

Building Envelope Insulation for Energy Conservation



Himanshu Agrawal

Senior Manager – Sustainable Building Solutions

BASF India Limited

National Conference on Green Design 2012

02.03.2012, New Delhi



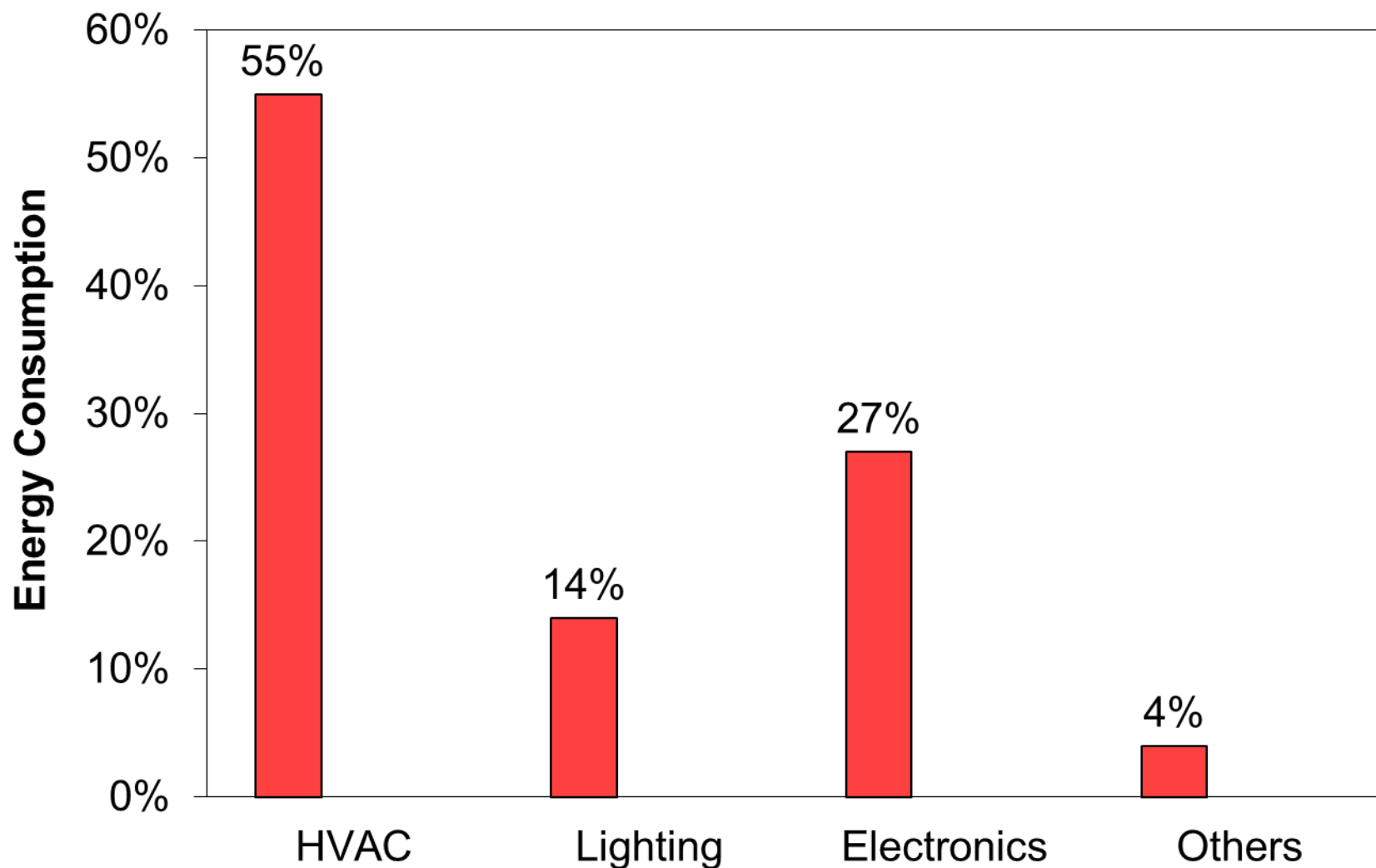
The Chemical Company

Indian Scenario

- Construction industry growing at 10%
- Power generation growing at 5-6%
- Dependence on coal based plants
- CO₂ emission of 0.795 tons/MWh
- Buildings consume 60-70% of total power generation
- Maximum energy used to condition buildings

