

Windows to Building Efficiencies



Stirling Morris, CSI, CDT

A dark green arrow points to the right from the left edge of the slide. Below it, several thin, curved lines in shades of green and grey sweep across the left side of the slide.

Overview

CSI Division 8 manufacturers are part of every construction project. Providing views to the outside world, and working in tandem with whole building design concepts, window, door, frame & glass manufacturers are uniquely positioned to assist in building efficiencies. Using fenestration as a project guide, this course explores resource provision considerations, logistical improvement strategies for product provision, installation, service, and continuous improvement initiatives that address active and passive energy modeling to improve the built environment.

A decorative graphic on the left side of the slide. It features a dark green arrow pointing right at the top, and several thin, curved lines in shades of green and grey that sweep upwards and to the right from the bottom left corner.

Learning Objectives

- Review window, door, frame, and glass manufacturing standards to help improve carbon action initiatives for the built environment
- Examine how technical consultations and product provisions improve installation, service, and operational enhancements
- Understand how effective fenestration addresses biophilic design, green building requirements, and innovations for construction
- Explore how product innovations and technologies are enhancing energy modeling as well as net zero and net positive initiatives



Fenestration Governance

Standards, Evolving Technologies, and Certifications

Meeting The Standards

- Evolution of the FGIA
- Third party testing agencies
- Certifying the results

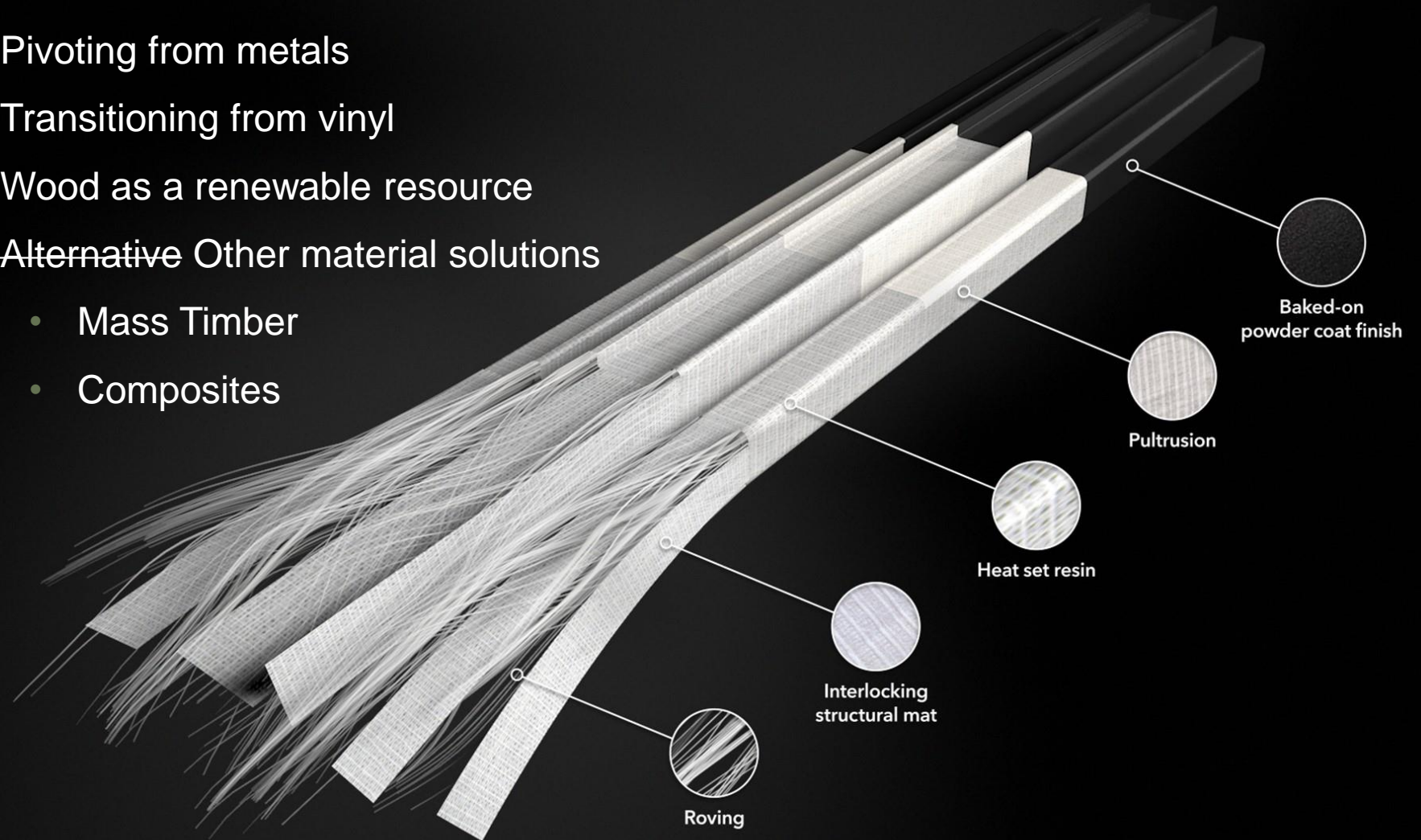


AAMA + IGMA United for Good.



Always On the Front Line

- Pivoting from metals
- Transitioning from vinyl
- Wood as a renewable resource
- Alternative Other material solutions
 - Mass Timber
 - Composites





Designing for Whole Building Performance

Performance of Components & Systems

- ▶ Glass & glazing innovations
- ▶ Improvements to frames & systems
 - ▶ R-Value vs U-Factor
 - ▶ SHGC makes a difference
 - ▶ The VLT trade-off

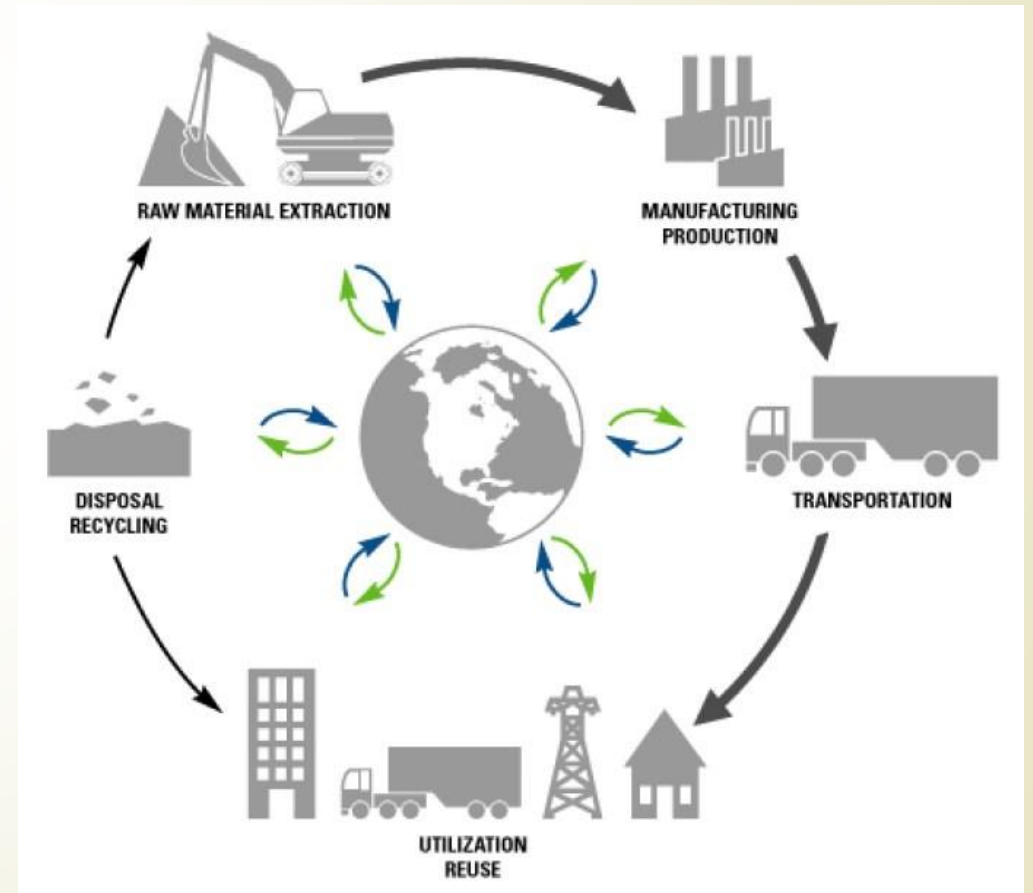
Meeting Operational Energy Needs

- ▶ Embodied carbon objectives
- ▶ Importance of product specificity to meet the need of each project
- ▶ Green building programs and initiatives

