



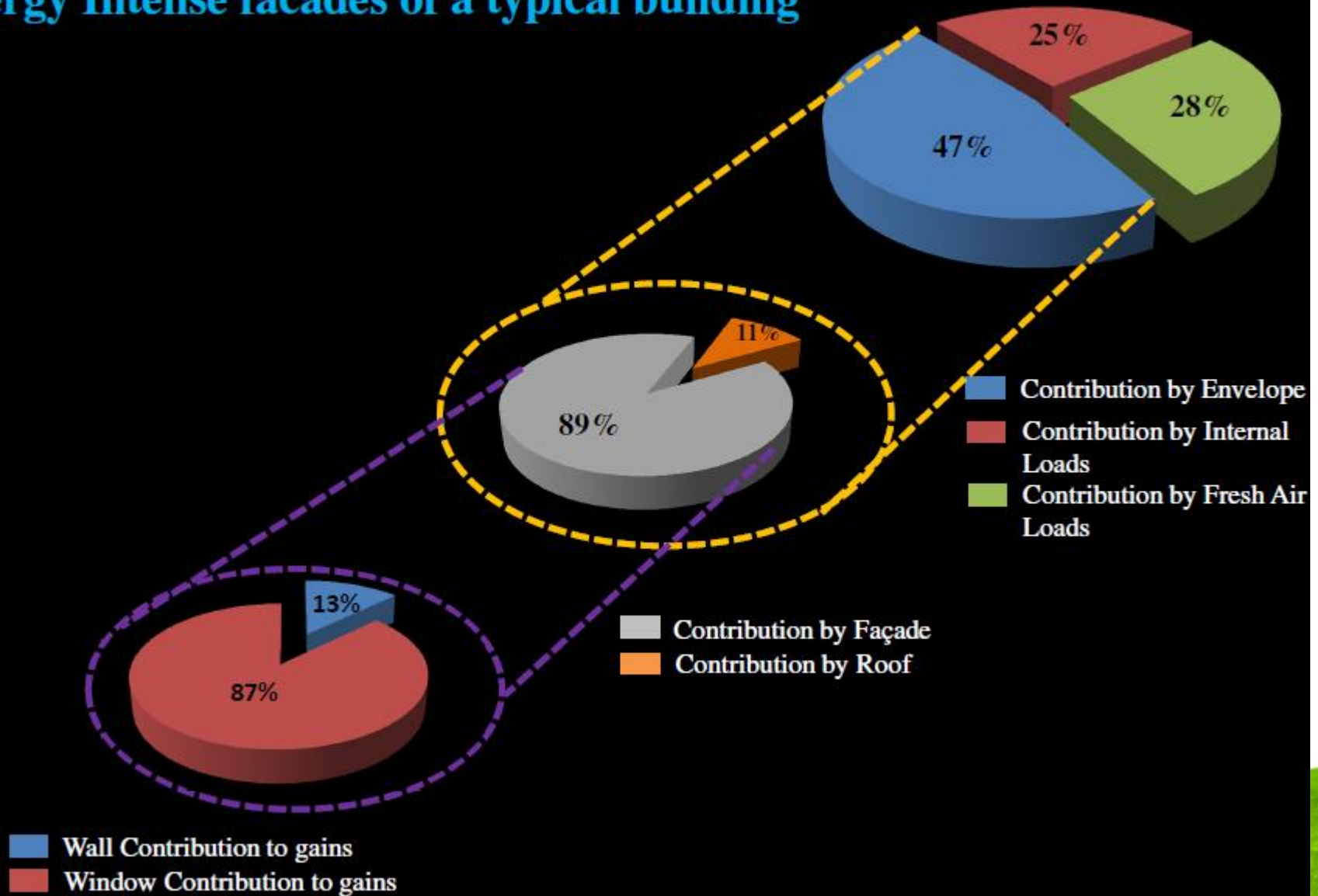
GREEN BUILDINGS, AIR QUALITY and GLASS FACADE



