

“Smart Glass” Reduces Glare, Improves Comfort

■ By Robbie Tarpley Raffish

Dynamic glass panes can decrease energy demand, glare and heat, resulting in a more comfortable indoor environment, while still letting the sunshine in.

WALK INTO THE MODERN, glass-clad Saint-Gobain headquarters in Malvern, Pennsylvania, on a summer afternoon and it should be overly bright, warm and stuffy. Yet the new two-story atrium lobby, which links two newly renovated headquarters buildings, is none of those. The LEED-Platinum certified building is a comfortable 71 degrees, even facing due west, without glare or discomfort.

The building “is a living lab,” says **Jill Betters**, manager of commercial and architectural programs for CertainTeed, a division of Saint-Gobain. “When the company decided to build our new headquarters here, it made sense to showcase our products, and this atrium really is a great example of our SageGlass.”

Betters is referring to the company’s dynamic glass product. Think Transitions lenses (the eyeglasses that darken in bright sunlight) on a massive scale. The tintable electrochromic glass — also known as photochromic or dynamic glass — is designed to help make indoor spaces more comfortable. The panes, the company claims, reduce energy demand, glare, heat and discomfort while increasing employee well-being and productivity.

It works like this: SageGlass panes are coated with five layers of ceramic materials at a total thickness of less than 1/50th that of a human hair. When voltage is applied across the coatings, ions travel from one layer to another, prompting a reversible solid-state change that causes the coating to tint and absorb light. In other words, the glass gets darker. Reversing the polarity of the applied



The west and south facades of Saint-Gobain’s U.S. headquarters in Malvern, Pennsylvania, feature 17,000 square feet of SageGlass, marking one of the largest installations of electrochromic glass to date.

Photos ©Jeffrey Totaro, 2015

voltage causes the ions to migrate back to their original layer, untinting the glass.

Controlled by a physical switch, automated settings or an app, each pane has three tint choices. In full tint mode — often the preferred setting for presentations in conference rooms — the process removes 99 percent of visible light, providing complete protection from the sun’s harshest rays while still remaining clear enough to see through. Other settings remove 60 and 20 percent of visual light. There is also a “clear” setting. The transition takes a gradual seven to 10 minutes, and every 2,000 square feet of the glass consumes the power of a very cost-effective 60-watt lightbulb as it transitions.

For developer **Eli Kahn** of E. Kahn Development, the Saint-Gobain headquarters was his first exposure to tintable electrochromic glass.

“I have never seen a building with window shades in architectural renderings,” says Kahn. “And then the building goes up, and all you need to do is stand outside on a sunny afternoon to see shades across buildings in an infinite number of positions. You understand in that moment how people struggle with heat and glare.”

Kahn sees the return on investment of dynamic glass in three ways: “First, there’s the energy payback. Our models show this is about a seven- to 10-year window. Then there is the contribution it makes to LEED certification. And most importantly, there’s the comfort and productivity of employees. Isn’t that why we started putting air conditioning in buildings in the 1960s? People just work better when they are comfortable.”

SageGlass, one of the first and largest companies to produce dynamic glass, was formed in 1989 based



Photochromic glass dynamically controls sunlight, maximizing daylight while minimizing glare and solar heat. Here, the glass is at full tint in the top zone, partial tint in the second- and third-from-top zones, and clear in the bottom zone.

on a simple principle: Companies could save energy by tinting windows to prevent heat from entering or leaving buildings, rather than by using HVAC systems to mitigate it. In 2010, the company began partnering with Saint-Gobain, the world's largest building products company. In 2012, Saint-Gobain bought SageGlass. Other companies that produce dynamic glass include Glass Apps, Suntuitive and InvisiShade.

SageGlass CEO **Alan McLenaghan**, who holds a Ph.D. in polymer physics, has been at the helm of SageGlass since the acquisition, and his passion for the product is palpable.

"It's obvious: Humans need to feel connected to the outdoors! With this product we can help architects open up spaces; we can bring the outside in."

McLenaghan commutes to his office in Minnesota from his home in Indiana, spending a fair amount of time at Minneapolis-St. Paul International Airport Terminal One. SageGlass recently installed 2,800 square feet of dynamic glass near the terminal's Transportation Security Administration (TSA) checkpoint, where heat and glare had long been a problem. In line for a flight, he found himself simultaneously speaking to a fellow traveler about his job and realizing that the other people in line had no idea the glass was changing as they stood there.

New & Noteworthy

2.2 million sq. ft.

Property Group Partners has completed the first phase of construction for an elevated deck above Interstate 395 in Washington, D.C., and has begun vertical construction on the first building at Capitol Crossing, a three-block, seven-acre, 2.2 million-square-foot project that will consist of five mixed-use buildings. The completed work includes upgraded infrastructure such as a new high-voltage electrical line and new water mains.



The second phase will consist of almost 30,000 square feet of ground-floor retail space with 11 stories of offices above, as well as completion of the highway deck over I-395 to E Street, NW.

1.33 million sq. ft.

McCraney Property Co. plans to develop a speculative industrial property totaling nearly 1.33 million square feet on 70 acres of farmland the company acquired in July 2016 along County Line Road in Plant City, Florida. County Line Logistics Center at Fancy Farms will include four spec buildings ranging in size from 131,200 to 876,200 square feet, with ceiling clear heights up to 36 feet. Target tenants include those with freight forwarding and fulfillment needs.



1.15 million sq. ft.

