

The Tax Credit for the Installation of Energy Efficient Windows:

Does the ENERGY STAR Help Consumers Find Products that Qualify?

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With the passage of the Energy Policy Act of 2005, signed into law on August 8, the first nationwide tax incentive for purchasing energy-efficient windows, skylights and doors has been established. The provisions for the tax credit are comprised in *Sec. 1333 Credit for Certain Nonbusiness Energy Property*. The credit offers cost-based incentives of 10 percent of the amount expended by the taxpayer for “Qualified Energy Efficiency Improvements” up to a maximum credit limit of \$500 for all improvements. Up to \$200 of this can be claimed for qualifying exterior windows and skylights. Qualifying exterior doors are not subject to this \$200 cap. To be eligible for the tax credit, the windows must be placed in service between Jan. 1, 2006 and Dec. 31, 2007. The credit is received in the tax form filed by April 15th of 2007 or 2008.¹

In order to qualify for the tax credit, a window must, in the language of the legislation, be an

“energy efficient building envelope component which meets the prescriptive criteria for such component established by the 2000 International Energy Conservation Code, as such Code (including supplements) is in effect on the date of enactment of this section”.

The purpose of this paper is to examine how a consumer-friendly way of complying with the tax-credit provision can be implemented. Therefore, the paper

- Examines which version of the International Energy Conservation Code (IECC) might be used as criteria for whether window products qualify for the tax credit,
- Compares these IECC criteria with the criteria for ENERGY STAR windows,
- Discusses whether the ENERGY STAR label is an effective guide for consumers to find windows that qualify for the tax credit, and whether it would be reasonable to integrate the ENERGY STAR criteria into the tax credit criteria.

In preparing this paper, the Alliance to Save Energy conducted a county-by-county comparison of the IECC criteria to ENERGY STAR fenestration labeling criteria. This allowed us to determine where ENERGY STAR criteria met or exceeded IECC requirements, or in some cases fell short. **On a national basis we found that an “all zones” ENERGY STAR rating provides a “safe harbor” for meeting either the IECC 2000 or IECC 2004 requirements in every US jurisdiction.** As we describe later on, ENERGY STAR windows criteria can meet the 2000 International Energy Conservation Code (IECC 2000) replacement windows criteria in virtually all US counties. Out of 3,111 US counties and jurisdictions, the basic ENERGY STAR windows criteria are less than that of the IECC 2000 in only 57 counties. These differences are largely attributed to the way the IECC and ENERGY STAR climate zones were drawn. When the new 2005 ENERGY STAR “Equivalent Energy Performance Amendment” criteria are evaluated, we find only 115 US counties where IECC 2000 criteria are not met. Similar results were found with respect to the IECC 2004. DOE has determined that the equivalent energy performance criteria offer the same or better energy efficiency as compared to the basic ENERGY STAR criteria. The details of this analysis are discussed throughout the paper, and summary results are shown in Attachment 1.

In light of these findings, the Alliance to Save Energy offers the following recommendations for implementation of the residential windows tax credits:

- If the 2000 IECC is deemed to be the correct reference standard, the IECC 2000 replacement window table (502.2.5) should be adopted as the fundamental criteria for the residential tax credits. In the 2004 IECC, Table 402.1 would be the appropriate criteria.
- The “All Zones” ENERGY STAR label (see Figure 1 on page 8) should be promoted as the primary indicator for qualifying windows, since it provides a “safe harbor” for fulfilling the IECC criteria for windows.
- If it is within the discretion of the IRS, we recommend:
 - Fenestration products with any ENERGY STAR label should be deemed to meet the IECC windows requirements in the regions indicated on the respective label;
 - The acceptance of the ENERGY STAR label for tax credit compliance should also be extended to the new DOE Equivalent Energy Performance Amendment criteria effective on September 19, 2005. DOE has come to the conclusion that windows conforming with this amendment perform equally good or better than envisaged by the standard ENERGY STAR criteria. Moreover, this amendment sends positive market signals by allowing more hurricane windows to qualify in the South.
- Campaigns to promote the residential windows tax credits should focus on an ENERGY STAR message for consumers. This will build on the existing significant public awareness of the ENERGY STAR label and the established network of ENERGY STAR partners. Embracing the ENERGY STAR label for this purpose will eliminate market confusion about qualifying fenestration products, simplify tax rule compliance and provide for simple messaging to the public for maximum participation.

The Importance of Energy Efficient Windows

Due to growing energy prices, the heating costs for the winter of 2005/06 are expected to surpass those of last winter by a wide margin – by an expected 32 to 48 percent for oil and gas heating, for example² - while the share of cooling costs among residential energy expenditures has been on the rise for years. Increased use of energy-efficient windows, on the other hand, can help to significantly reduce these costs. A 2003 study by the Lawrence Berkeley National Laboratory estimated that the total energy used for heating and cooling in the U.S. could be reduced by 11 to 12 percent if all windows in the current stock added low-e coatings.³

It is crucial that the criteria for the tax credit ensure that consumers are given an incentive to purchase the most efficient windows while not being too complex for consumers to easily find windows that qualify. A purpose of this paper is to examine whether consumers can be assisted by the ENERGY STAR label as an easy means to identify windows that qualify for the tax credit.

What Makes Windows Energy Efficient?

Standard elements of energy efficient windows are:⁴

- multiple glazings,
- low-e coating,
- gas fill (e.g. with argon or krypton),
- warm edge spacers and improved frame material.