Contribution of façade in energy consumption

Energy Intense facades of a typical building

Common Practice



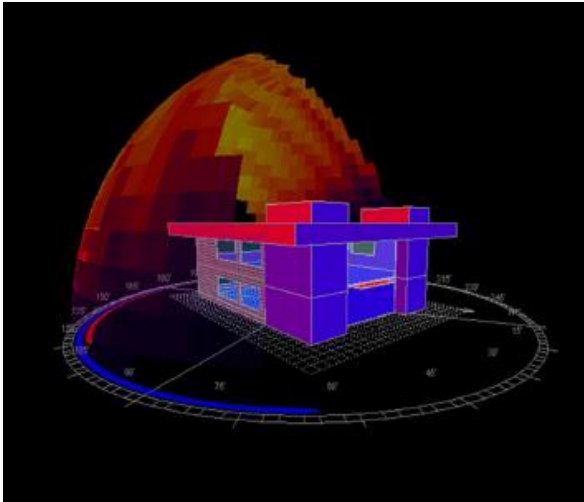
Role of Façade in energy

~36%+ of heat load of a building is due to glass facade

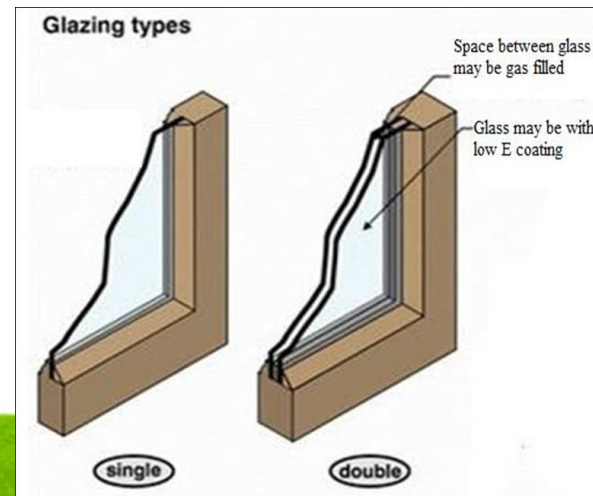
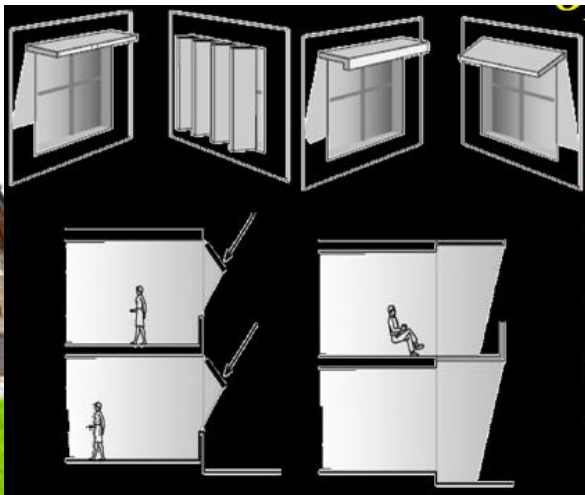
- ➡ Glass industry can influence the energy consumption of the country
- ➡ There are clear ways to reduce this number so heat load due to glass gets lower
- ➡ Glass industry should use these strategies to not only increase sales, but help the builders understand the relevance and interdependence of glass and energy
- ➡ Glass façade also has an influence on air quality



Saving energy



- ➡ Building Orientation – 2%
- ➡ Optimize Window Wall Ratio (WWR) – 15%
- ➡ Proper shading devices – 7%
- ➡ Optimizing glass selection – 6%
- ➡ OVERALL – 30% saving possible over basecase





J W Marriott Hotel Complex, Kolkata
Overall WWR: 45%
Certification: LEED India NC



Eroor Residential Project, Kochi
Overall WWR: 28%
Certification: IGBC Green Homes



