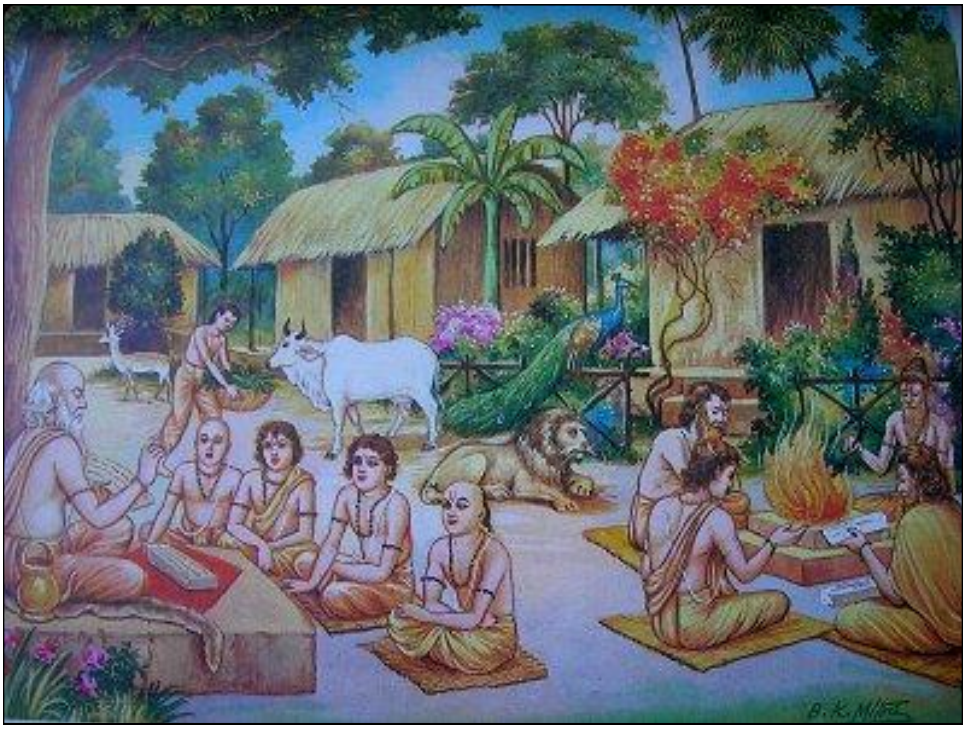
The World's most Net Positive Building/Environment



Of course..
We can't go back to the Good 'ol times..
But still let's

Think beyond Green Buildings !

Net +

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GLASS

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ENERGY | ENVIRONMENT | ENGINEERING

Abhinav Nanda
GRIHA Trainer, IGBC AP
Manager – Key Accounts
Saint-Gobain Glass India

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Towards a better Future…

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The Present Day Energy Crisis

Buildings Account for :

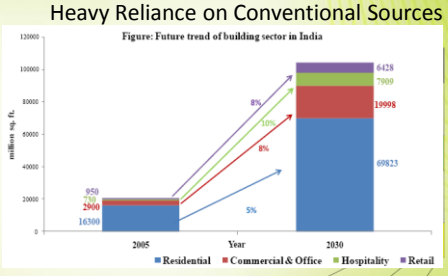
40%
Energy Use

80%
Towards Lighting and Cooling needs

8% ⬆
Annual Energy Consumption

5.4 Bn kWh est
Increased Demand projected

Heavy Reliance on Conventional Sources



Geothermal 0.2%
Biofuels 0.2%
Solar photovoltaic 0.04%

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Source: IGBC – CII data for building footprints
Energy generation: wiki

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Depleting Environment

Today's Buildings are Responsible for :

50%
Air Pollution

48%
Waste Generation

42%
Greenhouse Emissions

20%
Allergy Complications

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What's the way ahead?

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Net **INNOVATIVE** Engineering with **GLASS**

- For **E**nergy
- For **E**nvironment

Responsible Engineering

Sustainable Engineering

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The Four Pillars of Net Positive Design

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- ENERGY GENERATION
- ENERGY CONSERVATION

- ENVIRONMENTAL COMFORT
- ENERGY MANAGEMENT

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A Four pronged Approach..