The most widely-used codes and standards for energy efficient windows, however, do not require any of these specific elements for qualified windows. Instead, in the building energy codes that are relevant for the Energy Bill tax credit the required energy performance of windows is expressed through the *U-factor*, which indicates the window's insulation value, and the *solar heat gain coefficient (SHGC)*, which indicates the window's ability to control the heat gain from solar radiation. Normally, the lower either value is, the more energy efficient the window. To reach a low U-factor or SHGC, manufacturers may combine any of the above elements.

The International Energy Conservation Code

Among criteria for energy efficient buildings the 2000 International Energy Conservation Code (IECC 2000) includes criteria for window U-factors and SHGC values depending on U.S. climate zones. The IECC 2000 is the successor to the first national energy codes - the Model Energy Codes of the 1990s and the IECC 1998. The IECC 2000 established 3-year cycles of code changes, after each of which new versions of the code are published. In addition, supplements have been added during the cycles, such as the 2001 supplement to the 2000 edition and the 2004 supplement to the 2003 edition.

Overview of the relevant IECC revisions

- **IECC 2000** Edition – starts the 2000-2003 cycle of code changes, declares that new editions will be published in 3-year intervals
- **IECC 2001** Supplement
- **IECC 2003** Edition – begins the 2003-2006 cycle of code changes
- **IECC 2004** Supplement – simplifies the rules of the previous versions substantially

According to the language of the Energy Policy Act (EPAAct 2005) the criteria for the tax credit are those included in the IECC 2000 and its supplements. The 2001 supplement does not change the U-factor and SHGC criteria set by the IECC 2000. In the 2004 supplement, however, the requirements for window U-factors and SHGC differ considerably from those of the earlier versions.

Some observers interpret EPAAct 2005, Section 1333 in a way suggesting that the IECC code in effect on the date of the bill's enactment (August 2005) is the IECC 2004 supplement. This interpretation may be contested on the ground that Sec. 1333 refers to the IECC 2000, whereas the IECC 2004 is a supplement to the IECC 2003. Yet an examination of whether the IECC 2004 was intended to set the tax credit criteria is worthwhile. Which version of the IECC will be applied will have some impact on the stringency of the requirements and on the suitability of the ENERGY STAR label as a designation for qualifying windows.

In the following, major differences between the prescriptive requirements for windows in the different IECC versions are compared.

The IECC 2000

Which requirements in the IECC 2000 are relevant for the tax credit?

The 2000 edition of the International Energy Conservation Code includes several methods to determine window requirements for residential buildings. These requirements generally set standards for the construction of new buildings. However, it is not likely that the tax credit in Sec. 1333 of the Energy Bill is intended for windows in newly constructed homes. EPCA 2005 specifies that the tax credit applies for “energy efficiency improvements” to be installed in a residence “owned and used by the taxpayer”, which does not read as if it can be applied to new construction. Furthermore, new homes are already covered by the Energy Bill provisions in *Sec. 1322, Credit for Construction of New Energy Efficient Homes*.

Nevertheless, Sec. 1333 does not explicitly exclude the possibility that the tax credit might be given for windows in newly constructed homes. Therefore, though unlikely, it may be that in certain cases the IECC 2000 requirements for new construction are relevant for the tax credit. The window requirements for new home construction can only be determined if the home’s glazing area relative to the gross exterior wall area is taken into account, no matter if the Component Performance Approach is taken or the Simplified Prescriptive Requirements are used. Moreover, a distinction is made between detached one- and two-family dwellings and buildings containing three or more dwelling units. Since these building characteristics need to be considered, simple labels like the ENERGY STAR do not tell whether windows fulfill the IECC 2000 criteria for new homes if the window-to-wall ratio needs to be taken into account.

With that in mind, this paper will concentrate on what is more likely, namely that the tax credit will be given for improved glazing installations for existing homes. For replacement windows, the IECC 2000 includes separate criteria (Table 502.2.5, page 87) that are independent of building characteristics and depend only on the climate zone of the building’s location. The IECC 2000 features 19 US climate zones for new construction criteria. For replacement windows, the IECC 2000 specifies 5 heating degree day “bins” for the U-factor and SHGC requirements.

On the following pages, IECC 2000 refers to the criteria for replacement windows in this code, since these are the IECC 2000 criteria most likely to apply to the tax credit, and since the compliance with these criteria can - to a certain extent – be measured by whether a window is ENERGY STAR labeled or not.

The IECC 2004

The IECC 2004 supplement substantially revises the 2003 edition of the IECC, which in turn is based on the IECC 2000 and its 2001 supplement. The IECC 2004 includes is the first part of a major set of changes to the IECC codes that will shrink the 2006 edition of the codes to less than half the volume of the 2003 edition and is predecessor, the 2000 edition.

The purpose of the 2004 revisions is to produce a code that will be easier to understand, use and enforce. The Building Energy Codes Program of the U.S. Department of Energy states the following advantages to the revisions included in the supplement:⁵

- Easier compliance due to redefined climate zones that:
 - are fewer in number than in previous versions (8 instead of 19)
 - take political boundaries into account
- Better integration of cooling considerations into climate zone criteria.
- Glazing requirements that are independent of window area, eliminating the majority of calculations needed to show compliance.
- U-factor requirements for individual windows are stricter.

The IECC 2004 requirements do not discriminate between different window-to-wall ratios. For central and northern regions the U-factor requirements of the IECC 2004 are slightly more stringent than the IECC 2000 requirements for replacement windows. In much of the warm south, however, the IECC 2004 requirements are less strict. This is most likely due to the fact that the IECC 2004 is most concerned with cooling requirements throughout the warm regions, for which the SHGC is seen as more crucial than the U-factor.