Sahara Star Mall, Mumbai
Overall WWR: 70%
Certification: LEED India NC



TVH Aurora, Coimbatore
Overall WWR: 25%
Certification: IGBC Green Homes



Multi Hued Kuggen, Sweden

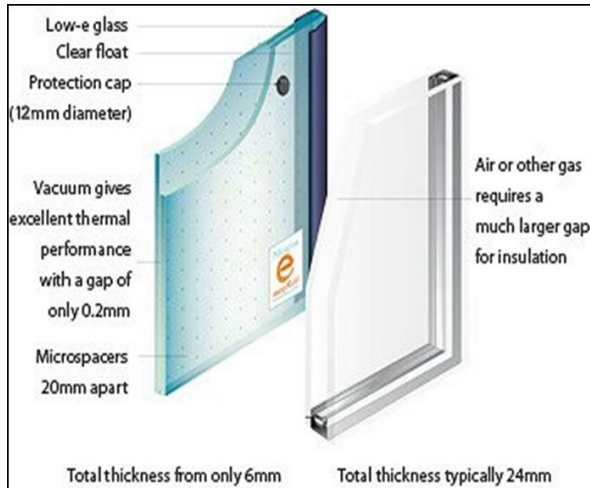


Infosys, Hyderabad

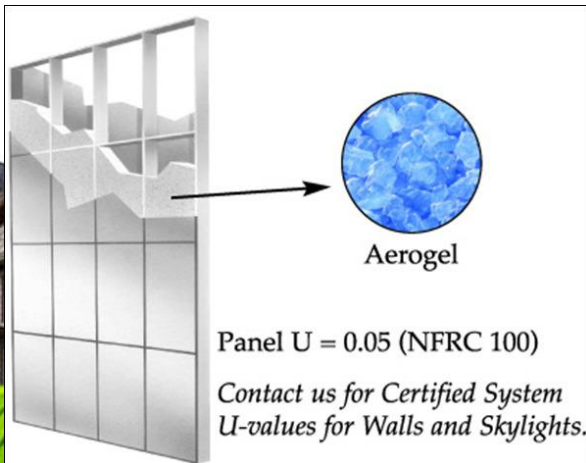


Masdar Institute campus, Abu Dhabi

Innovation in glass façade



- ➡ Vacuum and Aerogel Glazing
- ➡ Thermal break in window frames
- ➡ Green walls
- ➡ Ventilated façades
- ➡ Photovoltaic Glass Units (PGU) – façades generating power





Debis Headquarter,
Berlin



Commerzbank
Headquarter,
Germany



RWE
Ingenhoven,
Germany



Swiss Re
Building-The
Gherkin,
London



Scheidegger Building, Switzerland



Kanazawa bus terminal, Japan



Police Station Barcelona



Princess Margaret Hospital – Hong Kong

Why Green Buildings like glass

Glass is STRONG

Glass is 100% RECYCLABLE

Glass is MAINTENANCE FREE

Glass is NOISE RESISTANT

Glass SAVES TREES

Glass is 100% **recyclable** and can be **recycled** endlessly without any loss in purity or quality. Over a ton of natural resources are saved for every ton of **glass recycled**. Energy costs drop about 2-3% for every 10% cullet used in the manufacturing process.



SOME FACTS

- ➡ 13 of the top 20 MOST Polluted cities of the world are in India
- ➡ Delhi ranks at # 1 out of 1600+ cities in air pollution
- ➡ Top 4 cities are Indian (Delhi, Patna, Gwalior & Raipur)

Delhi world's most polluted city

TOXIC India slips to 155 among 178 countries on environment performance index, Capital pips Beijing to be city with dirtiest air

Chetan Chaudhary
@chetanmishra1980

NEW DELHI: It's no surprise that pollution is a perpetual problem in India. But it's definitely disheartening to hear that India has slipped 32 ranks in the global Environment Performance Index (EPI) 2014 to rank a lowly 155 and its capital Delhi has earned the dubious tag of being the world's most polluted city.

A comparative study of 178 countries on nine environmental parameters released earlier this month by the US-based Yale University shows that one

and water resources, India's performance lags most notably in the protection of human health from environmental harms," said a statement issued by Epi.

The study described India's air pollution as the worst in the world, tying with China in terms of the proportion of population exposed to average air pollution levels exceeding World Health Organisation (WHO) thresholds.

A deeper look at the data gathered by a Nasa satellite showed that Delhi had the highest particulate matter (PM) 2.5 pollution levels followed by Beijing. Delhi, with 80 million registered vehi-

cles, has the highest health implications. And while Beijing's infamous smog has begged headlines and prompted government action, even led to the announcement of rewards for cutting back on pollution, the dangers in Delhi have been largely ignored.

According to a study by the Harvard International Review, every two in five persons in Delhi suffer from respiratory ailments. The Lancet's Global Health Burden 2013 report termed air pollution the sixth biggest human killer in India. The WHO last year termed air pollution carcinogenic.

