

Facing the Smog Challenge



By: Kamal Meattle, CEO
Paharpur Business Centre

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Disclaimer

This document is created to help schools in Delhi NCR to tackle the ongoing problem of hazardous air pollution in Delhi area.

The document is based on the recommendations and suggestions provided by Mr. Kamal Meattle, CEO, Paharpur Business Centre (PBC) and an active environmentalist.

Mr. Kamal Meattle became allergic to Delhi's air pollution 20 years ago and found solutions in plants.

Since then, he has been implementing such solutions in his personal life and office space.

He has shared some practical solutions with us, which he has been implementing in his daily lifestyle for years.

It should also be noted that nothing mentioned in the document is intended as medical advice.

These solutions are also taken forward by Breathe Easy. Breathe Easy was incubated by Paharpur Business Centre and is founded by Barun Aggarwal, who is related to Mr. Meattle. All products like air purifiers, car air purifiers, sensors for PM 2.5 and Co2, TVOC"s etc are available from Breathe Easy <http://breatheeasy.com/>

They offer testing services and large scale solutions for clean air in buildings of all types.

To know more about:

- Kamal Meattle, visit: <http://www.pbcnet.com/about-us/CEOs-message.html/>
- Paharpur Business Centre, visit: www.pbcnet.com/about-us/
- BreatheEasy, visit: <http://breatheeasy.com/>

Kamal Meattle invites you to Paharpur Business Centre (PBC), 21 Nehru Place, New Delhi to experience the excellent air quality inside the building.

PBC had its PM 2.5 level below 15 even on the day after Diwali, when Delhi had PM 2.5's over 400.



He also invites everyone to visit Café Einstein, a restaurant on the Ground Floor of the building, at PBC, to experience the fresh mountain air along with fresh food.

He believes that it is important to help yourself and do your best to save yourself from poor air quality, improve productivity and improve our cognitive ability.

Given that Air Quality is worsening each year, those who can do something for themselves, should do so and set examples for others.

Air Quality of Delhi has gone from bad to hazardous in the past few days after Diwali.

Air quality or ambient (outdoor) air pollution is represented by the annual mean concentration of particulate matter PM 10 (particles smaller than 10 microns) and PM 2.5 (particles smaller than 2.5 microns).

source: Wikipedia

Prescribed standards

On 6th November 2016

PM 2.5 - 60

more than 900 in most areas

PM 10 - 100

more than 1,500

Delhi is witnessing its worst smog in last 17 years.

Below is the air quality guide for PM 2.5 level to understand the situation better.

| Air Quality Index (AQI) | PM 2.5 Health Effects Statement | PM 2.5 Cautionary Statement |
|--|--|--|
| Good (0 - 50) | PM 2.5 air pollution poses little or no risk. | None |
| Moderate (51 - 100) | Unusually sensitive individuals may experience respiratory symptoms. | Unusually sensitive people should consider limiting prolonged outdoor exertion. |
| Unhealthy for Sensitive Groups (101 - 150) | Increasing likelihood of respiratory symptoms in sensitive individuals, aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly. | Active children and adults, and people with respiratory diseases, such as asthma, should limit prolonged Outdoor exertion. |
| Unhealthy (151 - 200) | Increased aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; increased respiratory effects in general population. | Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion. |
| Very Unhealthy (201 - 300) | Significant aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; significant increase in respiratory effects in general population. | Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion. |
| Hazardous (301 - 500) | Serious aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; serious risk of respiratory effects in general population. | Everyone should avoid all outdoor exertion. |
| Beyond Index (> 500) | Extremely High Levels of PM2.5 | |

Source: U.S Embassy, New Delhi, Website

So, what are the causes of air pollution in Delhi?

It begins when the paddy husk is burned on the fields in neighboring states. This is followed by Diwali crackers and a temperature inversion.

The warm air is unable to rise and travels horizontally to slightly cooler areas of Delhi like Lodhi Garden, Nehru Park, Chanakyapuri, PM Residential complex and the Lutyens Delhi area, which has a large number of trees and is cooler than the surrounding concrete areas.

The horizontal wind current increases the PM 2.5, in these areas.

Burning of Grass, leaves, plastic and rubber, etc by Security Guards, to keep themselves warm, leads to added pollution.

