
SageGlass
DARE TO BE DYNAMIC:
SUSTAINABILITY IS COOL!
SAINT-GOBAIN

WORLD'S MOST INNOVATIVE GLASS

GLOBAL REACH AND LOCAL FOCUS

SAINT-GOBAIN

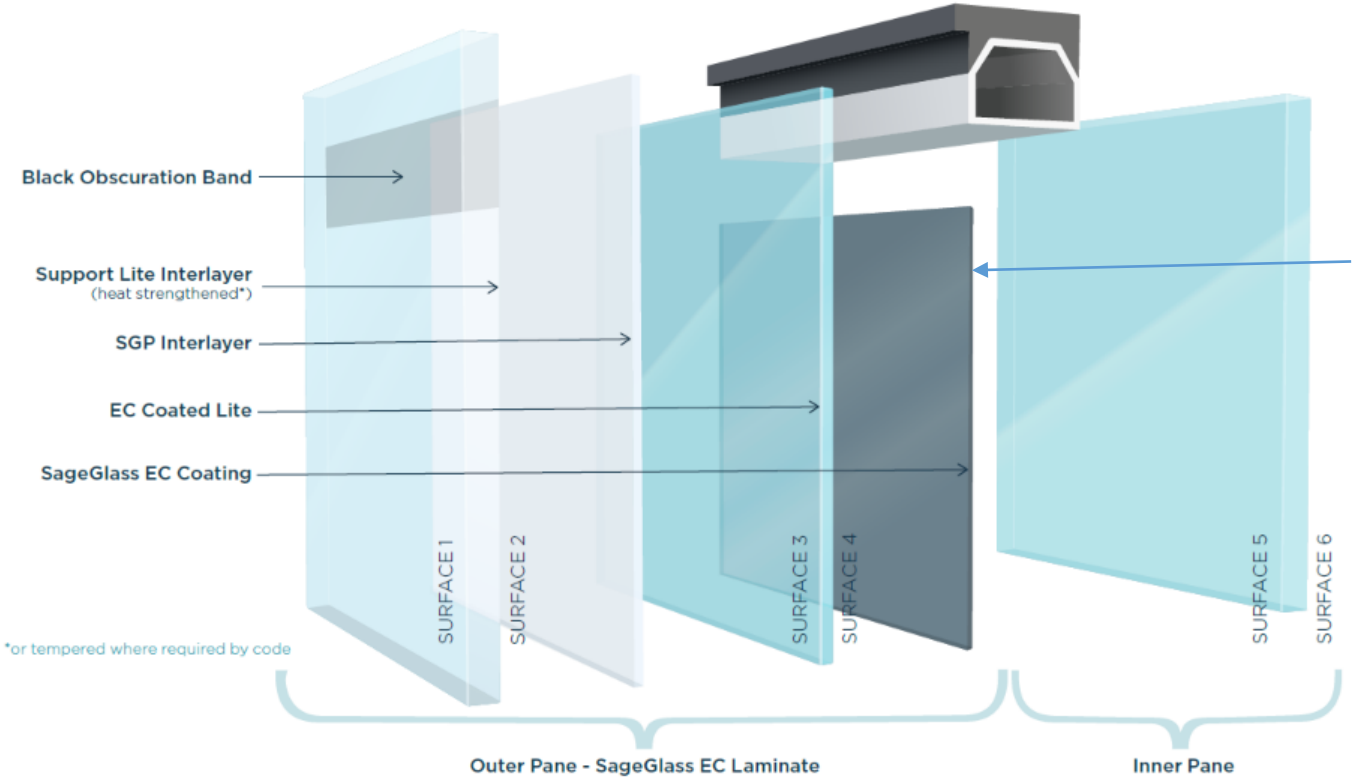
350+ year heritage
#2 glass producer globally
180K team members in 67 countries

SageGlass®

>600 patents
>1,000 projects
Installed in 27 countries, and growing!

