Why Utilities and Market Transformation Programs Need to Move Beyond Lighting and Equipment: A Highly Insulating Windows Incentives Argument

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Presented at the 2011 ACEEE National Conference on Energy Efficiency as a Resource

September 27, 2011

Denver, CO

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Contents

- Background on the Evolving Utility & Energy Efficiency
- Why Care About Windows?
- Today's Windows Incentives Programs
- Today's Windows Market: Highly Insulating Windows are Entering the Market.
- Considerations for Incentives for Highly Insulating Windows

2008: International Energy Agency (IEA) on Energy Efficiency

"Using energy-efficient equipment is the most cost-effective short-term path to greater energy security and lower greenhouse gas emissions to combat climate change. It reduces pressure on energy resources".

April 1, 2008. IEA Implementing Agreement for a Co-operating Programme on Efficient Electrical End-Use Equipment. www.iea-4e.org

2011: NOTHING HAS CHANGED……..

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2011: Once Again the Utility is Facing 'Sea-Changes'

"The importance of energy efficiency has never been greater than now as a utility resource helping to achieve multiple economic and environmental objectives.

Energy efficiency lowers costs to energy customers and utility systems. It promotes job growth and local economic development. It also reduces negative environmental impacts by reducing fossil fuel use.

Finally, energy efficiency is increasingly an important tool in addressing and maintaining electric system reliability.

Unless we change the fundamental utility regulatory model to meet 21st century needs, we are destined to continue to achieve 20th century results—more and more power plants."

The Old Model Isn't Working:
Creating the Energy Utility for the 21st Century
An ACEEE White Paper
September 2011

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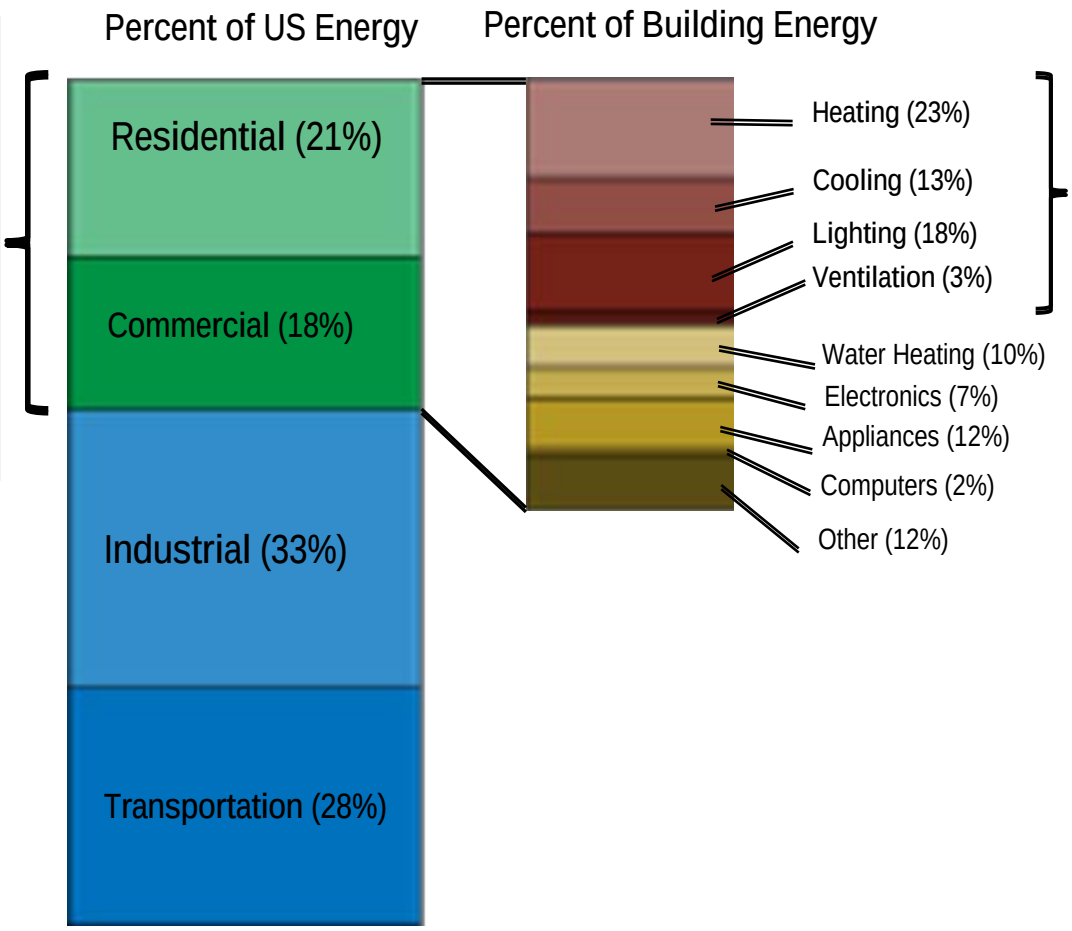
Windows Impact on U.S. Energy Consumption

