

# YOUR WINDOW ON ENERGY SAVINGS

**Better windows can save money, brighten your mood and freshen your air but beware the advice of a window salesperson or your neighbor**

by Bob Alf Construction, 2009

Windows are a hot topic, especially now that the US government is offering a sizable tax credit for home energy improvements.<sup>1</sup> Yet, the countless types of windows plus the complexity of installation can leave you a bit vulnerable. Sales and installation folks are very busy so their tendency may be to lead you toward the fastest and highest margin options .... not the options that are best for you. Beyond these cautions though, this article provides a path toward a less confusing and better prioritized investment in windows. Understanding of industry terms will be crucial, so refer to the "Glossary" at the end of the article if you need to.

**The "Myths/Traps"** - Before diving into an understanding of window options, it's first helpful to understand some "myths/traps":

Myth/Trap	The Truth
Windows are so expensive you should spend your energy improvement \$ on something else (myth)	Many homes now have very efficient furnaces/boilers and have well insulated/sealed walls/attics. This may leave windows/doors (about 25%-30% of total wall surface) at a ridiculously inefficient R-1. Usually, improving your envelope (ie. windows/doors included) should be done before replacing your heating equipment as the furnace/boiler might possibly drop down in size thus saving \$.
Windows installed for under \$200 (trap)	You can see advertisements for windows installed for a very low cost. There are just so many things potentially wrong with this, there is not enough space to address it. Three of those problems are addressed as the next few "traps". Bottom line... it's better to install several good windows than a bunch of bad windows.
"The Shrinking view" (trap)	Some homeowners receive "totally new windows" only to find that these new windows were installed into the old frames thus reducing visible glass size by almost 10%. For some, this surprise reduction in daylight might be a mood altering experience (especially during Winter).

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<sup>1</sup> See [www.energystar.gov](http://www.energystar.gov) for more details. Generally 30% credit on qualified products up to \$1500 thru 2010. See also <http://www.mnhousing.gov/> "Energy Saver Rebate Program" for up to 35% rebate on qualified improvements.

Myth/Trap	The Truth
What you can't see (ie. rot), can't hurt you (trap)	Some new windows have been inserted within old frames that had rot. And this rot was covered up by the new window frames. This can result in more extensive wall rot and more costly repairs. Make sure your window professional inspects EVERY existing window for rot (especially at sill) before they make recommendations.
No Maintenance is Best (trap)	This is often the loudest claim by sellers of inexpensive vinyl windows. There are almost always downsides to a cheaper window. Vinyl is considered toxic to manufacture and to dispose of (expected useful life of 25-30 years). Vinyl also expands/contracts much more during seasonal changes and this can result in failure of the caulk that seals the window to the exterior trim/siding. Consider other options that are low maintenance.
My storm windows give me lots of energy efficiency (myth)	Storm windows were designed to protect your main windows from weather and bugs... not to provide thermal insulation. Most should have weeps holes at the bottom to allow rain and condensation to escape to the outside. Those important weep holes reduce insulating value and should be left open to serve their important purpose. Some energy efficiency is gained by storms but consider cost plus the added maintenance of cleaning 4 more panes of glass.

**Know YOUR Reasons** for getting new windows. Your reasons may be different than another person's thus a different option might be right for you. For example, you might one of those who needs maximum daylight in the Winter so you are actually motivated to clean windows in the Fall (author is one of "those"). And with old windows that don't tilt/remove, this chore can be very time consuming and difficult. So choosing a type of window that reduces the total size of glass area, may not make sense for you. The following are some reasons for getting new windows. You should rank these and consider them before approving a final order for new windows:

1. ROT - the frame and/or sashes of the old window is rotting thus putting the entire wall system at risk
2. FUNCTION - the sashes don't open or fully open/close as they might be painted shut and/or sash cords broken, etc.. Even cool Summer days are hot if you can't open the windows at night.