Shortcomings of the IECC in Terms of Consumer-Friendliness

For the purpose of implementing the tax credit, both versions of the IECC windows criteria have serious shortcomings in terms of consumer-friendliness:

- Many homeowners may never have heard of the IECC,
- It is not easy for consumers and retailers to find exact information about the IECC criteria, whether on the internet or as hard copies of the code,
- The IECC codes may confuse many readers since among their criteria for energy efficient buildings, window criteria are just one part. The IECC 2004, however, is less complex than the IECC 2000.

Compared to the IECC criteria, the ENERGY STAR criteria for windows have the following advantages:

- The ENERGY STAR logo is widely known and can easily be recognized by consumers,
- Consumers can make their purchase decisions by referring to the ENERGY STAR label without having to research the ENERGY STAR criteria themselves.

The ENERGY STAR criteria for windows follow the same principles as those of the IECC. However, several differences in detail exist. Therefore the ENERGY STAR criteria are described more closely in the following.

The ENERGY STAR Label

With the ENERGY STAR label, energy efficient windows can easily be recognized by consumers. The criteria for obtaining an ENERGY STAR label basically follow the same logic as the IECC criteria: Windows installed in the colder north require lower U-factors in order to keep homes warm, whereas windows in the warm south have less strict U-factor but stricter SHGC requirements. Due to these similarities, it can be assumed that ENERGY STAR labeled windows are more likely than other windows to qualify for the tax credit, regardless of which IECC version

determines the criteria. Indeed, the ENERGY STAR climate zones and criteria are inspired by the IECC model, so that there is considerable similarity. Nonetheless, some differences exist in the details if either IECC version is compared with ENERGY STAR.

How Good a Guide for the Tax Credit is ENERGY STAR?

The requirements for fenestration products to qualify for the ENERGY STAR label can generally be considered more stringent than the IECC requirements. Therefore, it is reasonable to assume that the installation of windows with the ENERGY STAR label would typically also qualify for the tax credit. Nevertheless, for each IECC version there are at least some jurisdictions where the requirements are stricter than those of ENERGY STAR. However, an ENERGY STAR “All Zones”-rated window qualifies for the tax credit in US jurisdictions for either the 2000 or 2004 IECC.

Most obviously, the ENERGY STAR label cannot guarantee that the IECC 2000 requirements for windows in new construction are met, since these requirements are subject to factors such as the window-to-wall ratio and the building type, which are not considered when windows are given the ENERGY STAR label. According to these criteria for new construction, houses in northern regions with window-to-wall ratios of more than 18 percent have stricter U-factor requirements than any ENERGY STAR requirement demands. It is not very likely that these complicated building-specific criteria can be used for the tax credit, which is after all designed to provide incentives for retrofits instead of initial construction. Concerning the IECC 2000 replacement window criteria or the IECC 2004 criteria, on the other hand, the ENERGY STAR is a far more helpful guide as to whether windows qualify.

The ENERGY STAR criteria are generally as strict as or stricter than those of the IECC. However, in some cases, most notably in New Mexico, Texas and North Carolina, the ENERGY STAR climate zones diverge considerably from the IECC zones. In other cases such as Oklahoma and California, the ENERGY STAR climate zones follow state boundaries, whereas the IECC zones are more accurately tuned to the climatic situation. The result is that ENERGY STAR does not meet the IECC 2000 or IECC 2004 requirements for a number of counties in these states. On a national basis, however, ENERGY STAR windows meet or exceed the IECC 2000 requirements in all but about 30 counties.

The Equivalent Energy Performance Amendment

Another problem for the compatibility between the IECC and ENERGY STAR standards is that the ENERGY STAR U-factor requirements for the southern regions provide a flexibility that the IECC does not directly accommodate.

