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NOT JUST GLASS BOXES!

CW explores what constitutes the intelligent use of glass in façades.

India is moving away from the 'glass box' syndrome, all-glass façades that were widely used in commercial buildings in the last two decades but came at a significant environmental cost given the country's predominantly hot and humid climate. Poor thermal performance, excessive heat gain and dependency on mechanical cooling systems made buildings with glass façades energy guzzlers and significantly increased their carbon footprint.

That said, it's important to be aware that "glass is not the enemy," points out **Heena Bhargava, Architect, Architecture Discipline.** "How it is used matters immensely."

Growing awareness is contributing to the intelligent use of glass. Additionally, **Jaideep Thareja, Founder and Principal Architect, Jaideep Thareja Architects,** says, "Regulatory bodies enforcing energy codes like the Energy Conservation Building Code are pushing design innovation; essentially, innovations contributing to the aesthetics, performance and cultural relevance of façades."

High-performance glazing

Using glass more selectively, choosing high-performance, coated, double or triple-glazed units, strategically placing these on north facing façades and limiting their use on sun-heavy elevations, and simultaneously using shading elements, solid walls and natural materials constitute the thoughtful use of glass and façade design, says **Vijay Dahiya, Partner, team3.**

Glass is best combined with smarter, climate-friendly elements such as deep overhangs, shading

Photo courtesy: Metropolis Architects

"Glass is not the enemy. How it's used matters immensely."

- Heena Bhargava, Associate, Architecture Discipline

screens, perforated metal panels and louver systems, to cut heat and glare while keeping interiors bright, shares **Vinod Singhi, Founder & Principal Architect, BASICS Architects.**

For instance, at team3's B 10 Residence project in New Delhi, large glass openings bring in natural light and connect to the outdoors, but they're offset by deep balconies and timber soffits, which offer shade and keep the interiors cool. The design is about balance, not excess. At the Mehra Residence, vertical timber fins combined with glass manage privacy and sunlight. The timber softens the elevation and helps filter harsh light, besides weathering well in Delhi's climate.

The façade of the East India Hotels Headquarters in Gurugram, an Architecture Discipline project, is wrapped in double-glazed, high-performance glass with automated blinds to ensure thermal comfort and flexible visual connectivity, earning it a LEED Platinum certification.

Vivanta by Taj in Bengaluru features a façade using highly reflecting glass simultaneously with tinted glass that is both dark and bright, evoking memories of the former structure while meeting its desirable overall thermal transfer values without sacrificing the views from the guest rooms, explains **Sohrab Dalal, Founder and Principal Architect at Designplus Architecture.**

BASICS Architects' Twin Habitat project, a commercial office and warehouse complex located in Noida, uses Saint-Gobain high-performance, double-glazed, solar-control glass to balance daylight and heat gain effectively. "The frame that holds the glass matters too," explains Singhi. "Aluminium frames look modern and are strong, but they easily transfer heat or cold if they don't have thermal breaks. That's why we always specify aluminium systems with proper thermal breaks, so the façade performs well in every season."

Production innovations

While smart glass façades have gained popularity over the years, promising developments, according to Dalal, include glass manufactured in green energy-powered facilities using recyclable

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- Smart glass like electrochromic and self-cleaning variants improves energy efficiency and usability.
- Solar-integrated façades provide passive cooling and generate renewable energy.
- Cladding materials such as fibre cement, precast concrete, non-composite metal, and fire-rated aluminium panels are increasingly being explored for their fire resistance and energy efficiency.

"Glazing should be placed on north facing façades and limited on sun-heavy elevations."

- Vijay Dahiya, Partner, team3

resources, and longer-lasting, more durable glass, with designs meant to be easily repaired or recycled.

Advanced fabrication techniques like 3D printing and fluid-form glass structures are increasing the use of curved and sculptural geometries, says **Gaurav Sanghavi, Co-Founder & Principal Architect, Pentaspace.** "On the decorative front, layered or sandwich glass is becoming popular, where textures, fabrics or patterned films are embedded between glass layers to create unique visual effects."

Further, electrochromic glass is gaining traction for offering dynamic control over thermal performance and daylight penetration while self-cleaning glass is becoming more prevalent, especially in high-rise façades where maintenance access is limited.

