiguration of fenestration manufacturing.

EPA Response:

EPA has modified the North-Central Zone U-factor to 0.30 based on comments received and conversations with manufacturers. This change recognizes the large number of products already being made at that U-factor and the additional cost required for a small improvement in performance. To counter the loss of energy savings in the North-Central Zone and simplify the proposed specification, EPA has also revised the South-Central U-factor maximum to 0.30.

Comment 61 – Criteria (South-Central Zone)

Several commenters prefer a U-factor maximum of 0.32 in the South-Central Zone.

EPA Response:

EPA has modified the South-Central Zone U-factor to 0.30 based on conversations with manufacturers. EPA notes that the commenters did not provide sufficient information explaining their rationale for requesting a U-factor of 0.32. The proposed U-factor maximum of 0.30 in the South-Central Zone will simplify the proposed specification and make up some of the lost energy savings resulting from the increase of the North-Central Zone

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U-factor maximum from 0.29 to 0.30. In addition, windows with U-factors of 0.30 are widely available due to the expired “30/30” Federal tax credit.

Comment 62 – Criteria (Southern Zone)

One commenter asks that EPA add equivalent energy performance options (trade-offs) in the Southern Zone, which can be consistent with IECC 2012 (in Zone 1) through Sections R102 and R405.

EPA Response:

EPA notes that builders who wish to follow the compliance path described in the sections referenced must obtain approval from the code official in the local jurisdiction. EPA believes it would be problematic to set prescriptive criteria that allow products to qualify when a builder would need special permission to use that product.

Feasibility and Availability Comments

Comment 63 – Analysis (Incorporation of Feasibility Analysis)

One commenter seeks clarification on how EPA is incorporating information on “what products could be feasibly manufactured” into its analysis.

EPA Response:

To determine “what products could be feasibly manufactured,” EPA analyzed the NFRC CPD. This analysis was compared to the Products Available for Sale Database of more than 17,000 products that EPA created based on product information available on the websites of major manufacturers. These datasets were used in concert with discussions with manufacturers to evaluate potential availability at various specification levels at the time of implementation.

Comment 64 – Analysis (Use of CPD to Determine Availability)

One commenter sees the CPD as an inappropriate data set for the criteria revision analysis because it was never intended to serve as an indicator of products actually being sold. The commenter believes the vast majority of products contained in the CPD are not available on the market.

EPA Response:

EPA recognizes the CPD is not an indicator of which products are being sold. For this reason, EPA supplemented its analysis of the CPD by compiling and analyzing the Products Available for Sale Database, which contains more than 17,000 products. EPA confirmed that the distribution of product performance for the databases was comparable, making both datasets useful in the comparative analyses performed.

Comment 65 – Analysis (Feasibility versus Availability)

One commenter believes that EPA gave technological feasibility more weight than product availability.

EPA Response:

EPA complemented its analysis of technological feasibility (advancements) by analyzing the Products Available for Sale Database. The CPD (used for the analysis of technological feasibility) represents the best available information on what could be available in the market in the future. This, when used in combination with the Products Available for Sale Database, helps EPA evaluate potential availability when a specification takes effect. In addition to analyzing these two databases, EPA reviewed and discussed current technological advancements with product manufacturers, component manufacturers, and testing organizations to confirm availability and performance. The two databases are just part of the many elements EPA used in evaluating the potential criteria levels for the Northern Zone.

Comment 66 – Analysis (Use of Technological Feasibility Analysis, Part 1)

One commenter believes that EPA should not have considered technological feasibility because it is not an issue discussed in the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles*.

EPA Response:

Technological feasibility analysis assists EPA in evaluating technological advancements, which is a parameter identified in the *ENERGY STAR® Products Program Strategic Vision and Guiding Principles* as an element considered in specification revisions. Technological advancements can include new technologies already in the

marketplace or changes that have not been widely adopted by manufacturers. By evaluating the CPD and the Products Available for Sale Database, EPA looks at both types of technological advancements.

Comment 67 – Analysis (Use of Technological Feasibility Analysis, Part 2)

One commenter believes that EPA cannot use technological feasibility to justify the stringency of the proposed specifications in the Northern Zone.

EPA Response:

EPA looks at technological feasibility by analyzing the CPD, which represents the best available information on what could be available in the market in the future. This, when used in combination with the Products Available for Sale Database, helps EPA evaluate potential availability when a specification takes effect. These are just two of many elements EPA used in evaluating the potential criteria levels for the Northern Zone.