Vehicular emissions from a number of motorcycles which are not checked for PUC, adds to the problem. Diesel vehicles add to NOx and PM 2.5 tailpipe emissions, as they do not have Diesel Particulate Filters (DPF) fitted on them.

The Nox combines with other hydrocarbons under sunlight and heat and becomes ozone. This is very harmful and leads to an increase of Out of Hospital Cardiac arrests (OHCA).





Children, who have higher respiration rates, have irreversible lung damage due to poor ambient quality of air.

We may not be able to produce a Ms. Sania Mirza or Mr. Sachin Tendulkar, from Delhi!

In addition, research shows that pollution can lower children's intelligence quotient and increase the risks of autism, epilepsy, diabetes and even

Adult onset diseases like multiple sclerosis.

Adults have reduced lung capacity, headaches, sore throats, coughs, fatigue, and early deaths as a cause of unhealthy air quality.

In last year's CSE report, it was mentioned that air

pollution is responsible for 10,000 to 30,000 deaths in the national capital every year.





We, at citizen level, cannot completely get rid of the air pollution, but certainly can take steps to protect ourselves by taking action at the individual level, house /school level and community level.

While taking action one should not only think of protecting oneself, but also help the community to lessen the air pollution.

Solutions at individual level

1. Intake of anti- oxidants and supplements:

Following are few sources and food supplements that can be included in the diet for better immunity, to fight health impacts from air pollution:

- a. Chawanprash
- b. Fish oil
- c. Garlic
- d. Chlorella
- e. Spirulina
- f. Krill oil
- g. Chelated Magnesium Glycinate

2. Vegetables and Fruits help fight pollution effects: as anti - oxidants

- **Chakotra** boosts the immune system, improve digestion, lowers blood pressure, prevents cancer and protects heart health.
- **Amla:** A shot of Amla juice with honey on an empty stomach in the morning, boosts the immune system.
- **Wheat Grass Juice:** Wheat grass juice is one of the best sources of living chlorophyll available. It is a superior detoxification agent compared to carrot juice and other fruits and vegetables. It is high in oxygen like all green plants that contain chlorophyll which is anti-bacterial. The brain and all body tissues function at an optimal level in a highly oxygenated environment.
- **Pomegranate seeds and Juice:** For breakfast, the best is to have one Pomegranate (one that does not have very hard seeds) and eat it along with the seeds. The edible insides of the pomegranate, are little ruby red bursts of sweet and tart deliciousness that pack a seriously big punch of health benefits. The juice portion has an antioxidant activity three times higher than red wine and green tea. Together, they heal the body and the mind. Pomegranates can help prevent or treat various disease risk factors, including high blood pressure, high cholesterol, oxidative stress, hyperglycemia, inflammation and provide anti carcinogenic effects.
- **Mung Bean Sprouts:** For breakfast, Sprouted Mung beans have biological activities including anti-oxidant, anti-microbial, anti-inflammatory, anti-diabetic, anti-hypertensive, lipid metabolism accommodation, anti-hypertensive and anti-tumor effects.
- Its best to consume organically produced food and products.
- Consumption of Trans fat is cancer producing.
- Avoid reuse of oil used in frying as it has Trans fats.
- Avoid eating any candies, chocolates, etc. with Trans fats or Hydrogenated oils.

3. Take plenty of fluids

A good check is to keep nostrils moist and urine nearly colorless.

4. Exercise in daily routine

Some of the suggested Pranayam exercises, that can be included in the daily routine, are:

- a. Diaphragmatic Breathing
- b. Reaching to the ceiling
- c. Windmill
- d. Thigh and Lung strengthening
- e. Foot Treading
- f. Anulom Vilom
- g. Kapal Bhati

It is important to not indulge in outdoor or indoor exercise and activities when air has PM 2.5 level of more than 150 ug /m³ and ideally, < 60 ug /m³ outdoors and < 15 ug /m³ indoors.

5. Know your Body well.

Measure your Blood Oxygen level

The Blood Oxygen level is measured for SpO₂ by a Pulse Oximeter. Blood Oxygen level should always be higher than 96%.

A Pulse Oximeter is available online.

If the SpO₂ is below 96, it is advisable to visit one's pulmonary doctor and get a Lung Function Test done.

If the blood oxygen level is between 96 - 97, it is advisable to practice Pranayam, and bring it up to 98 - 100.

