

# Chapter 7

## Energy-Efficient Windows and Doors

Recommendations	First Cost	% Potential Savings	
		Cooling	Heating
1. Minimize glass area.	R	5-10	5-10
2. Shade glass areas using porches, trees awnings, sunscreens, shutters, sun control films, interior shades or blinds.	S/M/H	5-15	—
3. Choose reduced transmittance glass products with low shading coefficients.	M	5-15	—
4. Base glass and shading choices in large part on compass orientation.	N	0-10	—
5. Choose windows with low infiltration ratings and durable hardware. Choose well-weather-stripped doors.	N/S	5	5-10
6. Choose windows and doors with maximum <i>openable</i> area for improved ventilation (casements; awning type; pocket or swinging glass doors to porches).	S/M/H	5	—
7. Choose casement windows for rooms with only one outside wall to create a wingwall effect for improved ventilation.	M/H	0-5	—
8. Use screen doors for ventilation.	S	0-5	—
9. Consider using insulated glass.	M	0-5	15-20
<b>Maximum Combined Total</b>	<b>H</b>	<b>30</b>	<b>30</b>

Cost Codes: R = reduced  
 N = negligible  
 S = small (<\$0.25/ft<sup>2</sup> of floor area)  
 M = medium (>\$0.25 and <\$1.00/ft<sup>2</sup> of floor area)  
 H = high (>\$1.00/ft<sup>2</sup> of floor area)

# Marketing Energy-Efficient Windows and Doors

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View, daylight, ventilation. These have been the functions of windows for centuries. But since the energy crisis, possibly no other house component has come under as much scrutiny. That is because the window is the weak link in the building envelope. It admits solar heat, tends to leak, and is a poor insulator relative to the rest of the building. More than one unhappy home owner call their windows “holes in the insulation.”

But manufacturers are responding almost daily with new window products claiming greater energy efficiency. As a result, knowing what window features to look for can be confusing for the builder. This is particularly true in Florida because many of the energy-efficient features promoted by national window manufacturers save heating energy, but not necessarily cooling energy.

This chapter discusses windows and doors for Florida homes. After reading it you will know not only what to look for in currently available window products but also which features are desirable so that you can evaluate future products. Your knowledge of windows, as demonstrated in your homes, will be one of your best selling tools.

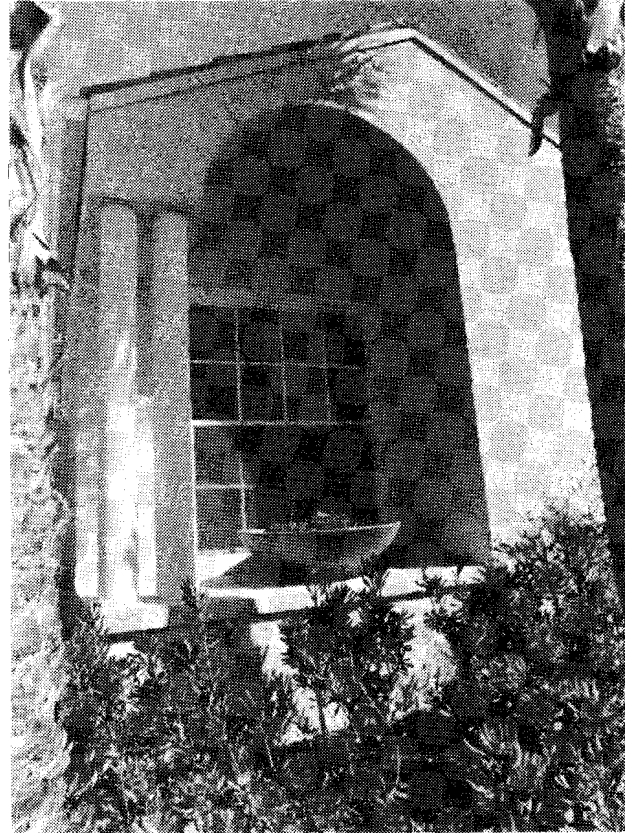
Keep in mind that there are four key items that can significantly affect the home owner’s utility bills:

- solar heat passing through the glass
- air leakage through and around the window
- heat flow outward through the window in winter
- ventilation of the house.