Meeting Operational Needs

- LCA developments
 - **Resources**
 - EPDs & HPDs
- Improving energy efficiencies
 - Passive House
 - Energy Star 7.0
- Green building programs
 - USGBC LEED
 - ILFI LBC
 - WELL

Over a tenth of global CO₂ emissions come from building materials.





CSI Division 8 in All Structures

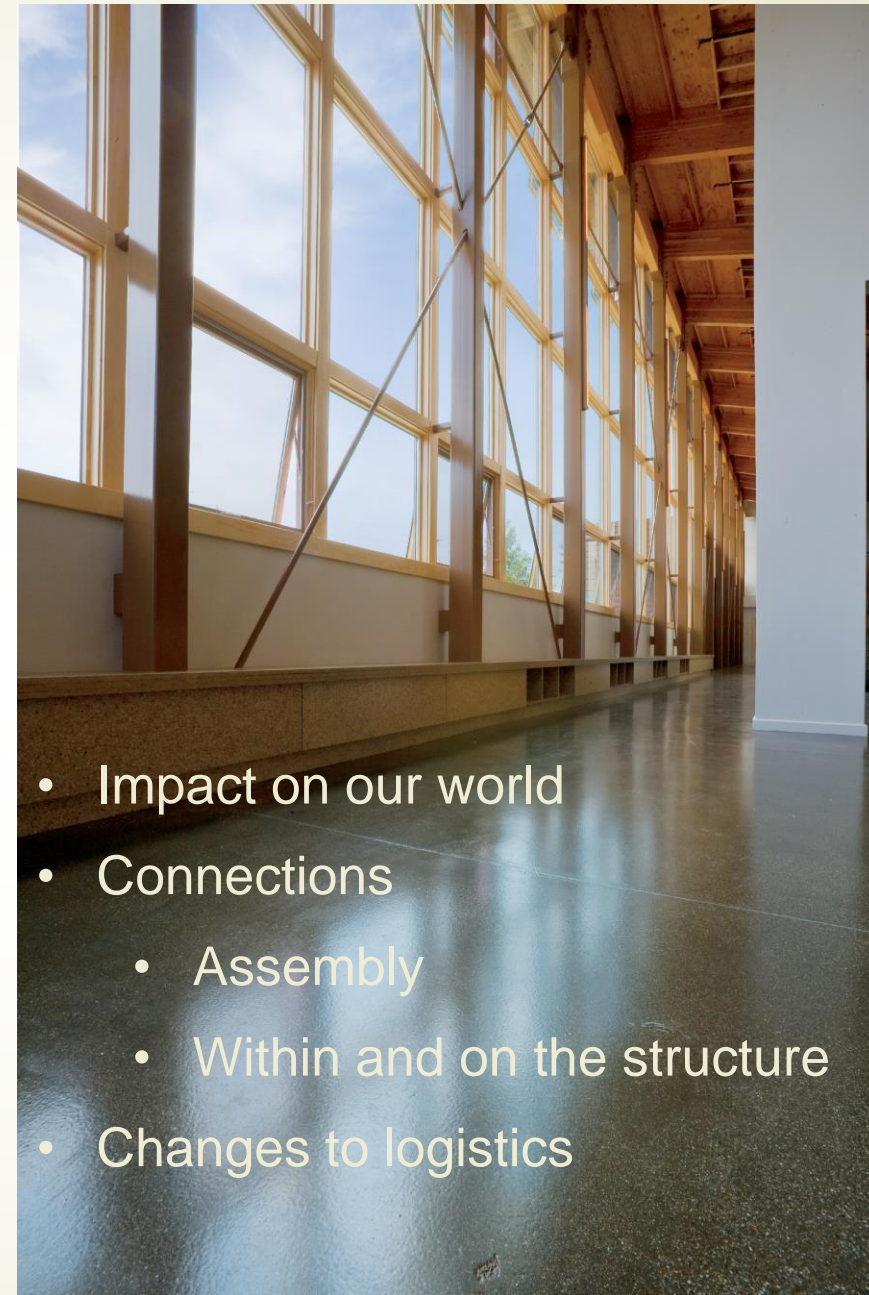
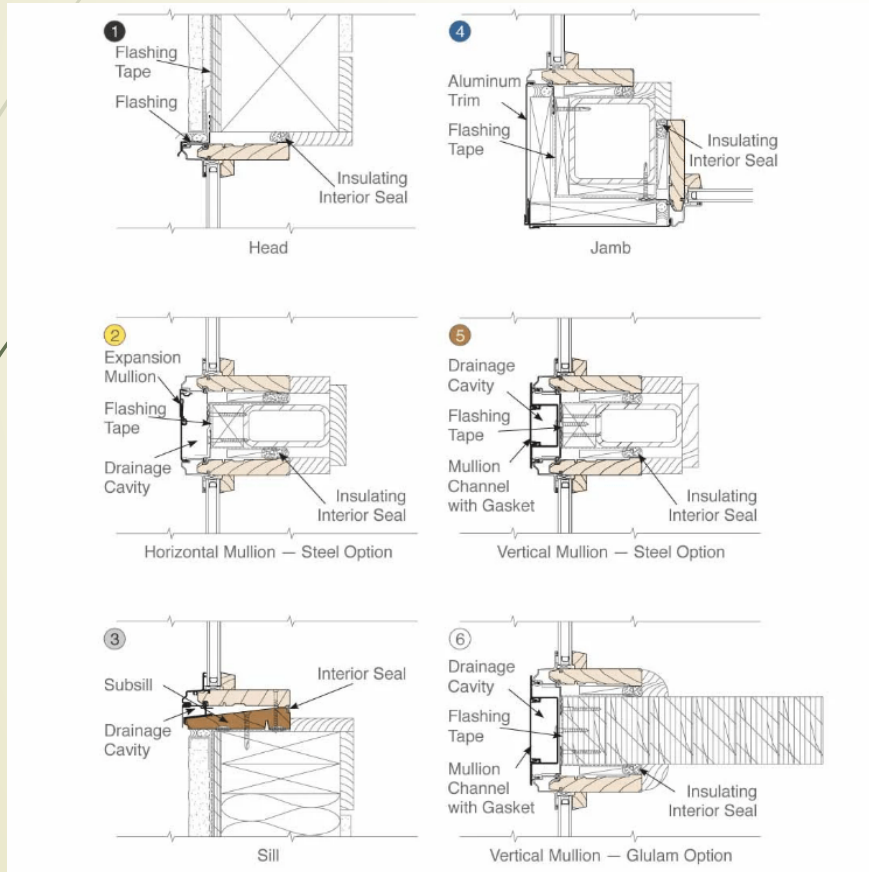
Technical Consultations and Emerging Innovations