Get **Blood pressure** checked



IGE level serum blood test should be done to identify symptoms of allergies because of various pollutants in the air.

Many online free Apps are available for health check:

”Oximeter“: It gives a reading of Blood Oxygen levels and Heart Rate

“Heart Rate“: It measures Heart Rate.

“Argus“: It tracks footsteps. One should take ~10,000 steps per day.



6. Take care for your body well

- Clean nose & throat and gargle in the morning & evening daily
- Apply edible oil in the nostrils to keep them moist and to trap particulate matter.
- Rinse the nostrils with water.

7. PH level of drinking water is important.



- PH level of our blood is ~ 7.4 (slightly alkaline side of neutral) and it is very important to maintain this PH level.
- PH scale is between 0 - 14.
- 0 is most acidic, 14 is most alkaline and 7 is neutral.
- When the PH level of our body is slightly acidic, oxygen level of tissues is low and one would have difficulty in holding breath for more

than 20 seconds.

- Drinking water should have PH level a little > 7.4 to maintain the PH level of our body. Ideal PH is 7.6 with water that contains minerals like Ca, HCO₃, FI, Mg, NO₃, etc with a TDS of ~900.
- Many RO water purifiers bring the PH level to a slightly acidic side.

- Even most bottled water PH is < 7.4
- Carbon dioxide from the atmosphere dissolves in water, creating a dilute solution of carbonic acid. This is more so in Carbonated water.
- Measure PH of drinking water by a PH test strip, available online on websites like www.amazon.in or www.ebay.in
- Add a pinch of food grade baking soda in water to make it ~7.6, especially if it's acidic.

8. Watch air quality index regularly

It is important and intelligent to know about the ambient air quality and the indoor air quality, especially in the bedroom, where one spends 1/3rd of the time.

It can help one in taking decisions on either to participate in outdoor activities or to stay indoors.

One can download free air quality apps: "AirVisual" and "Global PM 2.5"

Sensors are available in market to measure the PM 2.5 level and CO₂ level, indoors.



9. Wear masks

Wear a mask when exercising, if the ambient air quality is not acceptable



- In Japan, even when air quality is good, people wear masks, to protect themselves from infection.
- However, in India people consider wearing masks, not fashionable. This is now changing because of necessity.

- It is important to replace the mask, depending on the hours of use.

Even the best masks have to be replaced after 90 hours of use if the air quality index is over 500, which is the case in Delhi during winters.

It is important to fit the mask properly.

Please also remember that one may inhale part of the breath that one exhales and hence the CO₂ level of air inhaled will increase.

Different masks are fitted, based on the weight of the person.

The mask should be FFP2 rated (N95 % equivalent) that are ~ 95 % efficient at filtering out PM 2.5 level. These are comparatively less expensive. These are not as effective.

Masks which are N99 CE certified (3M Mask and Cambridge masks) filter out 99 % of PM 2.5 levels.

Different types of masks are available in the market and prices vary between INR 200 - 2,500.

1. Use of Air purifiers

It is advisable to use air purifiers in homes, vehicles and offices, as on an average, a person spends 90% of its time indoors.

Many air purifiers are available.

Commercial systems to remove Nox, Sox, Ozone, VOC's and PM 2.5 are also available for shopping malls, schools, offices, homes and larger spaces.

Buy air purifiers, which do not have an Ionizer that generates Ozone.

Ozone has the tendency to oxidize the lungs.

This increases the absorption of pollutants entering the arteries, at a faster rate.

It results in a higher velocity of PM 2.5's entering the blood stream along with oxygen, sent by the lungs.

PM 1, which is $\frac{2}{3}$ rd of the PM 2.5 present in ambient air, is a nano particle and very dangerous to human health.



PM 1 clogs the arteries and increases the risk of out of hospital cardiac arrests (OHCA).

It is important to know the outdoor air quality and take steps to maintain better air quality inside.

Sensors are available to measure the PM 2.5 level, and some that give both CO₂ and PM 2.5 readings.

Some cost effective air purifiers that do not produce Ozone, are made by IQ Air, Sharp and Phillips.