Start by selling a potential buyer on your choice of home plans that have reduced glass area, emphasizing these advantages:

- less expensive to build and operate
- lower initial cost for air conditioner
- less of the sun’s heat entering the house, therefore less air conditioning needed
- less heat escaping in winter
- greater thermal comfort for anyone sitting or standing near (smaller) windows, because of less radiant heat exchange between the glass and the person in winter or summer.

You can also point out other benefits of less window area. The home buyer will not have to spend as much on window coverings. The house will generally be quieter. It will be more secure with fewer or smaller points of entry.



**Windows allow you to look out, and let in light and breezes. But windows are the weak link in the building envelope.**

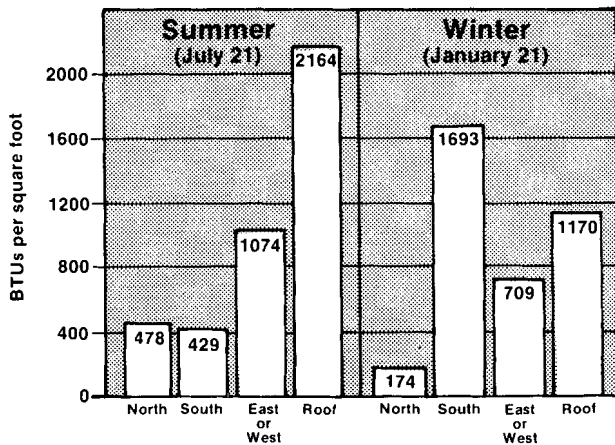
Regardless of all these benefits, many home buyers will want more glass for the sake of light and appearance. As an alternative to small windows and window areas, you can provide larger window areas that are well shaded. A big advantage to their use is that glare is much less of a potential problem than with small unshaded windows.

There are many methods of shading windows. When you select trees, awnings, sunscreens, reflective glass or interior blinds, you have something tangible and visible to sell. Show clients the shading device and explain that it will cut out unwanted heat from the sun. Mention that the sun’s heat entering the house can account for about 20% to 30% of their air conditioning bill.

Explain that the south side receives less sun in summer and more in winter, so seasonal shading is ideal for south-facing windows. Indicate how you have taken special care to minimize eastwardly and

westwardly facing windows, which are difficult to shade, but have assured adequate shading for windows that do appear on those sides of the house. (Refer to Chapters 3 and 4 for more marketing suggestions.)

**Daily Solar Heat Gain for 1/8" Single Glass**



**North- and south-facing glass is preferred to east, west, and roof (horizontal) facing glass.**

Explain to clients that cracks around windows and doors can cause a loss of up to 10% of their heated or cooled air. Show them the door weatherstripping and the caulking around the windows and glass doors. If you have chosen window products that are

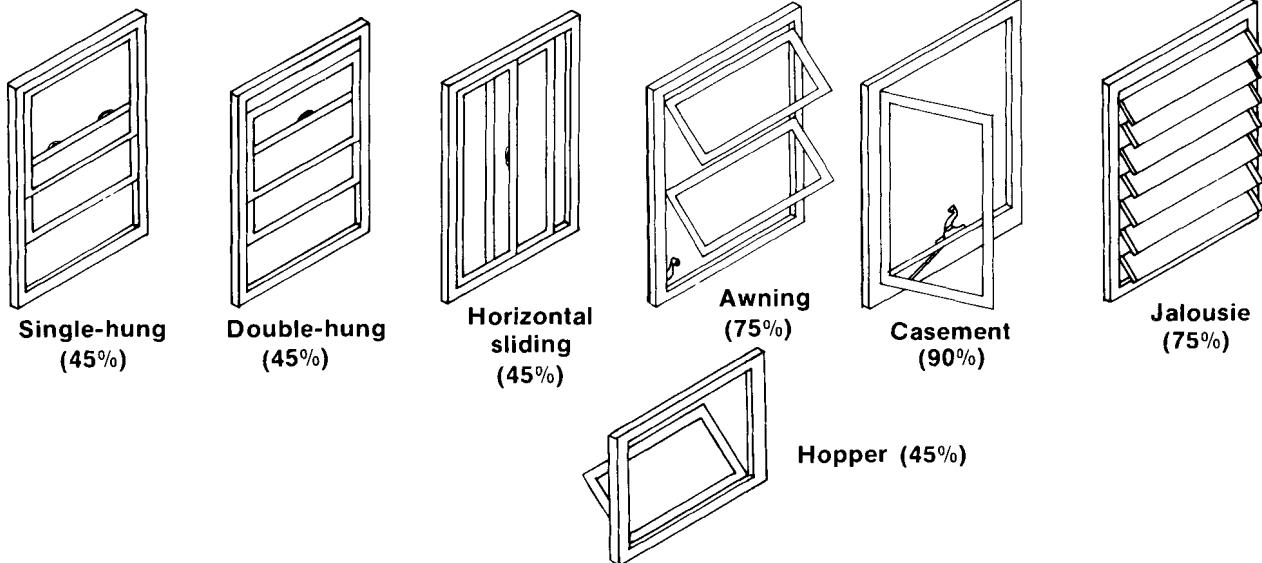
two, three or four times tighter than industry standards, with hardware guaranteed to be durable (10-year or lifetime guarantees), make sure to point that out. Potential home buyers who have lived in an apartment or house with poorly sealed windows will appreciate superior products.

