Electrochromic Windows

The tint of electrochromic (EC) windows can be controlled on demand through an electric signal. The window can become darker to keep sunlight out, and clear to provide better views, illumination, and passive solar heat gain. This dynamic control allows EC windows to provide substantial energy savings to buildings, both by enabling solar gain when it is cold outside and blocking unwanted solar gain when it is hot. EC windows are commercially available in the U.S. from multiple manufacturers and have been installed in many buildings nationwide.

ENERGY SAVING BENEFITS

1.9 quads

Potential primary energy savings from EC windows in residential buildings in 2030.[1]

1.8 quads

Potential primary energy savings from EC windows in commercial buildings in 2030.[1]

10%

Reduction in total annual U.S. building energy use in 2030.[1]

CARBON EMISSIONS REDUCTION BENEFITS

78 Mt

Annual million metric tons of avoided CO_2 emissions from EC windows in residential buildings in 2030.[1]

81 Mt

Annual million metric tons of avoided CO_2 emissions from EC windows in commercial buildings in 2030.[1]

11%

Reduction in CO_2 emissions from building energy use in 2030.[1]

OTHER BENEFITS

JOBS

Several major EC glazing companies in the U.S. market manufacture their glazings domestically. Rapid, widespread adoption of EC glazing could create thousands of jobs installing and commissioning them in new and existing buildings.

COMFORT

By controlling glare and solar heat gain, EC windows can improve building occupant comfort. In several studies,[2, 3] at least 85% of building occupants stated their preference for EC over conventional windows.

UP TO 25% PEAK DEMAND REDUCTION[4]

EC windows are actively controlled, which further enables a building's interaction with a smart electrical grid. Among available envelope technologies, they have the highest potential for providing grid benefits.[5]

For more information visit: windows.lbl.gov/ec

REFERENCES

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DOE RESOURCES

Research and Development Opportunities for Windows

Grid-interactive Efficient Buildings Technical Report Series: Windows and Opaque Envelope

DOE Building Technologies Office

DOE Building Technologies Office - Windows Program

BERKELEY LAB RESOURCES

Berkeley Lab Windows R&D

NREL RESOURCES

nrel.gov/buildings/windows.html

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