2. Indoor Plants, to “grow your own fresh air”

There are 3 common indoor plants, which are easily available to maintain indoor air quality:

1. Areca Palm (*Chrysalidocarpus lutescens*)
2. Money Plant (*Epipremnum aureum*)
3. Mother law’s Tongue (*Sansevieria Trifasciata*)



For more information on which indoor plants to have and why, please view to a TED talk by Mr. Kamal Meattle on “how to grow your own fresh air”

https://www.ted.com/talks/kamal_meattle_on_how_to_grow_your_own_fresh_air?language=en#t-161398

3. Check the use of products that release harmful chemicals indoors

Harmful chemicals are released from cleaning agents, varnish, paints, etc, which are used in our homes, schools and offices and affect indoor air quality and human health.

Organic and green cleaning products are available online on shopping websites: www.amazon.in www.organicshop.com for house cleaning.

Use paints that are lead free and have less VOCs.

Lead-free and low VOC paints are available from Nippon Paint, Asian Paints and others.

<http://www.nipponpaint.co.in/>

Avoid using air freshener sprays, nail paint removers, and incense sticks, indoors, unless the area is properly ventilated.

4. For Bedrooms

Bedrooms require special attention as we spend 1/3rd time of the day in our bedroom.

It is prudent to open windows at daytime and allow inside CO₂ level to be equal with CO₂ level outside, so that there is no growth of bacteria and fungus indoors.

In the evening, close all the openings, put on the air purifier at full speed for 2-3 hours.

At time of sleep, reduce the speed of air purifiers.

Decreasing speed will reduce the noise level and will result in better sleep quality.

Four to Eight indoor Mother-in-law's tongue plants per person, depending on their size, should be kept in the bedroom.

Make sure plants are not over watered and should be sponged, so that there are no black particles on the tissue paper, on wiping the leaves.

They must be grown using vermi manure, which is sterile. Otherwise, there will be bacteria & fungus, which will cause health issues.

These plants are used to reduce the CO₂ level inside the bedroom, as the carbon dioxide level is higher inside, than in ambient, as we inhale air and exhale CO₂.

Mother-in-law's Tongue is a CAM plant and is able to convert CO₂ to oxygen at night.

5. In a vehicle

While sitting in a vehicle, open windows for few minutes to remove VOC's and other harmful chemicals, emitted from plastics etc and then close them.

Car air purifiers should be used.

6. Schools that are not Air Conditioned

Paharpur Business Centre's and Breathe Easy's experience is to improve the indoor air, in air-conditioned spaces.

Example: The American School, German School, French Embassy, Apeejay School, Select City Walk offices etc.

Cleaning up the indoor air in a non AC environment, is a Challenge but doable.

One cannot place air purifiers inside classrooms to remove PM 2.5 as the CO₂ levels would go up. There will be too many plants, if a class has 30 or more children!

Given our own 20 years experience with many people and the recent Harvard and The University of California, Berkeley studies; they all point to keeping the CO₂ below 650 ppm in rooms, for enhancing cognitive ability of occupants.

Hence, a central air purification system with ducts has to be designed which can remove the PM 2.5, Sox, Nox, and Ozone from ambient air, and send it to the classrooms, while creating a slight positive air pressure, in the class room.

While doing this, it may be prudent to cool the air through a cooling coil or treated water evaporation to make the classrooms pleasant in the summer and perhaps warmer in the winter, using solar heating. However, this can be optional.

Work has to be done to optimize the solution but there are development costs involved. Some new equipment using new technologies is available that removes CO₂ indoors along with VOC's and then periodically throws them out into the atmosphere. This can be used where use of plants or Greenhouses is not feasible.

Solutions for ambient air quality

- Adequate warm clothing should be provided to security guards working at night. Prohibit them to burn twigs, plastic or coal at night.
- No burning of waste and educate and discourage others to do so.
- Plant trees and maintain them.
- It is important to clean the leaves of trees regularly to reopen their stomata.
- Wash outdoor trees with a 40 bar pressure pump to create a micro-climate in the area.
- High pressure pumps are available.
- Kaercher provides high pressure washer and it's available online on websites like ebay and Amazon or <https://www.kaercher.com/us/>

Reason: Stomata of the leaves gets coated /covered with pollutants and photosynthesis stops. The trees then hibernate.

Cleaning leaves allow them to perform photosynthesis and convert carbon dioxide into wood mass, creating a micro climate in the area.