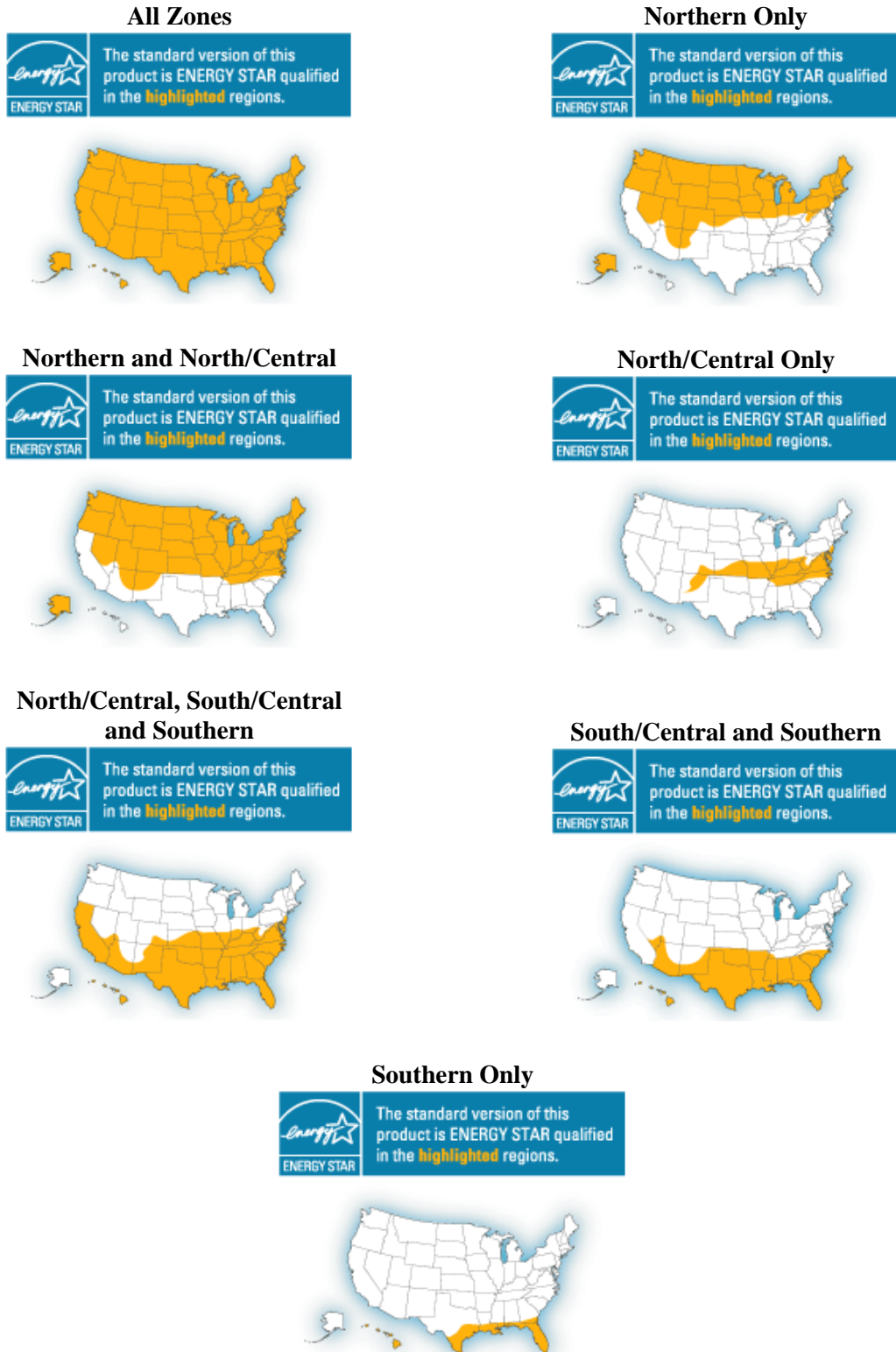
Due to an amendment made in May 2005 (effective September 19, 2005), the ENERGY STAR requirements for windows in the South/Central (excluding California) and Southern climate zones can also be met with slightly higher U-factors than required by the standard criteria. As a trade-off, the windows must have lower-than-standard SHGCs. This is so because many impact-resistant hurricane windows using laminated low-e glass have higher U-factors but can save as much or more energy due to lower SHGCs. This trade-off is only possible in the warmer regions, since this is where the SHGC plays a similar or stronger role than the U-factor. The increased flexibility that the trade-off allows is intended to help create a greater market for windows that are both hurricane-resistant and qualify for the ENERGY STAR.⁶ If related to the IECC standards, however, this has the effect that in many counties of the South the U-factor of ENERGY STAR qualified windows does not meet the requirements of IECC 2000 and/or IECC 2004.

Windows that bear the ENERGY STAR label for the South/Central (excluding California) and Southern zones only qualify for the ENERGY STAR because of the trade-off. Therefore, consumers should generally seek further information before assuming that windows with this label qualify for the tax credit. However, it is possible that DOE and the Treasury Department can deem the Equivalent Energy Performance Amendment as meeting the tax credit criteria.

On the following pages, the ENERGY STAR labels for the different climate zones are shown, followed by lists that illustrate the locations and the number of the cases where the different labels are not suitable as an indicator that the labeled window products qualify for the tax credit. The first set of lists is based on the assumption that the IECC 2000 criteria for replacement windows form the basis for the tax-credit, while the second list assumes the IECC 2004 as the basis.

ENERGY STAR labels show in which climate zones windows fulfill the ENERGY STAR criteria. The following ENERGY STAR labels exist:⁷

Figure 1



How to Find Out if the ENERGY STAR Requirements Meet the IECC Requirements?

Table 502.2.5 of the IECC 2000 and the ENERGY STAR criteria for residential windows, doors and skylights on the energy star website⁸ can be consulted to compare the two standards. The IECC 2004 requirements for windows can be found in table 402.1 of the 2004 code. The ENERGY STAR and IECC 2004 tables include U-value and SHGC requirements, whereas the IECC 2000 requirements for the SHGC are stated separately in paragraph 502.1.5.

The different requirements for windows (excluding skylights) are summarized here:

Figure 2

IECC 2000 replacement window table		
Climate Zones (heating degree days in brackets)	U-factor	SHGC
1-4 (0-1,999)	0.75	0.40
5-7 (2,000-3,499)	0.50	0.40
8 (3,500-3,999)	0.50	N.A.
9-12 (4,000-5,999)	0.40	N.A.
13-17 (6,000-12,999)	0.35	N.A.

Figure 3

IECC 2004		
Climate Zones	U-factor	SHGC
1	1.20	0.40
2	0.75	0.40
3	0.65	0.40
4	0.40	N.A.
5-8	0.35	N.A.

Figure 4

ENERGY STAR		
Climate Zones	Fenestration U-factor	Fenestration SHGC
Southern	0.65-0.75*	0.33-0.40*
South / Central	0.40-0.43*	0.24-0.40*
North / Central	0.40	0.55
Northern	0.35	N.A.

