

Colloidal Nanocrystal Electrochromic Glazing Technology

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Heliotrope Technologies Inc.



- Founded in 2012
- 35+ engineers and growing
- 22 issued and pending patents
- Prototype production scale-up underway



The Opportunity: Solve the Energy Balancing Act Dilemma



Increasing Global HVAC Demand

+



Increasing Demand for Daylighting

=



> 30% Global Energy Draw

- Global effort underway to reduce HVAC and lighting energy draw
- Today you can solve only one problem at a time (static products)
 - Select high light transmission (daylighting) and sacrifice solar heat gain OR
 - Select low light transmission (low solar heat gain) and sacrifice daylighting
- Dynamic glass is the only solution that solves both problems

We build electrochromic (EC) dynamic glass products based on patented Colloidal Nanocrystal (CNC) technology (NanoEC™)

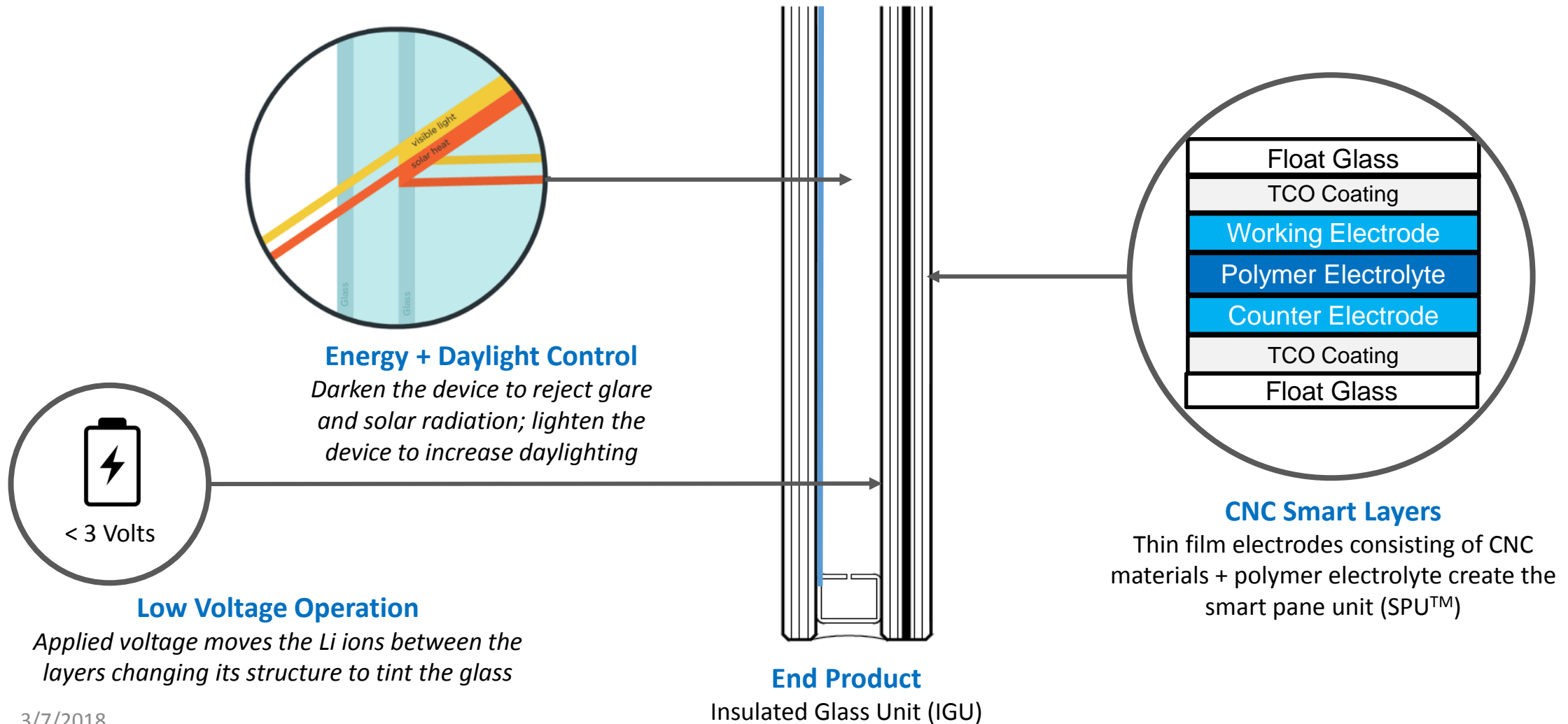


We are unique because we have:

