



SMART BUILDINGS & GOOD INDOOR AIR QUALITY

Providing a Smart Place
to Work & Live in
that Enhances Human Experience
by Enhancing Wellness

A Presentation by
Kamal Meattle,
CEO – Paharpur Business Centre



GB FEATURES

- Energy Efficient
- Water Efficient
- Waste Management
- Sustainable Materials & Vendor Management
- Aware Occupants
- Indoor Environment Quality (Human Experience)



**Green Buildings - a high school degree,
Next step is Smart Cities, And,
Smart Cities can't flourish without**

Assuring WELLNESS

**Moving A Step Further
From just Green Buildings
to
Smart Buildings with Wellness**

WELL BUILDINGS

- **Delos WELL Building Certification** is first protocol of its kind that addresses critical parameters of Human Health and Well-being within the built environment
- Prescribes a series of technology enhancements and performance-based measures that are systemized across seven categories relevant to occupant health in the built environment

Paharpur Business Centre (PBC) is registered as a Pilot Project in India for WELL Building certification

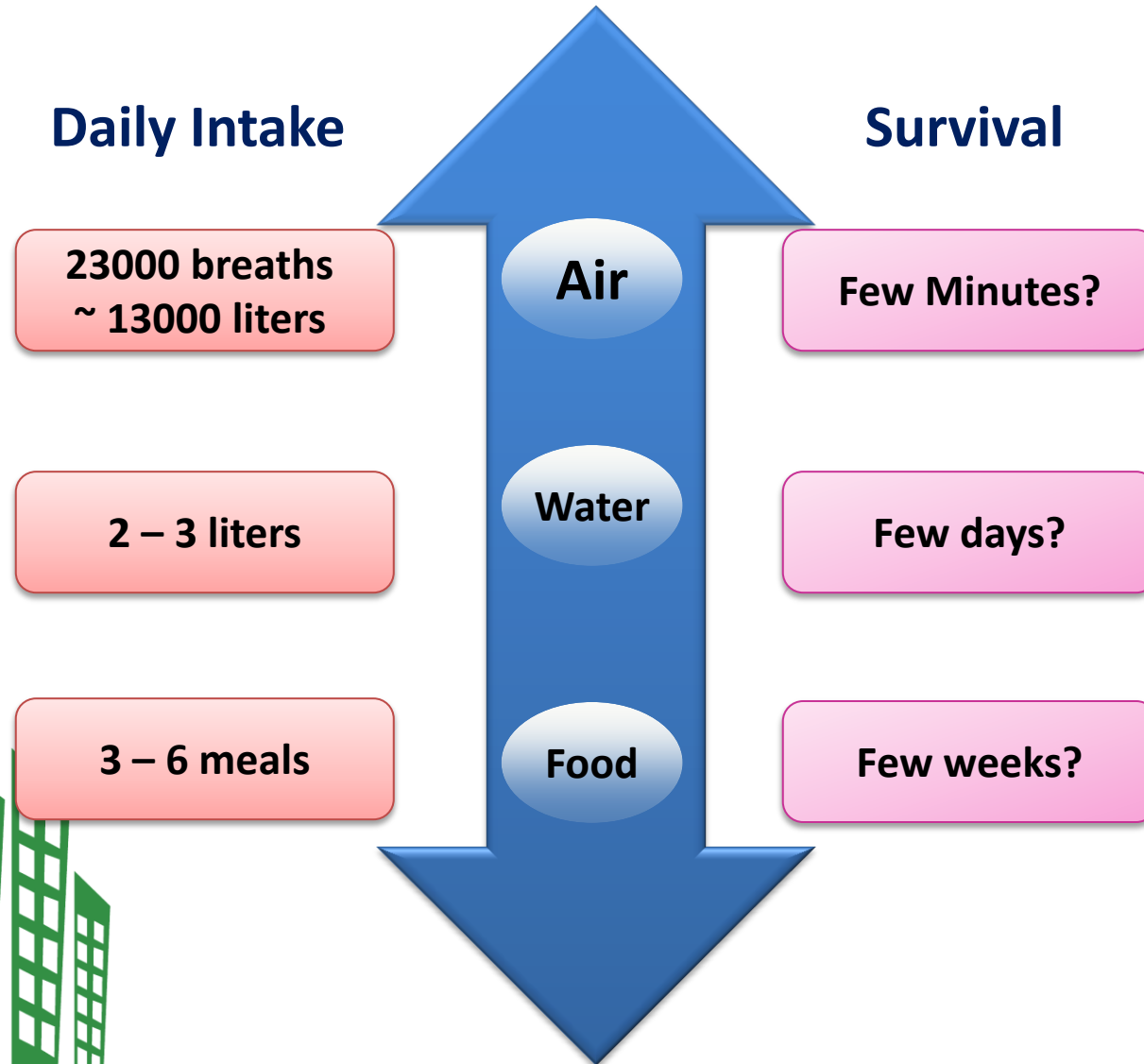


WELL PYRAMID



WE CHOSE AIR FIRST

Why?



AIR: BASE OF WELL BUILDING CERT

Following are some of the criteria to be addressed for maintaining good air quality as per WELL Building Standard.

- A demand controlled ventilation system integrated with HVAC to regulate the ventilation rate of outdoor air to keep CO₂ levels in the space below 800 ppm
- The standard also demands maintenance and monitoring of the levels of any one parameters from, Ozone or CO₂ clubbed with either PM 2.5 or PM 10 in the regularly occupied areas on an hourly basis
- Adherence to ASHRAE 62.1 2013 is required.



Contd..

Specifications to be achieved as per adherence to ASHRAE:

- a) Formaldehyde levels less than 27 ppb
- b) Total volatile organic compounds less than $500\mu\text{g}/\text{m}^3$
- c) Carbon monoxide less than 9 ppm
- d) $\text{PM}_{2.5}$ less than $15\mu\text{g}/\text{m}^3$
- e) PM_{10} less than $50\mu\text{g}/\text{m}^3$
- f) Ozone less than 51 ppb



Indoor Air Pollution

-The Slow, Silent & Invisible Killer