3. GLASS CLEANING - new windows can generally be tilted in for very easy cleaning. If you choose full screens, there would no longer be storm window glass to clean thus reducing efforts by 50%
4. ENERGY EFFICIENCY - older single pane windows are often R-1 (U-1.0) and leak air. Moderately efficient windows are approx R-3 (U-.33) and highly advanced windows are R-4 (u-.25) to R-9 (u-.11). Old windows often have uninsulated wall cavities used for sash weights. It is tough to have an advanced thermal envelope with old windows that utilize sash weights. And generally, building scientists consider the thermal envelope (windows included) a higher priority than many other energy generation/conservation strategies.
5. SUN BLOCK - newer windows are much better at blocking UV rays that can damage interior finishes and are better at reducing Summer radiant heat gain.
6. AESTHETICS - old windows may be in such terrible, ugly shape we just cannot look at them any longer.

### Here are some Window Options:

TYPE OF UPGRADE:	Full Replacement	Full Inserts	Sash Packs	Interior Insulation Panel
Costs per opening materials + labor (1)	\$1000-\$2000 including new trim inside/out	\$700-\$1200	\$300-\$600	\$150- \$200
Best Choice if...	<ul style="list-style-type: none"> <li>• rot in old frames</li> <li>• maximum energy efficiency needed</li> </ul>	<ul style="list-style-type: none"> <li>• Existing frames and trim in good shape</li> <li>• Easy tilt/ remove needed</li> </ul>	<ul style="list-style-type: none"> <li>• Budget concerns</li> <li>• Existing frame and trim in good shape</li> </ul>	<ul style="list-style-type: none"> <li>• serious budget restrictions</li> <li>• Fall install and Spring removal not a big deal</li> <li>• historical windows</li> </ul>
Don't Choose If...	a cheaper option meets your requirements	<ul style="list-style-type: none"> <li>• Reduced glass size is a concern</li> <li>• Max energy efficiency needed</li> <li>• rot in old frames</li> </ul>	<ul style="list-style-type: none"> <li>• Easy tilt/release needed</li> <li>• You want casement-type windows (ie. crank-out type)</li> </ul>	<ul style="list-style-type: none"> <li>• Old frames or sashes rotted</li> <li>• Sashes don't operate to allow Summer venting</li> <li>➡ You need NEW windows... buy 1-2 per year</li> </ul>

<b>TYPE OF UPGRADE:</b>	<b>Full Replacement</b>	<b>Full Inserts</b>	<b>Sash Packs</b>	<b>Interior Insulation Panel</b>
Scope	<ul style="list-style-type: none"> <li>• fully tear out old</li> <li>• waterproof-gasket opening</li> <li>• new exter. trim (usually)</li> <li>• often requires repair &amp; touch-up paint of walls/siding</li> </ul>	<ul style="list-style-type: none"> <li>• Remove storms &amp; sashes... old frames stay in place</li> <li>• Minor pieces of new trim needed</li> </ul>	<ul style="list-style-type: none"> <li>• Remove storms &amp; sashes... old frames stay in place</li> <li>• Minor pieces of new trim needed</li> </ul>	<ul style="list-style-type: none"> <li>• usually just add 4 mounting screws</li> </ul>
Functionality	High	High	Low-Moderate Tilt-in or removal for cleaning is tougher	Very Low Must remove panel to clean or operate window
Energy Savings	Higher can seal between windows & structural lumber	Med-High use low-expand foam to fill old sash-weight cavities	Medium use low-expand foam to fill old sash-weight cavities	Medium
Other Green Considerations	<ul style="list-style-type: none"> <li>• Advanced options: Triple-pane (R-5;U-.2); Suspended Film (R-9; U-.11)</li> <li>• Fiberglass frames better</li> <li>• Vinyl: don't do it</li> <li>• If wood... consider FSC certified</li> </ul>	<ul style="list-style-type: none"> <li>• Fiberglass frames better</li> <li>• Vinyl: don't do it</li> <li>• Consider FSC certified wood</li> </ul>	<ul style="list-style-type: none"> <li>• Consider getting full-screen to allow better Summer venting</li> </ul>	<ul style="list-style-type: none"> <li>• Don't install on outside of window</li> <li>• Don't caulk exterior storms to create a type of insulation panel</li> </ul>