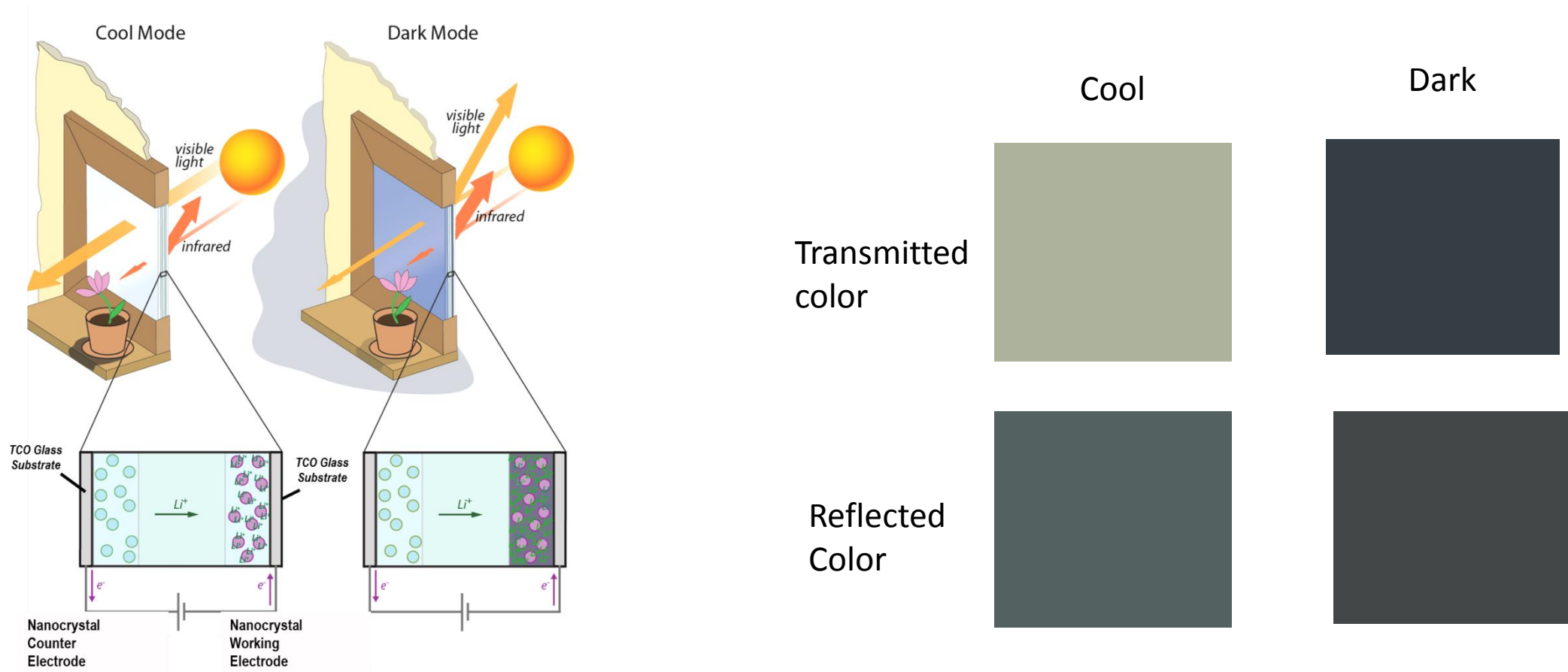
1. **Lowest manufacturing cost** EC technology capable of meeting demand inflection point
2. Industry's **best color** matching architectural aesthetic design requirements
3. Industry's only **adjustable IR transmission** EC technology poised to revolutionize energy efficient glass market
4. Go to market **strategic partnerships** with the largest insulated glass unit manufacturers in Europe & NA



Ink coated glass + electrolyte + electronics form EC devices that integrate into IGUs

