063

MAY 2026

NON-METALIZED EXTERIOR SOLAR CONTROL FILM

OPPORTUNITY

Windows are responsible for how much cooling demand?

28% **OF COOLING ENERGY DEMAND**
due to heat gain in windows[1]

60% **WINDOWS ARE MULTI-PANE**
in commercial buildings[2]

TECHNOLOGY

How do Non-Metalized Films work?

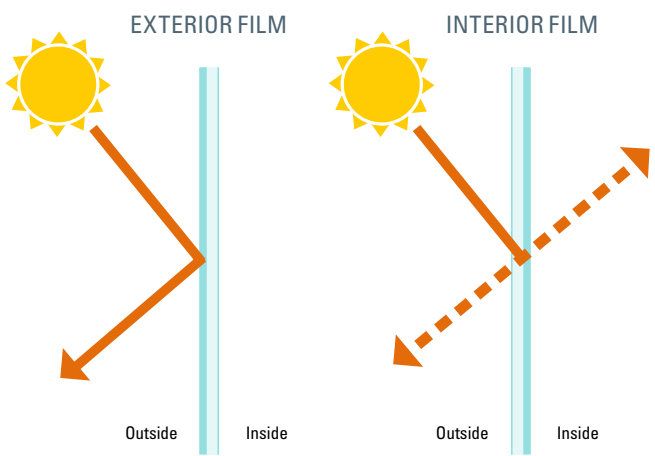
Exterior films block solar heat before it enters the building

Interior films on double-pane windows absorb heat, reducing savings and increasing thermal breakage risk

Corrosion-resistant and more durable than metalized exterior films

Better heat rejection

Non-disruptive installation



M&V

Where did Measurement and Verification occur?

LAWRENCE BERKELEY NATIONAL LABORATORY (LBNL) assessed the impact of non-metalized window film provided by 3M at Building 67 of the Denver Federal Center in Lakewood, CO.

RESULTS

How did Non-Metalized Exterior Film perform in M&V?

74%
SOLAR HEAT GAIN REDUCTION
>99% of UV rays blocked[3]

-2.7 TO +7.5% ENERGY SAVINGS
Peak Demand Savings
Electricity: 6.5% to 9.4%

Gas: 29.1% to 3.9%[4]

SEAMLESS INSTALLATION
2 installers completed 13 floors in 19 days[5]

Exterior installation $1.15/sf more than interior[6]

Positive pilot led to full-building expansion[7]

76%
OCCUPANT PREFERENCE
over baseline windows. Occupants noted cooler spaces, improved daylight comfort, and reduced glare.[8]

Exterior Film Delivers Strongest Performance at Testbed*

Greater savings in warm climates. Demand savings will increase ROI.

	Non-Metalized Interior	Non-Metalized Exterior
Installed Technology Cost ($/SF)	$11.85	$12.90
Testbed Electricity Savings (kWh/yr)	7,644	51,600
Testbed Gas Savings (kWh/yr)	-9,121	-37,560
Testbed Electricity Savings (blended $0.11/kW/yr)	$841	$5,676
Testbed Gas Savings (blended $7.68/MMBTU/yr)	$-239	$-985
Testbed / GSA Avg Simple Payback (yrs)**	**138 / 33–89**	**19 / 6–13**
Testbed / GSA Avg Savings-to-Investment Ratio ***	**0.11 / 0.17–0.45**	**0.78 / 1.17–2.18**

*Based on whole-building simulation for Boulder, Colorado, using a DOE medium office model with baseline tinted windows without low-e coating
**GSA payback applies only in select climate zones (1A, 2B, 3A, 3B, 3C): Assumes electricity $0.09–$0.27/kWh and natural gas $4.80–$20/MMBtu blended rates; accounting for demand charges is expected to significantly decrease payback.
***Technology lifespan = 15 years, SIR > 1 indicates a positive Return on Investment

DEPLOYMENT

Where does M&V recommend deploying Non-Metalized Exterior Film?

TINTED DOUBLE-PANE WINDOWS
in warm climates 1A, 2B, 3A, 3B, and 3C

ROI improves in cooler climates if there are significant cooling demand charges

[1]Charlie Curcija, Howdy Goudey, Robin Mitchell, Leandro Manes, Stephen Selkowitz , Liquid-Applied Absorbing Window Film Retrofit. LBNL, November 2014, p. 10 [2]Fernandes, L., Harris, C., Praprost, M., & Kohler, C. (2025). Energy impacts of nationwide window upgrades in commercial buildings. Lawrence Berkeley National Laboratory. OSTI ID: 2530151. Retrieved from https://escholarship.org/uc/item/29d3z67m p. 5 [3]Fernandes, Thanachareonkit, Wang, Yu, Goudey, Lee, and Sun, Non-metalized Exterior Solar Control Film. LBNL, May 2026, p. 25 [4]Ibid,p. 27 [5]Ibid, p. 6 [6]Ibid, p. 6 [7]Ibid, p. 6 [8]Ibid, p. 6