CAPITAL BREATHES UNEASY

Tops global cities with worst air pollution



1 NEW DELHI, INDIA

INDIA SLIPS IN RANK TOO

Is second-most polluted among its neighbors

	2014	2013
Bangladesh	169	139
India	255	123
Pakistan	140	125
Nepal	139	30
China	118	121
Sri Lanka	69	58

■ Ranking based on 9 parameters: Health impact, air pollution, water & sanitation, water resources, agriculture, fisheries, forests, biodiversity & habitat.

Indoor Air Pollution

The Slow, Silent & Invisible Killer

- ➡ *IAQ is generally upto 10 times worse than ambient air*
- ➡ Indoor air pollution is the 2nd highest killer in India after Blood Pressure
- *Global Burden of Diseases Report*
- ➡ 1.3 million people in India die due to indoor air pollution every year - *WHO Study*
- ➡ Annual premature deaths caused by particulate air pollution have increased six times since the year 2000 - *Global Burden of Diseases Report*
- ➡ 27.5% under-five infant mortality is because of indoor air pollution - *TERI study*



VOLATILE ORGANIC COMPOUNDS (VOCs)

1200+ different VOC's



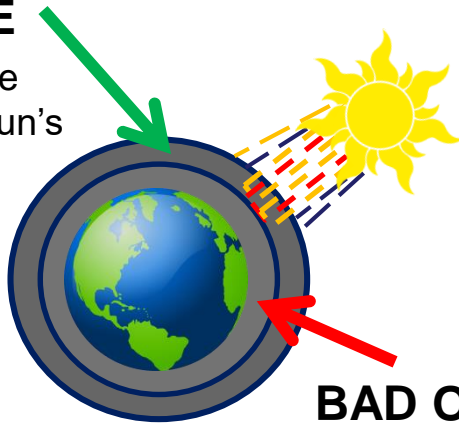
❑ Leads to: Eye, nose, throat irritation, headaches, loss of co-ordination, nausea, damage to liver, kidney, and central nervous system. Some VOC's cause cancer in human beings

OZONE (O_3)

Forms in the atmosphere through a series of complex chemical reactions between oxides of nitrogen (NO_x) and hydrocarbons

