

# DECODING ENERGY EFFICIENCY:

A Comprehensive Guide to Energy Codes, ENERGY STAR, and Tax Credits for Windows and Doors



A FAMILY OF BRANDS







## ENERGY CODE: 8<sup>th</sup> Edition (2023) Florida Building Code, Energy Conservation (FBCEC):

Energy codes are mandatory rules for builders, enforced by local authorities, ensuring minimum energy efficiency.

Section 1, Page 3.

### Prescriptive Path:

- No modification from earlier edition for Windows and Doors.
- Specific component criteria.
- Requires strict adherence to guidelines.
- Limits design flexibility.

Section 2.1, Page 3.

### Performance Path:

- Proposed home must have  $\leq$  95% energy loads required than the model reference home. (NEW REQUIREMENT).
- Assesses overall building energy performance.
- Uses energy modeling software.
- Most popular compliance method.
- Trade-off analysis needed to find the most cost-effective and sustainable solution.

Section 2.2, Page 3.



## ENERGY STAR:

Voluntary program certifying energy performance in products like windows and doors.

Section 1, Page 3.  
Section 4.1, Page 4.

## ENERGY STAR v7.0:

- Specific component criteria.
- Based on climate zones.
- Must meet: U-factor, SHGC.

Section 4.2, Page 4.

## ENERGY STAR MOST EFFICIENT 2024:

- Windows and Sliding Glass Doors.
- More stringent U-factor, SHGC than ES v7.0.

Section 4.3, Page 5.

## 25C TAX CREDITS:

- Doors: 30% product cost, max \$250 per door and up to \$500 Exterior Door, must meet ENERGY STAR v7.0
- Windows: 30% product cost up to \$600, must meet ENERGY STAR Most Efficient 2024.

Section 5.1, Page 5.

## ENERGY STAR SINGLE-FAMILY NEW HOMES "SFNH" (v3.1 & v3.2):

- Based on entire home.
- Similar to Energy Code Performance Path.
- Options permitted through 12/31/24 Options: SFNH Florida v3.1, National v3.1 or National 3.2.
- Options permitted after 12/31/24: SFNH National 3.2.

Section 4.4, Page 5.

## 45L TAX CREDITS:

- Tax credit (to the builder) of \$2,500 for each home
- Must meet ENERGY STAR SINGLE-FAMILY NEW HOMES "SFNH" (v3.1 & v3.2).

Section 5.2, Page 6.

This document delves into the often-confusing relationship between Energy Codes and ENERGY STAR. Energy Codes are a subset of building codes adopted by state and local jurisdictions to set minimum requirements for energy efficient design and construction. Energy Star is a public-private partnership, administered by the U.S. Environmental Protection Agency, with the goal to deliver cost saving energy-efficient solutions to consumers through a voluntary labeling program. Federal Tax credits are available through the various ENERGY STAR programs.

The goal is to clarify the distinctions and highlight how compliance with both can not only boost energy efficiency but also unlock tax credits for those adhering to ENERGY STAR guidelines. By simplifying these standards, this document aims to empower stakeholders with the knowledge needed to make informed choices for more energy-efficient homes during a time of changing requirements.

## 1. What is the difference between Energy Code and ENERGY STAR?

Energy Codes are *mandatory* regulations that builders must adhere to, and they are enforced by local building authorities. ENERGY STAR, on the other hand, is a *voluntary* program, and manufacturers as well as consumers can choose whether to participate. Energy Codes are regulatory requirements outlined in the building code that mandate minimum energy efficiency standards, while ENERGY STAR is a program that certifies and promotes superior energy performance in specific products, including residential windows and doors. Energy Codes provide a baseline standard that must be met, and ENERGY STAR offers a means for consumers to identify and choose high-performing, energy-efficient products.

## 2. How Can I Comply with the 8<sup>th</sup> Edition (2023) Florida Building Code, Energy Conservation (FBCEC)?

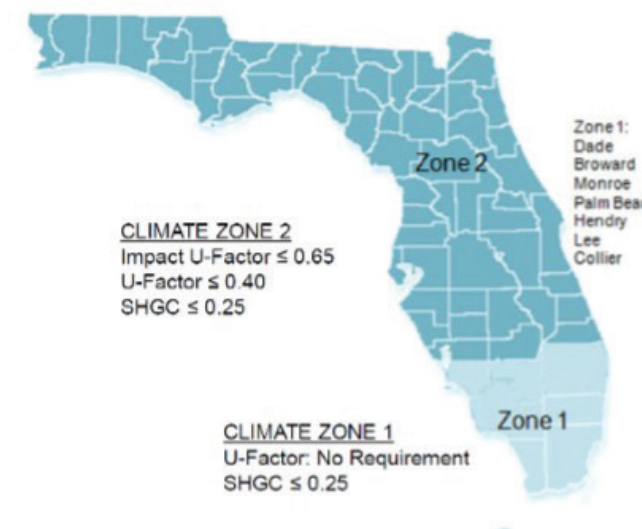
The building code outlines two methods for achieving compliance with Energy Code requirements: the prescriptive and performance paths.