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- Conserve **E**nergy
- Preserve **E**nvironment
- Enhance **C**omfort

…through Product **E**ngineering

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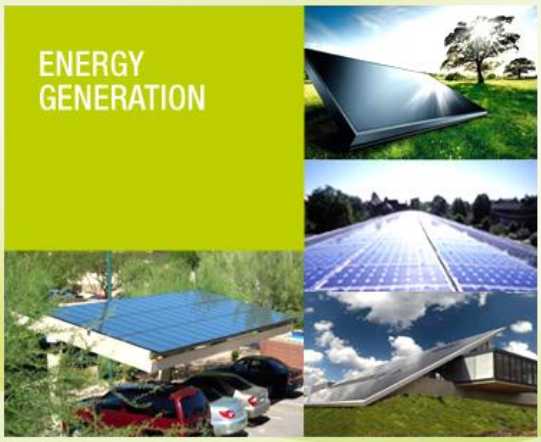

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Solar Power

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- Lifeline of a Net Positive Building.
- Advanced technologies available for easy installation anywhere and everywhere
- For a **100sft-120sft** area, the best Solar Panels generate **1500** units per year, considering **300** sunny days
- **1.5 Mn** units from a **1MW** on a **5** Acre space (110000 Sft) can be generated
- E.g. an idle Car park Roof can be made into an Energy generation Zone !

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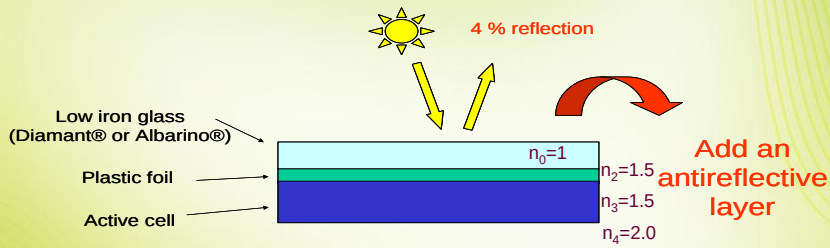
Increase efficiency with Specialized Glass



Reflection can be reduced by upto 3%

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Bridging The Energy Gap

Studies show that usage of right kind of energy efficient glazing can reduce energy consumption by **35kWh** per sqm of built space

Energy Conservation
Or..
'Negawatt'

Energy Generation
Or..
'Megawatt'

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Glass Engineered For **Energy Conservation**

Lighting

Cooling

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Lighting

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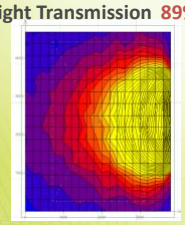
Clear Glass

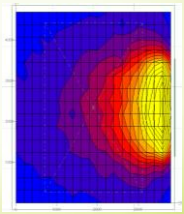
Solar Control Coated Glass

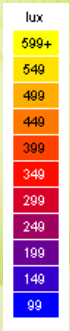
Light Transmission 89%



Optimize Light Transmission

Light Transmission 40%





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Natural Lighting

	Barely glazed bedroom		Largely glazed bedroom
Opening index	16.4%	+ 49% →	24.5%

Electricity consumed	4.2 kWh/m²/year	- 36% →	2.7 kWh/m²/year

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Cooling (Solar Control)

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Solar Incident Energy : **500 W/Sqm**

Temp Diff **15⁰ C**

U value W/SqmK

Clear Glass

407 W/sqm

TRIPLE SILVER

319 W/sqm

1G SF **0.50** U value **5.7**

2G SF **0.35** U value **2.8**

217 W/sqm

6G **Selectivity : >2.2**

3G SF **0.30** U value **1.9**

178 W/sqm

125 W/sqm

5G **Double Silver** SF **0.20** U value **1.6**

4G SF **0.25** U value **1.8**

150 W/sqm

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The future is here

"Extreme" Solar and thermal control

- SGG **Extreme**
- Triple silvered low-e glass
- High spectral selectivity **2.15**
- Solar Factor : **0.28**
- U-Value : **1.5**
- Light Transmission : **60%**

