



Department of Energy
Washington, DC 20585

April 7, 2009

Dear ENERGY STAR[®] for Windows, Doors, and Skylights Stakeholder:

After a thorough review of technical data and stakeholder feedback, the Department of Energy (DOE) is pleased to present the final revised criteria for ENERGY STAR qualified windows, doors, and skylights, included in the *ENERGY STAR Program Requirements for Residential Windows, Doors, and Skylights – Version 5.0* accompanying this letter.

The Department would like to thank the many stakeholders who participated in the revision process over the last 18 months. Stakeholder input was invaluable in developing the final criteria and requirements for the program.

The revised criteria uphold the guiding principles for ENERGY STAR by providing

- Significant energy savings over the current criteria for windows, doors, and skylights (9.21 trillion Btu);
- Reasonable payback periods for purchasers on their fenestration investments; and
- A choice of technology options to meet the needs and preferences of the market.

In August 2008, DOE published its first proposal for the revised criteria in the *Windows, Doors, and Skylights Draft Criteria and Analysis*, following extensive research of the criteria options. In response to feedback from the subsequent stakeholder meeting and round of public comments, DOE refined its proposal in the follow-up *Revised Draft Criteria and Report*, published on March 11, 2009. After reviewing the additional round of comments, DOE has decided to include the following elements in the final revised criteria:

1. **Phased implementation.** Stakeholders generally supported postponing finalization of Phase 2 criteria. Since it is still three to four years until the likely effective date for these criteria, DOE is deferring finalization of these criteria to allow for additional data collection and analysis. The Department will begin research on a Phase 2 proposal in late CY 2009.
2. **Revised four-zone climate zone map.** Despite isolated suggestions for changing the number of zones, most stakeholders agreed with the concept of returning to four climate zones and geography-based zone names. A few stakeholders reiterated support for the map proposed jointly by the Window and Door Manufacturers Association and the American Architectural Manufacturers Association, but DOE's analysis showed greater energy savings from a larger Northern Zone, with more stringent criteria, such as the one proposed in the *Revised Draft Criteria and Report*. For the final criteria, DOE has adopted this revised map from its March report.

3. **Category shift for sliding glass doors.** Stakeholders suggested it would be easier for consumers to understand the separate criteria for doors if they applied to all doors and left only windows in the windows category. The Department's analysis showed that no significant savings would be lost by transferring sliding glass doors to the door category. The door criteria will therefore apply to all doors (See definition in the *Program Requirements*), and the window criteria to windows only.
4. **Revised criteria.**
 - a. **Windows.** In the North, stakeholders generally supported the limited tradeoffs, and DOE has retained the criteria levels and limited tradeoffs as presented in the *Revised Draft Report*. The tax credit in the American Recovery and Reinvestment Act of 2009 specified energy performance criteria, a maximum 0.30 U-factor and maximum 0.30 SHGC, for the entire country, regardless of climate zone. DOE considered this fact when reviewing ENERGY STAR criteria levels across the country, but tightened the U-factor criterion to the 0.30 level of the tax credit only in the North, the zone that would most benefit from the application of this low U-factor.

To maximize the number of products qualifying in this zone at the 0.30 maximum U-factor, DOE set no SHGC criterion rather than carry over the tax credit's SHGC maximum. The majority of windows in the market meeting the 0.30 U-factor will also meet the tax credit's 0.30 SHGC level, because the median SHGC for products with U-factors ≤ 0.30 is 0.27.¹ The revised tax credit of 30%, up to \$1500 total, will help cover the cost of purchasing windows that qualify for the credit.

The energy savings analysis in the *Draft Criteria and Analysis* revealed that in the North, a 0.01 increase in U-factor produces equivalent energy performance to a 0.05 increase in SHGC. DOE used this relationship to establish the proposed revised tradeoff levels: setting the tax credit criteria of 0.30 U-factor and 0.30 SHGC as the base case, the minimum required SHGC in the revised tradeoffs rises 0.05 to balance a 0.01 rise in U-factor. The two alternative criteria specify U-factors of 0.31 and 0.32, while allowing the minimum SHGC to rise to 0.35 and 0.40 respectively. Windows with those specific U-factors and the corresponding SHGCs or higher will qualify.