### 2.1 Prescriptive Path

The prescriptive path provides a set "menu" of requirements, and compliance is achieved by strictly adhering to these established guidelines with all aspects of the building. While this approach offers simplicity and ease of implementation, it may limit design flexibility compared to alternative methods, such as the performance path, which considers the overall energy performance of the building rather than specific component criteria. The prescriptive path, however, ensures a baseline level of energy efficiency and facilitates straightforward assessment and enforcement during the construction and inspection process. Florida Declaratory Statement DS 2018-072 provides an exemption for residential replacement, wherein the new units are not mandated to be brought up to code unless their cost surpasses 30% of the assessed value of the structure.

### 2.2 Performance Path

To comply using the performance path, builders must use energy modeling software or conduct simulations, typically with an experienced energy rater, to evaluate the collective impact of various energy-saving measures, including the selection



and placement of windows and doors. These simulations compare the proposed building to a model reference home and the proposed home must have 95% or less energy loads required than the model reference home. This approach enables a more holistic assessment, considering the effect of all components and systems within the building. Designers can optimize energy efficiency by balancing factors like insulation, building orientation, HVAC system efficiency and daylighting strategies, among many aspects, to allow for a customized and job-specific solution to compliance with the FBCEC.

### 3. Help! My Building No Longer Complies with the Latest Energy Code!

No modifications have been introduced to the prescriptive path for residential windows and doors in the recent 8<sup>th</sup> Edition (2023) FBCEC. Consequently, any products utilized under this method in the past can continue to be employed in the same manner going forward.

The performance path, which is the most popular compliance method, has now become more stringent. Previously, homes only needed to match the loads of the model reference home, but now they must exceed these loads by at least 5%. This change means that building packages that were previously barely within simulation requirements will no longer comply. Builders can navigate these new requirements by collaborating with a knowledgeable energy rater and conducting a trade-off analysis to identify the most cost-effective and sustainable solution to improve the energy efficiency of the home enough to comply with the heightened standards. Energy simulations encompass various internal and external aspects of the building, with some elements impacting home performance more significantly than others. To meet the heightened standards, certain aspects must exhibit improved efficiency, whether it be the window and door package or other components.

### 4. All Things ENERGY STAR:

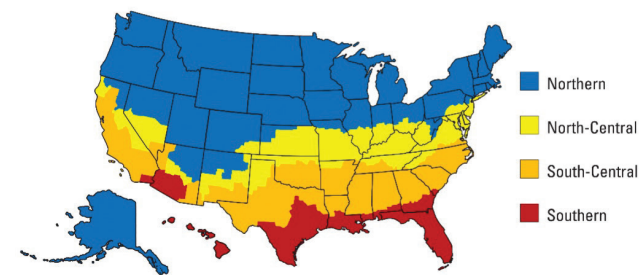
#### 4.1 What is ENERGY STAR?

ENERGY STAR is a voluntary program established by the U.S. Environmental Protection Agency (EPA) to promote and identify energy-efficient products and practices. The program covers a

diverse range of consumer and industrial goods, including appliances, electronics, lighting, and building components like windows and doors. Products carrying the ENERGY STAR label meet or exceed stringent energy efficiency criteria, indicating that they contribute to lower energy consumption, reduced environmental impact, and potential cost savings for consumers. Because ENERGY STAR is a voluntary program, it is not required to be used to meet the requirements of the Energy Code and is a step beyond normal code requirements.