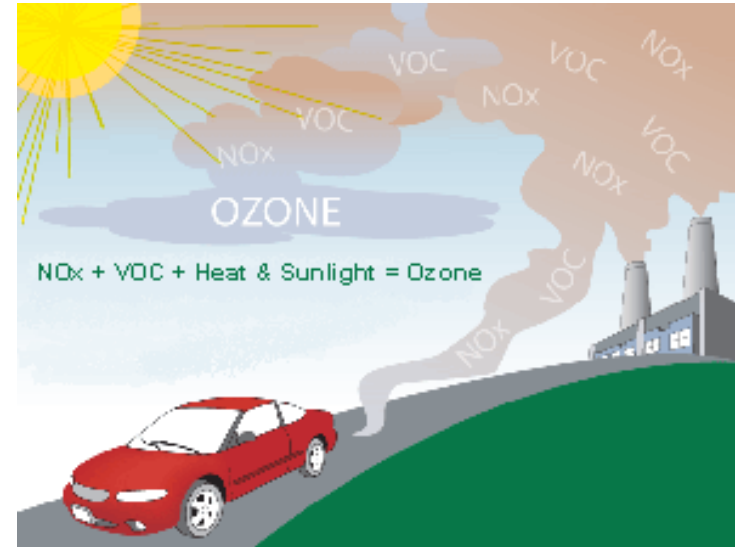
GOOD OZONE

Stratosphere, ozone protects us from the sun's harmful ultraviolet radiation



BAD OZONE

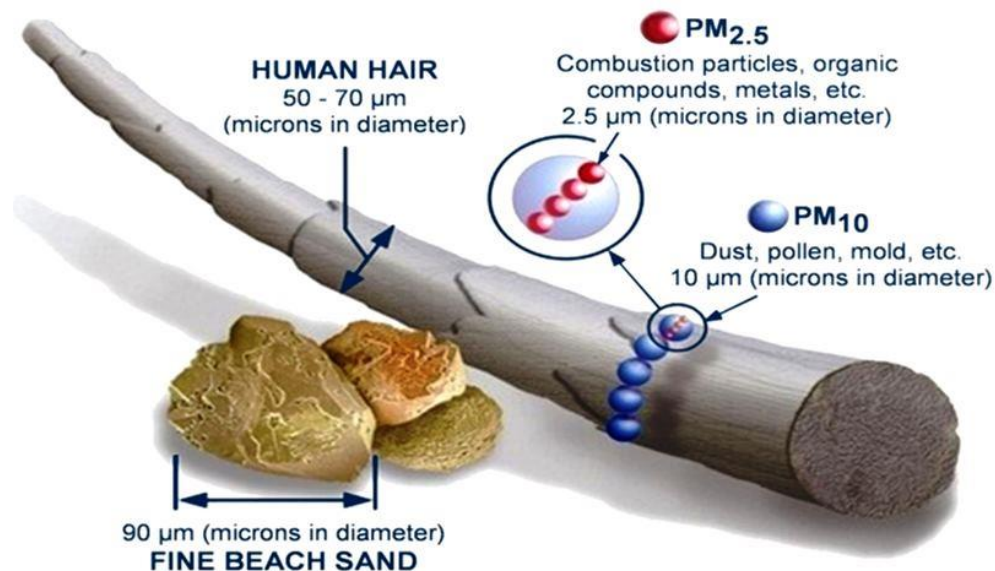
Troposphere, ground level ozone can damage lung tissue and plants



Leads to - Wrinkles on skin, sensitive lungs, increased asthma attacks & daily mortality

PARTICULATE MATTER (PM_{10} & $PM_{2.5}$)

One of the most dangerous air pollutants



❑ Leads to - Premature mortality, chronic respiratory disease, weakening of eyesight. Pre-existing heart or lung or asthmatic patients very sensitive to respirable PM

HIGH OZONE & HIGH PM_{2.5} DEADLY

***Study by
Rice University
&
Houston Fire Department EMS***

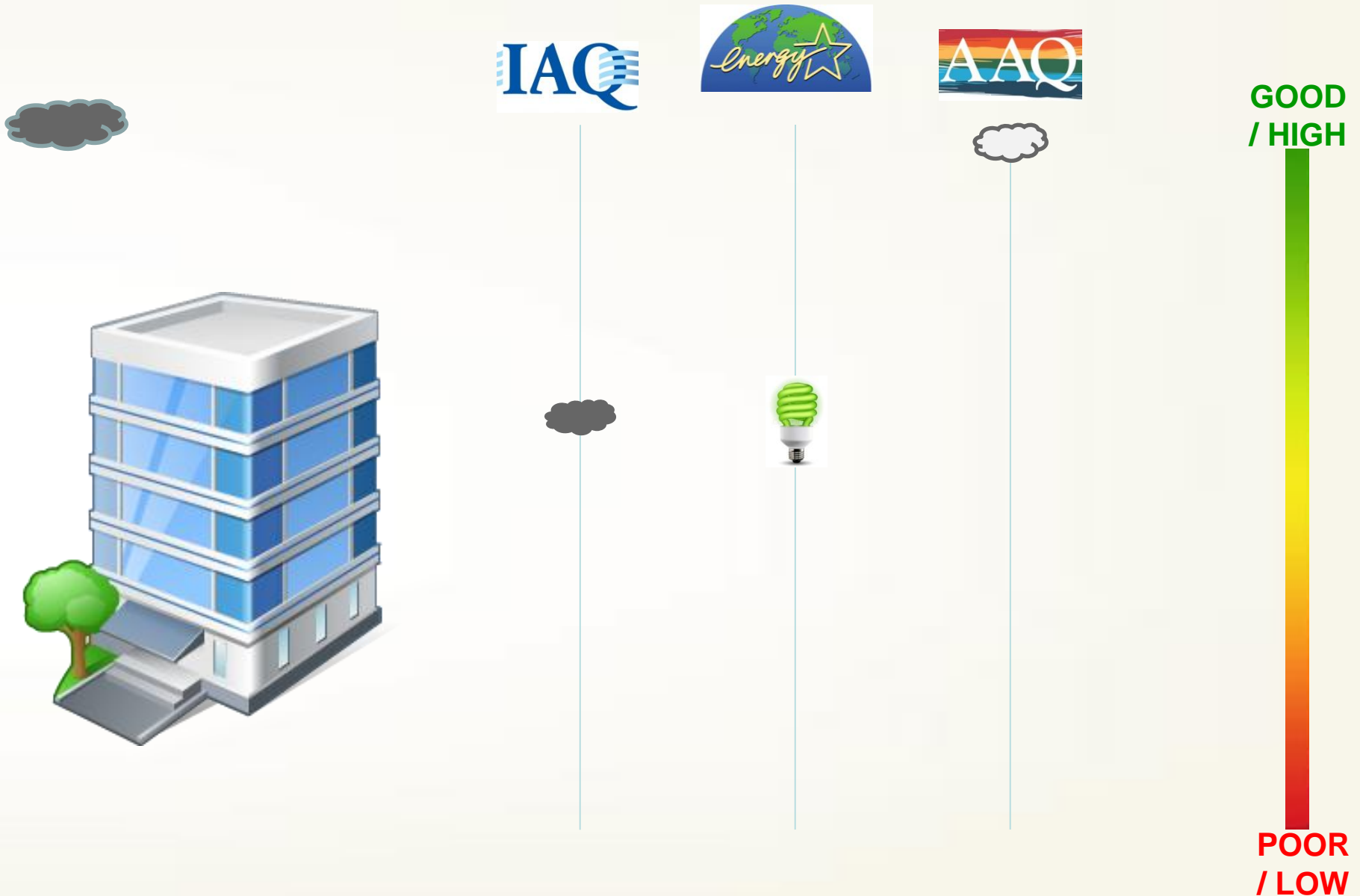
*Direct correlation between out-of-hospital cardiac arrests (OHCA)
and exposure to PM_{2.5} and Ozone*