- Use LED lights and five star rated appliances, as it will reduce load on power plants.
- Reduced consumption of electricity will help in shutting down the coal burning and polluting power plants.
- Consume responsibly.
- Use Solar PV panels on rooftop.
- Encourage the community to have community fireworks during festivals like Diwali.
- Such initiatives will help in reducing the amount of burning of firecrackers and less air pollution due to reduced electricity consumption. Electricity is generally generated by burning coal, which also increases pollution and CO₂ in the air.



BRING THE CHANGE BY CAMPAIGNS

Collective voice has the power to change.

You can raise your voice and ask your Government to take the necessary action.

Ms. Sevren Suzuki, at the age of 9, gave a powerful speech at the Rio Earth Summit in 1992. She has been speaking and writing about environmental issues since she was small.

Listen to her speech here: <https://www.youtube.com/watch?v=oJJGuIZVfLM>

You can ask the Government to take action on severe air quality in Delhi and tell everyone, that you care about the air you breathe.

1. By starting or signing an online petition
2. Writing a letter to your government
3. Tweeting the problem of air pollution
4. Spreading the word on Facebook
5. Talking about it among your friends and family
6. Share solutions
7. Lead by example.

If millions of such message will be sent, our Government will certainly wake up and make it a priority.

There are > 5,000 schools in Delhi. Each student is associated with 4-5 family members and hence children have direct access to 5 million family members or > 25% of Delhi's population.

Together, therefore, we can bring change.

Some of the other related problems, one can talk about, are following:

- To take action on the burning of crop residues.
- Have plants on both sides of roads.
- Clean roads at night with vacuum cleaning machines.
- Have roads free of potholes.
- Vacuum cleaning machines cannot be effectively used on roads having potholes.
- Open call centers with a toll free number to register complaints for potholes on main roads and burning of leaves etc, producing smoke.
- Remove service tax applicable on electricity sold to tenants, when produced from PV panels by owners.
- Have diesel cars with Diesel Particulate Filter (DPF) as in developed countries.
- It will drastically decrease NOx and PM 2.5 level tailpipe emissions.
- Diesel Particulate Filtration cannot be used in India, as the Euro 3 or Euro 4 diesel with > 10 ppm of Sulfur cannot be used with it.
- Euro 6 diesel with < 10 ppm of Sulfur is produced and exported by companies like Reliance, but we export it and import Euro 3 & 4 diesel. Why?
- Vehicle producers in India produce and export Euro 6 compliant cars but need another 3 years to produce them for the Domestic Market. Why? Perhaps, because the cost of their product will go up and hence reduce their sales? Who wants his product price to go up in a price sensitive market like India?
- Mandate and check the emission standards for two wheeler vehicles.
- If there is no PUC, there should be no fuel sold to the vehicle.
- Last mile connectivity of public transport.
- Connect METRO stations to people's homes using buses – small and large.

- Small size buses can be used for smaller and narrow lanes to better connect homes in the lanes with the METRO station for last mile connectivity.
- Learn from the DOMINO PIZZA distribution model.

Sample letter to CM /MLA /Minister

Dear Hon. Sir /Madam,

As we are all aware, Delhi NCR is now experiencing the worst air quality in the last 17 years and is affecting each one of us.

The adverse effects of such bad quality of air are known to all of us.

The time has come that we pay serious attention to this issue.

We are finding it difficult to breathe.

Please understand that it is about our future and with so many children facing these issues, we really need to fix the problem.

We live in the Capital of India and are visible to the entire World.

Since not everyone has the resources to invest in buying purifiers and masks, it's time the higher authorities take some stringent measures to make the city a better place to live in.

We are confident that you do not wish to make Delhi livable only for the rich who can afford to have their personal air purification devices and masks.

What about some of us living in *Jhuggi - Jhopris*, using Buses and METRO, walking or traveling on a bicycle or motorcycle? Are we not important to you?

Should the city be not inclusive for all?

Thank you,

Best wishes,

Signed

(Name)

Address:



About Kamal Meattle

Kamal Meattle, CEO - Paharpur Business Centre (PBC) is an environmentalist and serial entrepreneur with more than twenty five years of real estate experience and several awards to his credit.