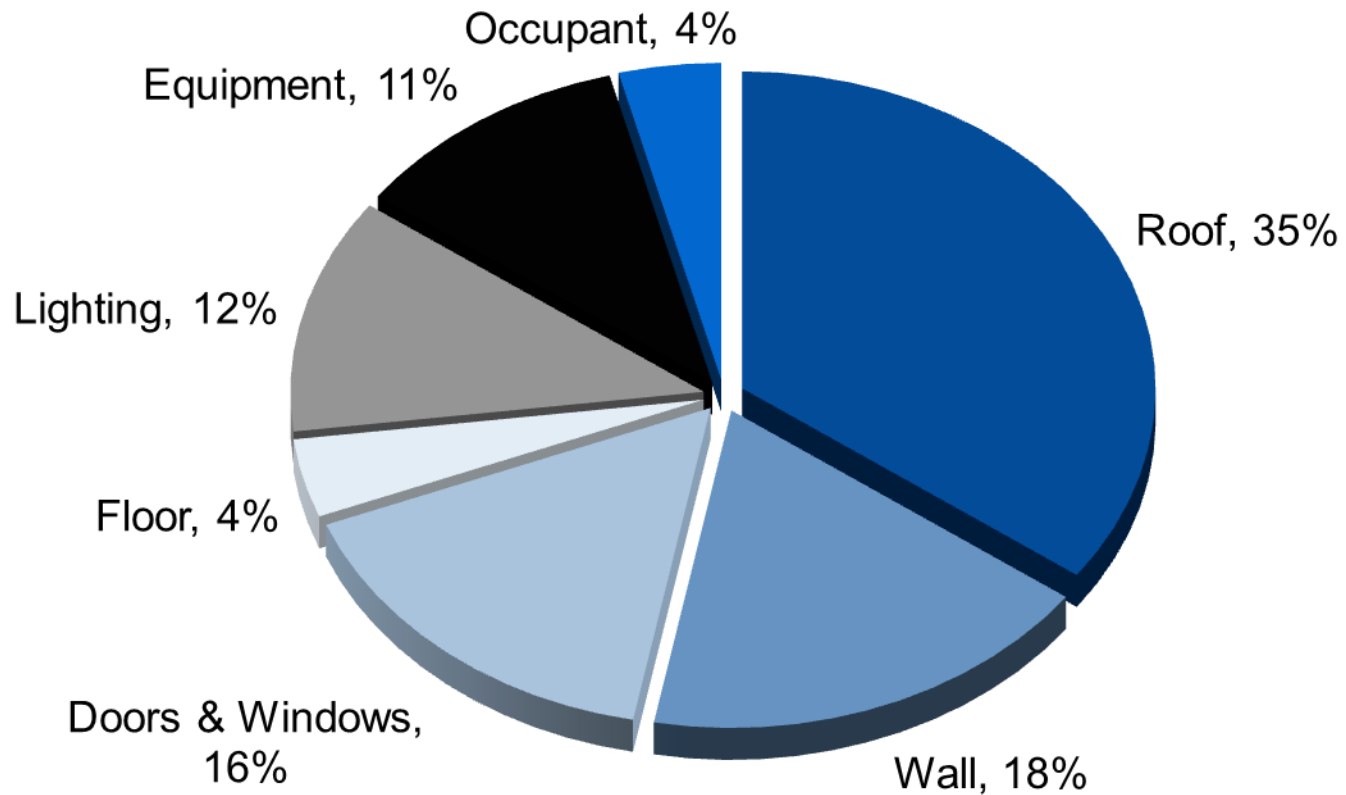


Typical Energy Consumption in Building



Heat Gain in Building

Source: BEE Website



Building Envelope Insulation

- Most effective building insulation method
- Provides barrier to building structure from direct solar radiation
- Reduces heat stress in structure
- Monolithic blanket of insulation
- Eliminates thermal breaks
- Insulation absorbs thermal shock

Polystyrene Foam Insulation

- Expanded Polystyrene Boards - Peripor & Neopor
- Offer high thermal insulation
- Water resistant boards
- Fire retardant with Class B1/B2 rating
- Ideal for thermal insulation of Roof & Wall
- Free of CFC & HCFC (Zero ODP)
- Recyclable
- Produced locally in India at multiple locations