*These numbers are variable due to the Equivalent Energy Performance Amendment

The climate zones of the different standards roughly correspond in the following way:

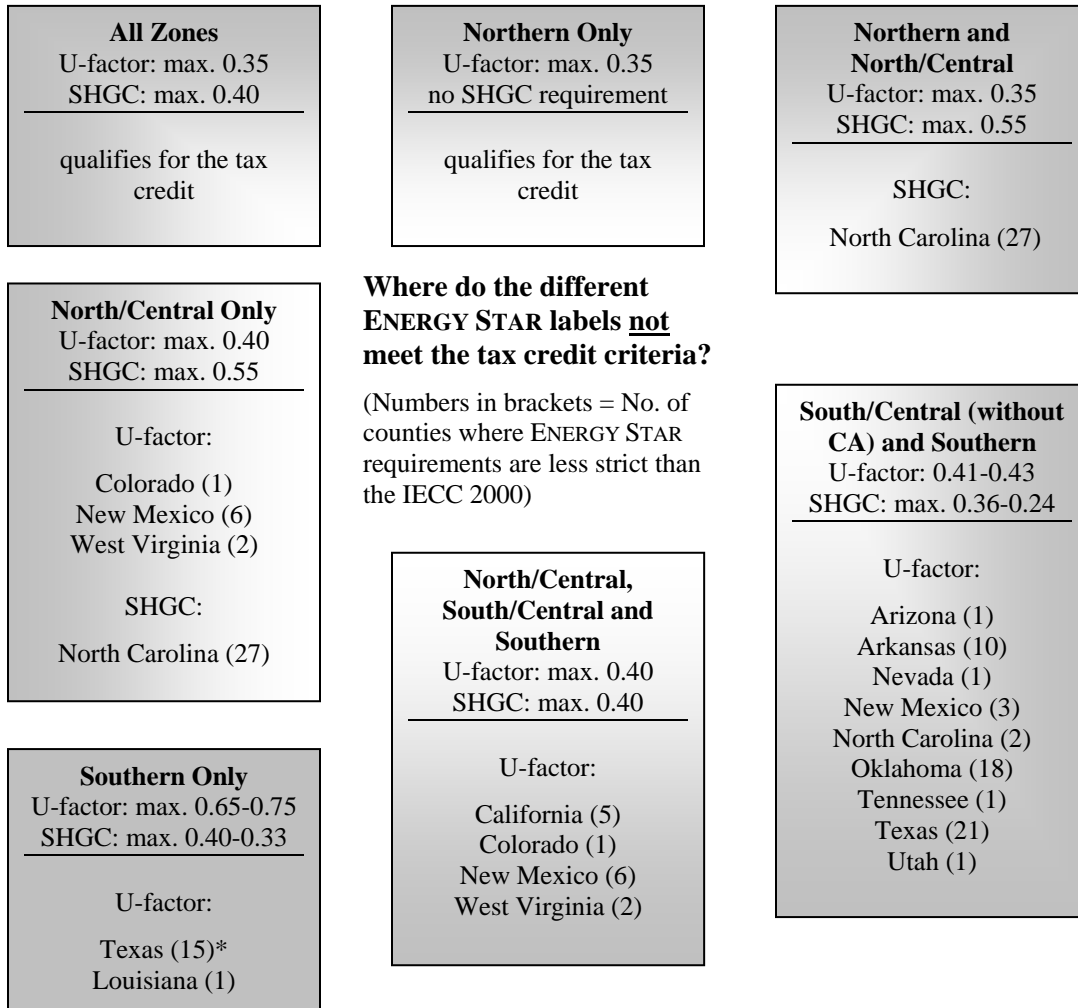
Figure 5

IECC 2000	IECC 2004	ENERGY STAR
zone 1-4	zone 1-2	Southern zone
5-7	3	South/Central
8-11	4	North/Central
12-17	5-8	Northern

Wherever the climate zones correspond as shown above, the ENERGY STAR standards are at least as strict as those of the IECC codes. However, there are also many areas where the climate zones do not correspond like this, and where a county-by-county comparison is required in order to verify that the ENERGY STAR criteria meet those of IECC 2000 or IECC 2004. The Alliance to Save Energy did such a county-by-county comparison of IECC 2000, IECC 2004 and ENERGY STAR windows criteria. The results of this comparison are summarized in the tables in Attachment 1.