#### 4.2 What is the ENERGY STAR Criteria for Windows and Doors?

Products are certified for ENERGY STAR based on the climate zone that they are sold in, either Northern, North-Central, South-Central, or



ENERGY STAR® Certification Criteria for Residential Windows, Doors, and Skylights

WINDOWS			
Climate Zone	U-Factor <sup>1</sup>	SHGC <sup>2</sup>	
Northern	≤ 0.22	≥ 0.17	Prescriptive
	= 0.23	≥ 0.35	
	= 0.24		
	= 0.25		
	= 0.26		
North-Central	≤ 0.25	≤ 0.40	Equivalent Energy Performance
South-Central	≤ 0.28	≤ 0.23	
Southern	≤ 0.32	≤ 0.23	

Air Leakage ≤ 0.3 cfm/ft<sup>2</sup>  
<sup>1</sup> Btu/h·ft<sup>2</sup>·°F  
<sup>2</sup> Solar Heat Gain Coefficient

DOORS			
Glazing Level	Climate Zone	U-Factor <sup>1</sup>	SHGC <sup>2</sup>
Opaque	All Zones	≤ 0.17	No Rating
≤ ½-Lite	All Zones	≤ 0.23	≤ 0.23
> ½-Lite	Northern	≤ 0.26	≤ 0.40
	North-Central		
	South-Central	≤ 0.28	≤ 0.23
	Southern		

Air Leakage for Sliding Doors ≤ 0.3 cfm/ft<sup>2</sup>  
 Air Leakage for Swinging Doors ≤ 0.5 cfm/ft<sup>2</sup>  
<sup>1</sup> Btu/h·ft<sup>2</sup>·°F  
<sup>2</sup> Solar Heat Gain Coefficient

Southern. Each zone has different requirements for NFRC Certified U-Factor and SHGC ratings that the products must meet.

#### 4.3 What is ENERGY STAR Most Efficient?

ENERGY STAR Most Efficient represents an advancement beyond the standard ENERGY STAR program, featuring annually updated criteria that demand a challenging level of compliance. This program specifically pertains to residential windows and sliding glass doors, excluding swing doors from eligibility under the Most Efficient designation.



Climate Zone	U-factor	SHGC
Northern	≤ 0.20	≥ 0.20
North-Central	≤ 0.20	≤ 0.40
South-Central	≤ 0.20	≤ 0.23
Southern	≤ 0.21 = 0.22	≤ 0.23 ≤ 0.21

Meeting the stringent requirements for the “Most Efficient” designation often means windows and doors with specific features such as vinyl frames, triple-pane insulated glass, and argon or krypton gas fill. Occasionally, a low emissivity coating facing the interior of the home is necessary, which comes with its own set of limitations. These exacting criteria result in a limited number of manufacturers offering readily available products that align with the requirements while remaining at a reasonable price point.

#### 4.4 What is ENERGY STAR Single-Family New Homes (SFNH) (v3.1 & v3.2)?

ENERGY STAR Single-Family New Homes (SFNH) is a comprehensive program enabling entire homes to achieve ENERGY STAR certification. Like the performance path used for Energy Code compliance, certified raters conduct energy simulations on the entire house package. To qualify, the proposed house package must meet or surpass the target established by the ENERGY STAR Reference Design Home, as outlined in the program’s requirements document.

To comply with the ENERGY STAR SFNH program, builders can choose from various National and Regional requirement options based on the home’s location and the most straightforward path for compliance. Builders are advised to collaborate with their certified rater to determine the most suitable requirements version for their project.

In Florida, three options for requirements are currently available for ENERGY STAR SFNH: SFNH Florida v3.1, SFNH National v3.1, and SFNH National v3.2. Each option has its own mandatory minimum requirements for compliance, along with an associated ENERGY STAR Reference Design Home against which the proposed building must be compared. SFNH Florida v3.1 and SFNH National v3.1 are applicable for homes permitted until December 31, 2024, after which SFNH National v3.2 becomes the sole option. For a comprehensive list of accepted program requirements based on location and permit issuance date, please refer to the energystar.gov website.

### 5. What Federal Tax Credits are Available for Windows and Doors?

#### 5.1 25C Tax Credits – ENERGY STAR v7.0 and ENERGY STAR Most Efficient

In 2024, the 25C Federal tax credits allow for 30% of product cost up to \$600 annually for residential windows and 30% of product cost with a maximum of \$250 per door and up to \$500 annually for exterior residential doors. The eligibility criteria for these tax credits vary between window and door products. Here’s an overview of the key requirements:

**1. Residential Windows:** To qualify for the 25C tax credit, residential windows must meet the ENERGY STAR Most Efficient criteria, outlined in more detail previously. The stringency of the requirements means that few manufacturers have products capable of qualifying for this tax credit at a reasonable price point for operable products.

**2. Exterior Residential Doors:** To qualify for the 25C tax credit, exterior residential doors must meet the ENERGY STAR V7 requirements, outlined in more detail previously.