Why worry about windows and envelopes?

Buildings are responsible for about 40% of U.S. primary energy consumption



More than 50% of the energy used in a building falls in an end use impacted by windows and envelope choices.

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Why Residential Windows?

According to the Environmental Protection Agency's (EPA) ENERGY STAR Program:

- "Windows typically comprise 10 to 25 percent of the exterior wall area of new homes. Research studies report that windows in heating-dominated climates account for up to 25 percent of a typical house's heating load and that in cooling-dominated climates, windows account for up to 50 percent of the cooling load."

Today's Incentives for Windows*

- 41 states with incentives
  - 169 utilities
    - 101 utilities offer rebates for windows or storm windows ($0.48 - **$8**/ft^2).
      - Many offer rebates+loans
    - 74 utilities offer only loans for windows or storm windows.
    - 10 utilities offer only loans for just storm windows.
  - 19 State/public program offerings
    - Primarily loans and/or tax credits/incentives
    - 2 offer only to the commercial/institutional sector.

Only 1 Incentive Program for U-factor 0.22

**Source: Efficient Windows Collaborative www.ecw.org (1/1/11)*

Highly Insulating Windows Utility–Based Incentive Program

Energy Trust of Oregon (ETO) (www.energytrust.org)

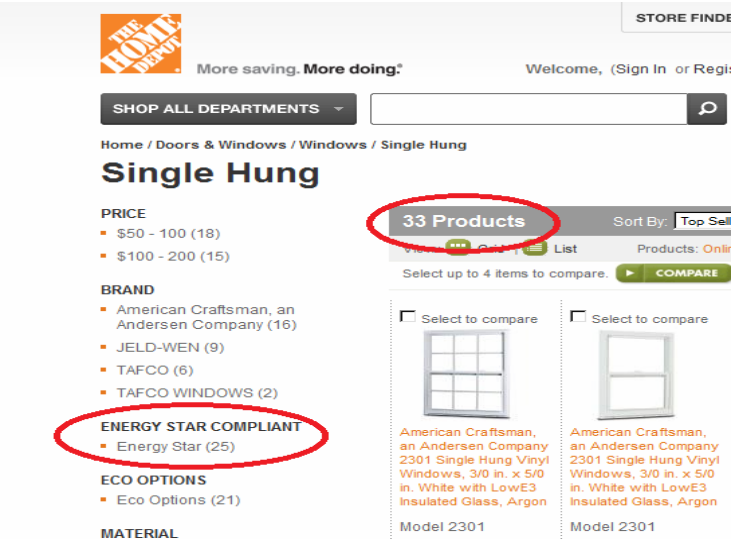
- Public purpose non-profit providing services and cash incentives to customers of Portland General Electric (PGE), Pacific Power, Northwest Natural and Cascade Natural Gas.
- Cash incentives for all sectors across a broad range of technologies.
- Offer single technology and package incentives for customers of their member utilities, including high performance windows for residential customers.
  - U-factor of 0.22 or less–receive a cash incentive of $3.50/ft^2 of windows installed in electric or gas heated homes.
  - U-factor of 0.30 to >0.22–receive $2.25/ft^2.
  - $100 bonus if combined with a second energy saving measure.