Several stakeholders proposed lowering the SHGC minima proposed for the 0.31 and 0.32 U-factor levels in the North. However, the tradeoff criteria must demonstrate equivalent performance to the base case of .30/.30, set to match the tax credit level. Therefore, DOE has retained the tradeoff criteria levels for the Northern Zone as presented in the *Revised Draft Report*.

Some stakeholders suggested extending the tradeoffs in the North to U-factors of 0.33 and 0.34. DOE cannot do so as the stakeholder-proposed values are too

¹ D&R International, Ltd., 2008. Analysis of 62 window manufacturers from 2008 Top 100 Manufacturers from *Window & Door Magazine* (February 2008) and ENERGY STAR Windows, Doors, and Skylights partners.

close to the 2009 IECC code and would make the criteria vulnerable to early obsolescence should the code be tightened even modestly. Finally, one comment suggested eliminating Northern tradeoffs altogether in favor of the one prescriptive level that matches the tax credit. DOE has decided to retain limited tradeoffs in order to increase the range of available products and the number of manufacturers able to offer qualifying products. The tradeoffs also recognize the benefits of higher solar gain where orientation and conditions are optimal.

In the North-Central Zone, stakeholders suggested relaxing the proposed SHGC maximum, but DOE set the 0.40 level to be consistent with the 0.40 cap under Title 24 in California, which is part of the North-Central Zone.

In the Southern Zone, stakeholders suggested tightening the U-factor to 0.55, but the IECC set the maximum U-factor for this region at 0.65. Therefore, as discussed in the *Draft Criteria and Analysis*, DOE set the U-factor at 0.60. Stakeholders also suggested a 0.30 SHGC in the South, but DOE prefers ENERGY STAR exceed code where possible and practical and set a maximum of 0.27. By lowering the SHGC to 0.27, DOE expects the mean SHGC of qualifying products to be 0.25 or 0.26, near the 0.27 level.

- b. **Doors.** Stakeholders agreed with the adjustment to the U-factor for doors in the $\leq 1/2$ -lite category. A remaining concern lay in the SHGC levels for glazed doors, but DOE set the SHGC at the IECC level and cannot relax the level further.
 - c. **Skylights.** Stakeholders agreed with the amendments to the skylight criteria and therefore DOE is retaining the criteria proposed in the *Draft Criteria and Report*.
5. **Tubular Daylighting Devices (TDDs).** Stakeholders advocated maintaining TDDs in the program, under the requirements for skylights. At the time of the *Revised Draft Report*, the National Fenestration Rating Council (NFRC) had two procedures available to TDD manufacturers for rating the U-factor of their products: the simulation ENERGY STAR has relied on to date, and a new physical test for which there was not yet a wide body of results. Since the report, NFRC has clarified that manufacturers can recertify their products under the old simulation procedure, with the physical test not required until 2012. Therefore, DOE has decided to retain TDDs in ENERGY STAR for Windows, Doors, and Skylights under the condition that manufacturers provide documentation showing the product U-factors are rated under NFRC's computer simulation procedure. TDDs will continue to be subject to the ENERGY STAR criteria for skylights.

Through due diligence during the course of the criteria revision, it has come to the Department's attention that stakeholders have raised questions about the reliability of the test procedures for TDD U-factor and about the appropriateness of U-factor and Solar Heat Gain Coefficient to represent the energy performance of TDDs. For these reasons, DOE, with input from industry, will decide how best to represent TDD performance in the ENERGY STAR program and will reevaluate TDD program participation as part of the research on Phase 2.

6. **Insulating Glass (IG) certification.** In its *Draft Criteria and Analysis*, DOE proposed adding IG certification as a requirement for ENERGY STAR qualification of windows, doors, and skylights, because certified IG units will become increasingly important as the use of argon-gas-filled units rises. Stakeholders agreed with this requirement in the first draft and no change was made to this requirement in the *Revised Draft Report*; DOE will require IG certification as soon as NFRC makes this certification mandatory, expected in July 2010.