ENERGY STAR and the IECC 2000 Criteria (for replacement windows)⁹

Figure 6



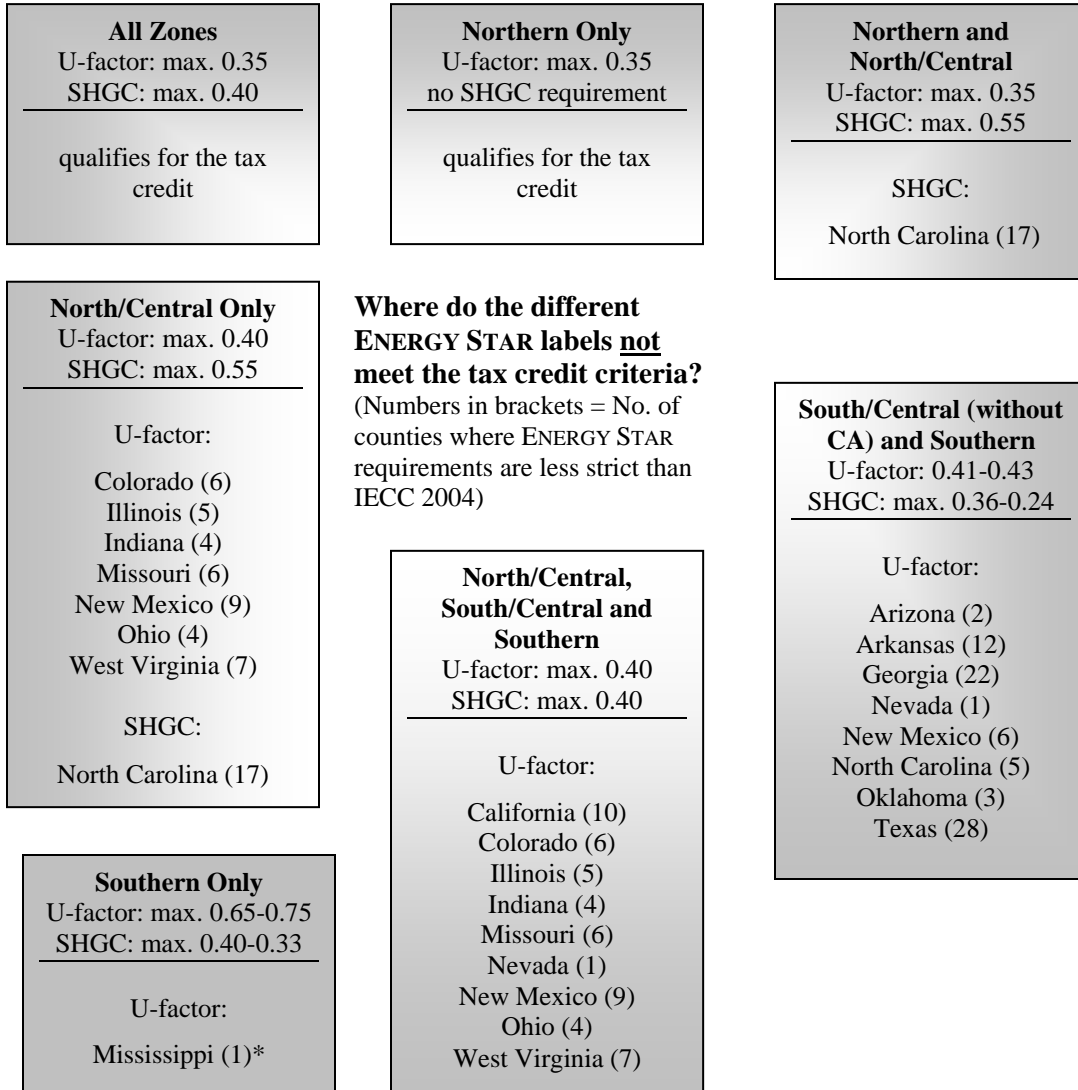
* In 15 Texas counties, not only windows but also skylights with the Southern label might fail to qualify under the IECC 2000 criteria.

From the above lists it can be seen that the label for the South/Central and Southern climate zones have the greatest challenge in meeting the tax credit criteria. This label is issued for windows that receive the ENERGY STAR due to the Equivalent Energy Performance Amendment. The amendment allows for windows in the Southern and South/Central climate zones (excluding California) to have slightly higher U-factors than the usual 0.40. Consequently, in many parts of the region windows with this label do not meet the published IECC criteria.

The other ENERGY STAR labels are better suited for indicating that windows qualify for the tax credit. Both the label for all climate zones and that for the Northern zone meet and exceed the tax credit criteria, and windows with the other labels meet the tax credit criteria unless they are installed in a number of counties where the IECC 2000 climate zones are based on different assumptions than the ENERGY STAR climate zones.

ENERGY STAR and the IECC 2004 Criteria

Figure 7



* In addition to windows, skylights with the Southern label might also fail to qualify under the IECC 2004 criteria for Anacoco County in Mississippi.

If the IECC 2004 is used for the tax credit criteria, windows that receive the ENERGY STAR designation through the Equivalent Energy Performance Amendment are even less likely to qualify than if the criteria are based on the IECC 2000. This is because the IECC 2004 has slightly more rigid criteria, requiring a 0.40 U-factor for many counties where the IECC 2000 only requires a 0.50 U-factor. However, the respective ENERGY STAR labels for the Northern, for the Southern (with the exception of one Mississippi county), and for all climate zones meet the tax credit criteria based on the IECC 2004.

Comparing the compatibility of the ENERGY STAR criteria with both the IECC 2000 and the IECC 2004 criteria, a slightly better match with the IECC 2000 is apparent. However, both sets of IECC

criteria have in common that only two ENERGY STAR labels provide definite information about whether windows qualify. Windows with the other ENERGY STAR labels may require customers to verify that their home is not situated in a county where ENERGY STAR is less stringent than the applied version of the IECC, unless DOE and the Treasury Department rule that they are equivalent.

Conclusion

If compared with the IECC 2004, the IECC 2000 requirements for replacement windows are slightly more compatible with the ENERGY STAR requirements. Consequently, the ENERGY STAR will indicate more accurately whether windows qualify for a tax credit if it is based on the IECC 2000 replacement window criteria than if based on the IECC 2004. The IECC 2004 version, on the other hand, has its own advantages: it is easier to apply, takes the growing demand for cooling into account, and sets slightly more stringent standards. In addition, the IECC 2004 standards form the basis of the criteria for the *Sec. 1333 New Energy Efficient Home Credit* in the Energy Policy Act. Since it is desirable to achieve a certain consistency among the standards for the different national programs for residential energy efficiency, the advantages of applying the IECC 2004 standards may outweigh the slightly higher effort necessary to verify the qualification of ENERGY STAR labeled windows. However, it is the IECC 2000 that is explicitly written into the legislation.

Regardless of which IECC version is applied, consumers will need further information in order to verify that the tax credit requirements for their county are really met by ENERGY STAR windows. This is regrettable, since the ENERGY STAR label otherwise provides consumers with a simple means to assess the energy performance of products. Nonetheless, as long as the tax credit is based on the fairly straightforward IECC 2000 replacement window or IECC 2004 criteria, an ENERGY STAR label does at least indicate that the labeled window qualifies for the tax credit in virtually all of the 3,111 US counties and jurisdictions. Consumers in nearly all U.S. counties may be encouraged to install ENERGY STAR windows and profit from the incentive in the Energy Bill. The task ahead will be to provide salespeople and consumers with information about the few counties where this is not the case, so that a good level of clarity about the location-specific requirements can be reached before the tax credit takes effect in January 2006.