Other Current or Planned Offerings Beyond ENERGY STAR Windows

- Minnesota Power (www.mnpower.com)
  - $300 window upgrade on new residential construction (electric heat) for windows with U-factor ≤ 0.28.
- Puget Sound Energy (www.pse.com)
  - Upgrade single-pane or double-pane metal frame windows to a U-factor ≤ 0.25 in electrically-heated 5+ attached units building (condor or multifamily) AND with specific insulation levels to receive rebate of $8/ft^2.
- Northwest Energy Efficiency Alliance (www.neea.org)
  - Considering a 3-tier utility incentive for owner-occupied residential retrofits to offset price differentials for highly insulating windows, and exploring rental and second homes for eligibility for incentives.

…..and, don't forget the $200 Federal tax credit for windows that expires 12/31/11.

Today's Residential Windows Market is Changing

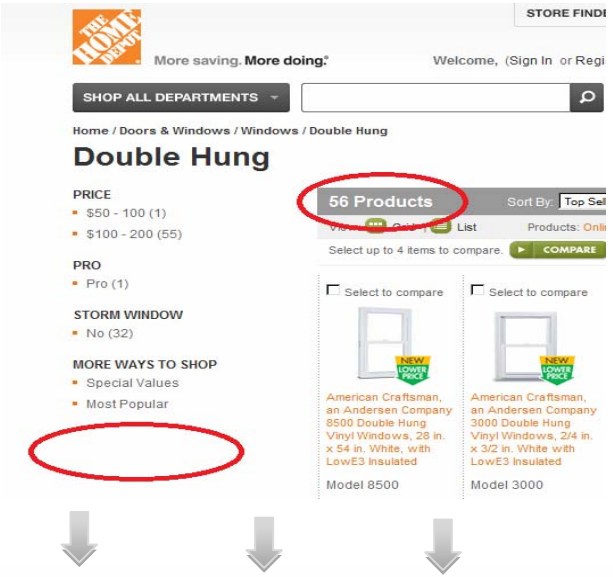