A SageGlass® IGU

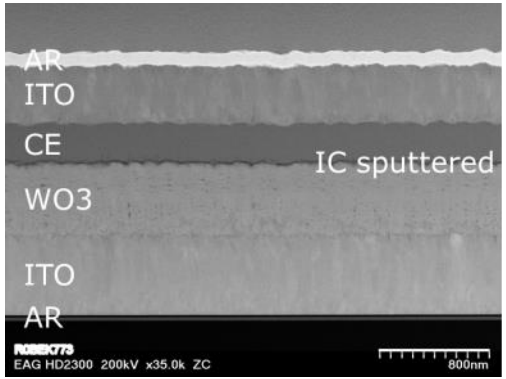
Made like other IGUs, but with a twist

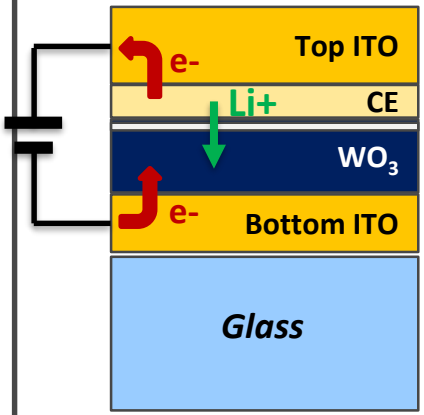


The “special” EC coating comes courtesy of our 2 custom designed Buhler Coaters!

SageGlass®: How it works.

Cross-sectional SEM image

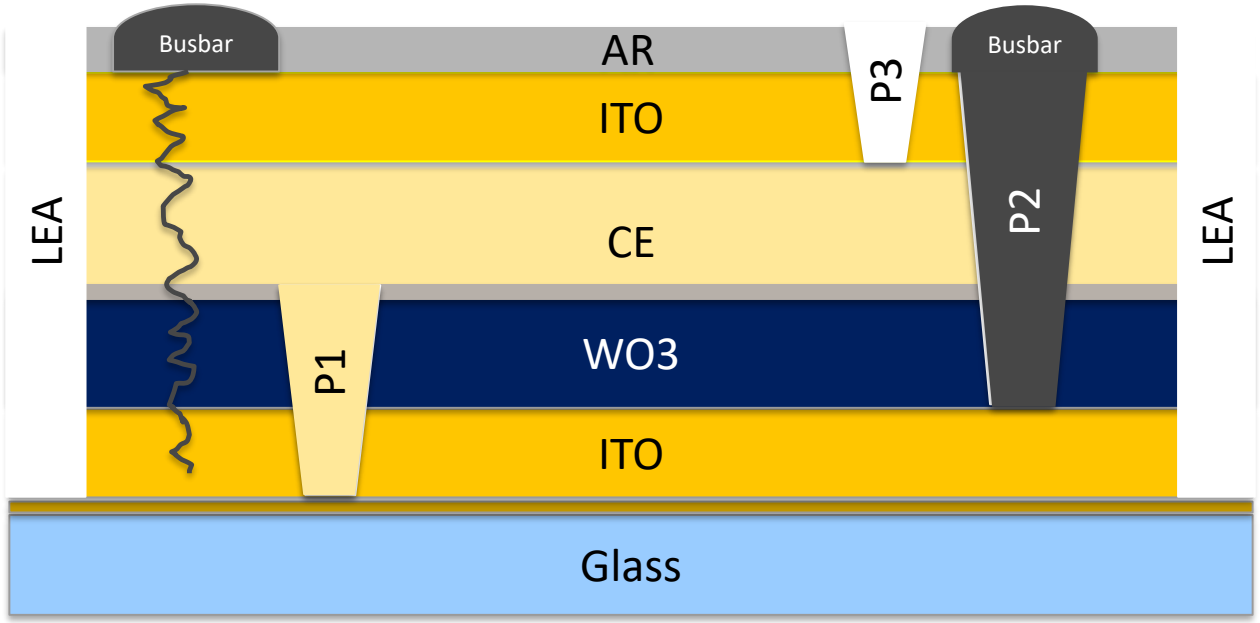




$$WO_3 + xLi^+ + xe^- \underset{Redox}{\Longleftrightarrow} Li_xWO_y$$

- The layers are deposited onto 2.2mm float glass using our Buhler **vertical magnetron sputtering** process
- To **tint**, we apply a positive voltage to the Stack that drives lithium ions into the WO_3 cathode
- To **clear**, we apply a negative voltage, moving the lithium back into the CE
- The **Reaction is reversible and very stable** thanks to the all-inorganic coating (# cycles >> 10.000)