Comment 68 – Product Availability (General, Part 1)

One commenter believes that EPA has not demonstrated adequate product availability based on either the CPD analysis or the products available for sale analysis.

EPA Response:

EPA used both the CPD and the Products Available for Sale Database when performing its analyses. These two analyses helped EPA evaluate potential availability for various specification levels at the time the Version 6.0 criteria take effect, which is the primary concern with respect to availability when revising a specification. The analyses of both the CPD and the Products Available for Sale Database indicate there will be adequate product availability when the proposed specification takes effect with the revised implementation date of January 1, 2015. In addition to analyzing these two databases, EPA reviewed and discussed product availability with product manufacturers to confirm that products would be available.

Comment 69 – Product Availability (General, Part 2)

One commenter notes that the existence of high-efficiency windows that meet the criteria does not mean that these products are broadly available in the market.

EPA Response:

EPA understands that the existence of advanced technologies is not the same as availability, which is why EPA supplemented its analysis of the CPD with the analysis of the Products Available for Sale Database, which includes more than 17,000 products.

Comment 70 – Product Availability (Availability Levels in the Northern Zone)

One commenter believes that a U-factor of 0.27 in the Northern Zone is too stringent and that the U-factor should be no lower than 0.29 to ensure that sufficient products will be available. The commenter found that 6% of products in the CPD are certified for a U-factor of 0.27 and 12% of products are certified for U-factors of 0.25 – 0.27, which indicates that a U-factor of 0.27 cannot meet the 25% product availability metric. The commenter also found that 4% of products available for sale have a U-factor of 0.26 or 0.27, and 8% of products have a U-factor of 0.27 or less, which further indicates that a U-factor of 0.27 cannot meet the 25% product availability metric. The stakeholder calculated that 13% of available products have U-factors of 0.26 - 0.28, while 18% of products in the CPD have U-factors of 0.26 - 0.28. The commenter also found that 27% of products have U-

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factors of 0.27 - 0.29 based on EPA's CPD analysis and products available for sale analysis, which indicates that a U-factor of 0.29 would meet the 25% product availability metric.

EPA Response:

The *ENERGY STAR® Products Program Strategic Vision and Guiding Principles* states that EPA has typically found that the best balance among the guiding principles may be achieved by setting specifications that recognize the top 25% of product models on the market at the time a specification takes effect. EPA emphasizes that this figure is provided for reference and is not a goal, metric, or rule for criteria setting. EPA believes that the proposed Version 6.0 requirements will result in a wide selection of products for consumers from numerous manufacturers at the time of specification implementation. EPA has arrived at this conclusion by analyzing and comparing the NFRC CPD and the Products Available for Sale Database, which contains more than 17,000 products. The comparison of the CPD to the Products Available for Sale Database was extremely useful when trying to understand what products *might* be available once the proposed revised specification takes effect. In addition to analyzing these two databases, EPA reviewed and discussed current technological advancements with product manufacturers, component manufacturers, and testing organizations to confirm availability and performance. Finally, there is historical evidence that shows ENERGY STAR market share for windows has remained strong after previous criteria revisions.

Comment 71 – Product Availability (Equivalent Energy Performance Criteria)

One commenter could not find any products in the CPD that meet the combinations of U-factor and SHGC proposed as equivalency metrics.

EPA Response:

EPA reviewed its initial query of the CPD and found that approximately 4,500 products in the CPD met the proposed equivalent energy performance criteria. Feedback from and discussions with manufacturers indicate that companies have already begun working to develop additional products that meet the proposed trade-offs.

Comment 72 – Product Availability (Use of CPD to Determine Availability)

One commenter notes that Section 3.2.3 of the *Draft 1 Criteria and Analysis Report* includes the word “availability” and that this section includes data from the CPD, which would seem to indicate that EPA used the CPD to assess availability.

EPA Response:

EPA used both the CPD and the Products Available for Sale Database when performing its analyses. These two databases helped EPA evaluate potential availability for various specification levels at the time the Version 6.0 criteria take effect, which is the primary concern with respect to availability when revising a specification.

Comment 73 – Product Availability (Double-Pane Windows)

One commenter does not believe that EPA has demonstrated that double-pane windows will be available to meet the criteria, which means that the Northern Zone specification must be set where it is clear that triple-pane windows are not required.