***Daily average increase in PM_{2.5} of 6µg/m³ per day over two
days raised risk of OHCA by 4.6%***

***Each increase of Ozone of 20 ppb over one to three hours also
increased OHCA risk, with a peak of 4.4%***



UNDERSTANDING THE AIR PROBLEM



CAN THE PROBLEM BE FIXED? YES IT CAN...

CASE IN POINT – A BREATHE EASY BUILDING

PARAMETER	WHO/ASHRAE GUIDELINE	OTHER BUILDING	BREATHE EASY BLDG	% REDUCE
CO ₂ , ppm	ambient +700	1067.5	488	54
PM10, µg/m ³	50	689	7	99
PM2.5, µg/m ³	15	492	3	99
VOC - Benzene, ppb	NA	150	BDL	99.99
VOC - Acetaldehyde, ppb	NA	3125	BDL	99.99
VOC - Acetone, ppb	NA	800	BDL	99.99
VOC - Toluene, ppb	NA	275	BDL	99.99
Aerobic Plate Count, cfu	NA	153	26	83
Fungal Count, cfu	NA	48	<1	99.99

3 varieties of plants

For growing fresh air indoors

"The Living Room Plant"

Areca Palm

(Chrysalidocarpus lutescens)



"The Bedroom Plant"

Mother-in-law's Tongue

(Sansevieria trifasciata)



"The Specialist Plant"

Money Plant

(Epipremnum aureum)





RESULTS: Human Health

A study by Chittaranjan National Cancer Institute, Kolkata &
Central Pollution Control Board (CPCB)
Ministry of Environment & Forests, GOI