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Intelligent Systems

- Intelligent Energy Management
- Dynamic Climate responsive performance
- Enhanced Real Time Energy Management possible
- Ensuring the internal comfort to occupants is maintained always
- Tangible benefits in improving energy conservation

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Welcome to the Future

- SGG **Electrochrome**
- Flexible Energy management – at a click of a switch
- Automatic transition - excellent light and heat control – **Climate responsive**

Automatic transition performance from clear to high solar control at will

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Ball State University: Muncie

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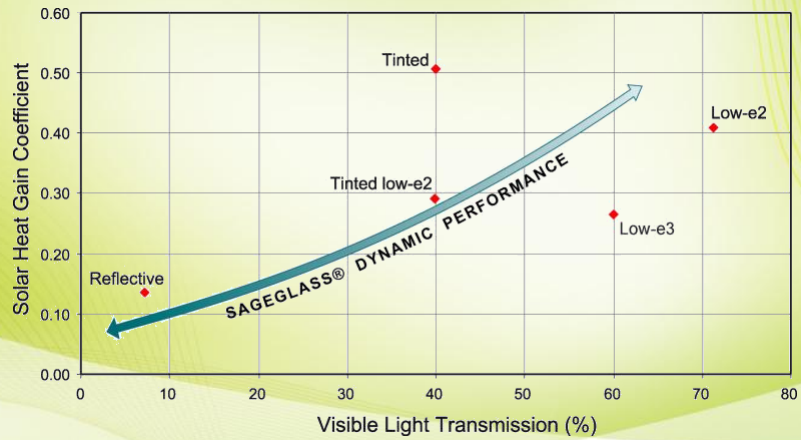
Performance



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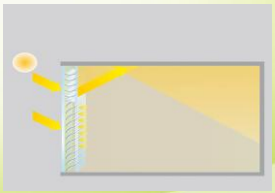
Automated Louvers

- **Eckelt** - Glass integrated electrically operated louvers - solar and glare control.
- Solar factor total of up to **8 %** and Diffused Light Transmission of upto **22%** can be achieved
- Roof Glazing - innovation in skylights
  - Reichstag, Berlin (GER) – Sir Norman Foster
  - Daimler Chrysler AG, Sindelfingen (GER) – Renzo Piano



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Glass Engineered For **Environment**

Non-Toxic

100% Recyclable

Low VoC

Lead Free
Arsenic Free

Hygiene

Self Cleaning

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Self Cleaning Glass

5

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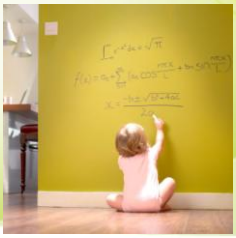
Writing on the Wall…!

- **Save Paper!**
  - Have we ever wondered , how much of paper is used for regular office communication?

- **Maintenance ?**
  - How do we reduce toxic Maintenance measures?



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Lacquered Glass

- SGG **Planilaque Evolution** 6
- Combines the visual depth of lacquer colors and the resistance of glass
- Environment friendly - Lead free, arsenic free, formaldehyde free, low VOC

The Writing on the wall… **is now clear!**

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Net INNOVATION

Anti –Reflective Coating for Solar panels 1

Triple Silver , Highly Spectral Selective coatings 2

Flexible Climate Responsive Control 3

Automated Glass integrated Louvres 4

Self-Cleaning Glass 5

Environment friendly Lacquered Glass 6

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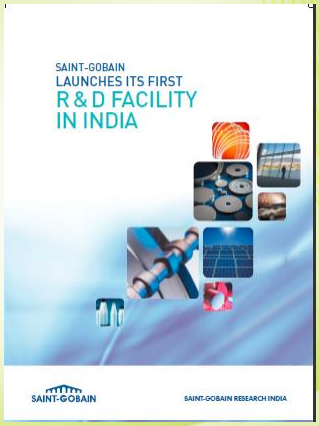
Innovation.. Now closer home!!

- Saint-Gobain' 7th Worldwide Transversal R&D facility ..now in Chennai!
- Send in your ideas to sriram.n@saint-gobain.com
  - We are Listening !!



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Glass !!

TRULY ... an intriguing material

... with Glass Engineered for the tomorrow....

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Thank You

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