

APEC Knowledge Sharing Platform (KSP) Workshop Task SB-4: Smart Buildings- Low Energy Windows Demonstrations

Cary Bloyd
Energy and Environment Directorate
Pacific Northwest National Laboratory
Cary.Bloyd@pnnl.gov

Marc LaFrance
Buildings Technology Program
Office of Energy Efficiency and Renewable Energy
marc.lafrance@ee.doe.gov

Kaohsiung, Chinese Taipei

October 18, 2011

Four major windows related activities were completed in 2011

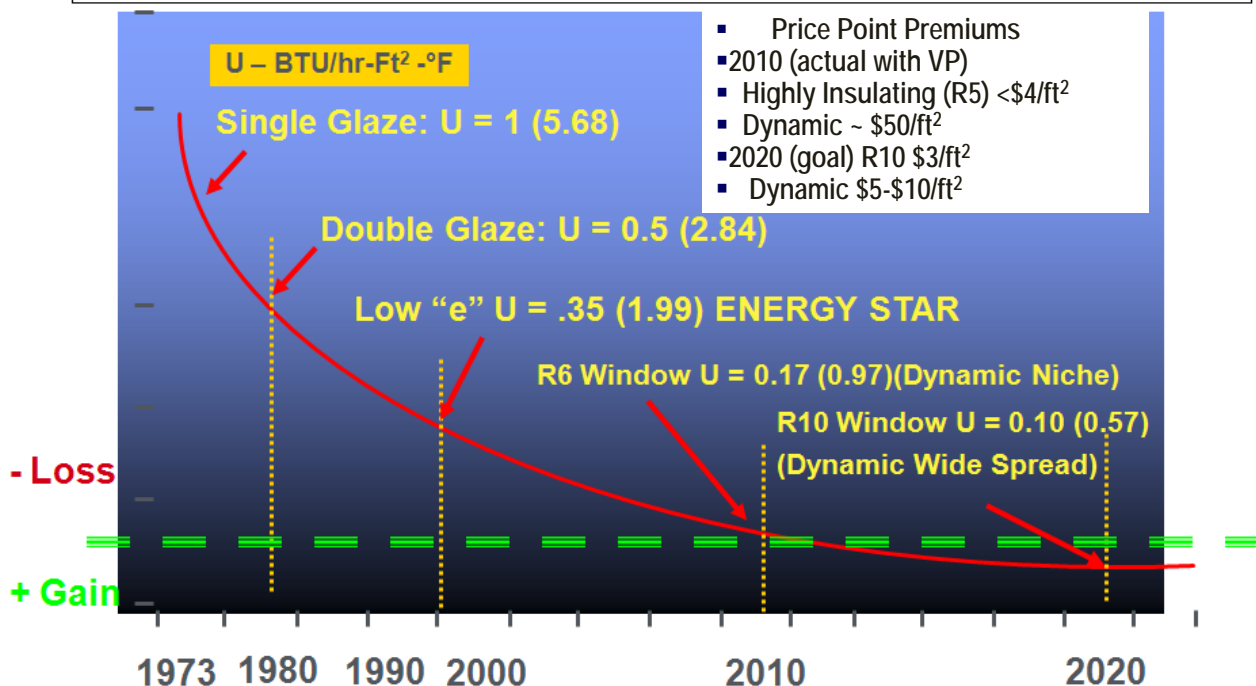
- *Establishing a Rating Program for Pre-and Post-Fabricated Windows*, GS Parker, TS Mapes B Shaw, and CN Bloyd Pacific Northwest National Laboratory, Richland, Washington, PNNL-20647, August 2011
- *Energy-Saving Windows: Survey of Policies and Programs to Promote Advanced Window and Glazing Technologies in APEC Economies*, National Fenestration Rating Council, APEC # 211-RE-01.6, June 2011
- *APEC Efficient Building Envelope Stakeholders Meeting and Workshop*, Bangkok, Thailand, June 2011
- *Final Report for CEEDS Phase 2: Building Energy Codes and Labeling*, Asia Pacific Economic Research Center (APEREC), APEC # 211-R-01.5, May 2011

- It is important to consider the entire window infrastructure that supports modern efficient building envelopes
- Harmonization of standards should be a priority
- Demonstrations are useful, but they are climate dependent



Window Pathway

Advanced Windows Can Become Energy Producers
(US Mixed and Northern Climates)

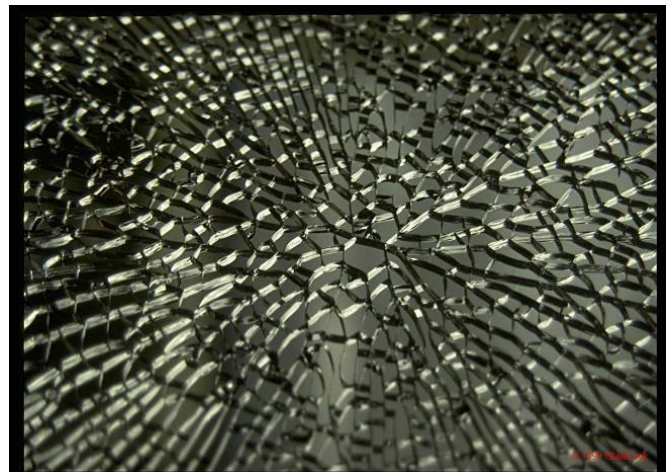


- **Highly Insulating**
 - Goal U value 0.10 (SI U value 0.56)
 - **Vacuum glazing have the greatest potential for high light transmission**
- **Dynamic solar control**
 - Passive heating and dramatic peak cooling reduction, SHGC 0.53 – 0.09
 - Market ready, prices will drop with more investment
 - Many new projects underway, competitive market in 2012 - 2014



- Prototype – Concept Window
- (Highly Insulating and Dynamic)
 - U Value 0.18 (SI U value 1.0)
 - SHGC 0.04 – 0.34)
- Low cost unsealed center lite

Window Film Retrofit Applications - energy, blast, hurricane, etc.

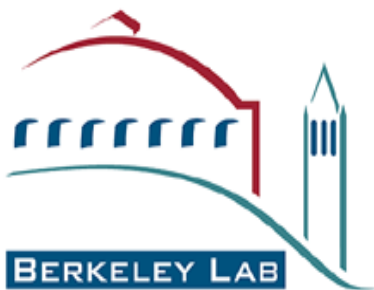


Case Study – compared to single pane windows with aluminum frames (no thermal break), in conference room with low usage



- 91% lighting energy savings
- Modeled space conditioning savings for the window (39% to 48%)
- Peak electric load reduction of 22% – 35%
- Manual override of automated lighting – 4% of the time

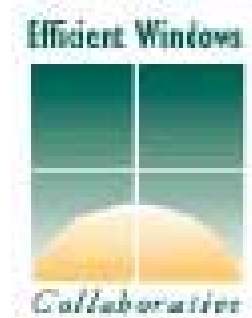
DOE Assists with Technical Support Activities



▪ <http://windows.lbl.gov/software>



▪ www.nfrc.org



▪ www.efficientwindows.org

- Full range of software support tools, education materials and expansion to new product categories
- Continued financial support to assist industry in rating and promoting efficient products

Code Development

- Sends a strong message to economy
- Sets goals to strive for

Infrastructure

- Needed to assess key building components
- Likely starting point, but hard to get interest w/o codes

Enforcement

- Key issue to achieve results, but often not investigated deep enough
- Core problems include lack of product ratings, product availability, lack of knowledge