CFC
Free

HCFC
free

Polyurethane Foam Insulation

- Polyurethane Foam Insulation
- High density, fire retardant grade
- Available as boards (Elastopor) & Elastospray (Spray)
- Spray PU foam ideal for profiled roof
- Offer highest thermal insulation
- Useful for Roof & Wall Thermal Insulation
- Recyclable
- Produced locally in India at multiple locations



Waterproofing to Sustain Insulation

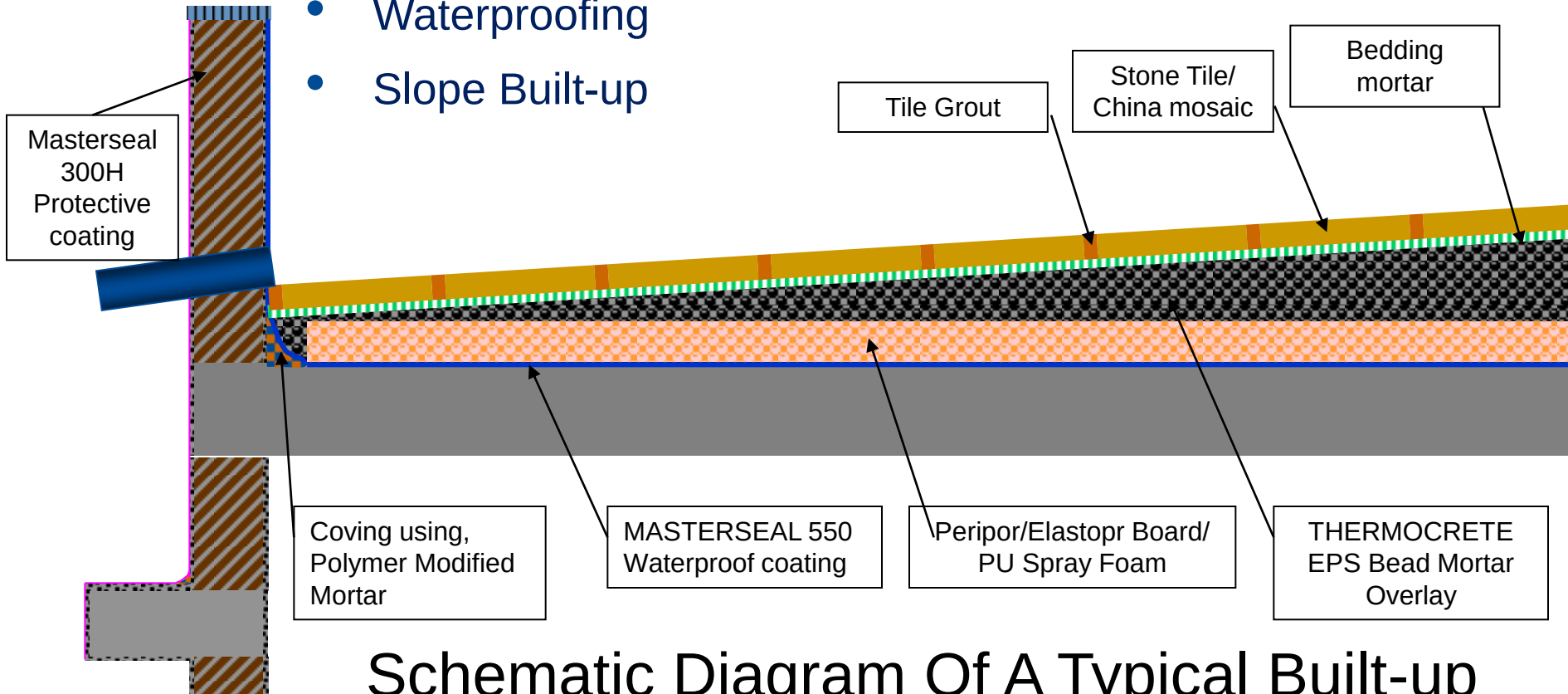
- Insulation value drops in contact with water
- System built-up needs waterproofing that protect insulation
- Typical waterproofing membranes – Preformed TPO, Elastomeric PU
- Well insulated & waterproofed building envelope enhances life span of buildings