EPA Response:

EPA believes that Figure 7 of the *Draft 1 Criteria and Analysis Report* clearly demonstrates that double-pane products are currently available that meet the proposed criteria. Based on discussions with manufacturers, EPA

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believes double-pane products that meet the proposed specification will be widely available when the proposed specification takes effect.

Process Comments

Comment 74 – Draft 1 Version 6.0 Comment Responses (Support)

Several commenters offer appreciation for EPA's responsiveness to commenter concerns in response to the Draft 1 criteria. One commenter notes EPA's forthrightness and effort for transparency, and another appreciates EPA's willingness to discuss the ENERGY STAR proposals in order to establish the best program for product consumers and manufacturers.

EPA Response:

EPA appreciates the comments supporting its comment responses and criteria revision process.

Comment 75 – Draft 1 Version 6.0 Comment Responses (Critique)

Several commenters believe that EPA could have been more responsive, citing the need to respond to each comment offered by commenters and the need to provide better feedback when commenters' suggestions are not taken. One commenter finds EPA's responses to Draft 1 comments general, cursory, inadequate, or indicative of EPA not fully understanding commenter concerns. Specifically, the commenter believes that EPA provided inadequate responses to stakeholder comments on market share. The commenter also believes that EPA did not engage substantively in many of the comments and did not engage seriously and openly in the issues raised. The commenter sees EPA's responses as indicative that EPA did not thoughtfully consider comments on their merit, had no intention of modifying its proposal if comments were found to be persuasive, and is not committed to holding open the possibility for significant modification in the specification.

EPA Response:

EPA has attempted to fully engage stakeholders throughout the specification revision process and has considered all comments. EPA has made and will continue to make every effort to respond to all the issues raised in the comments. EPA notes that the Agency made a large number of changes to the draft proposal in response to comments. The *Introduction to Response to Comments* released in conjunction with this document offers additional insight into EPA's decision-making process during this criteria revision.

Comment 76 – Future Criteria Development

One commenter prefers that future criteria revisions mirror the current review process, including commenters' meeting, preliminary proposals, final proposal, and comment periods. The commenter believes the current review process, developed throughout the existence of the program, is directly responsible for the continued success of the ENERGY STAR for Windows, Doors, and Skylights program and will remain an instrumental process in developing future program iterations.

EPA Response:

EPA appreciates the feedback and will make every effort to continue with the current process, making improvements as necessary.

Comment 77 – General (Process)

One commenter believes that EPA had largely decided on the outcome of the criteria revision process before it began. The commenter believes that EPA was set on the range of values presented in the *Version 6.0 Product Specification Framework Document*, which means the commenter process has been an unnecessary waste of time and money. The commenter sees no integrity in the process if EPA is not willing to modify the specifications in response to commenter input. Further, the commenter is concerned that EPA did not clearly

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state in the *Version 6.0 Product Specification Framework Document* that the proposed criteria ranges were intended to indicate what the final criteria were likely to be.

EPA Response:

EPA notes that stakeholders specifically requested that the Agency provide potential criteria ranges as early in the process as possible, which is why potential criteria levels were offered in the *Version 6.0 Product Specification Framework Document*. EPA has made a number of modifications to the specification in response to commenter input. EPA appreciates the feedback regarding the clarity of the *Version 6.0 Product Specification Framework Document* and will take this into consideration when composing the Version 7.0 Framework Document.

Comment 78 – General (Comment Review)

One commenter believes that EPA has not allowed sufficient time for rigorous and diligent review of Draft 2 comments and that review of the Draft 2 comments should take longer than review of Draft 1 or Framework Document comments because the last phase of the criteria revision is the most critical.

EPA Response:

EPA appreciates the commenter's concern and has allowed time for rigorous and diligent review of the comments received. EPA notes that it provided longer comment periods earlier in the process with the expectation that more substantive comments would be best addressed then, with the proposed criteria being fine-tuned as the process reaches its conclusion. Accordingly, EPA published the expected length of comment periods and tentative timelines at several points in the process.

Air Leakage Comments

Comment 79 – Air Leakage (General)

One commenter supports the Air Leakage (AL) requirement.

EPA Response:

EPA appreciates the support for the AL requirement.

Comment 80 – Air Leakage (NFRC Labeling)

One commenter supports the requirement to include the AL value on the NFRC label.

