By Mr. Vikram Khanna, COO – Consumer Glass, COO – Architectural Institutional Business, CMO, CIO Asahi India Glass Ltd.

For several decades, architects and builders around the world have explored ways and means to design the ‘nearly-Zero Energy’ building. Today, enabled by modern technology and innovative building materials, that dream is a reality. Across residential and commercial buildings, builders are offering customers the opportunity to explore a more eco-friendly way of life; a life that’s smart, efficient and above all, sustainable.

In recent times, the idea of green buildings has gained momentum. Builders, developers and architects are increasingly looking to make use of green materials like glass to add a new dimension to their buildings. Awareness of environmental impact of increased construction activity has recently been on the agenda of Governmental entities and Environment Ministry. It is widely expected that building codes changes are in pipeline in order to adhere to these concerns. Construction houses are striving to obtain sustainability certifications, to ensure a better quality of life for residents and help conserve the environment.

<table>
<thead>
<tr>
<th>2001</th>
<th>Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 green building</td>
<td>516 green buildings</td>
</tr>
<tr>
<td>0 sq. ft. area classified green</td>
<td>330 Million sq. ft. area classified green</td>
</tr>
<tr>
<td>No energy saving</td>
<td>40-50% energy saving</td>
</tr>
</tbody>
</table>

In little more than a decade, India has emerged as one of the leading countries in the adoption of Green Building norms.

**Building Green with Glass**

The extensive use of innovative glass products in today’s buildings has helped reduce the need for artificial lighting and thereby minimised energy consumption. Green buildings admittedly cost more to build but the operational cost is substantially reduced. This makes the cost of ownership of a green building substantially less than conventional spaces. Various types of glazing solutions – both internal as well as external – have not only
made our spaces more efficient but also unlocked new possibilities in design and aesthetics.

Glass – a versatile, aesthetic and green building material; here is why:

- Natural daylighting
- Recyclable, non-toxic and green material
- Improves energy efficiency
- Enables innovative designs
- Superior sound insulation
- Better thermal control
- Prevents accumulation of dust and dirt
- Lowers maintenance costs
- Solar Factor / Solar Heat Gain Coefficient (SHGC)
- U-Value
- Relative Heat Gain
- Visual Comfort
- Safety
- Sound Insulation

Parameters of glass that make it an effective green building material:
Green Solutions from Asahi India Glass Limited
As India’s leading integrated glass company, AIS has been at the forefront moving towards an eco-friendly future. It has pioneered innovations in glass processing technology to develop products that feature the best ‘green’ parameters. AIS manufactures both single-glazed and double-glazed products allowing architects greater choice and the ability to explore newer possibilities. These solutions enhance the aesthetics and efficiency of commercial and residential spaces, that provides the builders with viable, attractive and economical alternative to traditional building materials.

Providing you with 360° degree solutions, starting with expert and customised guidance for product selection and purchase, site assessment and consultation, installation, project management, and post-installation support.

We aim to provide a hassle-free experience during the process of decision making, delivery and installation of glass and allied products and services with world class quality control at each stage of the value chain, having a trained set of skilled technicians. All this to ensure a Best-in-Glass Experience for you.

So go ahead and dream big - Glassxperts is here to deliver you a world-class glass experience.

**Ecosense the Energy Efficient Glass**

Energy Efficient Glass ranges from AIS, under the brand name of “Ecosense” provides the benefit reducing the heat gain in buildings due to its excellent energy saving properties without compromising on the natural light coming inside the building or the brilliant aesthetics that add value to the façade. And in winter, they ensure solar gain. So that no matter whatever the season, people inside stay comfortable at all times. Using energy-efficient glass also helps in ensuring that the interiors – and the occupants of the home – feel more comfortable.

Ecosense comes in three ranges – Enhance (Solar Control), Exceed (Solar Control Low-E) and Essence (Low-E) high performance Gasses. Ideal for solar and thermal insulating parameters, Ecosense combines aesthetics with environmental sensibility and conforms to all International and National Green Standards, making it the natural choice as a Green Building solution. Ecosense performance parameters like Visual Light Transmission, Solar Factor, U-Value and Internal Reflection make buildings more efficient and ecologically viable.