Outlook: Can the ENERGY STAR Standards Reasonably be Integrated with the Tax Credit Criteria?

The concept of the IECC 2000, IECC 2004 and ENERGY STAR criteria for energy efficient windows follow the same principles: The maximum U-factor and SHGC of windows are set according to the cooling and heating needs of the different climatic regions of the nation. Does this mean that the ENERGY STAR criteria could be a reasonable part of the tax credit criteria in addition to the IECC? Would it diffuse the purpose of the tax credit if all ENERGY STAR windows were to qualify?

In general, the U-factor and SHGC standards are similar among the IECC codes and ENERGY STAR, with the latter being slightly more stringent in many areas. Therefore it can be said that the intentions behind the IECC codes are fulfilled if consumers buy ENERGY STAR windows, and that these often offer a higher standard than required by the IECC. If the Equivalent Energy

Performance Amendment is left aside, there are only some 30 odd counties in the U.S. where the IECC 2000 requires a stricter U-factor than ENERGY STAR, and 27 counties where it requires a stricter SHGC (see the tables in Attachment 1 for details). This is due to slight differences in the way the borders between climate zones are drawn, such as the fact that the borders of the ENERGY STAR climate zones follow state borders wherever practical as opposed to the more detailed IECC climate zones.

As can be seen on the previous pages, if ENERGY STAR windows do not meet the IECC standards this is mostly due to the Equivalent Energy Performance Amendment. However, this does not mean that the amendment makes the ENERGY STAR standards less effective. On the contrary, after in-depth stakeholder discussions the Department of Energy concluded that the higher SHGC requirements that are part of the amendment ensure that windows offer the same or better energy efficiency after the trade-off.¹⁰

The IECC and ENERGY STAR are similar in purpose – to set standards for efficient windows according to climatic conditions. Moreover the ENERGY STAR label offers an advantage that the IECC does not offer: it is a simple and effective tool to make the market for efficient windows transparent to consumers. There are several advantages of the ENERGY STAR compared to the IECC when it comes to recognizing whether windows qualify for the respective standards:

- ENERGY STAR: Qualified windows can easily be recognized due to their labels. This way, customers can find qualified windows even if they are not informed about the qualification criteria.
- IECC criteria: In order to verify that windows qualify, customers must know the criteria. It is not realistic to assume that customers sort through the detailed IECC codes, even less so since these are not widely available. Web resources such as the Efficient Windows Collaborative website¹¹ can help consumers find out what the criteria for specific regions are, but the practical problem here is that consumers do not necessarily know about these websites.
- The ENERGY STAR label includes a map that shows where a window qualifies. If a window qualifies only in parts of a state and it is not clearly visible whether this includes the consumer's home county, more detailed information can be found on the ENERGY STAR website. This website is widely known among window salespeople and many consumers.
- Only 20 states are divided by multiple ENERGY STAR climate zones. In the other 30 states, retailers and customers can be sure that the same criteria for Energy Star windows apply throughout the state. In contrast, the IECC 2000 divides all states except Hawaii into multiple climate zones. The IECC 2004 climate zones divide 39 of the 50 states.

To sum up, if all ENERGY STAR were to qualify for the tax credit, the same general purpose as with the IECC criteria alone would be served: consumers receive an incentive to install energy efficient windows according to strong criteria. However, the important first step – that consumers find out which these efficient windows are – is far easier and more straightforward with an established and widely-known label such as the ENERGY STAR.

In light of the analysis and findings presented in this paper, the Alliance to Save Energy offers the following recommendations for implementation of the residential windows tax credits:

- If the 2000 IECC is deemed to be the correct reference standard, the IECC 2000 replacement window table (502.2.5) should be adopted as the fundamental criteria for the residential tax credits. In the 2004 IECC, Table 402.1 would be the appropriate criteria.
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Attachment 1

Attachment 1: Comparison - In how many counties per state do the ENERGY STAR requirements not meet the different IECC standards?

STATE	no. of counties or equivalent	IECC 2000							IECC 2004		
		U-factor					SHGC		windows		skylights
		new construction, window area				replacement		(replacement + new construct.)	U-factor	SHGC	U-factor
		25%	20%	18%	15%	windows	skylights				
Alabama	67	12	12	0	0	0	0	0	0	0	0
Alaska	36*	36	36	36	16	0	0	0	0	0	0
Arizona	15	5	4	3	0	1	0	0	2	0	0
Arkansas	75	31	31	10	0	10	0	0	12	0	0
California	58	12	12	8	5	5	0	0	10	0	0
Colorado	64	64	64	64	1	1	0	0	6	0	0
Connecticut	8	8	8	4	0	0	0	0	0	0	0
Delaware	3	3	3	1	0	0	0	0	0	0	0
DC	1	1	1	1	0	0	0	0	0	0	0
Florida	67	67	34	34	0	0	0	0	0	0	0
Georgia	159	42	42	23	0	0	0	0	22	0	0
Hawaii	5	5	0	0	0	0	0	0	0	0	0
Idaho	44	44	44	38	0	0	0	0	0	0	0
Illinois	102	102	101	77	0	0	0	0	5	0	0
Indiana	92	92	80	60	0	0	0	0	4	0	0
Iowa	99	99	99	99	0	0	0	0	0	0	0
Kansas	105	105	104	83	0	0	0	0	0	0	0
Kentucky	120	120	120	77	0	0	0	0	0	0	0
Louisiana	64	36	36	36	0	1	0	0	0	0	1
Maine	16	16	16	16	0	0	0	0	0	0	0
Maryland	24	24	24	11	0	0	0	0	0	0	0
Massachusetts	14	14	14	9	0	0	0	0	0	0	0
Michigan	83	83	83	83	0	0	0	0	0	0	0
Minnesota	87	87	87	87	0	0	0	0	0	0	0
Mississippi	82	6	6	6	0	0	0	0	0	0	1
Missouri	115	97	97	83	0	0	0	0	6	0	0
Montana	56	56	56	56	0	0	0	0	0	0	0
Nebraska	93	93	93	93	0	0	0	0	0	0	0
Nevada	17	16	16	8	1	1	0	0	1	0	0
New Hampshire	10	10	10	10	0	0	0	0	0	0	0