Promote the ventilation aspects of awning and casement windows and pocketing or swinging glass doors by demonstrating how the entire windowed area opens to provide the greatest ventilation with the least amount of glass (see illustration below).

Consider selling screen doors as a ventilation-enhancing option, both for front doors and doors opening to the garage or other outside area. Many home owners add screen doors later, so why not show an appropriate one on your model?

Most home buyers recognize that insulated (double pane) glass is an energy saver, so merely pointing out that you have used it may be sufficient. Explain that in winter when it is 40°F outside and 70°F inside, a single layer of non-insulated glass isn't effective enough in deterring the escape of heat. Furthermore, anyone sitting or standing near glass will be far more comfortable if it is insulated. Also, insulated glass reduces moisture condensation and usually will reduce sound transmission as well.

If you have chosen insulated steel doors, promote them in a similar fashion.



**Effective open area of various types of windows (percentages).**

# Selecting and Installing Energy-Efficient Windows and Doors

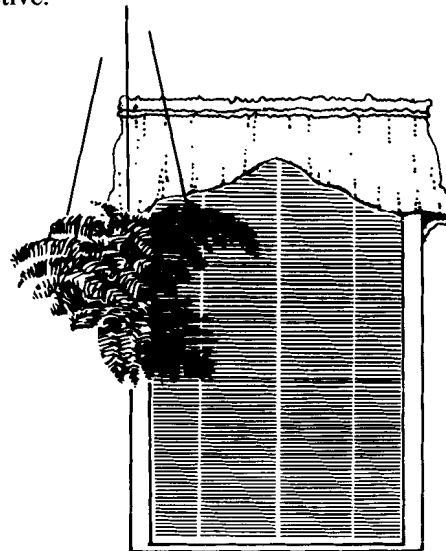
## 1. Reduced glass area

Your approach to reducing the amount of glass in the home is best begun at the time you select the house plan. Check the plans. Will smaller windows significantly affect the marketability of the house? Can an 8-foot-wide section of windows be replaced by a 6-foot section? Consult the architect or designer to explore the possibilities. In some situations, front doors with glass may be less desirable than solid doors. In other cases, larger glass areas can be tolerated for marketing and aesthetic reasons, without significant energy penalties, if they are oriented properly and shaded well.

