



Highly Insulating Windows  
DOE Roadmap Workshop

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**US DOE**

9 December 2010

# Integrated Programs to Reduce Price of Highly Insulating Windows

Building America demonstrations/production housing for easy markets

High-performance specs in LEED for Homes & NGBS

Production Engineering RFP – 50% Cost Share

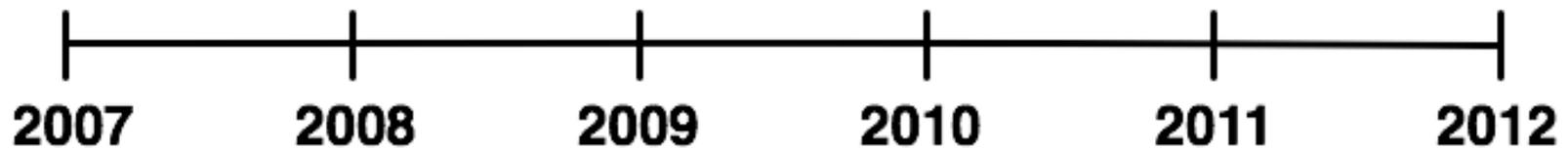
Technology Procurement/Volume Purchases – Multifamily/Public Housing/Condo, Builders, etc

Develop advanced utility program specs

Utility programs for advanced windows

ENERGY STAR spec revision

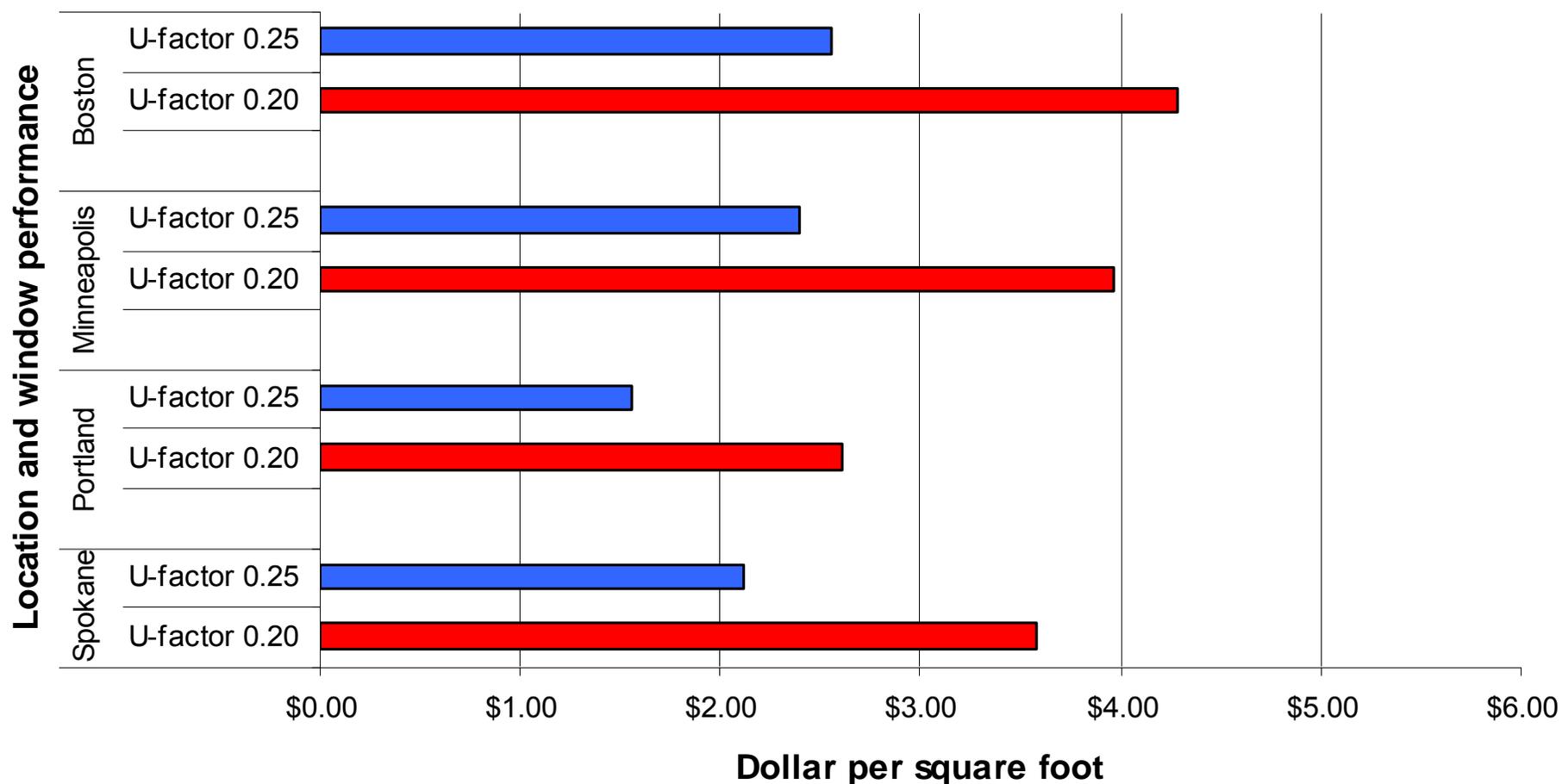
New ENERGY STAR / Phase II