*Although Alaska consists of only 27 boroughs, IECC 2000 divides it into 36 parts for the sake of climate measurement.

Attachment 1

STATE	no. of counties or equivalent	IECC 2000							IECC 2004		skylights	
		U-factor					SHGC		windows			
		new construction, window area					replacement		(replacement + new construct.)	U-factor	SHGC	U-factor
		25%	20%	18%	15%	windows	skylights					
New Jersey	21	21	17	11	0	0	0	0	0	0	0	
New Mexico	33	26	25	14	6	9	0	0	15	0	0	
New York	62	62	55	51	0	0	0	0	0	0	0	
North Carolina	100	43	43	8	0	2	0	27	5	17	0	
North Dakota	53	53	53	53	0	0	0	0	0	0	0	
Ohio	88	88	87	65	0	0	0	0	4	0	0	
Oklahoma	77	40	40	18	0	18	0	0	3	0	0	
Oregon	36	32	18	13	0	0	0	0	0	0	0	
Pennsylvania	67	67	58	42	0	0	0	0	0	0	0	
Rhode Island	5	5	5	5	0	0	0	0	0	0	0	
South Carolina	46	0	0	0	0	0	0	0	0	0	0	
South Dakota	66	66	66	66	0	0	0	0	0	0	0	
Tennessee	95	65	65	11	0	1	0	0	0	0	0	
Texas	254	109	100	90	15	36	15	0	28	0	0	
Utah	29	29	27	19	0	1	0	0	0	0	0	
Vermont	14	14	14	14	0	0	0	0	0	0	0	
Virginia	95	72	72	43	0	0	0	0	0	0	0	
Washington	39	39	21	9	0	0	0	0	0	0	0	
West Virginia	55	55	52	36	2	2	0	0	7	0	0	
Wisconsin	72	72	72	72	0	0	0	0	0	0	0	
Wyoming	23	23	23	23	0	0	0	0	0	0	0	
total	3111**	2367	2246	1779	46	88	15	27	130	17	2	
%age of total		76%	72%	57%	1.5%	2.8%	0.5%	0.9%	4.2%	0.5%	0.06%	

Results, if the Equivalent Energy Performance Amendment is not taken into account (i.e. if just the standard ENERGY STAR criteria are compared with the IECC):

total	3111**	2200	2052	1576	30	30	15	27	52	17	2
%age of total		71%	66%	51%	1%	1%	0.5%	0.9%	1.7%	0.5%	0.06%

** At present, the U.S. consists of 3,086 counties. However, for the purpose of the ENERGY STAR and IECC standards, a total of 3,111 jurisdictions are taken into consideration, including the Alaska boroughs and the District of Columbia.

¹ http://www.energystar.gov/index.cfm?c=products.pr_tax_credits

² Blum, Justin. "Oil and Gas Heating Costs to Soar This Winter". *The Washington Post*. October 13, 2005. Page D02. Available at:

<http://www.washingtonpost.com/wp-dyn/content/article/2005/10/12/AR2005101202199.html>

³ See: Apte, Joshua, Arasteh, Dariush and Yu Joe Huang. *Fututre Advanced Windows for Zero-Energy Homes*. 2003. Available at www.lbl.gov: 1.

⁴ *ENERGY STAR Qualified Windows, Doors & Skylights: The Basics*. Available at:

http://www.energystar.gov/ia/partners/manuf_res/windows/ENERGY_STAR_BASIC_7-18-05-final.ppt#256,1,ENERGY STAR® Qualified Windows, Doors & Skylights: The Basics

⁵ U.S. Department of Energy. Building Energy Codes Program. *2006 International Energy Code: Easier to Use and Enforce*. September 2005. Available at:

http://www.energycodes.gov/implement/doe_2004_proposals.stm

⁶ Department of Energy. May 2005. Available at:

<http://www.nfrc.org/documents/EEPAmentAnnouncementLetter-Final-51705.pdf>

⁷ The labels are available on the ENERGY STAR website at

http://www.energystar.gov/index.cfm?c=windows.display_unit_labels

⁸ http://www.energystar.gov/index.cfm?c=windows_doors.pr_crit_windows

⁹ The ENERGY STAR criteria and climate zones for each state and county can be found in *ENERGY STAR Climate Zones By State, County and City*. Available at:

http://www.energystar.gov/ia/partners/manuf_res/windows/ES_Climate_Zones_by_County.xls

¹⁰ Department of Energy. May 2005. Available at:

<http://www.nfrc.org/documents/EEPAmentAnnouncementLetter-Final-51705.pdf>

¹¹ www.efficientwindows.org/code.cfm