- ➡ **Indoor Air Pollution is up to 10 times worse than the 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



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KIWIS CRUSH INDIA IN 4TH ODI TO SEAL SERIES
 WIN, DHONI BLAMES PACERS >ht sport p21

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 >ht business p17

'ALAGIRI SAID STAL
 KARUNANIDHI SAYS THREAT LE

Breathing poison: Delhi's air was deadlier than Beijing this winter

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

CAPITAL BREATHES UNEASY
 Tops global cities with

DANGEROUS Pollution levels rose since mid-November as the chill slowed down the dispersal of pollutants

Chetan Chauhan was because of vehicular and industrial emissions and fire

EMIs set to rise



shortstories

WHO's health shocker: The air we breathe causes cancer

THE TIMES OF INDIA

Delhi, Kolkata have worst air quality in India

Vishwa Mohan, TNN | Oct 19, 2013, 06:25 AM IST

Latest China smog emergence 11 million people

Indian lungs 30% weaker than Europeans'

Durgesh Nandan Jha | TNN
 emission, doctors warned. The study was conducted slightly better than South In

findings have put the focus on India and which showed high concentration

Delhiites worst hit by air pollution: Study

Kolkata Institute Finds Bad Air Killing Immunity

As city sizzled, ozone reached alarming level

Health, Vegetation And Ecosystem Affected



High benzene levels raise alarm

Jayashree Nandi | TNN
 smaller towns. "AM be studied by testin
 Toxic ozone levels set to ys scientist

The Pollution Cocktail Isn't

Brain Function

The brain utilizes approximately 20% of the body's oxygen supply. Compared with other types of cells, brain cells are especially sensitive to oxygen availability, and they quickly begin to die when they are deprived of oxygen.



A STUDY BY EHP JOURNAL

Summary: Poor Indoor Environmental Quality Linked to Workers' Low Cognitive Function

CAMBRIDGE, Mass.—People working in well-ventilated buildings with below-average indoor air pollution and low carbon dioxide, levels showed better cognitive functioning than workers in "non-green" offices with typical pollutant and CO₂ levels, according to a recent study published in *Environmental Health Perspectives*.