# Up to what price premium are highly-insulating windows economic?

8% annual discount rate, 25 years time horizon

## Economic price premium over the cost of typical ENERGY STAR windows

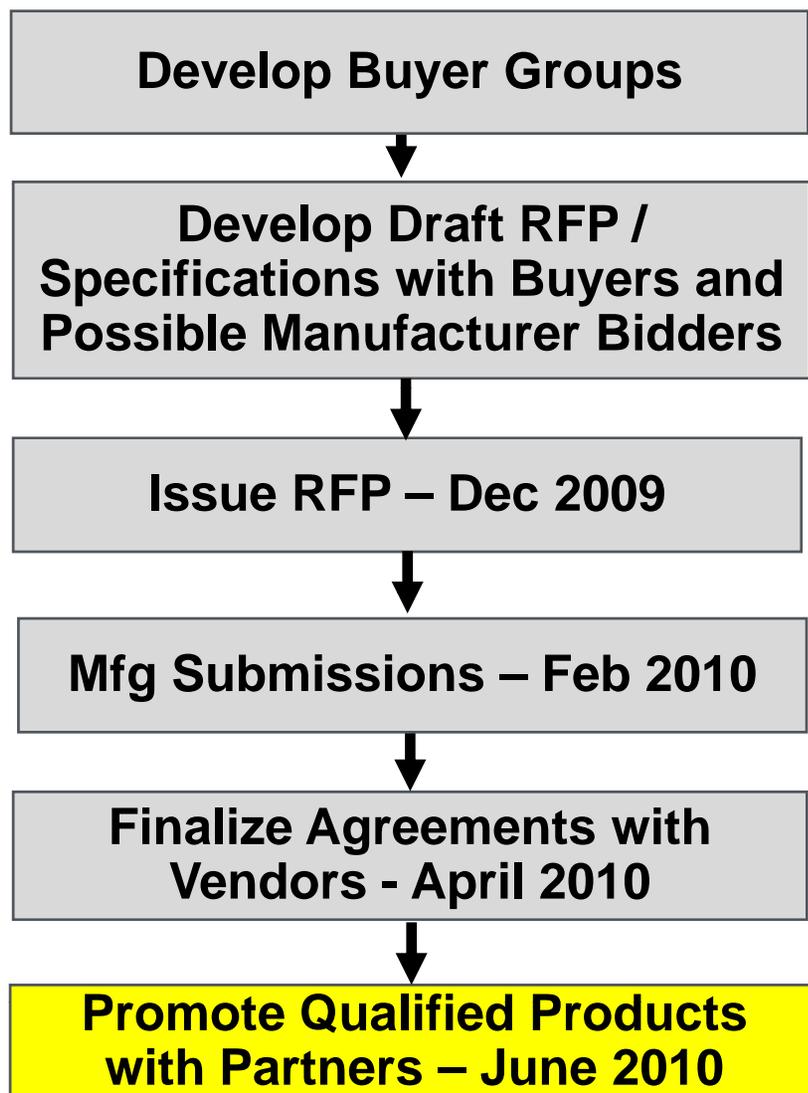


# Highly Insulating R5 Production Engineering Solicitation

- DOE Selected GED Integrated Solutions in partnership with PPG, and other major window companies
- Goal: Cost effective R5 (U-value of 0.22 or less for *operable window* and 0.20 or less for *fixed window*) with price premium less than \$4/ft<sup>2</sup> compared to conventional ENERGY STAR double pane low-e
- 50% cost share requirement
- Expects to offer high production double/triple pane automated IGU system



