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SUSTAINABLE ENERGY
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ENGINEERING

Details for follow-up activities: Double Pane Windows Recommendation

Installation & Labour

The cost for installation of double pane windows is approximated to be \$250-\$350. This considers a carpenter or technician that would replace the existing window with the new window. The cost is also dependant on the number of windows to be replaced. For this case, 27 windows need to be replaced, therefore the cost may be lower [1].

Implementation Schedule

The following factors should be considered when scheduling the window installation:

- The dependability of the window manufacturer
- Whether the windows are standard size or custom built to fit the void they are filling
- The skill and experience level of the installers
- The number of windows being installed
- The window size
- The material of which the windows are made (i.e., wood windows require more time due to priming and staining or painting)
- The material of the walls surrounding the window openings, such as brick, wood, Hard Plank, vinyl, or Stucco (i.e., Stucco requires more time and a higher level of expertise to remove windows)
- Possible obstructions in front of the windows on the exterior of the house/ building
- The amount of water damage, mold, or wood rot around the window
- Local Homeowners Association rules
- The permitting regulations in the specific zip code

It is estimated to consume at least 2 hours per installation. If the factors mentioned above are present in the installation, additional time may be required.

Maintenance

The thermal seals on these energy-efficient marvels are subject to breakage. Seal breakage can be identified by fog, condensation or haze between the panes. Since the seals cannot be replaced, the entire window must be replaced.

Below are some maintenance tips for protecting insulated windows' seals-and your investment [2]:

- Open and close the windows gently. Slamming them can cause premature seal failure.
- Wash the windows by hand rather than pressure washing. The force of the water pressure can also promote premature seal breakage.
- Clean and lubricate the hardware, screws and moving window parts annually.

It should be noted that defogging the windows may cost up to \$70 [3].

Energy Saving Cost

This study used a Manhattan structure with 920 ft² of windows. From the visit, it was determined that the brewing area has 580 ft² of windows. According to the study, results

show the installation of double-pane windows saved over \$16,000 dollars in heating costs throughout a ten-year span. It should also be noted that this study was performed in Manhattan, where the temperatures are not as extreme in areas such as eastern North Carolina. The higher temperatures in this region will result to higher energy savings. Savings can total to approximately \$1,400 per year according to the case study conducted in Manhattan.

Department of Energy Recommendations [4]

If installation of double pane windows is being considered, the Department of Energy recommends the following:

- Look for the ENERGY STAR and NFRC labels.
- In colder climates, consider selecting gas-filled windows with low-e coatings to reduce heat loss. In warmer climates, select windows with coatings to reduce heat gain.
- Choose a low U-factor for better thermal resistance in colder climates; the U-factor is the rate at which a window conducts non-solar heat flow.
- Look for a low solar heat gain coefficient (SHGC). SHGC is a measure of solar radiation admitted through a window. Low SHGCs reduce heat gain in warm climates.
- Select windows with both low U-factors and low SHGCs to maximize energy savings in temperate climates with both cold and hot seasons.
- Look for whole-unit U-factors and SHGCs, rather than centre-of-glass U-factors and SHGCs. Whole-unit numbers more accurately reflect the energy performance of the entire product.

Suppliers

Brand	Actual Size (inches)	Price	Website
ReliaBilt	23.5 x 35.5	\$108.83	Here
ReliaBilt (with panes)	23.5 x 35.5	\$117.24	Here
Pella Vinyl	35.5 x 59.5	\$244.13	Here
ReliaBilt 3100	23.5x 35.5	\$113.05	Here
Pella Vinyl	35.5 x 53.5	\$169.00	Here
Pella Vinyl	27.5 x 37.5	\$139.00	Here
Crestline	35.5 x 59.5	\$244.74	Here

Technician

Company	Location	Phone	Website
Tarboro Remodelling and Handyman Service	Tarboro, NC	252-214-9650	Here
Champion	Charlotte, NC	855-387-3381	Here
Home Depot Window Installation	Jacksonville, NC	866-501-9244	Here
USI Smith Insulation	Roanoke Rapids, NC	252-537-5449	Here

References

- [1] “Cost to Install Window - 2020 Cost Calculator (Customizable).” [Online]. Available: https://www.homewyse.com/services/cost_to_install_window.html. [Accessed: 22-Mar-2020].
- [2] “Insulated-Window Maintenance | HGTV.” [Online]. Available: <https://www.hgtv.com/design/decorating/design-101/insulated-window-maintenance>. [Accessed: 22-Mar-2020].
- [3] “Average Cost of Common Window Repairs | Angie’s List.” [Online]. Available: <https://www.angieslist.com/articles/average-cost-common-window-repairs.htm>. [Accessed: 22-Mar-2020].
- [4] “Update or Replace Windows | Department of Energy.” [Online]. Available: <https://www.energy.gov/energysaver/design/windows-doors-and-skylights/update-or-replace-windows>. [Accessed: 22-Mar-2020].