ELECTRONICALLY TINTABLE GLASS: THE FUTURE OF HIGH PERFORMANCE FACADES IS HERE

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SAGE Electrochromics, Inc.
“Ever since the first cave people crept indoors for safety, humans have sought to bring sunlight in from the outside.”

What are the top workplace complaints?

“This office is too hot!”

“This office is too cold!”
Performance Comparison

Solar Heat Gain Coefficient

Visible Light Transmission

- Tinted
- Low-e2
- Tinted Low-e2
- Low-e3
- Reflective

EC Glass

- 0% 10% 20% 30% 40% 50% 60% 70% 80%
- 0.00 0.10 0.20 0.30 0.40 0.50 0.60
How EC Products Work

Clear State

SageGlass IGU framed into a window

SageGlass IGU

SageGlass coating

Sunlight

Solar heat

Interior of building

Exterior of building

Surface 4

Surface 3

Surface 2

Surface 1
How EC Products Work

Tinted State

SageGlass IGU framed into a window

- Low voltage DC
- Argon filled
- Low-e coating (surface 2)
Attributes for Success

Performance

Compatibility

Durability

Low Cost Manufacturing
First Cost Competitive Solution

- Increased HVAC
- Sunshades
- Low-e IGU
- Automated Blinds

Plus additional on-going cost savings
# Key Benefits of Electronically Tintable Glass

## Energy and Operating Cost Reduction
- Reduces energy (heating, cooling, lighting) by up to 20%
- Lowers peak demand power requirements by up to 26%
- Eliminates need for blind / shade maintenance

## Upfront Cost Savings
- Reduces overall HVAC equipment requirements up to 25%
- Decreases ductwork size
- Eliminates the need for both interior and exterior shades

## Occupant Benefits
- Maintains occupants’ view and connection to outdoors
- Harvests natural light – more glass without penalty!
- Improves comfort and productivity
- Provides fading protection

## Building Value Enhancement
- Provides up to 12 LEED® points
- Enhances buildings’ sale and rental value
Case Studies
Case Studies

- Owner occupied office space
- Restaurants
- Educational Facilities
- Libraries
- Health Care
- Residential
CASE STUDY #1: 100 West Putnam  
Greenwich, CT

- Previous Method for Heat and Light Control: *Tarpaulin*
- PV Panels provide Power
- Interior light sensors control to intermediate tint levels
CASE STUDY #1: 100 West Putnam, Greenwich, CT
CASE STUDY #1: 100 West Putnam Greenwich, CT
CASE STUDY #2: Kirksey Architecture

Texas, US

- Offices and meeting room
- Glare control
- Heat control
- Comfort and view to outside

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CASE STUDY #4: Energy & Human Factors Evaluation

Lawrence Berkeley National Lab, CA

- California Energy Commission
- U.S. Department of Energy
- Wausau Window & Wall Systems
CASE STUDY #4: Energy & Human Factors Evaluation

Lawrence Berkeley National Lab, CA

- Energy Results
  - Up to 20% cooling energy savings
  - Up to 60% reduction in lighting energy
  - Up to 26% reduction in peak demand

- Human Factors Results
  - People greatly preferred to be in the room with dynamic windows VS static glass
CASE STUDY #5: Club Porticello Wisconsin, US

- Peak hours coincide with sun glare
- Premium view maintained
CASE STUDY #6: Century College

Minnesota, US

- Library
- Comparison of static to dynamic glass
- Glare control
CASE STUDY # 6: Century College  *Minnesota, US*

- **Dynamic Glass**
- Static, high performance tinted Low-E
- **Dynamic Glass**

Image of a library with shelves and windows.
CASE STUDY # 6: Century College  Minnesota, US
CASE STUDY # 7: Chabot College  Hayward, CA

- Large atrium area
- Dynamic glass allowed for design with no AC
- Participants:
  - tBP Architecture
  - Capitol Glass
CASE STUDY # 7: Chabot College

Hayward, CA
CASE Study #8: Ball State University Muncie, IN

• Multi-use “open feel” courtyard
• Participants:
  • Schmidt & Associates
  • LinEl Signature
• Automated variable control
CASE Study #8: Ball State University  Muncie, IN
CASE Study #9: University of Portland, OR
CASE Study #9: University of Portland  
Portland, OR
CASE STUDY #10: Medical Facility Application

California, US

- Desert Regional Medical Center
- Perkins & Will

Participants:
CASE STUDY # 11: Moscow Winter Garden

- Penthouse apartment
- Retractable skylight
- Featured in Salon Magazine
Questions?

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