# R5 (~U 0.2) and Low-E Storm Windows Volume Purchase – Phase I



- July, 2009  
Highly insulating windows/low-e windows volume purchase program concept described at industry events.
- September 2009  
1<sup>st</sup> draft specifications released for comment.
- October, 2009  
2<sup>nd</sup> draft specifications released for comment.
- November, 2009  
Collective industry conference call to address all comments.
- December, 2009  
Final specifications issued with solicitation.
- February, 2010  
Deadline for proposals.

# Developed and Issued RFP

- Specifications were developed by industry professionals (manufacturers, suppliers, testers, advocacy groups, etc.)
- Proposals evaluated by a team and awards were to be made to manufacturers to provide window products that meet specifications

**Develop Draft RFP /  
Specifications with Buyers and  
Possible Manufacturer Bidders**



## Final Specs for High R & Low-E Storm Windows

### High R Windows

- U-factor: 0.20 - 0.22 BTU/ft<sup>2</sup>\*°F\*h (1.14 - 1.25 W/m<sup>2</sup>K)
- Air leakage: ≤ 0.30 cfm/ft<sup>2</sup>
- Certifications: NFRC/NAFS
- Warranties: 20 glass/10 non-glass

### Low-e Storm Windows

- Emissivity: <0.22
- Glass thickness: 3 mm minimum
- Structural test: ANSI/AAMA 1002.10-93
- Registry: IGDB (LBNL database)
- Warranties: 10 glass/non-glass

The image shows two technical specification sheets from the U.S. Department of Energy. The left sheet, titled "High Performance Window (R-6) Specifications", contains a table with performance metrics and a detailed "Performance Requirements" section. The right sheet, titled "Certification Requirements", outlines the testing and certification procedures for the windows, including references to NFRC and NAFS standards.

Issue RFP – Dec 2009

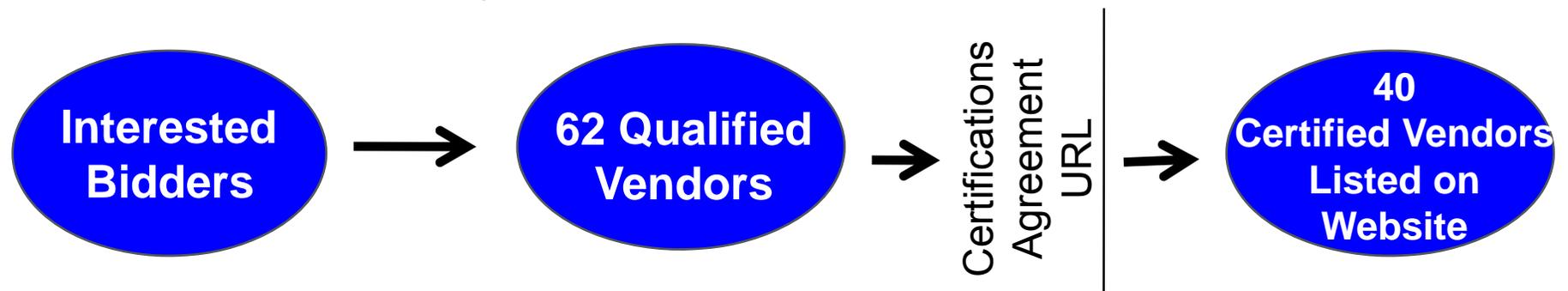


Mfg Submissions – Feb 2010



# Results – Phase I

- 62 vendors submitted qualified bids
  - 37 identified themselves as regionally based
  - 25 identified themselves as nationally based
  - 20 capable of delivering products to Canada
  - 11 entered bids for low-e storm windows
  - 9 of the top 16 window manufacturers by sales
- There are currently over 40 certified vendors listed on the website