Building Envelope Insulation

Roof

- Roof Insulation
 - Thermal Insulation
 - Waterproofing
 - Slope Built-up



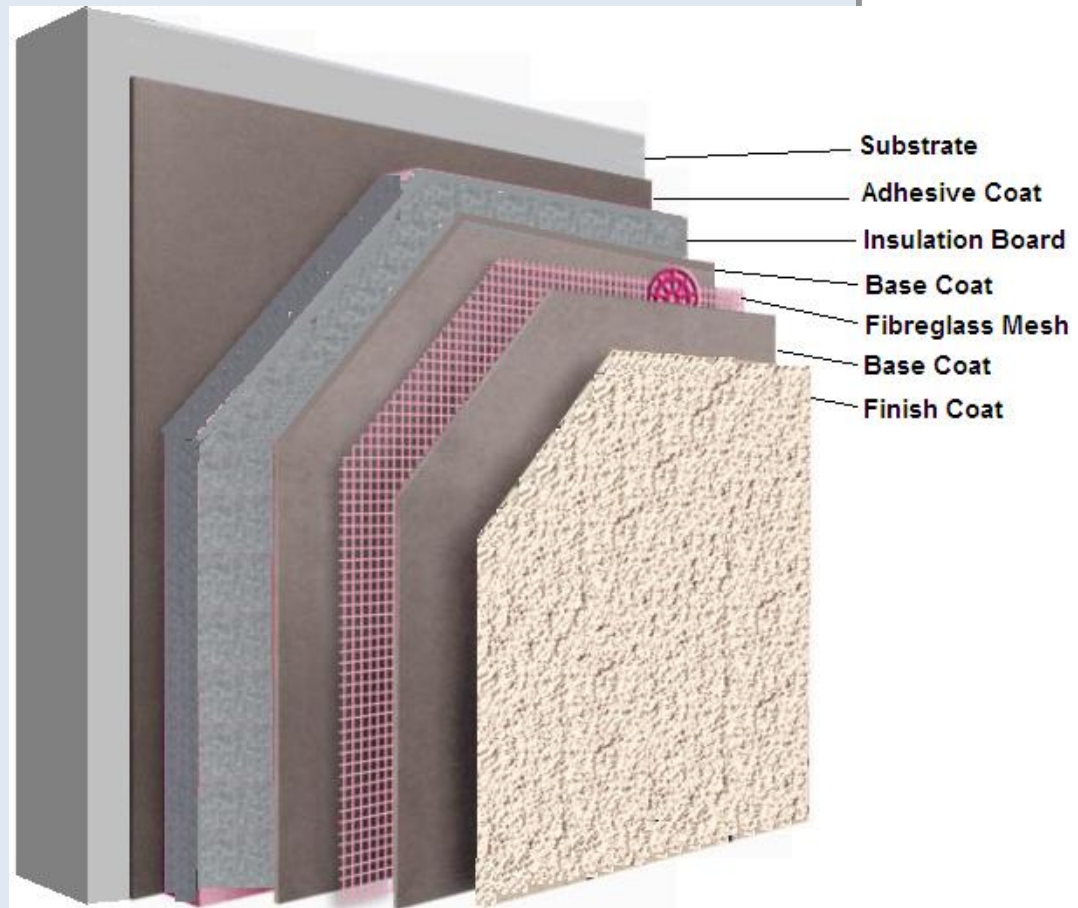
Schematic Diagram Of A Typical Built-up