He created a model of Health and Wellness at Work, “Paharpur Business Centre” (PBC) in 1990, an mSME in the services and real estate sector widely recognized for providing office and conference solutions in mountain fresh ambience.

After becoming allergic to Delhi’s polluted air, Kamal discovered that three common houseplants can help growing fresh air, and reduce indoor air pollution.

He implemented this innovative bio-technology, “Indoor Air Quality” in PBC to create Mountain-fresh ambience that conforms to ASHRAE and WHO standards.

Kamal spoke about, “How to grow fresh air” at TED TALK held in the USA which has been since viewed by over 2.7 million people.

http://www.ted.com/talks/kamal_meattle_on_how_to_grow_your_own_fresh_air.html

Kamal has founded various NGOs like Save the Tree Organization, Save Two Wheeler on Polluting Delhi and Nehru Place Greens Society.

He has also led a public campaign to reduce the benzene content in gasoline from 5 % to 1 % to make ambient air better. He has filed successful PIL on environmental issues in the Hon. Supreme Court of India.

He is a trustee of “The Climate Reality Project” (TCRP) founded by Nobel Laureate,

Al Gore.

Kamal has been personally groomed by him, as a Climate change leader.

In 2005, Kamal was conferred with the PHD Chamber's, "Ethics is Good Business Award," by the then, President of India, Mr. Abdul Kalam.

Kamal holds a B. Sc. Degree from Joseph's College, North Point, Darjeeling and an SM from the Sloan School of Management, MIT, USA. He also attended the Doon School in Dehradun.

In 2007, he was conferred with a Lifetime Achievement award by St. Joseph's College, North Point, Darjeeling, and the prestigious Massachusetts Institute of Technology (MIT), Distinguished Alumni Award.

He was also featured in the "MIT Technology Review" as "The Mad Hatter of Nehru Place Greens."

About Paharpur Business Centre

Paharpur Business Centre (PBC), an office building that makes people smarter & helps businesses grow, aims at offering workspace that enhances human experience.

There are more than 800 workstations in the centre offering people the perfect place to work for the office, co working, training programs, interviews and conferences on a 24 x 7 basis.

The building is the first retrofit office building in India that is USGBC LEED Platinum EB Certified (2010) and a BEE 5 star rated with a current annual average energy hourly energy rating (AAhEPI) of < 20 Wh /hr/sqm.

It is a Pilot Project for DELOS WELL that lays emphasis on wellbeing and productivity of the building's occupants in a holistic manner.

IAQ, at Paharpur Business Centre, a certified USGBC LEED Green Platinum Building, falling in the enhanced green category, conforms to ASHRAE & WHO specified guidelines.

It has been certified by NABERS, Australia for its IEQ.

The indoor air is as fresh as one would experience in the mountains like Gulmarg, Kashmir or Davos.

Over the past 20 years, experience shows that occupant Blood oxygen level in PBC increase by 1% with a 42% probability, if one remains indoors, for 8 -10 hours.

An October 2015 study by the Harvard T.H. Chan School of Public Health's Center for Health and the Global Environment that "Cognitive performance scores for the participants who worked in the green+ environments, were, on average, double those of participants who worked in conventional environments; scores for those working in green environments were 61 percent higher."

It explains that when lowered CO₂ levels were coupled with lower pollutants in buildings, cognitive scores were 101% higher, than in conventional buildings.

Another study, published by Center of the Built Environment, UC Berkeley, in August 2016, has found, that "Elevated indoor CO₂ levels are indicative of insufficient Ventilation, in occupied spaces and correlate with elevated concentrations of pollutants of indoor origin. Adverse health and well-being outcomes, associated with elevated

indoor CO₂ levels, are based on CO₂ as a proxy; although some emerging evidence suggests CO₂ itself, may impact human cognition.”

Another study has been released by United Technologies on October 5, 2016. The study, conducted by Harvard, shows that:

COGNITIVE RESULTS IN INDOOR ENVIRONMENT, IN GREEN BUILDINGS, ARE 61% HIGHER IN ENHANCED GREEN BUILDINGS, IT IS 101% HIGHER, THAN CONVENTIONAL BUILDING.

The study states that improved indoor environmental quality doubled cognitive function test scores in the 24 study participants.

Of note, participants’ cognitive performance scores averaged 101 percent higher in green buildings, with enhanced ventilation, compared to those in conventional buildings.