Eye Irritation

52% ↓



Respiratory symptoms

34% ↓



Headaches

24% ↓



Lung impairment

12% ↓



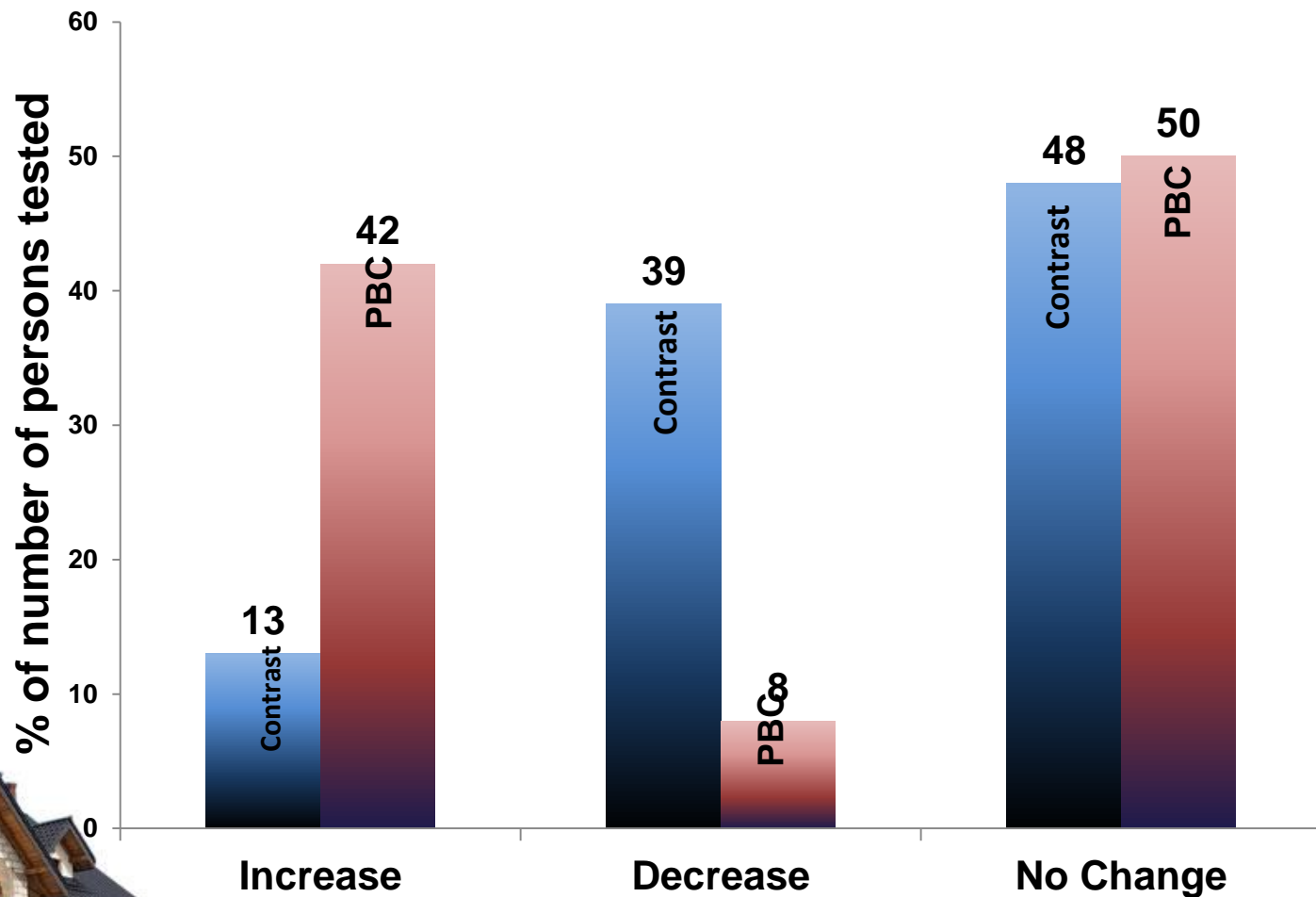
Asthma

9% ↓



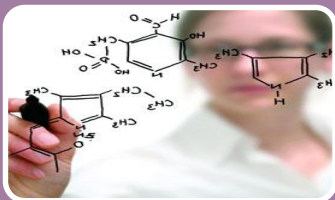
Providing cleaner air reverses the effects of pollution

RESULTS: Breathe Fresh, Feel Fresh



If a person spends 10 hours in oxygenated clean air, there is a 42% probability that their blood oxygen saturation level will go up by 1%

FULL SERVICE IAQ SOLUTION PROVIDER



IAQ TESTING

- Knowledge of what you are breathing is the first step to Clean Air
- Comprehensive suite of tests
- Reporting and recommendations for eventual corrective actions



HOME SOLUTIONS

- Helping people breathe better air at home
- Testing of air quality at home, improving IAQ with plants and the right air purifier
- GOAL – Developing an air purifier that is AFFORDABLE by the masses and WORKS.



LARGE COMMERCIAL SOLUTIONS

- We bring Davos to Delhi
- Improved energy efficiency and improved productivity of building occupants
- Mechanical filtration and Organic filtration technologies



CSR – HELPING INDIA BREATHE

- Partnered with the Blacksmith Institute, NY to further the cause of air pollution
- Creating a “mind map” of various organizations to understand gaps in air pollution issues
- Develop a 5 step plan for government with health effects studies to address air pollution

Thank you



New Delhi, INDIA

Phone: +91-11-41207171

Mobile: +91 98737 44440

www.breatheeasy123.com