Building Envelope Insulation

Wall

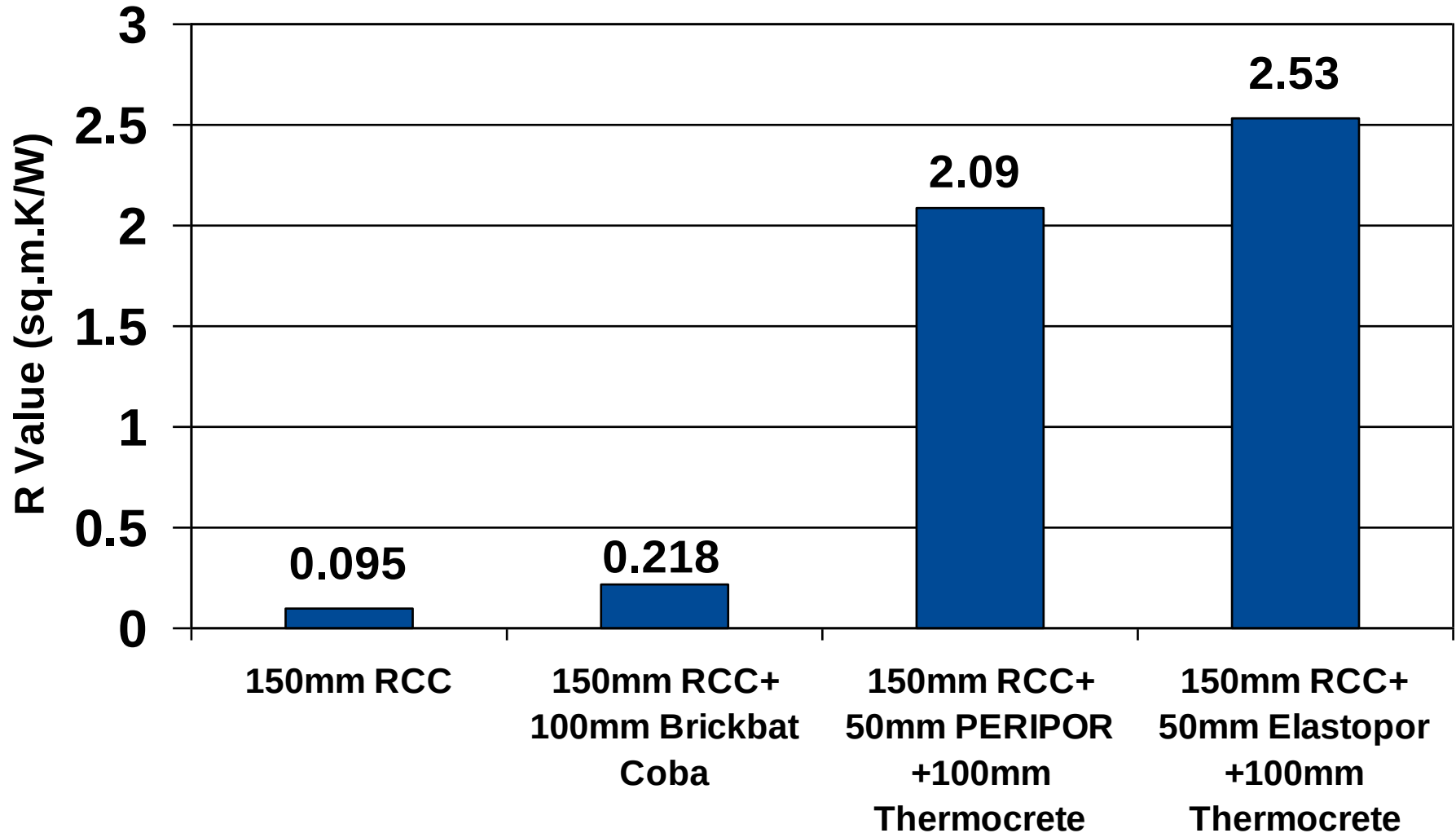
Wall Insulation

- External Insulation & Finishing System (EIFS)
 - Thermal Insulation
 - Waterproofing
 - Finish Coat



