Window Attachment Technologies Overview

Although replacing old existing windows with new-high performance windows is an excellent retrofit option, window replacement isn't always cost-effective or feasible. As an alternative option, window attachment technologies offer a more affordable and accessible retrofit option and can decrease solar heat gain, increase the reflectance of the window in the IR wavelengths, lower emissivity, reduce air leakage, and decrease the amount of thermal conduction and convection between indoor spaces and the outdoors. These technologies also provide passive resilience, decrease peak demand, increase occupant comfort, decrease noise infiltration, and are less invasive to install.

Storm Windows and Insulating Panels

Potential savings: 10-30% annual HVAC energy savings (Culp and Cort 2015; Knox and Widder 2014)

Storm windows and insulating panels are typically made of a single pane of glass or plastic in a wood or aluminum frame, and are installed on the interior or exterior of an existing primary window. This technology improves the thermal performance of the window by increasing air sealing and creating a dead air space to reduce both convective and conductive heat losses through the window. Storm windows and insulating panels can also include a durable low-emissivity (low-e) coating, which reduces the U-factor of the window and acts as a heat mirror, reflecting heat inwards in the winter and. outwards in the summer. Unlike older versions, modern storm windows and insulating panels are permanently installed, aesthetically pleasing, and can maintain full window operability.

Interior Cellular Shades

Potential savings: 5-25% heating and cooling HVAC energy savings depending on season (Metzger et al. 2017; Cort et al. 2018)

Interior cellular shades are made of multiple layers of opaque fabric that create cellular pockets reminiscent of honeycombs when viewed from the side. They can be made with single, double, or triple layers of cells, and work to insulate the primary window and increase the R-value of the window by reducing heat transfer by creating a layer of trapped air between the cells. Some models of cellular shades include a layer of metalized Mylar within the insulating air pockets, which serves to further minimize convective, radiant, and conductive heat transfer through the window.

Exterior Shade Attachments

Potential savings: 10-20% cooling HVAC energy savings (Hunt and Cort 2020)

Exterior shades are window attachments that are applied to the exterior of the existing window, such as solar screens or roller shades. They help to increase a window's thermal performance by reducing solar heat gain during the cooling season, and also help to reduce glare and improve comfort in the home.

Exterior shades regularly include a manual crank, motor, or rod that allows the resident to operate them from indoors, but many newer models utilize a remote-controlled motor to raise and lower the shade.

*Note that all estimated energy savings will vary based on climate zone, season, existing window type, and other building characteristics.