

OPPORTUNITY

Windows are responsible for how much energy use?

34% OF COMMERCIAL BUILDING HVAC ENERGY IS LOST TO WINDOWS<sup>1</sup>

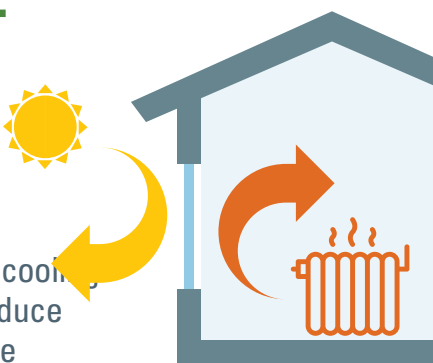
TECHNOLOGY

How does Low-e film work?

REDUCES SOLAR HEAT GAIN AND INSULATES

BY SELECTIVELY ABSORBING AND REFLECTING HEAT

Blocks direct solar heat to reduce summer cooling demand. Improves window insulation to reduce summer and winter energy use and improve occupant comfort.



M&V

Where did Measurement and Verification occur?

LAWRENCE BERKELEY NATIONAL LABORATORY assessed a low-e film provided by the Eastman Chemical Company at two sites, the Hansen Federal Building in Ogden, Utah, and the Cabell Federal Building in Dallas, Texas. They also modeled energy performance in seven climates with four different base window configurations.

RESULTS

How did Low-e film perform in M&V?

29% AVERAGE PERIMETER HVAC SAVINGS with single-pane clear glass<sup>2</sup>

BETTER THERMAL COMFORT Occupants reported superior comfort in both summer and winter<sup>3</sup>

2-6 YR PAYBACK with single-pane glass; installed cost of \$7.75 sq. ft.<sup>4</sup>

Modeled Perimeter Energy Savings for Range of Climates

Whole building energy savings is estimated to be at least 1/3 of perimeter savings

Location		Single Clear Glazing to VT35 Film			Single Bronze Glazing to VT35 Film		
CLIMATE ZONE	CITY	HEATING kBtu/ft2/yr	COOLING kBtu/ft2/yr	TOTAL %	HEATING kBtu/ft2/yr	COOLING kBtu/ft2/yr	TOTAL %
1A	Miami, FL	0.01	12.16	33%	0.03	8.08	25%
2A	Dallas, TX	0.47	10.94	33%	1.52	7.12	26%
2B	Phoenix, AZ	0.20	15.24	38%	0.45	10.40	30%
4A	Washington, D.C.	0.51	6.40	26%	3.24	3.74	23%
5A	Chicago, IL	1.97	5.66	24%	5.79	3.23	22%
5B	Ogden, UT	1.45	7.13	30%	4.97	4.12	27%
6A	Minneapolis, MN	2.97	5.45	22%	7.51	3.06	21%
AVERAGE PERIMETER SAVINGS		1.08	9.00	29%	3.36	5.68	25%

DEPLOYMENT

Where does M&V recommend deploying Low-e Film?

ACROSS ALL CLIMATE ZONES

Biggest efficiency gain and fastest payback will be in buildings with either single glazing or existing applied film that is low performing or nearing the end of its (~15 year) service life.

Also consider for lower-performing double glazing that does not already have a low-e coating between panes.

<sup>1</sup>Low-e Applied Film Window Retrofit for Insulation and Solar Control, Charlie Curcija, Howdy Goudey, Robin Mitchell, LBNL, February 2017, p. 10  
<sup>2</sup>Ibid, p. 62-131   <sup>3</sup>Ibid, p.43   <sup>4</sup>Ibid, p.42