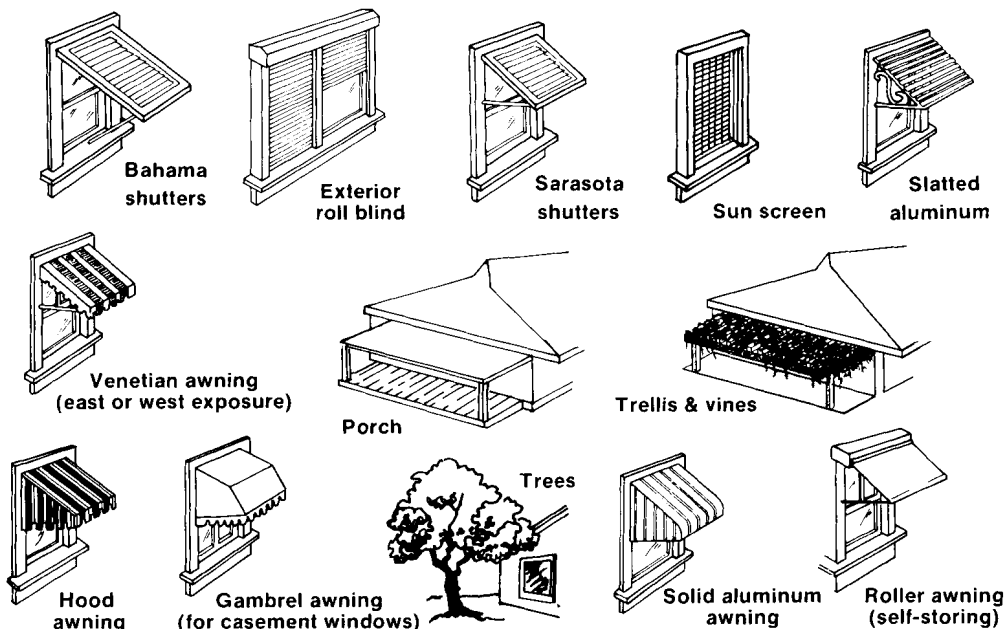
## 2. Shaded glass

Sun entering through windows in a home can account for 30% of the air conditioning load. Typically, residents use interior drapes or blinds to help reject the sun's heat, reducing the solar load to about 20% of the air conditioning load. You can take steps to reduce that even more. Choose Bahama shutters, awnings, trees, trellises, window films or sunscreens for exterior shading. Each of these is effective. Exterior shading is generally more effective than interior shading because the heat absorbed by the shade is dissipated outdoors rather than inside the house.

Although interior shading devices are subject to the control of the home owner and can be ineffective if not operated properly, most of them can be effective if designed and controlled correctly. Window coverings which have white (highly reflective) backs and are opaque (no light passing through) are most effective.



Vertical or horizontal blinds, white-backed draperies and shades are effective interior shading options.



Exterior shading options.

### 3. Reduced-transmittance glass

Not all alternatives to clear glass are created equal. Some glass absorbs a lot of sun, and part of that absorbed heat reradiates into the house. Other kinds of glass are highly reflective and reject most radiant heat to the outside; others are only slightly reflective. Some appear almost clear; others look tinted.

There is a way to compare the available choices. Ask the dealer or manufacturer about two key measurable qualities: the "shading coefficient" and the "visible transmittance." A low shading coefficient is desired to block solar heat. A high visible transmittance is desirable for a clear appearance and letting light in (see box). However, if the exterior scene is composed of unshaded expanses of brightly reflecting surfaces (buildings, parking lots, or paved areas, etc.), the visible transmittance should be lowered somewhat to minimize glare. Values for certain glasses appear in the adjacent table.

If you cannot find a commercially available window with the combination of visible transmittance and shading coefficient you desire, a relatively low-cost alternative is to use clear glass with an applied plastic sun-control film having the desired characteris-

tics. Inform the window supplier of your intentions. Some films have not worked well on certain windows, especially on insulated glass units.

<b>Shading Coefficient (SC)</b>	<b>=</b>	$\frac{\text{Total solar heat gain through window and shading device}}{\text{Total solar heat gain through a single sheet of 1/8" glass}}$
<b>% Visible Light Transmittance</b>	<b>=</b>	$\frac{\text{Amount of light that comes through window}}{\text{Amount of light incident on window surface}} \times 100$

Specifications of Various Window Glasses

Glass Type	% Visible (Daylight) Transmittance	Shading Coefficient	Winter R-Value
Single clear	90	1.00	.86
Single green	84-86	.85-.87	.86
Insulated clear	81	.89	1.72
Low-e clear insulated	76	.72	2-3
Insulated green	76-78	.71-.76	.76
Single bronze	69	.85	.86
Insulated bronze	62-67	.71-.78	1.72
Single plus control film	(10-90)	(.2-.9)	.86
Anderson Sun Glass, bronze	44	.38	3.13
Reflective bronze single	27	.51	.86
Reflective bronze insulated	25	.42	1.72
Heat Mirror*			
66/clear	55	.50	4.00
66/bronze	42	.41	4.00
44/clear	38	.35	4.20
44/bronze	22	.25	4.20

\* See illustration below.