The largest improvements in cognitive function occurred with crisis response, Information usage and strategy.

SCORE BREAKDOWN

| COGNITIVE FUNCTION | GREEN COGNITIVE SCORE PERCENT CHANGE (as Compared with Conventional) | ENHANCED GREEN COGNITIVE SCORE PERCENT CHANGE (as Compared with Conventional) |
|---------------------------|--|---|
| INFORMATION USAGE | 172% | 299% |
| STRATEGY | 183% | 288% |
| CRISIS RESPONSE | 97% | 131% |
| FOCUSED ACTIVITY LEVEL | 51% | 48% |
| BREADTH OF APPROACH | 21% | 47% |
| APPLIED ACTIVITY LEVEL | 4% | 36% |
| BASIC ACTIVITY LEVEL | 14% | 36% |
| TASK ORIENTATION | 3% | 15% |
| INFORMATION SEEKING | 9% | 11% |

PBC & support services are certified to ISO 9001; 14001; 22000; 50001; SA 8000; OHSAS 18001 and FSSAI standards.

It is a signatory to the United Nations Global Compact (UNGC) and Women's Empowerment Principles (WEP).

The building is a perfect place to work from as it improves productivity, wellness and Cognitive ability.

Please visit the Centre and experience the difference.

The PM 2.5 is < ~ 15 ug /m3 all the time, even when the outside PM 2.5 is more than 400.

The Air Quality readings at PBC on the day after Diwali on Monday, October 31, 2016 were:

Test – 10:30 am on October 31, 2016

| Location | PM10 (µg/m3) | PM2.5 (µg/m3) | PM1 (µg/m3) | CO2 (ppm) | TVOC (ppb) | Sound Level (dB) |
|-----------------------|--------------|---------------|-------------|-----------|------------|------------------|
| Ambient | 640 | 412 | 390 | 420 | 0 | 72.1 |
| Green House | 14 | 9 | 7 | 415 | 0 | 69.7 |
| 6 th Floor | 25 | 20 | 17 | 470 | 0 | 47.4 |
| 5 th Floor | 13 | 10 | 8 | 482 | 0 | 56.2 |
| 4 th Floor | 13 | 11 | 9 | 484 | 0 | 44.7 |
| 3 rd Floor | 18 | 14 | 12 | 600 | 0 | 56.4 |
| 2 nd Floor | 16 | 12 | 10 | 566 | 0 | 58.1 |
| 1 st Floor | 30 | 25 | 22 | 640 | 0 | 49.6 |
| Ground Floor | 16 | 11 | 9 | 655 | 0 | 70.0 |
| Café | 16 | 10 | 9 | 590 | 0 | 67.6 |

Today's Relative humidity level in the Building

| Floors | Ambient | 6 th | 5 th | 4 th | 3 rd | 2 nd | 1 st | GF |
|-----------------|---------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----|
| Humidity (in %) | 57 | 56 | 56 | 57 | 57 | 56 | 56 | 56 |

There is a 42 percent probability of one's blood oxygen going up by 1% if one stays indoors in good indoor air quality as that of the Paharpur Business Centre.

PBC has fully furnished, smart and healthy, work spaces, for office, co-working, Interviews, trainings and conferences on a 24x7 basis, improving occupant wellness, productivity and cognitive abilities.

An in-house restaurant Café Einstein is the place, to enjoy a cup of freshly brewed coffee or tea or some fresh coconut water in an environment that's Fresh to accompany Fresh Food.

Paharpur Business Centre after experiencing the benefits of the Indoor Air Quality system (IAQ) in its own building went on to other buildings and let people know the difference between breathing clean air and availing the benefits.

This is how Breathe Easy came into existence. It was incubated by PBC. It is a business model which not only creates awareness, but also makes people believe that breathing clean air is possible.

Breathe Easy helps other companies implement solutions to improve Indoor Air Quality while reducing their energy footprints.

They do commercial projects and homes. They test, sell air purifiers, sensors, masks, car air purifiers, plants and other services, for indoor air quality.

It targets Hospitals, Schools, Embassies, including Homes to replicate this system.

Breathe Easy has implemented solutions in The American Embassy School, The German School, The Embassy of France, Select City Walk, Apeejay School and > 6,000 homes in Delhi NCR.

