



Question: What is the annual savings if I upgrade from Clear glass to Low-e glass on the 5610 Series Single Hung window.

Assumption: Average temperature differential between outside and inside =20°F

"U Value" is actually an engineering number that Mechanical Engineers study in a class called "Heat Transfer", and, yes, it is a class Mechanical engineering geeks have to take.

Anywhich-a-way-how, "U Value" has units defined as: BTU/ (hr Δ°F ft²)

So if you know:

- The temperature difference between the inside and the outside of the house you know: Δ°F (assume Outside is 90°F, inside is 70°F, then Δ°F=20Δ°F)
- The hours that you are concerned with. (assume we want to know the heat loss over a 24 hour period: hr=24)
- The square footage of the window: ft² (assume a 3'0 x 5'0 window ft²=15ft²)
- U factor of the window (366 low-e U=0.30, for our 5610 sh, and the U=0.48 for clear glass)

Total heat through a 3'0 x 5'0 5610 sh/hour with Low-e glass on a 90°F outside temp day and an inside temp of 70°F is :

$$\{0.30 \text{ BTU}/(\text{hr } \Delta^{\circ}\text{F ft}^2) * (24\text{hours}) * (20\Delta^{\circ}\text{F}) * (15\text{ft}^2) = 2160 \text{ BTU}$$

By definition there are 3413 BTU/kilowatt-hour.

So:

$$2160 \text{ BTU} = .632 \text{ Kilowatt-hours (KWH)}$$

If:

The Nashville electric power company charges \$0.094/ KWH

Then:

The cost of the energy going through a 3'0 x 5'0 5610 sh/hour with Low-e glass on a 90°F outside temp day and an inside temp of 70°F per day is:

$$.632 * \$0.094 = \$0.06/\text{Day} \text{ or } \mathbf{\$21.90 \text{ per year (low-e)}} \text{ (assuming } 20\Delta^{\circ}\text{F)}$$

Using the same logic but now plugging in a U-value for **clear** glass the energy cost for the same window per year is:

the cost of the energy going through a 3'0 x 5'0 5610 sh/hour with Clear glass on a 90°F outside temp day and an inside temp of 70°F per day is:

$$\{0.48 \text{ BTU}/(\text{hr } \Delta^{\circ}\text{F ft}^2) * (24\text{hours}) * (20\Delta^{\circ}\text{F}) * (15\text{ft}^2) = 3456 \text{ BTU}$$
$$3456 \text{ BTU}/3413(\text{BTU}/\text{KWH}) = 1.0125\text{KWH}$$

$$1.0125 * \$0.094 = \$0.094/\text{Day} \text{ or } \mathbf{\$34.68 \text{ per year (clear)}} \text{ (assuming } 20\Delta^{\circ}\text{F)}$$

This is a \$12.78 savings per year, or a 37% savings per year for Low-e glass.

Assuming 15 windows per house there is a \$191.70 savings per year for Low-e over clear glass. Low-e probably pays back in one year.