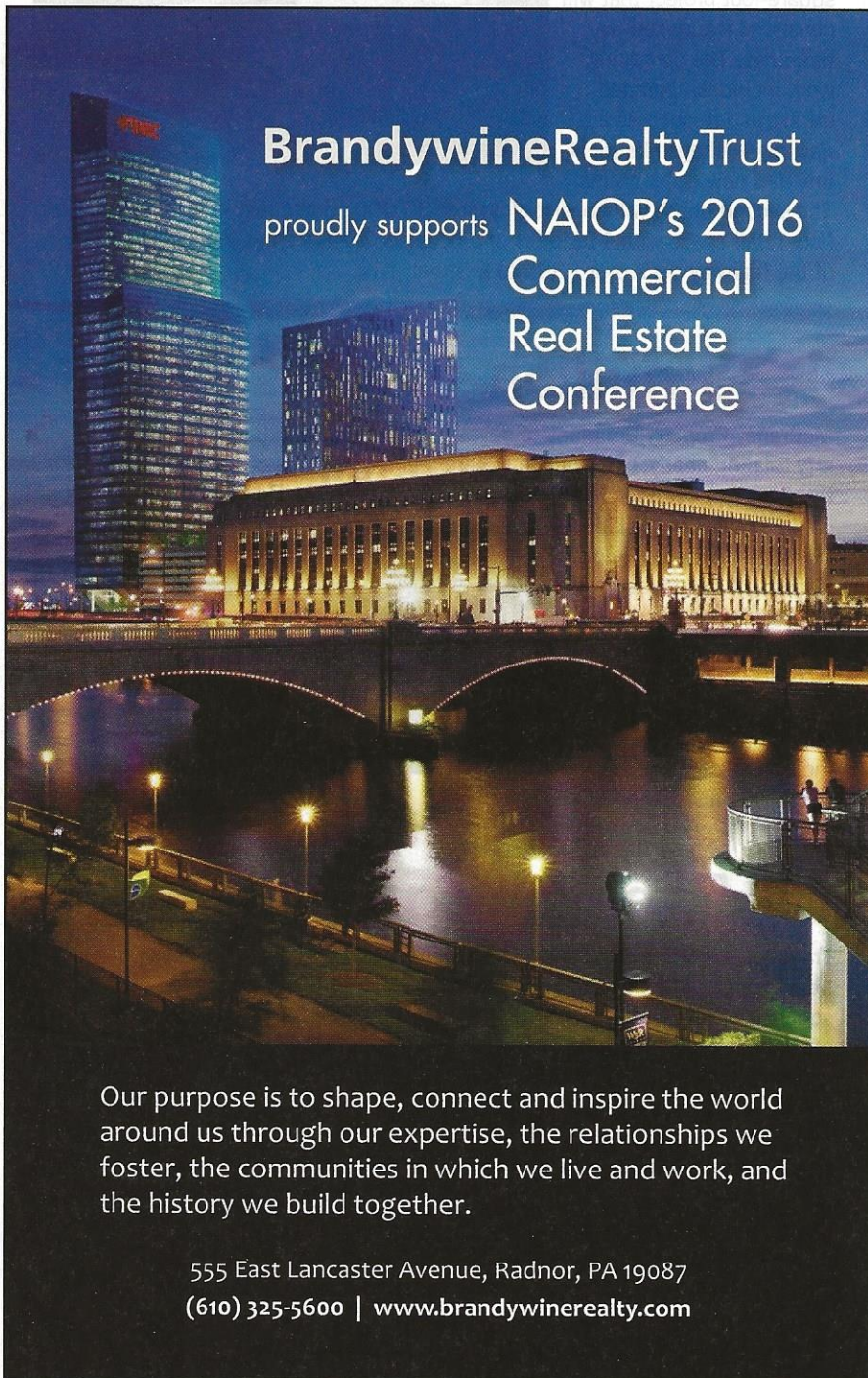
Trammell Crow Company and **Diamond Realty Investments Inc.** have begun construction on Principio Commerce Center I, a 1.15 million-square-foot distribution center expected to be completed in spring 2017. The center will feature a cross-dock design with 190-foot truck courts and 283 trailer stalls, up to 216 dock doors, 36-foot ceiling clear heights, an early suppression fast response (ESFR) sprinkler system and a seven and a half-inch slab. The center is part of the 6 million-square-foot Principio Business Park in the I-95 North submarket in North East, Maryland.



"It's such a subtle process," says McLenaghan. "You are standing next to it and it's doing its job and you don't even know it." He anticipates that the long-term value of dynamic glass at commercial office buildings, airports and especially health care facilities — where blinds and fabric shades can

harbor bacteria and viruses — can't be understated. The glass offers energy savings of 6 to 40 percent over regular glass. Those savings are influenced by factors such as the size, shape and orientation of the building. ■

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Mobile Design Studio

A mobile studio can be set up almost anywhere, enabling architects to work efficiently on-site, speeding up the design process.

■ By Craig Chinn, AIA, Architecture Design Collaborative

ARCHITECTURE DESIGN Collaborative's mobile design studio was born out of necessity. The California-based firm, which also has an office in the Denver area, wanted to compete with established designers in other markets. How could it add extra services without opening new offices or increasing costs?

The solution is essentially a design charrette that can be held on-site anywhere in the U.S. The concept has taken ADC a few years to perfect, but today it is being used with much success. The typical mobile design studio (MDS) setup includes three portable workstations, monitors, a combination printer/scanner, survey equipment and Wi-Fi hot spots. All of these are safely packed into two fiberglass hard-shell cases protected with molded foam insulation, which are either shipped to the project site or taken on flights by team members as checked luggage. The packed cases are roughly 20 by 30 by 40 inches large, and weigh about 80 pounds each. Team members carry on additional items in their design arsenal — Microsoft Surface Books, Apple iPads and sketching supplies — just in case the kits are lost or delayed in shipping. (This, unfortunately, has happened.)

The MDS offers many benefits compared to the traditional design process. Generally, designers make an initial