"These results suggest that even modest improvements to indoor environmental quality may have a profound impact on the decision-making performance of workers," wrote lead author Joseph Allen, director of the Healthy Buildings Program at the Harvard Center for Health and the Global Environment.

The study of 24 people exposed to different indoor environmental quality conditions over six full work days found that participants' cognitive scores were on average 61% higher on days working in buildings with low pollution levels than on days working in a conventional building.

When lowered CO₂ levels were coupled with lower pollutants in buildings, cognitive scores were 101% higher than in conventional buildings.



WHO ARE WE?

Paharpur Business Centre (PBC),
a Unique Experience Centre
which offers
Flexible Office & Conference Space
in Mountain Fresh Ambience



PBC – A UNIQUE BUILDING

Rated as the healthiest ready-to-move-in office building in Delhi by CPCB, MoEF, GOI and CNCI

USGBC Certified LEED Platinum building – With LEED Dynamic Plaque for Real time monitor of building performance

Rated as BEE 5-Star building with AAhEPI of 28 Wh/hr/sqm

Certified with international accreditations - ISO 9001, 14001, 22000, 50001, SA 8000, OHSAS 18001 & FSSAI

NABERS Certified Building (for Indoor Environment Quality)

CETEC 5 Palm Rating (for Healthy & Sustainable Operating Building)

Signatory to the UNGC & WEP



WE GROW FRESH AIR

With the help of Three Common Plants

The Living Room Plant

Areca Palm

(Chrysalidocarpus lutescens)

**Removes Chemical Toxins
Produces O₂ During the Day**



The Bedroom Plant

Mother-in-law's Tongue

(Sansevieria trifasciata)

**Removes Chemical Toxins
Produces O₂ at Night**



The Specialist Plant

Money Plant

(Epipremnum aureum)