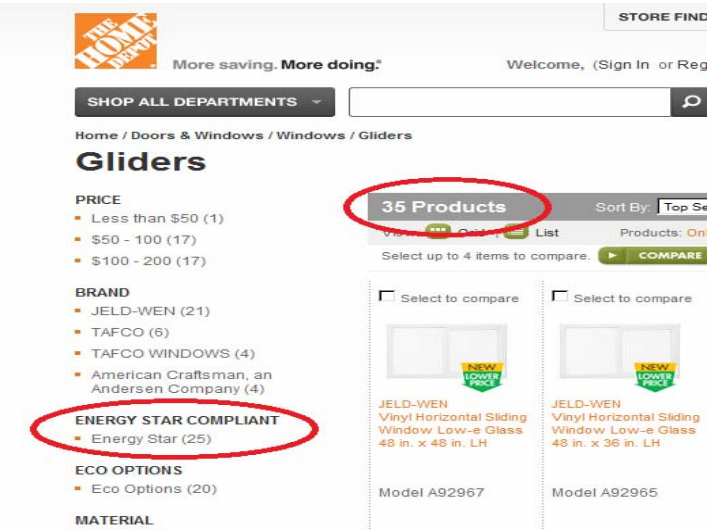
Home Depot

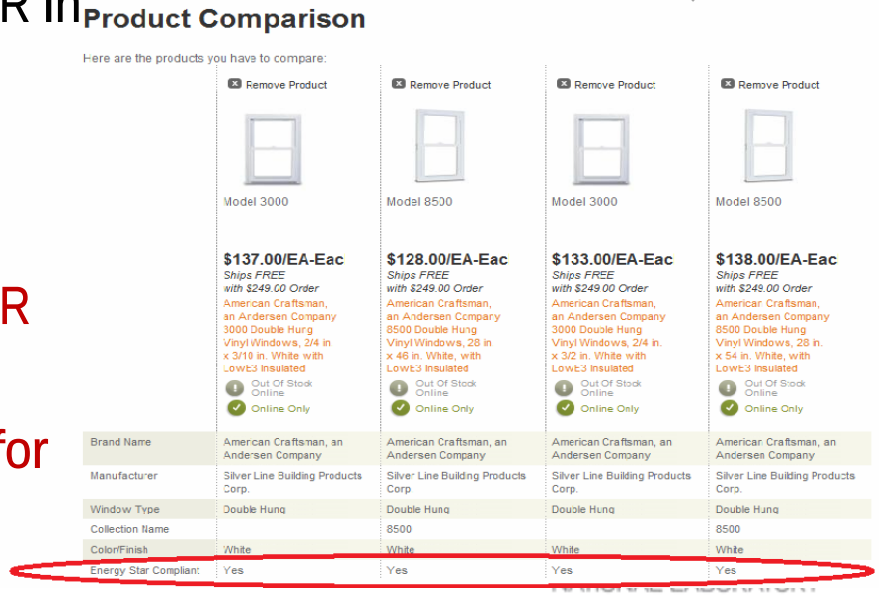
Major manufacturers of residential products

Over 85% ENERGY STAR in most markets

ENERGY STAR approaching the baseline for many regions



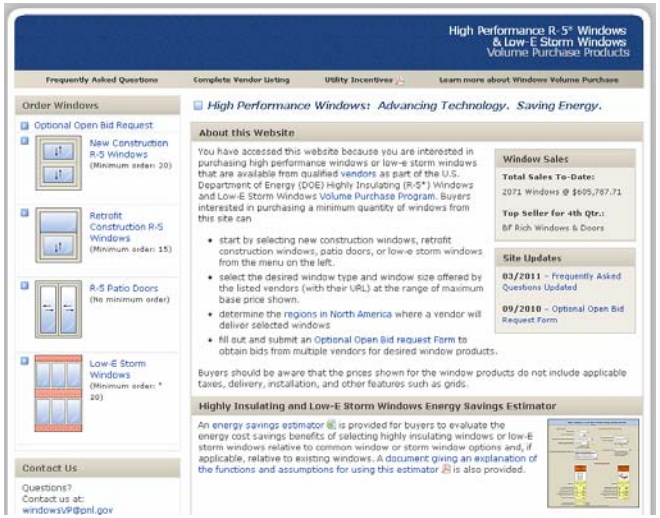


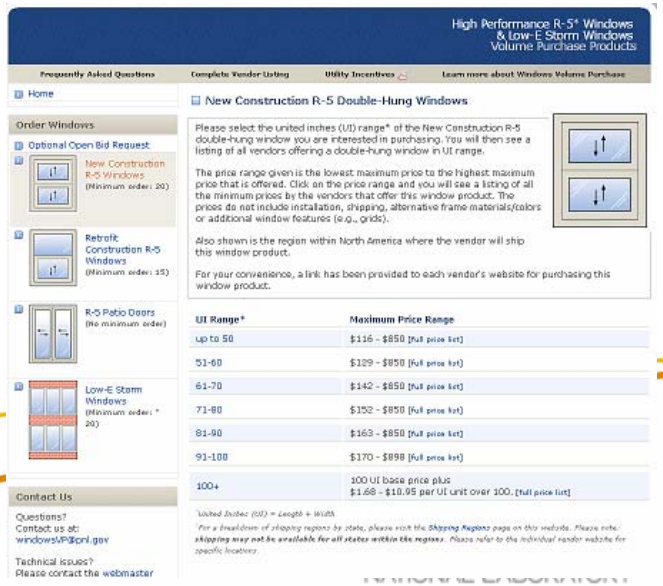


Highly Insulating Windows are More Widely Available Today Through a DOE Program

- High Performance Windows Volume Purchase (WVP) Program
  - Market transformation program with the goal to increase the availability of high performance windows products
  - Windows for sale by qualified vendors meeting program specifications.
  - Nearly 30 national and regional vendors offering residential/light commercial windows and low-e storm windows in volume pricing.
  - Searchable data base of products.
  - Residential and commercial grade (punch-out) available.