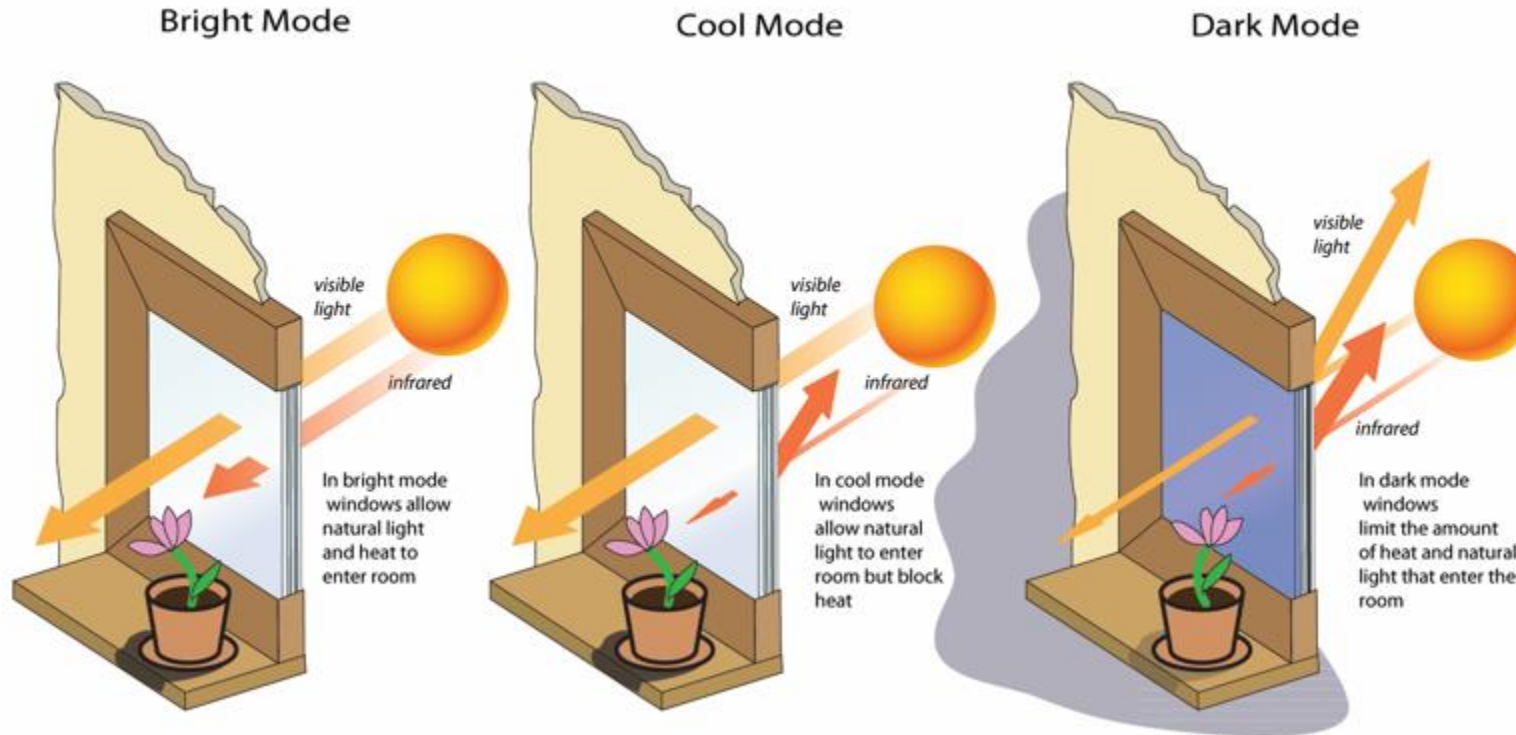


NanoEC™ Visible Electrochromic IGU



- Cool: transmit visible but blocks IR light
- Dark: blocks both visible and IR light

NanoEC™ is the Only Technology that Controls Both the Visible and Near-Infrared Spectrum