Technologies like electrochromic, thermochromic and photochromic glass, with their allure, add to the façade while also being a sustainable solution in today's world, says **Sumit Dhawan, Founder and Principal Architect at Cityspace'82 Architects.**

At the Discovery Centre in Bengaluru and 53 Silver Oaks in Gurugram, both Architecture Discipline projects, frit-printed glass manages solar gain while maintaining transparency. At night, these façades emit a soft glow, enhancing their ambient presence within their surroundings.

Beyond glass, kinetic or dynamic façades including movable shading elements that respond to

Fenesta Façades: Shaping Skylines, Redefining Possibilities

As India's most trusted name in fenestration, Fenesta has long stood at the intersection of design, durability, and innovation. Now, building on this legacy, Fenesta has expanded its footprint into the architectural façade segment, bringing with it the same unwavering commitment to quality and performance that has defined its journey in the fenestration space.

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Fenesta's strategic entry into the façade domain marks a significant evolution in its growth story. Armed with a deep-rooted expertise in fenestration systems, Fenesta is uniquely positioned to redefine façade solutions for the Indian market. This expertise is critical in ensuring that modern building envelopes are not only visually compelling but also functionally advanced-delivering on performance, precision, and longevity.

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Since launching its façade vertical in 2023, Fenesta Façades has successfully executed multiple landmark projects across India. These projects showcase Fenesta's ability to translate architectural vision into high-performance building envelopes-delivering value through engineering excellence, quality assurance, and consistent project management.

Trifecta Vanto Club House, Bangalore

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Fenesta's deep domain knowledge in fenestration systems-developed over decades-plays a critical role in driving innovation in façade engineering. The brand's understanding of thermal performance, acoustic insulation, air-water tightness, and long-term durability seamlessly extends into its façade solutions, creating offerings that are aesthetic, robust, and future-ready.

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environmental conditions like wind and sunlight are making a mark, says Sanghavi.

Supportive materials

Mixed-material facades are growing in popularity for balancing aesthetics with performance, says Thareja. Essentially, while glass remains central to façade design, it is increasingly being supported by other performance and sustainability-enhancing materials. Among these, **Naveen Thomas, Vertical Head - Developer Spaces, Edifice Consultants,** lists natural cladding materials, metal sheeting, wood and marble textures.

Natural cladding materials such as stone, ceramic and terracotta offer longevity, resistance to fire, minimal maintenance, tactile richness and visual grounding, he explains. "Stone cladding, in particular, is experiencing a renewed application due to its thermal mass and enduring appeal."

Materials like terracotta and stone are used in façades both for how they perform and how they age over time, agrees Dahiya.

In Thareja's project Abode of Cosmic Calm, glass fenestrations and railings allow the interiors to merge with the surroundings. Further, stone cladding and wooden slats give the façade rustic yet modern elegance.

Edifice Consultants' Monte Carlo project in Ahmedabad features double-glazed units for thermal control and natural cladding to temper solar exposure, while also expressing local materiality.

Metal (aluminium, copper and zinc) sheet cladding is valued for being corrosion-resistant and available in a variety of finishes, continues Thomas. "These support streamlined, durable skins and work well in layered or ventilated façade systems. Wood and marble textures are selected for visual refinement. Often used in upper-tier developments, they introduce warmth and contrast while requiring little upkeep."

Composite panelling is another option that is blended with glass.

"The frame that holds the glass matters. Proper thermal breaks ensure the façade performs well in every season."

- Vinod Singhi, Founder & Principal Architect, BASICS Architects

"Promising developments include longer-lasting, more durable glass, with designs meant to be easily repaired or recycled."

- Sohrab Dalal, Founder and Principal Architect, Designplus Architecture

Photo courtesy: Architecture Discipline/Photo by Jeetin Sharma

"Aluminium composite corrugated panels (ACCP) and aluminium composite panels (ACP) are being widely adopted," agrees Sanghavi. "In Chambers, we used a combination of ACP and glass for the façade."

At Designer's Den, a Cityspace'82 Architects project, the façade is composed of small sections of pigmento grey zinc composite panel, wooden louvers and glazing.

Second skins

A supportive material could help shield glass. **Praveen Bavadekar, Founder & Principal Architect, Thirdspace Architecture Studio,** explains that in many projects where glass becomes an exterior enclosure, he shields it through the use of filtering devices such as *jaalis,* fins and screens. "In the Hoverspace at Belagavi, we used exterior glass panelling by Saint Gobain and combined it with a second skin."

