EC WINDOW DEMONSTRATION IN GENERAL OFFICE SPACE

OPPORTUNITY

What have previous studies demonstrated about the potential for electrochromic (EC) windows?

TECHNOLOGY

How do EC windows work?

M&V

Where did Measurement and Verification occur?

RESULTS

How did EC windows perform in M&V?

DEPLOYMENT

Where does M&V recommend considering EC windows?

GPG FINDINGS

The GPG program enables GSA to make sound investment decisions in next generation building technologies based on their real world performance. www.gsa.gov/gpg

EC WINDOW DEMONSTRATION IN GENERAL OFFICE SPACE

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LAWRENCE BERKELEY NATIONAL LABORATORY assessed occupant satisfaction with EC windows in two buildings with curtain-wall construction—the 911 Federal Building in Portland, Oregon and the John E. Moss Federal Building in Sacramento, California.

Where did Measurement and Verification occur?


RESULTS

How did EC windows perform in M&V?

- Control Baseline Conditions and Occupant Behavior Determine Savings:
  - In Sacramento, most blinds remained lowered and darker tint levels predominated, resulting in a 62% increase in lighting energy. In Portland, 40% more blinds were left raised and lighter tint levels predominated, resulting in 36% lighting energy savings but a 2% HVAC increase.

- Not Cost-Effective for General Office Space Based on Energy Savings Alone:
  - Energy savings did not cover increased costs—in Portland, the incremental difference between installing spectrally selective low-e windows and EC windows was $37/ft².

DEPLOYMENT

Where does M&V recommend considering EC windows?

- Facilities Where Outside Views Are Critical:
  - A previous GPG study recommended EC windows where glare control is required but blinds would interfere with mission, such as Land Ports of Entry.
  - EC windows also could enhance architectural features that provide a connection with the outdoors, such as skylights and atriums, though this has not been evaluated.

What have previous studies demonstrated about the potential for electrochromic (EC) windows?

How do EC windows work?

1. Reduced Heat gain and Cooling Energy
2. Reduced Lighting Energy
3. Reduced Glare
4. Occupant Preference over Existing Low-E
5. Implementations that both satisfy occupants and meet competing performance requirements are challenging and take time.
6. Not cost-effective for general office space based on energy savings alone
7. Energy savings did not cover increased costs—in Portland, the incremental difference between installing spectrally selective low-e windows and EC windows was $37/ft².

A previous GPG study recommended EC windows where glare control is required but blinds would interfere with mission, such as Land Ports of Entry. EC windows also could enhance architectural features that provide a connection with the outdoors, such as skylights and atriums, though this has not been evaluated.

*63-92% Occupant Preference over Existing Low-E*

*Implementations that both satisfy occupants and meet competing performance requirements are challenging and take time.*

*A Pilot Demonstration of Electrochromic and Thermochromic Windows in the Denver Federal Center, Eleanor S. Lee (LBNL), March 2014, p.4

*Ibid*, p.1

*Electrochromic Window Demonstration at the Donna Land Port of Entry, Luís L. Fernandes (LBNL), May 2015, p.37

*Ibid*, p.3 and p.7


*A Electrochromic Window Demonstration at the John E. Moss Federal Building, Sacramento, Luís L. Fernandes (LBNL), August 2017, p.8

*Ibid*, p.8 and p.136

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