**Removes Chemical
Toxins & Produces O₂
During the Day**



WE GROW FRESH AIR

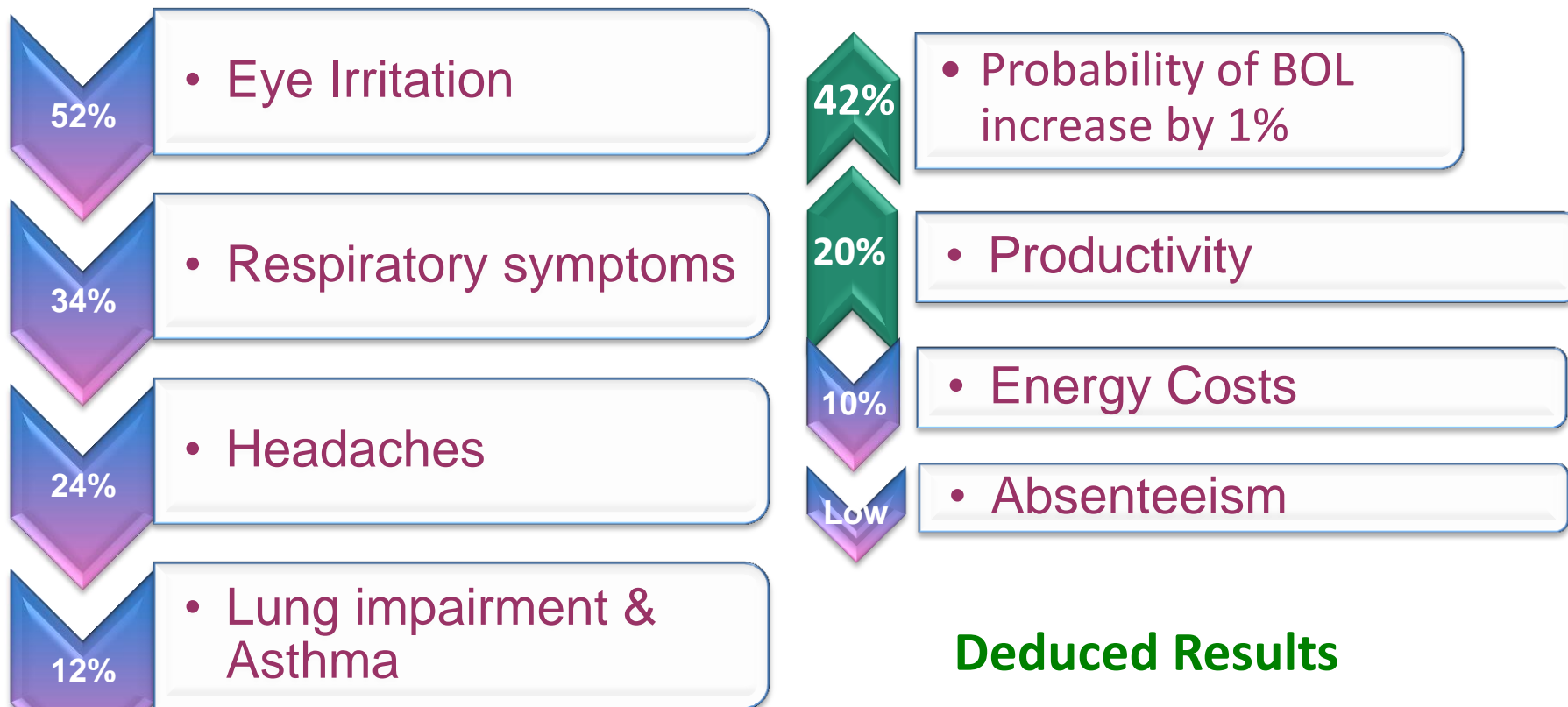
PARAMETERS	AVG. of other Buildings	PBC	% REDUCTION
CO ₂ , ppm	1068	441	59
PM ₁₀ , µg/m ³	689	9	99
PM _{2.5} , µg/m ³	492	5	99
VOC - Benzene, ppb	150	BDL	99.99
VOC - Acetaldehyde, ppb	3125	BDL	99.99
VOC - Acetone, ppb	800	BDL	99.99
VOC - Toluene, ppb	275	BDL	99.99
Aerobic Plate Count, cfu	153	7	95
Fungal Count, cfu	48	<5	90

- 
- BDL – Below Detectable level
 - PPB – Parts per Billion
 - CFU – Colony Forming Units