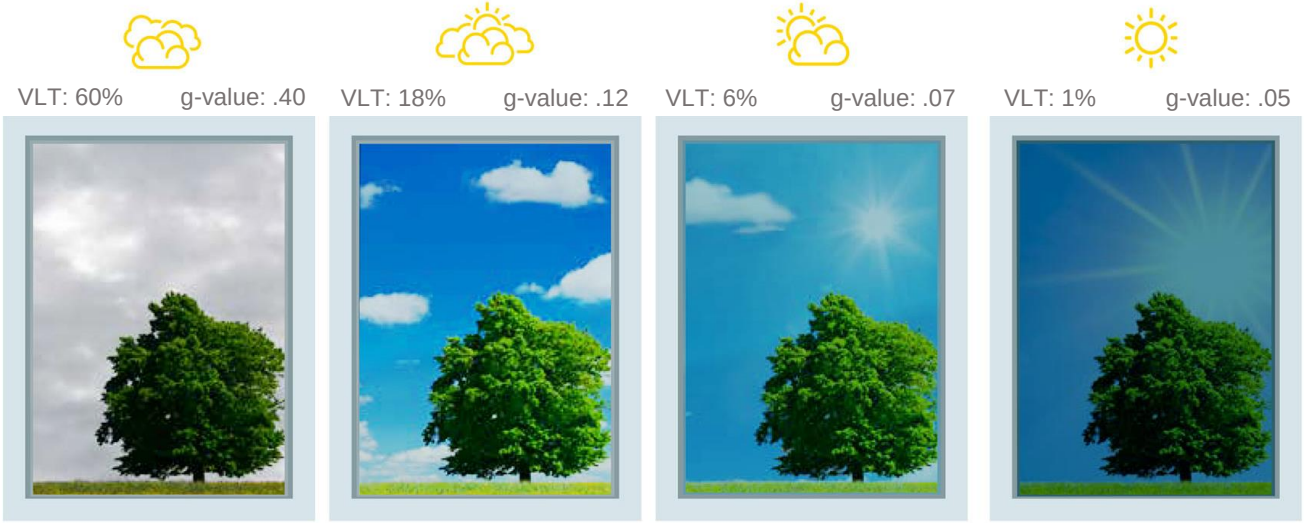
SageGlass®: Electrically connecting to the Stack



- **Laser scribes and busbars** are used to connect to the top and bottom ITO
- The **busbar material penetrates** the stack therefore our P1 scribe requiresa **vacuum break** between the WO_3 and CE deposition