### 5.2 45L Tax Credits – ENERGY STAR Single-Family New Homes v3.1 & v3.2

The 45L Federal tax credit is applicable to home builders constructing homes certified by ENERGY STAR according to the qualifying program version corresponding to the home's location and permit date. A tax credit of \$2,500 is provided for each home certified to meet the eligible ENERGY STAR Single-Family New Homes (SFNH) requirements, as previously outlined. To guarantee compliance with all program requirements, builders are advised to collaborate with an ENERGY STAR certified rater throughout the certification process. This ensures that the necessary standards are met and allows builders to maximize their eligibility for the tax credit.

## 6. Other Frequently Asked Questions:

### 6.1 What is the difference between ENERGY STAR Version 6.0 and 7.0?

ENERGY STAR Version 6.0 became obsolete, being succeeded by Version 7.0 on October 23, 2023. The introduction of Version 7.0 brought about a tightening of requirements, leading to the exclusion of several products that had previously met the criteria for compliance. Products ordered before October 23, 2023, were subject to the standards of Version 6.0, while those ordered on or after that date must comply with the more stringent requirements of the updated Version 7.0.

### 6.2 What aspects of the home have the largest impact on energy performance?

The building envelope, comprising walls, roofs, windows, doors, and insulation, holds paramount importance and exerts the most significant influence on a home's energy efficiency. It should be prioritized as the initial focus for improvements to align with Energy Code requirements.

#### Other important aspects to consider include:

- HVAC Systems
- Building Orientation and Design (Glass to wall ratio, overhangs, shading, etc.)
- Appliance Efficiency
- Airtight Construction (blower door and duct leakage testing)

These are just a few of the many important aspects that go into the simulations used for performance path to Energy Code compliance, and all aspects should be considered to determine which are best for meeting the code requirements.

### 6.3 Can I meet ENERGY STAR SFNH National v3.2 using Aluminum Products?

It may be possible to have a home qualify for the ENERGY STAR SFNH program using aluminum window and door products, provided that other aspects of the home are made more energy efficient to ensure the proposed home has the same performance or better than the reference design home. Builders should work with their energy rater to determine the trade-offs required and find the most cost-effective solutions.

### 6.4 What Products does PGTI carry that meet ENERGY STAR Version 7.0?

The following PGT product lines all have ENERGY STAR certified configurations: SH5400/5500, HR5410/5510, PW5420/5520, PW5440/5540, CA5440/5540, AW5440/5540, DH5460/5560 and SGD5470/5570. Please reach out to your customer care representative for help on specific configurations that qualify.

### 6.5 What Products does PGTI carry that meet ENERGY STAR SFNH v3.2?

Because the ENERGY STAR SFNH program is a performance-based program using simulated trade-offs to meet the efficiency standards, it is impossible to state exactly which products qualify for the program. A wide range of products may qualify based on the other aspects of the home that are selected. Working with an ENERGY STAR certified rater will allow you to determine exactly what U-Factor and SHGC window and door products the home will require for compliance based on the other choices that factor into the simulations.

### 6.6 Do I need to use vinyl windows & doors to meet the 8<sup>th</sup> Edition (2023) FBCEC?

No. Depending on the climate zone and Energy Code compliance path selected, there are a variety of alternatives to vinyl windows and doors that can be used to meet the latest edition of the FBCEC.



### 6.7 Do I need to use Vinyl windows & doors to meet the latest ENERGY STAR Version 7.0 requirements?

Yes. The strict criteria for compliance in ENERGY STAR Version 7.0 means that none of PGTI's aluminum products can qualify for the program.

### 6.8 What is U-Factor & SHGC, and why are they important?

U-Factor & SHGC are the two most important values relating to a window or door's energy efficiency. They are commonly used in the simulation of whole-home energy performance simulations for performance path compliance.

**6.8.1 U-Factor** is a measure of the rate of heat transfer through a window or door, representing the insulation efficiency of the product, with lower U-Factor values indicating better insulation.

**6.8.2 SHGC**, or Solar Heat Gain Coefficient, quantifies the amount of solar radiation admitted through a window or door, indicating its ability to transmit or block heat from the sun.

### 6.9 Should I use default values when using the performance path for code compliance?

It is advisable to steer clear of employing default values in performance path simulations for any aspect of the building whenever possible. Opting for default values incurs a significant penalty, requiring substantial improvements in other aspects of the home to either meet compliance standards or risk failure to adhere to the Energy Code altogether.

### 6.10 How do I find the energy performance values of the window and door products I am using?

PGT lists the energy performance values of the window or door in our quoting software as well as in the quotes, sales orders or NFRC reports for the order. Additionally, all window and door products come with a temporary label fixed to the glass that details the NFRC certified ratings for that product.