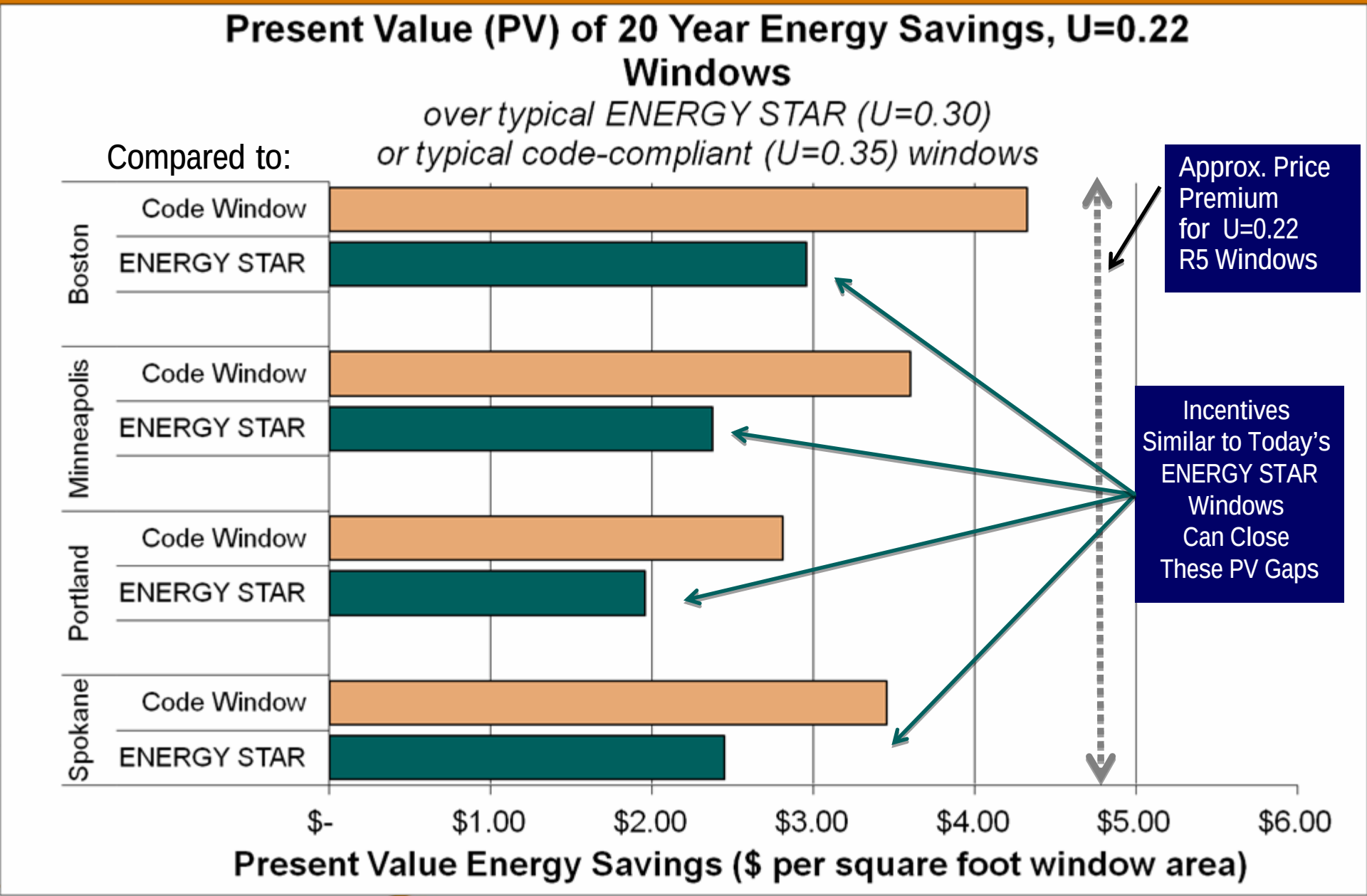
3x5 single hung as low as $205





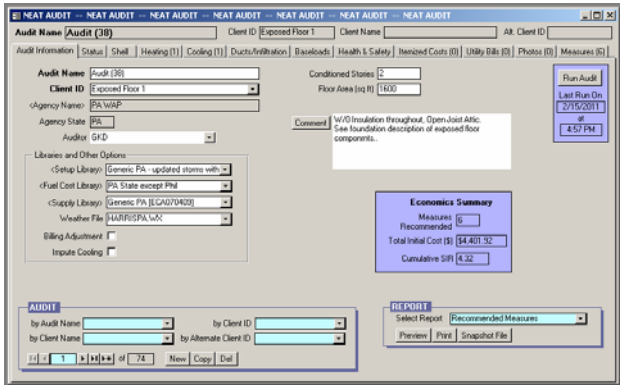
www.windowsvolumepurchase.org

Greater Affordability of Highly Insulating Windows: 4 City Present Value Analysis



One State Agency Choosing Highly Insulating Windows

- Pennsylvania's state weatherization program priority list now includes highly insulating windows and low-e storm windows.
  - WVP qualified windows recommended whenever windows must already be replaced
  - Low-E storm windows recommended as a cost effective measure when used over single pane or metal framed clear double pane windows.
- Changes to the priority list were due directly to the availability of products through the WVP program and through analysis provided by the WVP team.
  - Similar analysis can be requested by any state, utility or similar program by contacting the WVP team.



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Considerations for Going Beyond/Above ENERGY STAR Windows Incentives

- Unlike many appliances (that have/are incentivized), windows stay with the home when residents move.
- The chief barrier to consumer adoption of highly insulating windows for their homes is the perceived significant cost premium*.
- Price premiums between ENERGY STAR and high performance windows continue to decrease making high performance windows a viable option, particularly if a decision is made to retrofit windows. Modest utility incentives can help narrow the price gap as noted.