*Image: Eco Enhance - Range of Solar Control Glass by Asahi Glass India Ltd.*
As one of the most versatile and
equisite building materials, glass offers
excellent opportunities for making
extraordinary creations in architecture
and interior design. As enchanting
as the nature and effect of glass is,
its marriage with state-of-the-art
technology is creating results that are
as sophisticated as they are aesthetic.

**Smart glazing** - glass whose light
transmission properties are altered by
technology, so that it can interchange
instantly between transparency,
translucency, and opaqueness. Smart
glass is used for windows, skylights,
doors, and partitions, and is available
as laminated panels or insulated glass
units.

**A Smart Investment towards
a Smarter Future:**
The demand for smart glass has been
increasing for two reasons: modern
lifestyle requirements of comfort,
convenience, privacy, and energy
efficiency; and being a different
product in the highly competitive glass
industry. Investment worth hundreds
of millions of dollars has been made in
smart-glass technology over the past
few years by all bigwigs of the Industry.

**Electrochromic (EC) Technology**
This is the most promising switchable
glass technology today. A one-micron
electrochromic thin film stack is
deposited on a glass substrate. This
stack is made up of ceramic metal oxide
coatings with three electrochromic layers
sandwiched between two transparent
electrical conductors. A voltage between
the conductors sets up a distributed
electrical field. This moves lithium or
hydrogen ions reversibly between the
ion storage film through electrolyte and
into the electrochromic film.

As a result, the glazing switches between
the clear state and the transparent blue-
gray tinted state. There is no loss of visual
clarity, as in photochromic eyeglasses.
Power is needed only to change the
glass from one state to the other.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less energy consumption: Smart glass controls incoming light and solar heat gain, reducing the need for air-conditioning.</td>
<td>Shorter lifespan than traditional glazing.</td>
</tr>
<tr>
<td>Energy efficiency: it requires very low-voltage power (0-10 volts DC) to operate.</td>
<td>Slow transition between clear and opaque state.</td>
</tr>
<tr>
<td>Reduced costs: Control and modulation of incoming light and solar heat gain leads to lower energy bills and occupants' comfort.</td>
<td></td>
</tr>
<tr>
<td>Privacy: When you need it and Better security: When darkened.</td>
<td></td>
</tr>
<tr>
<td>Convenience: Reduces the need for mechanised and automated blinds.</td>
<td></td>
</tr>
</tbody>
</table>
Suspended Particle Device Technology

This technology enables manual and precise control of light and heat, compared to electrochromism. Rod-like nanoparticles are suspended in a liquid placed between two layers of glass or plastic. In the unpowered state, the randomly organised particles block light and the view. When voltage is applied, the particles align to allow light and to enable transparency. Varying the voltage of the film regulates the amount of light transmission and, hence, the tint of the glazing of the glass window or partition.

The Advantages:

- Less Energy Consumption: Precise heat and light control reduces need for air-conditioning and heating
- Reduced costs: Of installing and maintaining ACs and heaters, it also eliminates the need for expensive window dressings
- Comfort & Convenience: With 99% UV blockage and state switching in 1–3 seconds

Other Technologies

Micro-blinds are very tiny, rolled, thin metal blinds on glass. With no applied voltage, the micro-blinds are rolled up, letting light pass. With applied voltage, rolled micro-blinds stretch out and block light. Pros include switching speed in milliseconds, UV resilience, customisation, and cost-effectiveness. The technology is still under development. Nanocrystals embedded in glass provide selective control over visible and heat-producing, near-infrared (NIR) light. A small jet of electricity switches the material between NIR-transmitting and NIR-blocking states. The window can also be switched to a dark mode, blocking both light and heat, or to a fully transparent mode.

AIS Swytchglas: Switching on a New Trend

Manufactured using Suspended Particle Technology, AIS Swytchglas is a revolutionary smart glass which gives the user flexibility between transparency and opaqueness, while enabling control of both heat and light. Ideal for a wide variety of applications at home or in the office, it presents the perfect balance between style and necessity. A smart solution from AIS for a smart you. Smart glazing solutions, with the advantages they offer, are enabling the creation of smart buildings that were unimaginable until a few years ago. And they are inspiring smart living – in a brave new world that is the cause and effect of futuristic technologies in every sphere of human life.