MULTIPLE TINT STATES

For Optimum Occupant Comfort

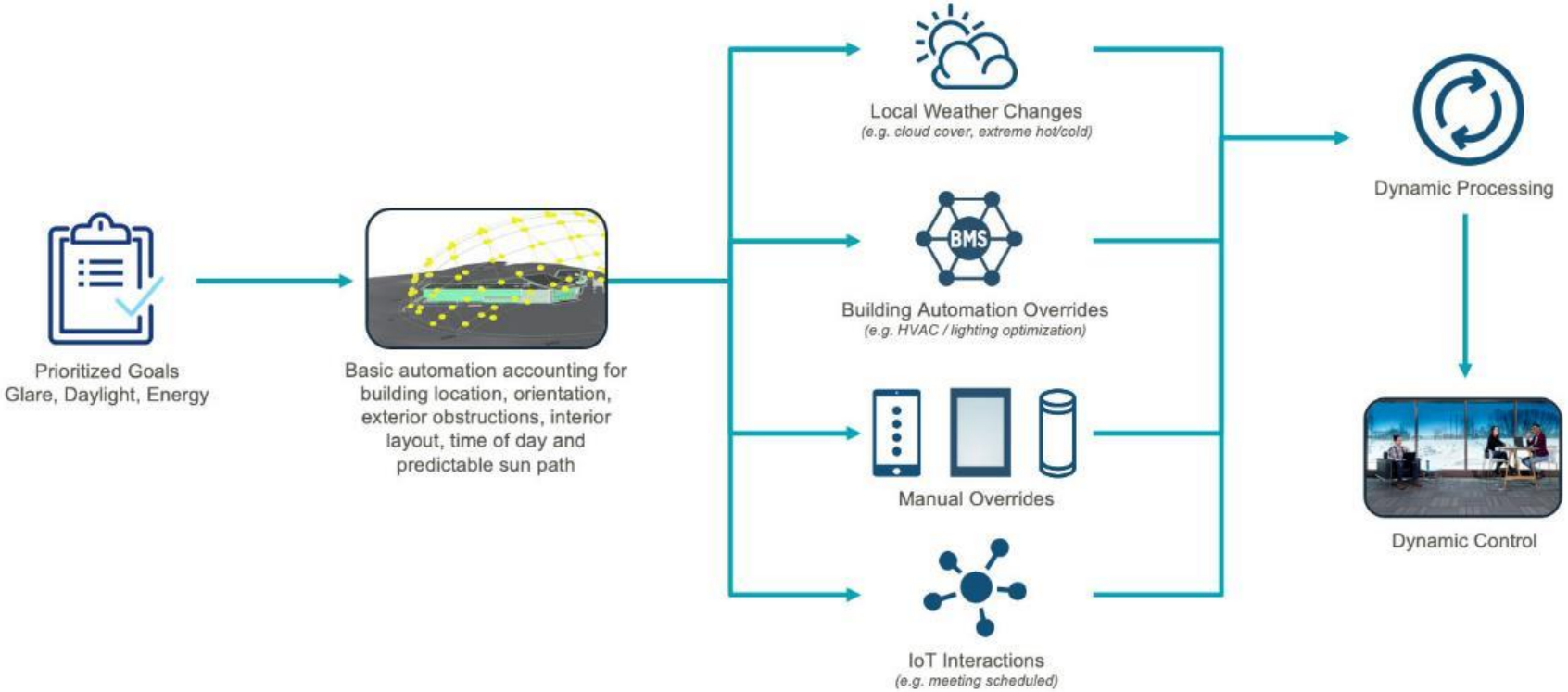


Electrochromic glass tint levels are a dynamic response to sunlight, tinting when needed to optimize daylight and energy performance and keeping occupants visually and thermally comfortable.

- Gets darker when it's bright, lighter when it's dark
- Different tint levels ranging from moderate to severe glare control
- Maintains a "daylight set-point" just like a thermostat maintains a "temperature set-point"

NOT JUST GLASS THAT TINTS…

…an Intelligent Glazing System

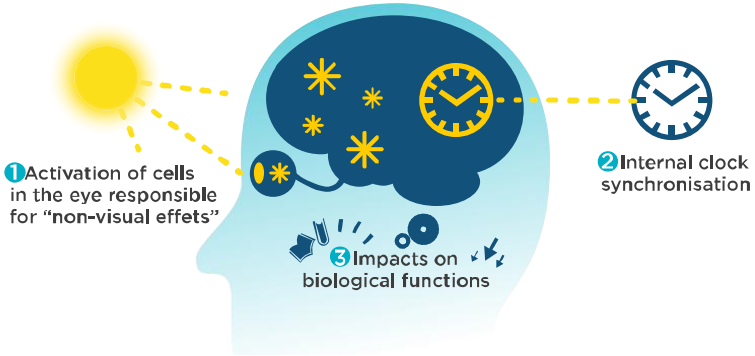


ENABLING COMFORT & PRODUCTIVITY

People Benefits Enabled by SageGlass®

WHY DAYLIGHT?