*DRAFT NEEA Report: *High Performance Windows Supply Chair Study*, March 2011

Considerations for Going Beyond/Above ENERGY STAR Windows Incentives

- ENERGY STAR is the ‘baseline’ retrofit window in many regions of the country and is near or at the cost of code windows; so why continue to incentivize?
  - Or more specifically, why incentivize ENERGY STAR @ $5-$8/ft^2?
- Future federal/national tax credits for windows are ending and future is problematic.
- Regional and local Building codes are increasingly moving to ENERGY STAR windows with future IGCC and green codes moving beyond ENERGY STAR to highly insulating windows for even mild climates.

Consider Other Benefits of High Performance Windows in New Construction

Reduce HVAC system size and eliminate perimeter heating with highly insulating windows:

- **Per a 1998 study by Hawthorne et al.:**
  - With moderately sized, highly insulating windows, perimeter heating not needed even with design temperatures below -15°F
  - 10-15% heating energy savings due to improved duct delivery system.
  - Fan electricity savings
  - 20-25% duct system cost savings ($500 for 1,200 ft^2 house)

Source: Rural Development Inc.

Guidance provided by the PassivHaus Standard and ISO 7730:
If window surface temperature is no more than 5-9°F below average room temperature, heating registers near windows are not needed.

* Savings estimates from 1998 study by Hawthorne, W. and Reilly, S. (Enermodal Engineering), Anderson, R. (NREL), Hancock, E.