Roof Insulation Comparison

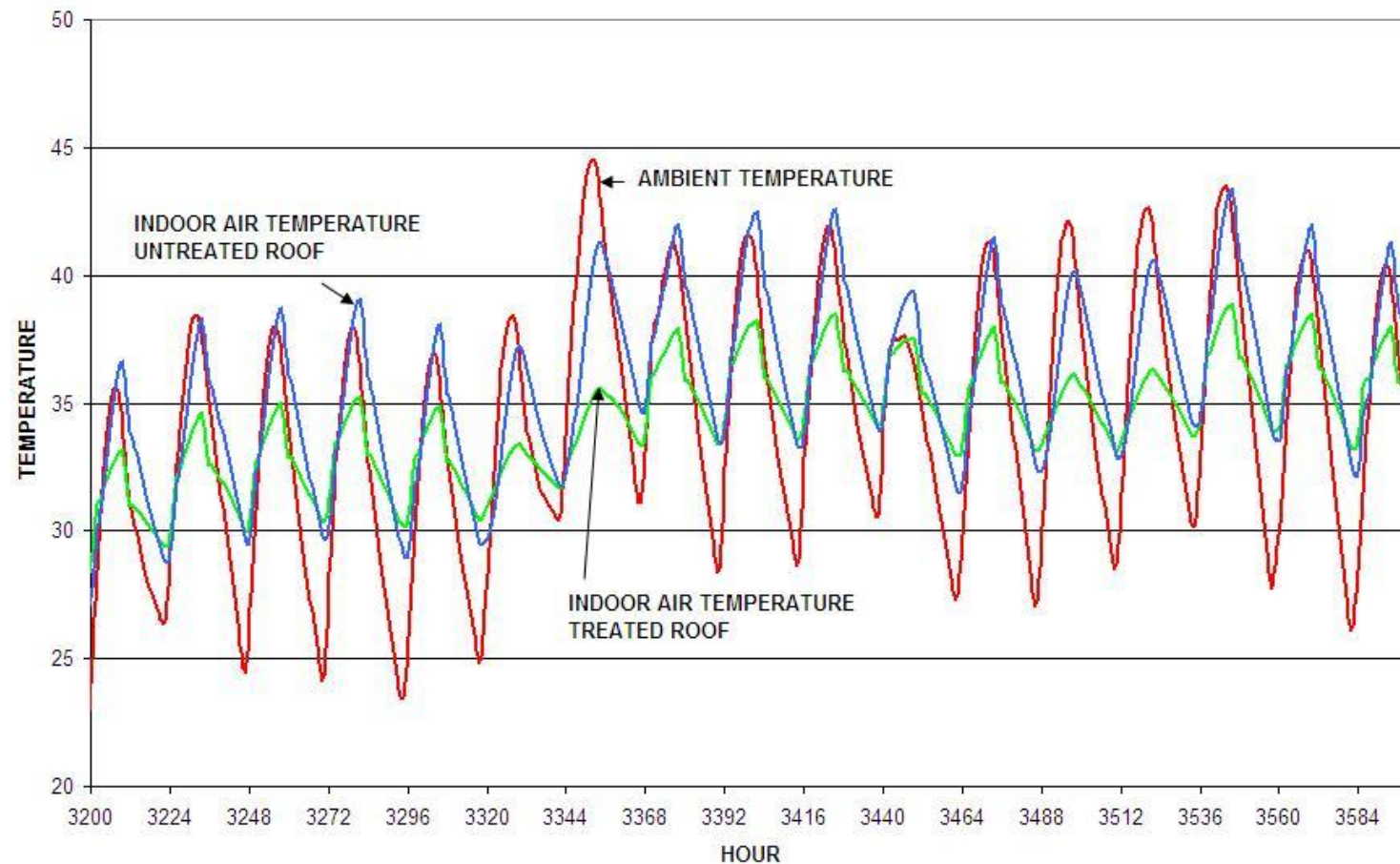
Source: CBRI Studies



Indoor Temperature Profiling

Source: CBRI Studies

3200-3600 HOUR COMPARISON



Energy Calculations

Source: CBRI Studies

Building Type: Medium Income House (2 Floors, 230 Sqm)

Central Aircon: Each Floor

Windows: Ordinary, Single Glass, Light Coloured



Heat Transfer Coefficient “U-Value” (W/m² K)

	Walls	Roof
Building A (Non-Insulated)	2.6	1.8
Building B (Insulated 50mm)	0.57	0.57

Annual Energy Consumption (kWh)

	Building A	Building B
For Cooling	74700	49020
For Heating	9491	6228
Total / Year	84391	55248

Energy Saving: 35%

Reference Project

Bangalore International Airport

BASF
The Chemical Company



Reference Project

WHO South-East Asia HQ, Delhi

 **BASF**
The Chemical Company

Reference Project

Godrej IT Park, Mumbai

 **BASF**
The Chemical Company



Reference Project

Marriott Hotel, Jaipur

 **BASF**
The Chemical Company



Atlantis Hotel Dubai

 **BASF**
The Chemical Company



Marriott - Myrtle Beach South Carolina

 **BASF**
The Chemical Company



Phase Change Material

- Technology of future PCM - Micronal
- Intelligent temperature management for buildings
- Works on concept of latent heat absorption/release and changing its physical state
- Can be used in internal plaster or in cement boards
- 3 cm Plaster with 30% PCM -
 - = 18 cm Concrete
 - = 23 cm Brick