Manufacturing Sector

- R&D Advancements and Innovations
- Architectural Services
- Engineering Strategies
- Construction Enhancements
- CE for All



Beyond Product Provisions



- Impact on our world
- Connections
 - Assembly
 - Within and on the structure
- Changes to logistics

Service After the Sale

- Value Propositions vs VE
- Reliance on LCA to improve EUIs





Effective Fenestration

Biophilic Design, Green Building Programming, and Construction Innovations

A Better View of Our World



- Corelative systems
- The importance of ventilation
- Enhancing a structure
- Increasing occupant comfort

Biophilic Design – From Concept to Occupancy

- Rachel Carson, *Silent Spring*
- Edward O. Wilson, *Biophilia*
- Janine Benyus, *Biomimicry*

The 2002 book, *Biomimicry*, describes a new science that studies nature's best ideas and then imitates these designs and processes to provide innovative and sustainable solutions for industry and research development. Author and international expert, **Janine Benyus**, is now focusing on working with industry and governments across the globe to implement her ideas. She will be touring Australia with the team from The Natural Edge Project in May.



Innovation inspired by nature **Biomimicry**

Janine Benyus believes that by treating nature as "model, measure and mentor", Australian companies, governments and universities are in a strong position to take advantage of the leading edge opportunities provided by the emerging field of what she has coined "biomimicry".

The idea is that, during its 3.8 billion years of research and development, nature has evolved highly efficient systems and processes that can inform solutions to many of the waste, resource efficiency and management problems that we now grapple with today.

Biomimicry has already provided some timely, standout innovations in areas such as energy engineering, and waste reuse, where multiple-scale efficiency improvements are greatly needed. "Over the millions of years, nature's life forms through natural selection have had to live with the constraints of the entropy law on a solar budget," reflects "Who Jackson, noted author and President of The Land Institute, Kansas, US, a body that promotes natural agricultural systems. Biomimicry's application is predicted across many sectors as the great potential for improved performance is realized.

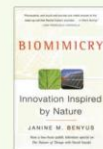
Benyus' book "sets out that there are nine basic laws underpinning the concept of biomimicry:

1. Nature runs on sunlight
2. Nature uses only the energy it needs
3. Nature fits form to function
4. Nature recycles everything
5. Nature rewards cooperation
6. Nature banks on diversity
7. Nature demands local expertise
8. Nature curbs excesses from within
9. Nature taps the power of limits.

As a biologist, the question for Benyus is not whether our technology is natural, but how well adapted it is to life on Earth over the long term. She says that engineers, scientists, architects and designers are often humbled, and then excited, when they discover how nature already has solutions to their challenges, and how it generally outperforms their traditional solutions, showing them creative alternatives. "Nature knows what works, what is appropriate, and what lasts here on Earth."

As co-founder of the Biomimicry Guild, Benyus has assisted the engineering, architectural and scientific professions as well as major international corporations, such as carpet company Interface, global architects HOK, Procter & Gamble and Nike, to learn from nature's designs how to develop truly sustainable solutions.