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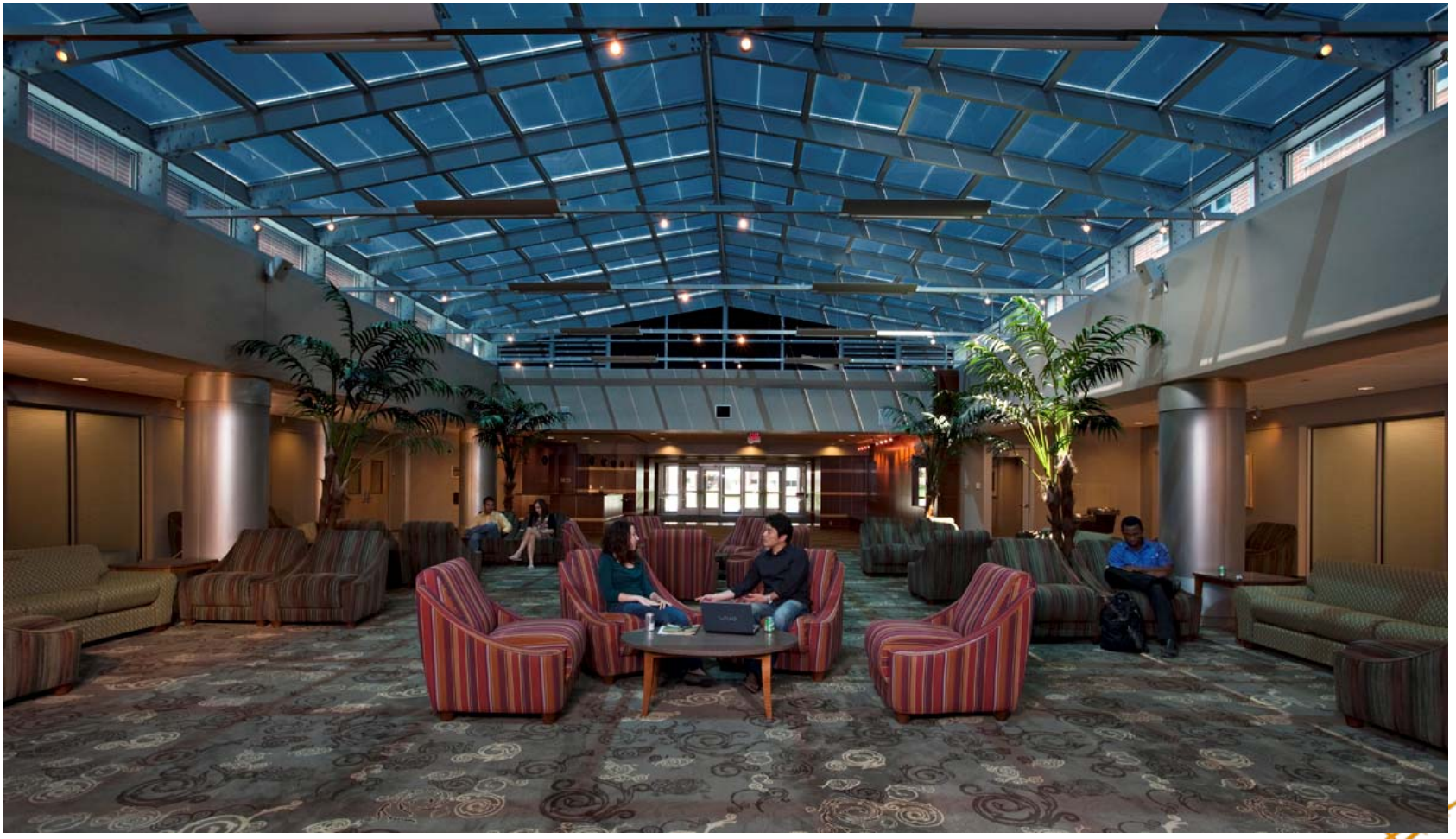
Advanced (Smart) Windows are Here! Dynamic Windows – Cost Neutral within 5 Years and Ready for Incentives?

DeHority Hall, Ball State University, Muncie, IN



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