BASF

Leading the Industry in the World



Fortune magazine:
America's Most Admired
Chemical Company, 2008

Global 100

World's most
sustainable
corporations,
2009



BASF Group in India

- No. of Employees: > 2000
- Sales 2010: >6,000 Crore
- 9 production sites
- 31 sales offices in India
- 1 R&D centre as part of global technology platform

We don't just make chemicals

We create chemistry



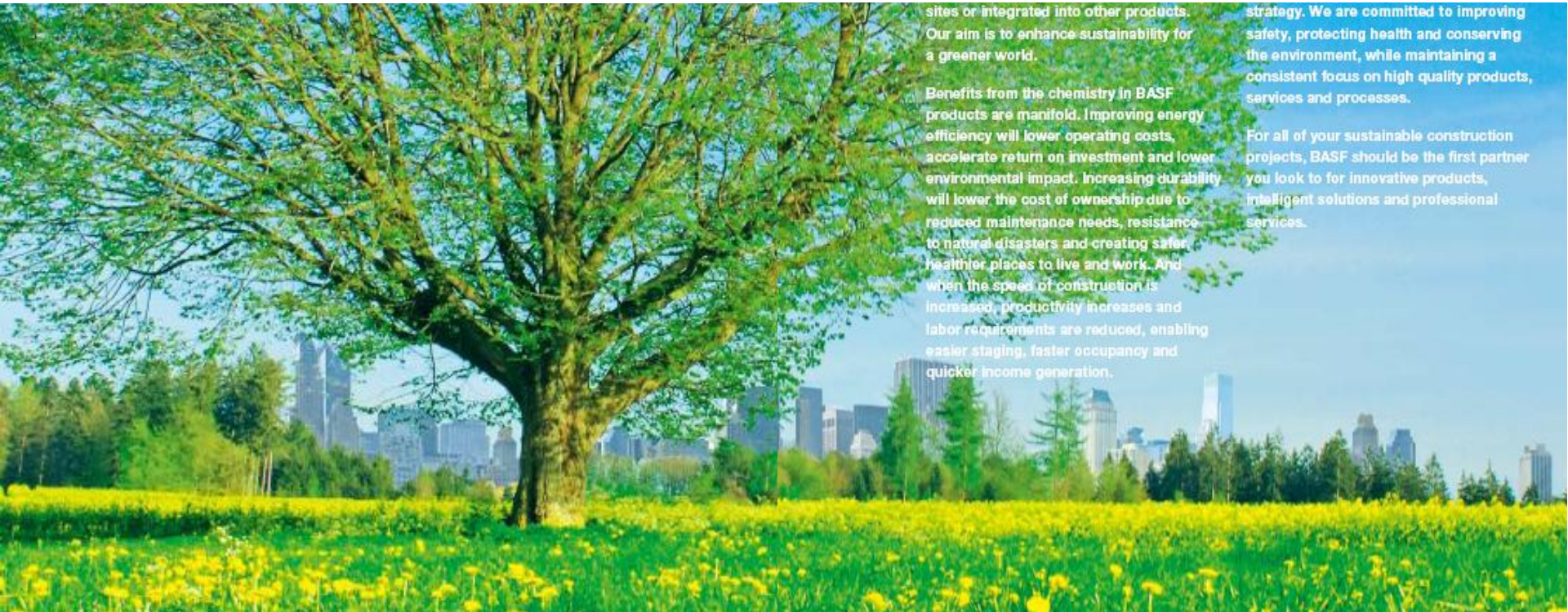
...with our employees

...In business

...And with nature



Let us build a sustainable future ... Together



sites or integrated into other products. Our aim is to enhance sustainability for a greener world.

Benefits from the chemistry in BASF products are manifold. Improving energy efficiency will lower operating costs, accelerate return on investment and lower environmental impact. Increasing durability will lower the cost of ownership due to reduced maintenance needs, resistance to natural disasters and creating safer, healthier places to live and work. And when the speed of construction is increased, productivity increases and labor requirements are reduced, enabling easier staging, faster occupancy and quicker income generation.

strategy. We are committed to improving safety, protecting health and conserving the environment, while maintaining a consistent focus on high quality products, services and processes.

For all of your sustainable construction projects, BASF should be the first partner you look to for innovative products, intelligent solutions and professional services.

Himanshu Agrawal

Senior Manager – Sustainable Building
Solutions

BASF India Limited

Email: himanshu.agrawal@basf.com