IG certification recognized by NFRC is expected to include the elements listed in DOE's *Draft Criteria and Analysis*. For details on the requirements of IG certification through NFRC, please see NFRC 706-2009, *Requirements for Participating Insulating Glass Certification Programs*.

7. **Shipment data requirement.** Stakeholders supported DOE's potential solution to the requirement for reporting product shipment data. Reporting and aggregation of this sensitive data through Ducker Research will satisfy stakeholders' request for confidentiality and DOE's need to measure the impact of ENERGY STAR for Windows, Doors, and Skylights. DOE is still in discussion on this alternative and will announce its decision in time to coordinate with the next study.

DOE opted not to include several other program elements:

1. **Exemptions for specialized products.** Stakeholders proposed allowing an exception to the U-factor values for high-altitude products, and others suggested separate criteria altogether for high-impact products. In its *Draft Criteria and Analysis*, DOE noted that it is initially only proposing criteria for the highest-volume windows, doors, and skylights. With these criteria finalized, DOE can now evaluate the feasibility of developing equivalent performance criteria for these two categories of specialized products. At this time there are no available databases linking specialized product designation with energy performance. As part of the work on a Phase 2 proposal, DOE will compile and analyze this data to determine the feasibility of setting exceptions or separate criteria for specialized products.
2. **Reference products for building packages.** Some stakeholders support the idea of designating a "package" of windows with a single glass package but various operator types, to allow consumers to have ENERGY STAR qualified windows throughout their homes. Under this option, some products that do not qualify for ENERGY STAR could bear the qualified product label. Consumers would not be able to verify performance data for the specific product and might mistakenly believe all windows they purchased qualified for applicable incentives offered in their region. Thus DOE has declined to include this element in the criteria.
3. **Elimination of the map on the product label.** Some stakeholders proposed removing the climate zone map from the product label, or at least making it optional, and possibly

substituting words to designate the zones in which the product qualifies. DOE designed the label with the map to effectively communicate product qualification to consumers and believes removing the map would compromise the effectiveness of the label for consumers. DOE will therefore continue requiring the map.

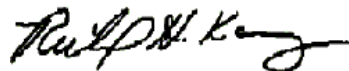
4. **Air infiltration requirement.** Some stakeholders proposed adding a mandatory air infiltration requirement. Air infiltration is currently an optional requirement for manufacturers with NFRC, so not all manufacturers have these test results. For those that do, they have a choice of tests, whose results are reported in different formats. Finally, air infiltration test results are reported only to the manufacturer and not listed in the NFRC's Certified Product Directory listing. With no consistent way to evaluate air infiltration performance and for the consumer to verify these performance claims, it is not currently feasible for ENERGY STAR to require this test for qualification.
5. **CPD number and code readjustment requirements.** Stakeholders generally supported the elimination of these requirements, and for the reasons described in the *Revised Draft Report*, DOE has eliminated them from the final criteria.
6. **Orientation, shading, and glazing requirements.** DOE agrees with the stakeholders who advocated proper orientation, shading and glazing when installing windows. Because ENERGY STAR for Windows, Doors, and Skylights is a program primarily aimed at the replacement market where orientation and shading are predetermined, it is not feasible for DOE to set these factors as program requirements. The optimal way to capitalize on these factors is to educate consumers on their benefits. The ENERGY STAR Web site for windows, doors, and skylights (http://www.energystar.gov/index.cfm?c=windows_doors.pr_energy_save_tips) already explains the role these factors play in home energy savings. As part of the introduction of the revised criteria, DOE plans to expand consumer education on these factors for homeowners replacing their windows.

The revised ENERGY STAR program requirements for windows, doors, and skylights are attached and will go into effect January 4, 2010. For partners to make the necessary changes to their product and marketing materials, there will be a transition period to full program implementation, scheduled to end on March 31, 2010. DOE will provide details on the transition in a few months.

Please also note that in conjunction with the revised criteria, partners will be required to submit updated partnership paperwork. DOE will provide details about this partner requalification process well in advance of the deadline.

Thank you for your participation in ENERGY STAR.

Sincerely,



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U.S. Department of Energy