EPA Response:

EPA appreciates the support for including the AL value on the NFRC label.

Comment 81 – Air Leakage (Other Labels)

Several commenters request that EPA recognize products with the American Architectural Manufacturers Association (AAMA) Gold Label as having met or exceeded the AL requirement.

EPA Response:

EPA appreciates this feedback. The final draft specification has been modified to allow AAMA, Window and Door Manufacturers Association (WDMA), Keystone Certifications, Inc., and National Accreditation & Management Institute, Inc. (NAMI) labels in lieu of including the AL value on the NFRC label. EPA plans to consider other labels on a case-by-case basis.

Comment 82 – Air Leakage (Testing)

One commenter supports the AL testing requirements.

EPA Response:

EPA appreciates the support for the proposed AL testing requirements.

Comment 83 – Air Leakage (Cost Effectiveness)

One commenter is concerned that there is no data with which to assess the impact of AL requirements on costs.

EPA Response:

In conversations with EPA, many manufacturers noted that this requirement would not result in added cost because they are already testing and certifying for AL.

Installation Instructions Comments

Comment 84 – Installation Instructions (Holistic Approach)

One commenter supports the installation instructions requirement, but would prefer to see it supplemented with a multi-faceted strategy to define and influence quality installation in the marketplace, including activities such as enhanced consumer education, contractor training, and certification standards.

EPA Response:

EPA appreciates the suggestions regarding installation instructions and may consider these ideas in the future. EPA encourages industry to develop the necessary standards for inspection, certification, and enforcement processes, which would better enable EPA to educate homeowners about these issues and/or add new ENERGY STAR program requirements as appropriate.

Comment 85 – Installation Instructions (Performance-Based Approach)

One commenter prefers performance-based installation instructions, rather than prescriptive, one-size-fits-all installation instructions.

EPA Response:

At this time, EPA seeks to offer general guidance to ensure that installers have instructions that include basic elements of proper installation. EPA believes a performance-based installation approach would be best handled through codes and/or local programs that can offer quality assurance.

Comment 86 – Installation Instructions (Flashing)

One commenter would like to see “as applicable to the product” removed from Paragraph 3.D.iv. because there are no installation scenarios in which proper flashing is not possible, and not requiring proper flashing will reduce the performance of products by as much as 50%.

EPA Response:

During the Draft 1 comment period, EPA received specific feedback that there are a limited number of scenarios where products cannot be flashed. EPA added “as applicable to the product” in response to this feedback to allow manufacturers additional flexibility.

Comment 87 – Installation Instructions (Recycling, Part 1)

One commenter would like to see Paragraph 3.D.iii. revised to state that manufacturers should reference www.epa.gov/recycling for information on properly disposing of old product.

EPA Response:

EPA appreciates feedback on Paragraph 3.D.iii. However, EPA notes that www.epa.gov/recycling does not contain any information regarding proper disposal of building products.

Comment 88 – Installation Instructions (Recycling, Part 2)

One commenter would like to see the recycling requirement made into a new paragraph.

EPA Response:

EPA agrees and has changed the proposed specification to make the recycling requirement a new paragraph.

Comment 89 – Installation Instructions (Disposal)

One commenter would like to see Paragraph 3.D.iii. clarify that this information is required only on manufacturer websites and is not required on product labels.

EPA Response:

EPA agrees and has revised the proposed specification to clarify that information about proper window disposal is required only on manufacturer websites, not on product labels.

Comment 90 – Installation Instructions (Installation Scenarios)

One commenter would like clarifications to Paragraph 3.D.vii. The current language suggests that exterior sheathing is not typically intact for new construction, which is not the case. The commenter recommends revising the language as follows: Variations of the above based on whether the job is a pocket replacement, full frame replacement, or new construction installation, as applicable to the product.

EPA Response:

EPA agrees and has modified the proposed specification to clarify this issue by removing the example of new construction from Paragraph 3.D.vii.

General Comments

Comment 91 – General (Consumer Education)

One commenter asks that EPA sponsor the development of a consumer education piece to supplement materials provided by manufacturers and strengthen the message to the consumer about potential condensation issues related to fourth-surface coatings.

EPA Response:

Several industry organizations are currently conducting research regarding fourth-surface products. As a result, EPA expects that more information will be available to consumers from organizations, component manufacturers, and window manufacturers in the future. EPA will continue to monitor the marketplace and may consider developing such educational materials if necessary.