### ***Choose Type of Upgrade First***

More important than considering what brand of window to buy, first choose one of the four "types" above that meets your reasons for getting new windows. The majority of window improvement contractors appear to be pushing "Full Inserts". This means you receive an entire new window system (frame + sashes) inserted into the old window frame. This may be perfect for you if you have considered all the other types of upgrades. But do not choose inserts just because a salesperson is recommending them. Construction coaches and some of the better general contractors can independently assess your situation and potentially save you significantly in the end.

## **Are Windows Really the First Priority?**

Now that you have taken time to become window-knowledgeable, it's time to take a step back and look at your home as a whole. Windows may be important to you but first find out if there is a repair that has higher priority within your limited improvement budget. Structural repairs like fixing rotting wood columns in the basement would be one example. Also look for opportunities to sequence the window repairs with other improvements that may be coming in the near future. For example it could save money to replace windows at the same time as siding is replaced.

## **Choosing a Window Brand and Installer:**

Few window sales people will give you objective information to allow comparing of brands. So start by making a list of brands available locally and then do your own research on these brands. Consumer review publications may have recent articles to help you. Green remodelers often have subscriptions to "green products" review services so they may be able to help. If this process is too daunting, consider hiring a green construction coach or green remodeler with long-term ties to the community (ie. active at The Living Green Expo).

Once the brand has been chosen, you can consider having an experienced green remodeler or window factory contractor do the install. Regardless of which type of installer, do the following background work:

- Is there at least one on-site worker that has at least 20+ installations experience?
- Does the installer have deep roots in the green remodeling community? Others may have poor environmental practices (no recycling of on-site waste, poor dust control, etc.)
- NEW LEAD RULE: As of April 22, 2010, all remodelers and installers are required to follow new EPA rules for controlling lead in pre-1978 houses. They must also be certified. See more at: <http://www.epa.gov/lead/pubs/renovation.htm>
- Is there an "enforcement action" by the State of Mn Dept of Industry & Labor? <http://www.dli.mn.gov/CCLD/LicVerify.asp>
- Check the Better Business Bureau for unresolved complaints: <http://minnesota.app.bbb.org/search>
- Obtain a copy of their Insurance Certificate showing you as "Cert. Holder"

Once the project is fully completed, make sure you receive a "waiver of lien" so that the installer cannot later file a claim against your property.

## **Wrap-Up**

Education and involvement can have a big impact on window improvement decisions. Take the time to educate yourself and make a fully informed decision. Else, the flow of "business as usual" will carry you on a path that is best for others with unknown consequences for you and the environment.

*Bob Alf is a St. Paul based construction coach and sustainable remodeler found at [www.bobalfconstruction.com](http://www.bobalfconstruction.com)*

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## **GLOSSARY:**

### *Casement -*

Style of window that generally has one sash with a hinge on one side and "cranks" open. Maximum ventilation is approximately 90% of full window unit. Easier to meet building codes for fire exit, offer better ventilation and are slightly more energy efficient than a double hung window.

### *Casing (aka "trim")-*

Trim covers the window frame edge on both the outside and the inside. It sits flat on the wall and covers the gap between the window frame and the wall surface (drywall/plaster). The exterior trim is often factory attached to new "full replacement" windows, whereas, interior trim is usually custom fit after the window has been installed.

### *Double-Hung -*

Style of window where there are two sashes that slide up/down vertically. Maximum ventilation is approximately 1/2 of full window unit.

### *Sash -*

A piece of glass plus the "sash frame" it is embedded in, which generally moves to open/close the window. Old sash frames are often wood and in recent decades may have been wood with a metal cladding on the outside.

### *Window frame -*

The rectangular frame that the sashes are mounted into. It is usually mounted within the wall and often the bottom piece (sill) juts out past the exterior siding. Often wood but can be wood covered with metal or can be made of many other options such as fiberglass, etc.