Daylight is dynamic and has the richest light spectrum: better adapted to human eye



WHY OUTDOOR VIEWS?

6.5% less sick leave

46' more sleep per night

10-25% better on mental function and memory tests

15% decrease in absenteeism

15% productivity boost

https://www.sageglass.com/en/visionary-insights/benefits-daylight-and-views-offices-schools-and-healthcare

PEOPLE BENEFITS
"Real Data":
Glatt GmbH HQ
Occupant Survey

50% said SageGlass® **SIGNIFICANTLY** enhances general well-being

80% said SageGlass® **ENHANCES satisfaction** across ***all*** criteria

91% said SageGlass® **ENHANCES ability** to concentrate

SageGlass® survey of 134 Glatt HQ employees in Binzen, Germany

SUSTAINABILITY

Energy Savings enabled by SageGlass®

- Reduce overall energy by **up to 20%**
- Reduces peak energy **by 26%**
  - More on this later…
- **HVAC downsizing** for Capex savings
- Fully tinted, SageGlass® **blocks 91% of solar heat;**
  - high-performance conventional glass rarely blocks more than 75%

Net-Zero and Passive House Buildings with SageGlass®

SUSTAINABILITY

City Gateway Net-Zero Project

SageGlass® VS. Standard Glazing:

- Annual energy savings: 17%
- Peak energy reduction: 24%
- HVAC downsizing: 20% or 70 tons of cooling

SageGlass®

All very COOL, but…

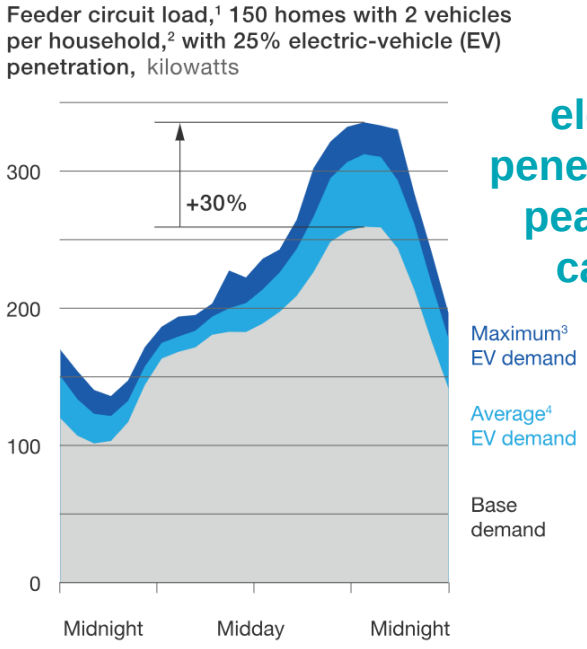
…how might SageGlass® impact the “Future of Mobility”?

SAINT-GOBAIN

One example: Electric Vehicles are cool but..

…..will create Peak Load Problems

- Peak load is already a problem
- 25% EV penetration could increase peak demand by 30%
- Our EV future could be a net negative for the environment if we don't address peak demand!



When local electric-vehicle penetration hits 25%, peak circuit loads can grow 30%.

[1]Load shape for a typical feeder with 150 houses at 8 mega-watt-hours per year; example shown for Midwestern US on typical September day.
[2]The average US household owns 2.1 vehicles.
[3]Statistically expected maximum EV demand—"peak day."
[4]Statistically expected average EV demand—"typical day."

McKinsey&Company | **Source:** OpenEI; McKinsey analysis

CLOSING

- SageGlass® delivers healthier and more sustainable built environments
- The Future of Mobility is closely linked to the Future of Buildings
- Smart solutions for peak management are needed to ensure the Future of Mobility is a sustainable (and COOL) one


SageGlass®
THANK YOU
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