"We are doing one apartment building where glass is used in equal measure with a *jaali* constructed out of humble bricks," adds Bavadekar. "In cohesion, both these elements not only create an interesting façade but each is allowed to play to its strongest strengths."

At the Lighthouse residence in New Delhi, rhythmic timber screens with operable glulam fins are designed to envelop a glazed volume, wrapping a double-height living space and allowing in limited heat while still maintaining a connection to the landscape. "Supported by an efficient steel frame, this combination of carbon-sequestering timber and glass forms a sustainable and expressive skin," explains Bhargava.

"In one of our ongoing projects, Zee Shan, we've used Saint Gobain glass for the inner layer and aluminium panels for the outer screen to manage heat and glare," says Sanghavi.

Photo courtesy: Bhargava Constraints

Supportive materials like *jaalis*, fins and screens help shield glass.

"3D printing and fluid-form glass structures are increasing the use of curved and sculptural geometries."

- Gaurav Sanghavi, Co-Founder & Principal Architect, Pentaspace

"Mixed-material facades are growing in popularity for balancing aesthetics with performance."

- Jaideep Thareja, Founder and Principal Architect, Jaideep Thareja Architects

Twin Habitat's main curtainwall is protected by an aluminium louver system integrated with glass reinforced concrete panels and vertical green walls "to keep the views open, add visual interest and respond far better to India's climate," explains Singhi.

"Where a second skin is not possible or where we need to really keep the light and the heat out, we have also looked at Climacool by Fishfa Glass as a product that gives us the flexibility of using this material while shielding the interiors," adds **Namrata Betigiri, Principal Architect, Thirdspace Architecture Studio.**

Solar-integrated façades

Solar-integrated glass façades are a strong trend in high-performance buildings where transparency is desired, shares Thareja. "When paired with green façades – living walls, creeper systems and planter-integrated screens – they create a double skin

that cools the building passively and improves urban biodiversity."

Thomas believes that the use of crystalline photovoltaic (PV) and amorphous silicon PV glass should be encouraged as these can be effectively applied to spandrels and east, south, and west facades to maximise solar gain and power generation.

Responsive façades

Façades need to be crafted to be not just visually striking but responsive to the climate, culture and material innovation. For a residence in warm and humid Goa's Vagator, Design Architecture opted to wrap the façade in charred timber panels (using the Japanese Yakisugi technique), offering resilience against its coastal environment. "Such panels are now available, and made sense given the site conditions and their long-term performance," says Bhargava.

"Where a second skin is not possible or where we need to really keep the light and the heat out, we have looked at Climacool by Fishfa Glass."

- Namrata Betigiri, Principal Architect, Thirdspace Architecture Studio

"Rising material costs are prompting innovations in integral façade finishes that reduce dependency on add-on systems."

- Naveen Thomas, Vertical Head – Developer Spaces, Edifice Consultants

At Palm Avenue in New Delhi, she opted to wrap the façade in horizontal timber planks that age gracefully, allowing the building to evolve with time and climate. "For the façade of Rug Republic Headquarters in Okhla, an industrial area, we deployed corten steel as a protective shell in response to the site's rugged conditions," Bhargava points out.

Justa Nuo, a metropolitan hotel in New Delhi, has a façade that responds to the sun path, with projecting glazed bays oriented to the northeast for optimal daylight.

Future developments

Cladding choices are increasingly being shaped by performance and value. In particular, Thomas observes, "Rising material costs are prompting innovations in integral façade finishes that reduce dependency on add-on systems."

Materials like fibre cement,

"Where glass becomes an exterior enclosure, we shield it through the use of filtering devices such as *jaalis*, fins and screens."

