

## You Should Insulate First

There are minimum insulation levels that should be in place prior to the installation of replacement windows. For more information refer to the Insulation Buyer's Guide.

### Replacement Windows

Windows can be one of your home's most attractive features. Windows provide views, day lighting, ventilation, and solar heating in the winter. The best time to install new windows and doors is if the existing units are single pane, have excessive air leakage, or if insulated glass unit seals have failed. There are several options to consider when you shop for windows most of which significantly affect cost.

The average home in Port Angeles has an annual energy use of about 17,300 kWh's at an annual cost of about \$1168, including a base charge of \$13 per month. If you install new windows you may save from 10% to 25% of your energy use for home heating each year. For the average all-electric home in Port Angeles that translates into a savings of \$48 to \$120 each year.

### Energy Efficiency

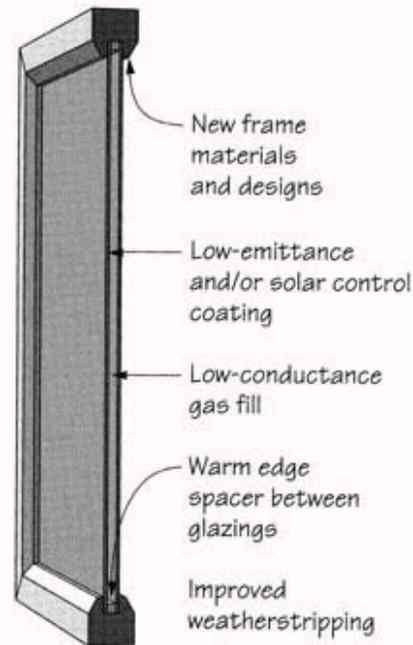
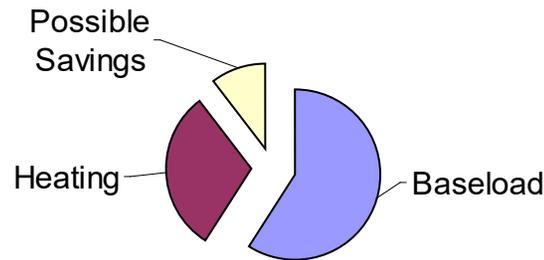
The main energy efficiency rating for windows is a U-value. The U-value, also called a U-factor, is a measure of how much heat flows through an object. The lower the U-value the better its insulating power. Under the Washington State Energy Code the maximum allowed National Fenestration Rating Council (NFRC) U-value is 0.35 for windows. The City recommends windows with a U-value of 0.30 or less. There are four factors that affect the U-value of windows:

- 1) Glazing material type (glass, treated glass, plastic, etc.)
- 2) The number of layers of glass
- 3) Space size and type of gas between the layers of glass
- 4) Thermal resistance of the frame and spacer bar materials

### Fresh Air Inlets

Fresh air inlets can be installed in the frames of your new windows to provide a minimum amount of fresh air without opening the window. Windows and bedrooms and one living area should be installed with fresh air inlets. The City also recommends fresh air inlets be incorporated into your new windows if you are air-sealing you home.

### Energy & Cost Savings 10% - 25%



## Window Buyers Guide

Weatherwise Service



## Window Buyer's Guide

**Weatherwise Service** is an Energy Conservation Program offered by the **City of Port Angeles** in cooperation with the **Bonneville Power Administration**

For more information contact us by mail at:  
**Weatherwise Service**  
**City of Port Angeles**  
321 E 5<sup>th</sup> St.

Port Angeles, WA. 98362

phone:  
**Message Line: 417-4713**

**FAX: 417-4709**  
or visit:

**Conservation Programs**  
on the City's website at:  
[www.cityofpa.us](http://www.cityofpa.us)

## Air Spaces

The air space between windowpanes affects the U-value of the window. Air spaces that are too wide (more than 5/8<sup>th</sup> inch) or too narrow (less than 1/2 inch) have higher U-values (the lower the U-value the better its insulating power). The space between window panes can be filled with an inert gas, such as argon or krypton, that transfers less heat than air does. Spacers to separate the windowpanes also affect the U-value. The most common spacer material is aluminum, which conducts heat excessively. Options to an aluminum spacer are now available such as PVC, foam or nylon.

## Low Emissivity (low-e) Coatings

Low-e coatings are put on windowpanes to reduce the amount of heat they give off through radiation. The best application of low-e coatings is on the inside windowpane, on the side that faces toward the outside.

## Solar Heat Gain Coefficient (SHGC) And Visible Transmittance Ratings

The SHGC, also called shading coefficient, is a measure of how well a window absorbs or reflects heat from the sun. A low SHGC will help block out the sun's heat during the summer, a high SHGC will increase solar gains during the winter. The visible transmittance rating is a percentage of how much light gets through a product. There are advantages and disadvantages of different ratings for south, east and west, and north facing windows.

## Window Selections

The type and quality of the windows you select have an impact on energy efficiency. Many window frames are available such as fixed-pane, casement, hopper, awning, single hung, horizontal sliding and double hung. Fixed-pane windows are airtight. Hinged windows including casement (side hinge), hopper (bottom hinge) and awning (top hinge) types with compression seals are moderately airtight. Single hung and horizontal sliding windows are commonly installed but are less airtight than picture and hinged windows. Double hung windows are usually among the most leaky type of windows.

## Frame Type

Window frames are available in a variety of materials including vinyl, wood and aluminum. Vinyl frames are made primarily of polyvinyl chloride (PVC) and are often strengthened with aluminum or steel reinforcing bars. Vinyl frames offer moderate to low U-values at an economical price. Wood frames offer among the lowest U-values. Aluminum frames conduct heat excessively and often are available with a "thermal break" to reduce heat transfer.

## Other Considerations

When windows are replaced exterior trim and molding is removed and reinstalled or replaced. Often times, indoor windowsills and trim need to be repaired or replaced.

## Condensation

Energy Efficient windows will not prevent water vapor from condensing on their frames and glazing. During high indoor humidity and low outdoor temperature conditions, condensation on window frames and glazing is possible in any home.



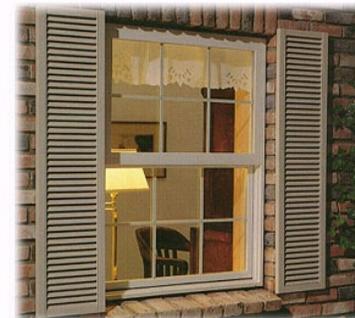
*Picture Windows are airtight (left)*



*Hinged Windows are moderately airtight (Casement Window right)*



*Horizontal Sliding Windows are common but less airtight (left)*



*Single Hung Windows are common but less airtight (left)*