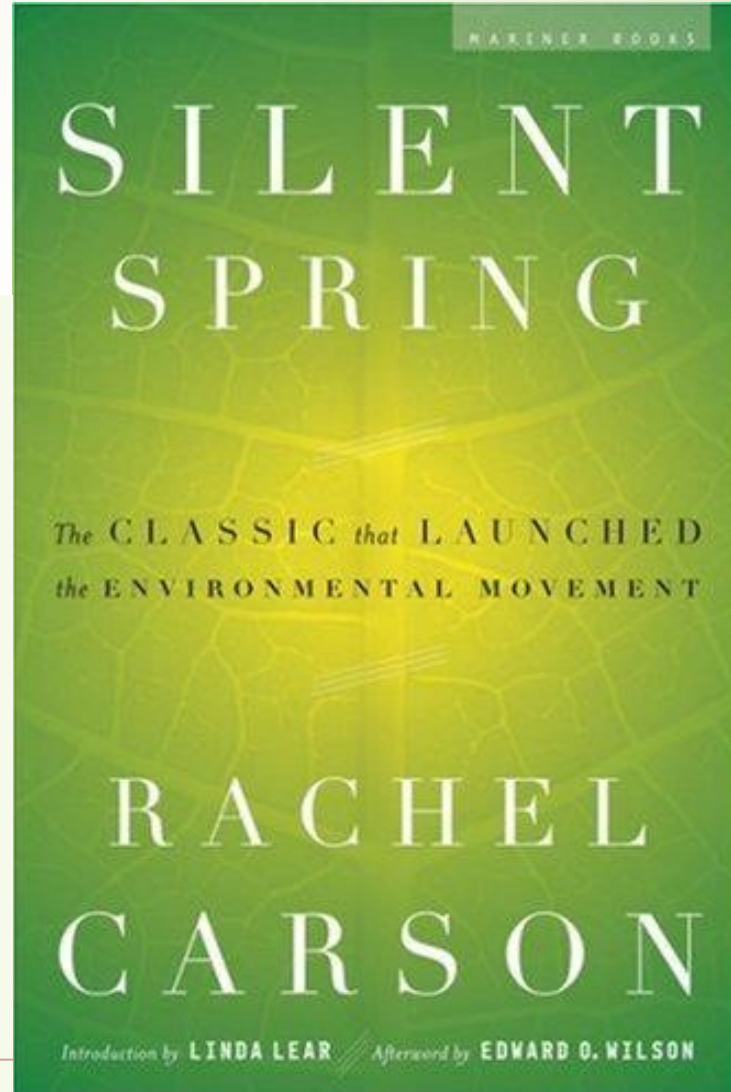
Bill Valentine, HOK's President said



working with Benyus had been a pivotal event for his organisation. "We were immersed in a sea of information, strategies, science and insight and left with a strong commitment for a far wider discovery and education of these ideas across the firm."

In order to meet the needs of businesses striving for sustainability, the team from the Biomimicry Guild focus on cultivating the transfer and application of biological knowledge to the business community, evolving the best model for integrating this knowledge with business, and creating strategies for monitoring successful

© Benyus, Inc. (2002). *Biomimicry: Innovation Inspired by Nature*. Perennial, New York.



Beyond LEED and Into a Living Future

- USGBC changed everything
- The ILFI stepping stone
- CI initiatives in code provisions and updates



GBCi



A Place for Passive House

- The places where we:
 - Live
 - Work
 - Play
 - Learn
- The infrastructure that ties it all together



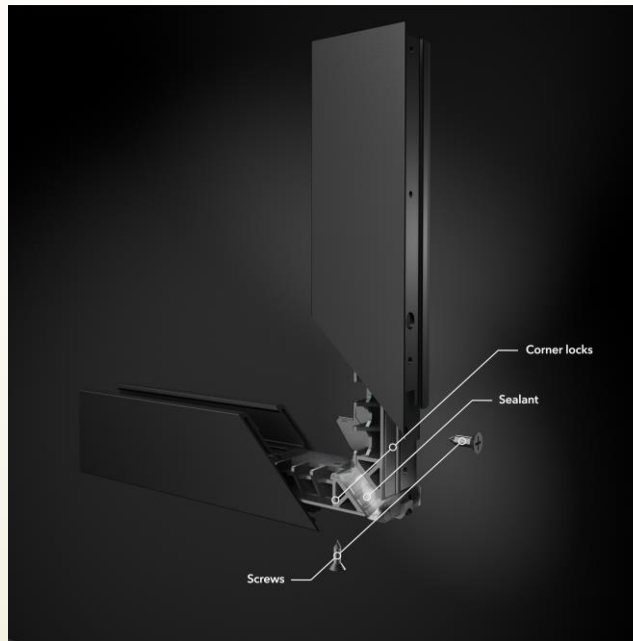


Windows to Building Efficiencies

Advancing Energy Modeling

Enhancing Passive Design

- Beyond metal substrates
- Future of frame & glass product integrations
- Think net zero, work towards net positive



ANSI/ASHRAE Standard 228-2023

Standard Method of Evaluating Zero Net Energy and Zero Net Carbon Building Performance

Approved by the ASHRAE Standards Committee on February 4, 2023; by the ASHRAE Board of Directors on February 8, 2023; and by the American National Standards Institute on March 8, 2023.

This Standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the Standard. Instructions for how to submit a change can be found on the ASHRAE® website (www.ashrae.org/continuous-maintenance).

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Beyond The Looking Glass

- Glass is fenestration's greatest asset *(and greatest weakness)*
- Evolving glass technologies
- A moment for Passive Building Standard
 - Adoptions in the U.S.
 - ASHRAE 227



*Fun fact! In Role Playing Games (RPGs), there are three **passive** strategies:*

Defense, Dodge, and Resilience. Does this seem similar in concepts & strategies?

Enhancements in Manufacturing

- Economies of scale
- Changes and challenges in the field
- Cross-Industry innovation sharing
- Building transparency



All structures depend effective fenestration and openings.

Energy Modeling for an Ever-Changing Planet

- Looking back 500 years
- Looking forward 500 years
- Advancing shared global goals



How do we ensure a just and equitable world?

What questions do you have for me?



Architectural
Solutions

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