- PPB – parts per million
- µg/m³ - Micrograms per cubic meter

IMPACT OF GOOD IAQ

A study by CPCB, MoEF, GoI & Chittaranjan National Cancer Institute, Kolkata



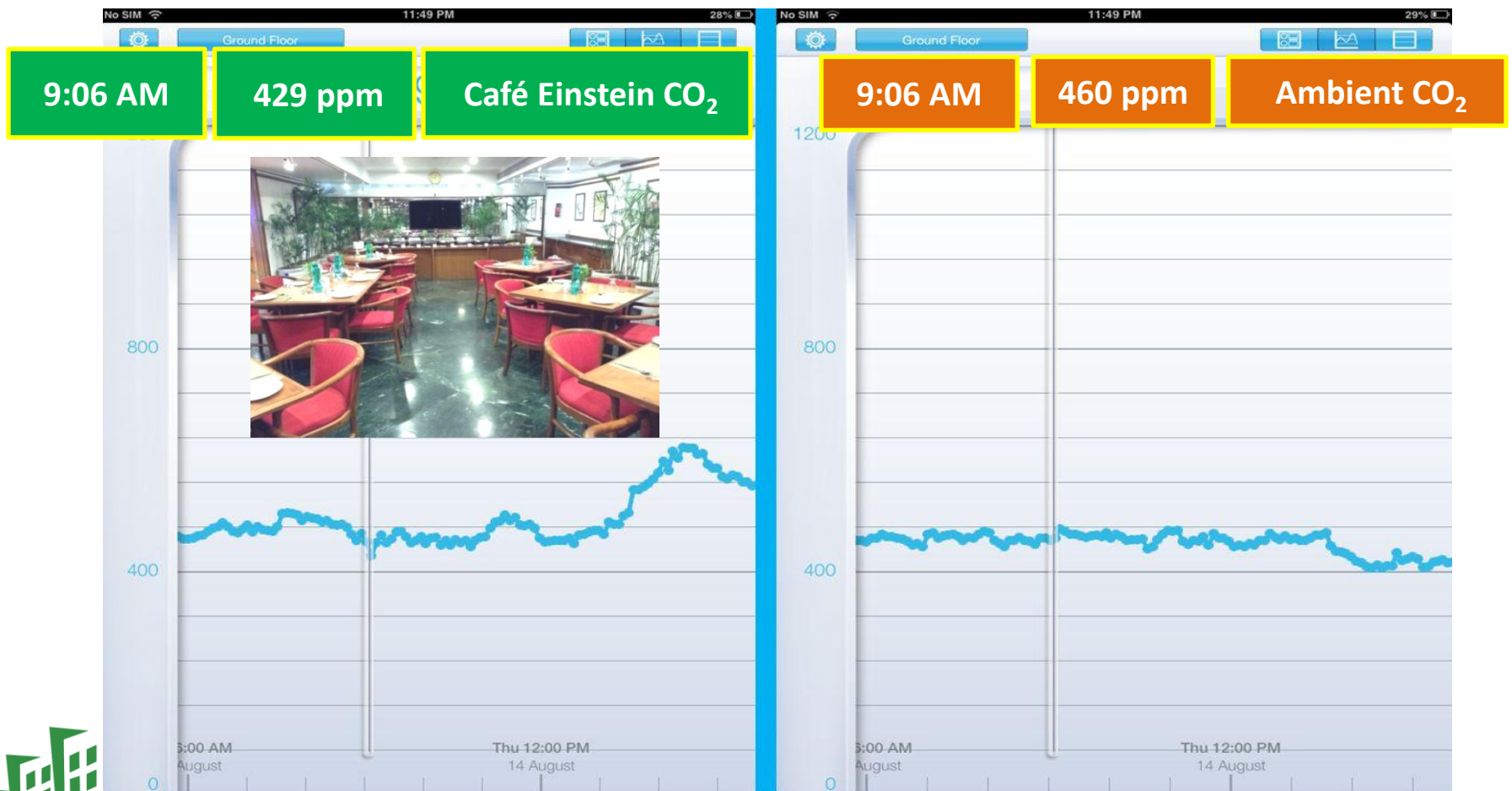
Deduced Results

‘Indoor Air Quality’ (IAQ) at PBC conforms to ASHRAE & WHO standards



CO₂ COUNT

**A SNAPSHOT OF CO₂ LEVEL AT CAFÉ EINSTEIN, PBC
– IT IS LOWER THAN AMBIENT**



Normally Indoors CO₂ levels should be lower than 700 ppm. At PBC we are way below that.



HOW DID WE MAKE IT?

- **Indoor Air Quality System**
- **Displaying Outdoor and Indoor Air Quality Index**
- **Measuring saturated Blood Oxygen Level**
- **Promoting use of Hand - Sanitizers**
- **TB Tests & Blood Pressure Monitoring**
- **Maintaining proper Acoustic levels**
- **Providing Optimal Water Quality**
- **Healthy Food & Beverage services**
- **Maintaining proper Lux Levels for different areas**
- **Health Check-up camps**
- **Yoga , Gym & Massage Chair**



- **Creating Awareness through training sessions**
- **Sharing information on TFTs & emails**



IAQ CAN BE REPLICATED

The same technology can be replicated in other buildings, both in homes and commercial buildings

BreatheEasy (BE), IAQ division of PBC renders Air Quality Solutions to homes (so far completed 2,500 homes in Delhi/ NCR) and commercial buildings



TO BREATHE FRESH

Visit us @

Paharpur Business Centre

and experience 'Davos' or 'Gulmarg' in Delhi'



**The Best Time to Act Towards
Enhancing Wellness & Making Buildings Smart
is NOW**

Thank You