**[www.windowsvolumepurchase.org](http://www.windowsvolumepurchase.org)**

- R5 (**U-value 0.22** and lower) highly insulating window at **\$2 - \$4/ft<sup>2</sup>** over price premium
  - Increasing the R-value from 3 to 5 reduces average heat loss through the window **by over 30% and improves occupant comfort.**
- Cost effective low-e storm windows between **\$7 - \$9/ft<sup>2</sup>**
  - Reduce heat loss through the windows by **25% to 50%** compared to single pane windows with a U-value of 1.1
- ❖ Windows Volume Purchase Program - Deployment program primed by several R&D activities and multiple integrated policies (production engineering RFPs, proposal for more stringent ENERGY STAR criteria)

**Promote Qualified Products  
with Partners – June 2010**

# WVPP Past Events

**International Builders Show**

January 19-22  
Las Vegas, NV

**State of Massachusetts Meeting**

March 31  
Boston, MA

**Youthbuild USA Meeting**

March 30  
Boston, MA

**NEEP Conference**

April 1  
Boston, MA

**NYSERDA Meeting**

March 29  
Albany, NY

**Windows Volume Purchase Kick-Off  
Event**

May 27, 2010  
Washington, DC

**DOE Windows Webinar**

June 22  
Washington, DC

**DOE Better Buildings Presentation**

July 8  
Washington, DC

**New York Weatherization Webinar**

July 28  
Washington, DC

**American Public Power Association  
Meeting**

August 26  
Washington, DC

**American Hotel & Lodging Association  
(AH&LA) Meeting**

September 1  
Washington, DC

**BOMA Meeting**

September 2  
Washington, DC

**Midwest Regional Pilot**

September 22-23  
Chicago, IL

**Pacific Northwest Regional Pilot**

October 11  
Portland, OR

**EEBA Conference**

October 12-13  
Portland, OR

**Mid-Atlantic Regional Pilot**

October 20  
Philadelphia, PA

**American Hotel & Lodging  
Association (AH&LA) Presentation**

October 26  
Washington, DC

**Greenbuild Conference**

November 16-18  
Chicago, IL

# Possible Future WVPP Events

## **Home Expo**

January 7-9  
Madison, WI

## **Home & Landscape Expo**

January 7-9  
Minneapolis, MN

## **Remodeling Expo**

January 7-9  
Pittsburg, PA

## **International Builders Show**

January 12-15  
Miami, FL

## **Home & Landscape Expo**

January 14-16  
Minneapolis, MN

## **Build, Remodel & Landscape Expo**

January 14-16  
Columbus, OH

## **Home & Remodeling Show**

January 21-23  
Baltimore, MD

## **Home & Landscape Expo**

February 25-27  
Colorado Springs, CO

## **Regional Workshop**

February  
Boston, MA

## **Home and Remodeling Show**

March 25-27  
Hartford, CT

## **Regional Workshop**

March  
Cleveland, OH

## **Atlantic Builders Conference**

April 6-8  
Atlantic City, NJ

## **Regional Workshop**

April  
Denver, CO

## **Regional Workshop**

May  
Madison, WI

# FY 11 Key Deliverables

Performer	Deliverable/Milestone	Due Date
LBL	Highly Insulating Windows Technical Support package for window industry to accelerate manufacturing of R5 windows.	September 2011
PNNL	Complete specifications for Phase II solicitation; Solicitation issued.	January 2011
	Agreements executed with qualified vendors; Certified vendor's products listed on website; Website enhanced and updated.	April 2011 - remainder of Phase II
EverSealed	Assemble and Test Prototype VIGUs	December 2011
	Design, assemble, and test prototype R-10 residential window	June 2012
Southwall	Technical and Economic Validation of R-10 Windows	April – June 2011
	Determine Heat Mirror (HM) IGU Feasibility	December 2011
	Develop HM-based R-10 window with improved SHGC performance for residential market.	2013

## Contact Information

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Links:

[www.eere.doe.gov](http://www.eere.doe.gov)

[www.eereblogs.energy.gov/buildingenvelope](http://www.eereblogs.energy.gov/buildingenvelope)

[www.windowsvolumepurchase.org](http://www.windowsvolumepurchase.org)

[www.windows.lbl.gov/software](http://www.windows.lbl.gov/software)

[www.nfrc.org](http://www.nfrc.org)

[www.efficientwindows.org](http://www.efficientwindows.org)