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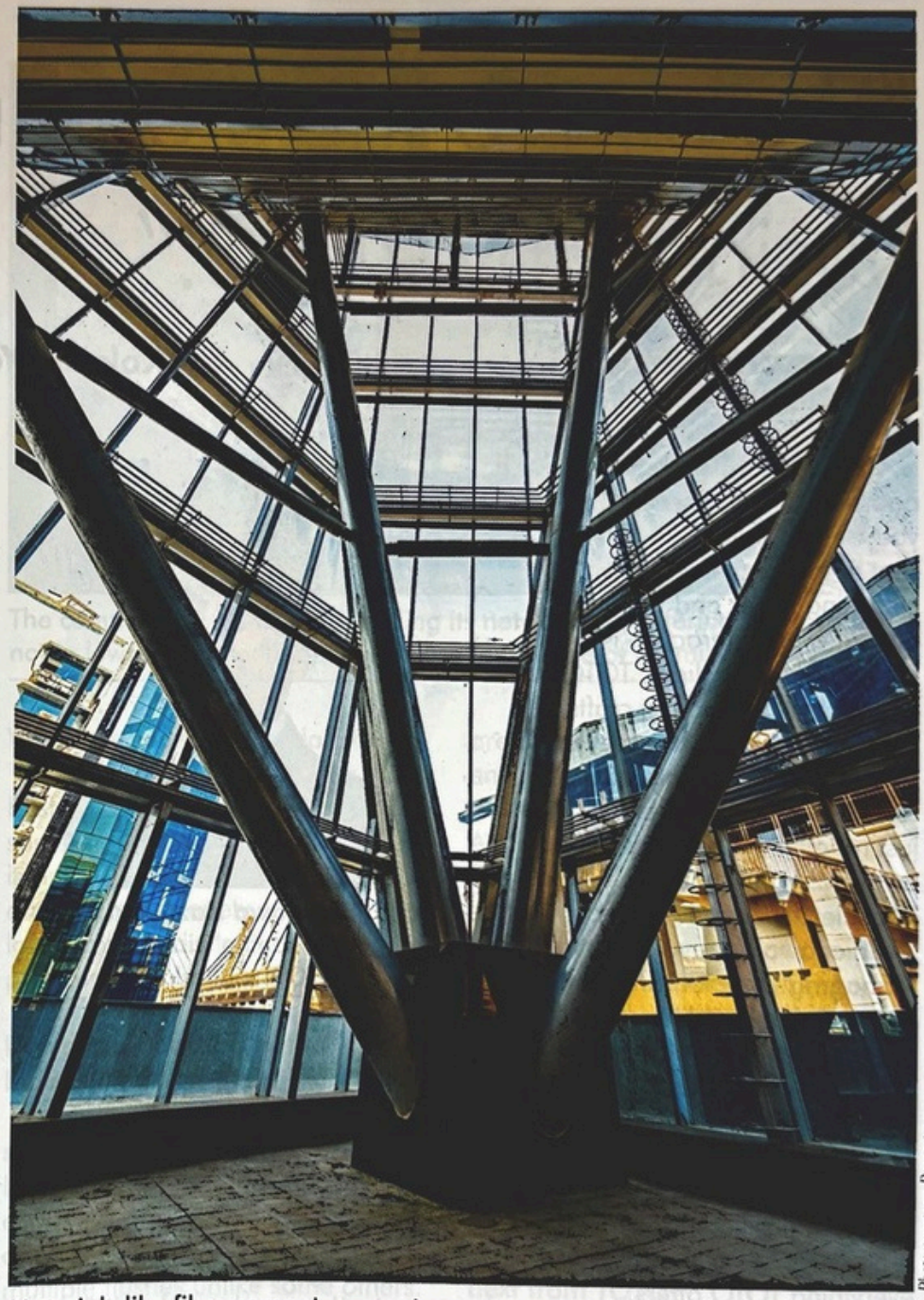

Photo courtesy: Pentaspace

Materials like fibre cement, precast concrete, non-composite metal and fire-rated aluminium panels are being considered along with glass, for their fire-resistance and energy-efficiency.

precast concrete, non-composite metal and fire-rated aluminium panels are being considered for their fire-resistance and energy-efficiency. "They also contribute to insulation and reduce HVAC loads – an essential criterion for contemporary buildings," he adds.

Materials like brick are making a strong comeback, especially in residential and low-rise buildings, due to their natural insulation properties and earthy aesthetics, according to Sanghavi. "Concrete, particularly experimental forms like moss-infused concrete, is also being explored for its potential to regulate temperature and reduce environmental impact, although it is still in the research phase in Europe and yet to be adopted widely in India."

He says interest is also increasing in ferrocement and even natural fibres like jute, especially in smaller structures and temporary or experimental architecture, because these materials are more locally available, reduce the carbon footprint and align with vernacular construction techniques.

Indeed, more options are the need of the hour for façades to deliver on all desirables.

- CHARU BAHRI | CW |