Highly-Insulating (R-5) Windows and Low-e Storm Windows Volume Purchase Program

What Builders Need to Know

Windows have traditionally been a large source of heat loss within buildings. Substantial improvements have been achieved with insulating glass and low-E coatings, but the potential for even greater heating energy savings with highly-insulting windows still remains largely untapped.

What are Highly Insulating Windows?

Highly-insulating windows with a whole-window R-value of 5 (a U-factor of around 0.2) are the top tier of energy-efficient windows for cold and mixed climates available today. This compares to common ENERGY STAR® windows with an R-value of 3. Increasing the R-value from 3 to 5 reduces average heat loss through the windows by 40%.

R-5 Highly Insulating Windows Save Energy and Money

Windows in the U.S. account for 30% of building heating and cooling energy, representing an annual impact of 4.1 quadrillion BTU (quads) of primary energy. Windows have an even larger impact on peak energy demand and on occupant comfort.

- In cold and mixed climates, R-5 windows offer significant energy savings and are cost effective when produced in volume. The figures on the right show the economic savings of high volume R-5 windows compared to typical ENERGY STAR® windows in selected cities— assuming a price premium of $4/ft2.

Barriers to R-5 Windows Commercialization

The principal barrier to widespread market commercialization of R-5 windows is cost. The Department of Energy is working with industry and potential buyers to achieve a price premium of $4/ft2 compared to today's typical ENERGY STAR® windows. Additionally, R-5 windows can be somewhat thicker and heavier than traditional windows.

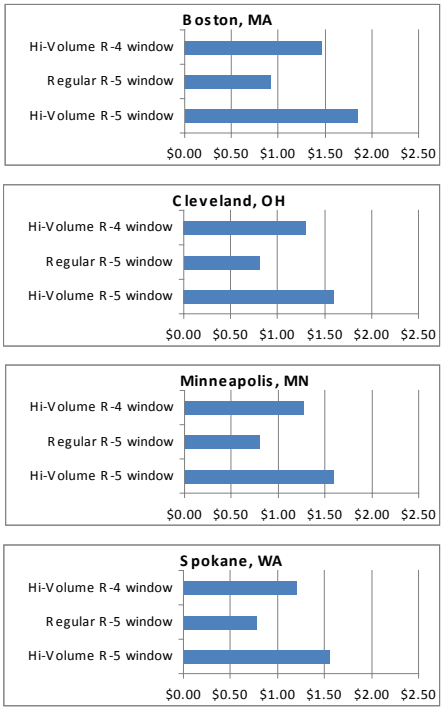
R-5 Windows Market Transformation

In order to overcome the principal cost barrier of R-5 windows, the DOE Building Technologies Program (BTP) is employing a three pronged strategy to increase demand and lower costs. BTP is making production engineering awards to window manufacturers to drive down the cost and improve the performance of R-5 windows. In order to increase market demand, BTP is organizing a volume purchase of R-5 windows and is working to establish more stringent ENERGY STAR® requirements.

The Pathway to Zero Energy Buildings

The Building Technologies Program (BTP) has embraced the strategic goal of developing net-zero-energy buildings to reduce national energy demand. A net-zero-energy building is a residential or commercial building with greatly reduced needs for energy through efficiency gains (60 to 70% less than conventional practice), with the balance of energy needs supplied by renewable technologies. Highly insulating windows are a key stepping stone to achieving net-zero-energy buildings.

Present Value of Energy Savings per Dollar of Marginal Cost Compared to Typical ENERGY STAR® Windows



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R-5 Windows Volume Purchase

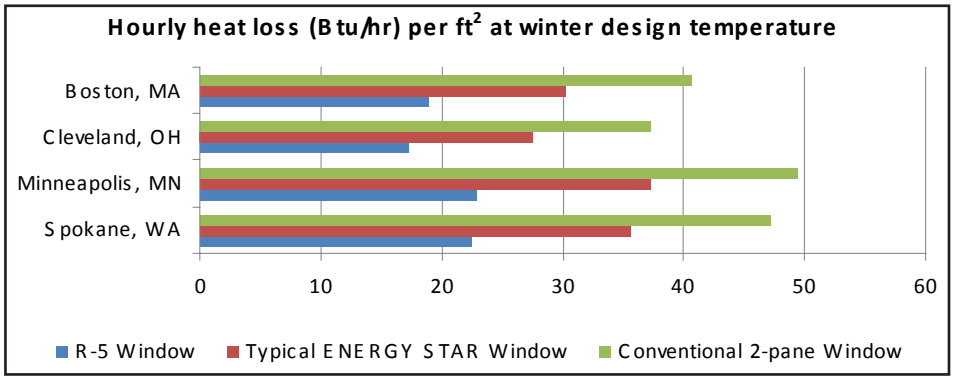
A technology procurement involves a number of steps including identification and organization of a buyer base including potential governmental and private sector customers. Manufacturers must be contacted and consensus reached on appropriate technical and economic criteria based upon customer expectations. Ultimately a specification is released, and interested manufacturers bid. Winners are chosen based upon their achievements technically and economically and their products are placed on a purchasing schedule. Customers then have the opportunity to purchase the winning products with the agreed upon specifications.

Schedule for volume purchase:

- Volume purchase RFP: December 2009
- Manufacturer proposals: February 2010
- Qualified vendors contacted: March 2010
- Window products available: Spring 2010 – mid 2011
- Phase II volume purchase: February 2011

Builders Must Be Involved

In cold and mixed climates, builders can reduce capital costs through the use of R-5 windows which may permit elimination or redesign of perimeter duct heating systems, and installation of smaller HVAC units. The figure below exhibits the advantages in peak heating load reduction through the use of R-5 windows. A prime example is that of the Cambria Office Facility (www.commercialwindows.org/case_cambria.php), a 34,500 ft2 facility designed and built in Ebensburg, PA. This facility incorporates highly insulating, triple glazed windows at an incremental cost of $15,000 compared to traditional double glazed windows. These windows permitted the complete elimination of the perimeter heating system priced at $25,000. The air conditioning system was also downsized from 120 to 60 tons, saving $40,000 of which 15 tons or $10,000 was directly attributable to the triple glazed windows. Operating energy costs for this facility are significantly lower than those with traditional double glazed windows. Highly insulating windows also allow builders to pitch market differentiation and a green edge. Home and business owners can cost-effectively lower lifetime energy costs, while improving temperature uniformity and room comfort, and potentially acoustic characteristics. Depending upon their structure, three pane R-5 windows can moderately to significantly lower noise levels compared to standard two pane windows.



The rate of heat loss determines the window surface temperature and the need for perimeter heating.

In order for the volume purchase to succeed, the participation of national builders is a must. Specifically, BTP is requesting input on the types, sizes, and quantities of R-5 windows of interest along with permissible price premiums and warranties. Most importantly, BTP is requesting the commitment of national builders to purchase R-5 windows in volume if prescribed performance and cost specifications are achieved.

In the future, BTP will be providing additional support to help successfully transform the market for R-5 windows. This support will include a follow on manufacturer production engineering solicitation to further improve performance and drive down costs, a Phase II volume purchase, and visibility and recognition mechanisms for builders who proactively install R-5 windows.

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U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy

EERE Information Center
1-877-EERE-INF (1-877-337-3463)
www.eere.energy.gov/informationcenter

For More Information on the Volume Purchase Program
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