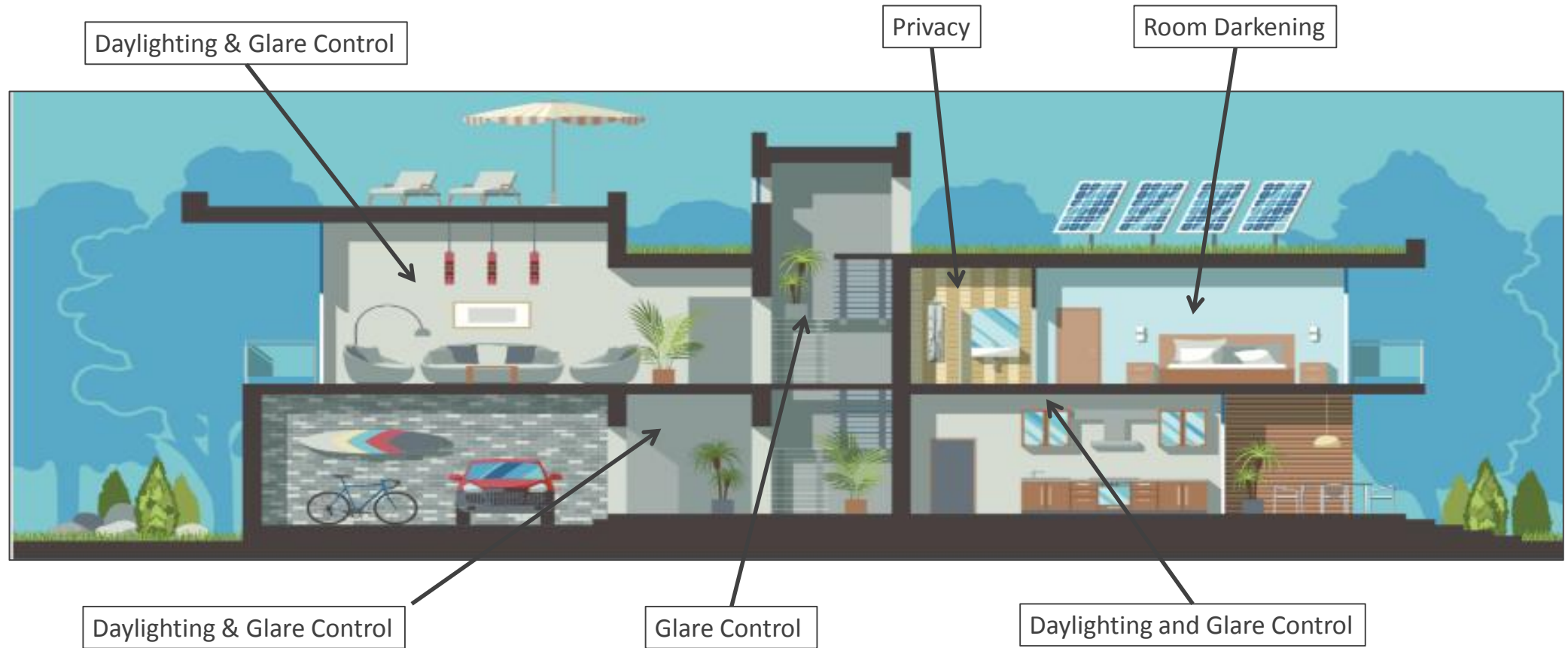


| NanoEC Operating Mode | Eliminate Glare | Daylight Control | Reduce Heat Gain | Passive Heat Gain (Winter) |
|-----------------------|-----------------|------------------|------------------|----------------------------|
| Bright - Dark | ✓ | ✓ | ✓ | |
| Cool | | | ✓ | ✓ |
| Bright – Cool - Dark | ✓ | ✓ | ✓ | ✓ |

Summary

- Colloidal Nano Crystal Technology NanoEC™ allows:
 - Spectral Transmission Control of Both the Visible and NIR
 - Optimization of Transmission Range, Color and Durability
 - Good Control of Process Uniformity, Repeatability and Yield
- Our NanoEC™ SPUs:
 - Integrate into a custom IGU configuration
 - Offer uncompromised views with fully adjustable neutral gray shading in all states
 - Come with build enhanced sound and UV insulation
 - Drive energy efficiency with SHGC adjustable to as low as 0.1 in a double pane IGU
- Most importantly: NanoEC™ Enables Mass Adoption of Dynamic Glass
 - Replacing blinds & shades and associated maintenance with a perfect view at no extra cost

Heliotrope NanoEC™ Dynamic Glass



Eliminate Glare • Maximize Daylight • Reduce Heat Load
Eliminate Blinds and Shades