IAQ system can be implemented in every building that has a controlled AC system.

Some press about us is below:

Recent CNBC TV18 – link to video is here:

http://www.moneycontrol.com/video/business/breatheeasy-technology-to-produce-fresh-air_1210335.html

National Geographic Coverage – December 2014: <http://news.nationalgeographic.com/news/energy/2014/12/141230-can-plants-really-clean-indias-air/>

The Climate Reality Project, India

Former U.S. Vice President and Nobel Laureate Al Gore founded the Climate Reality Project in 2006.

As a program of the Alliance for Climate Protection, TCRP's mission is to educate the public about the harmful effects of climate change and to work toward solutions at a grassroots level, worldwide.

India Branch aims to provide teachers in every school with the tools and techniques to educate their students about climate change, and choices to mitigate and adapt to its dangerous consequences.

We have been successfully doing it through our Teachers Training Program.

The Teacher Training Program on climate change is our Flagship Program running successfully since 2009.

We have trained more than 2,000 teachers from > 550 schools.

We plan to cover all the +5,000 schools in Delhi with over 1 million children.

We have over 500 Climate Reality Leaders in India.

You can also register as a volunteer with us.

For more information visit:

<https://climaterealityproject.org/>

&

www.climatereality.org.in/

BREATHING EXERCISES



IMPORTANT NOTES

- When doing these exercises, breathe out through pursed lips as you move.
- It is important these exercises every morning!
- Keep a proper sitting posture when doing these exercises.

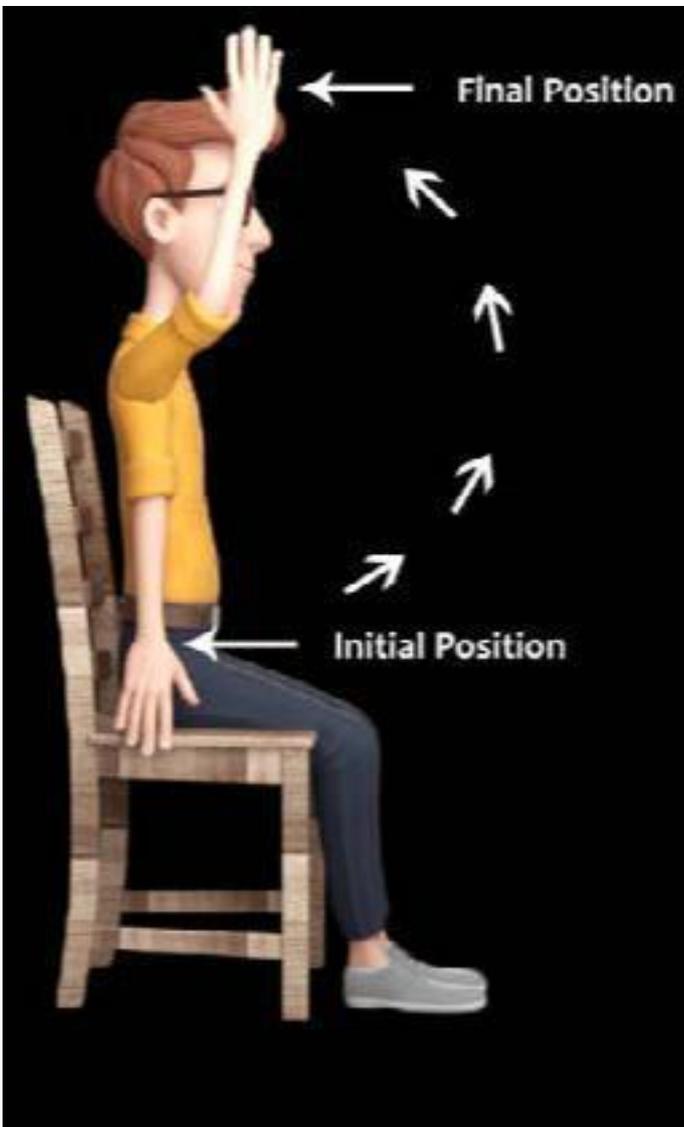
Diaphragmatic Breathing



- Sit in a relaxed position, hands on stomach.
Breathe in through your nose, feel hands move out.
- Breathe out twice as long through pursed lips, feel hands move in.



Reaching to the ceiling

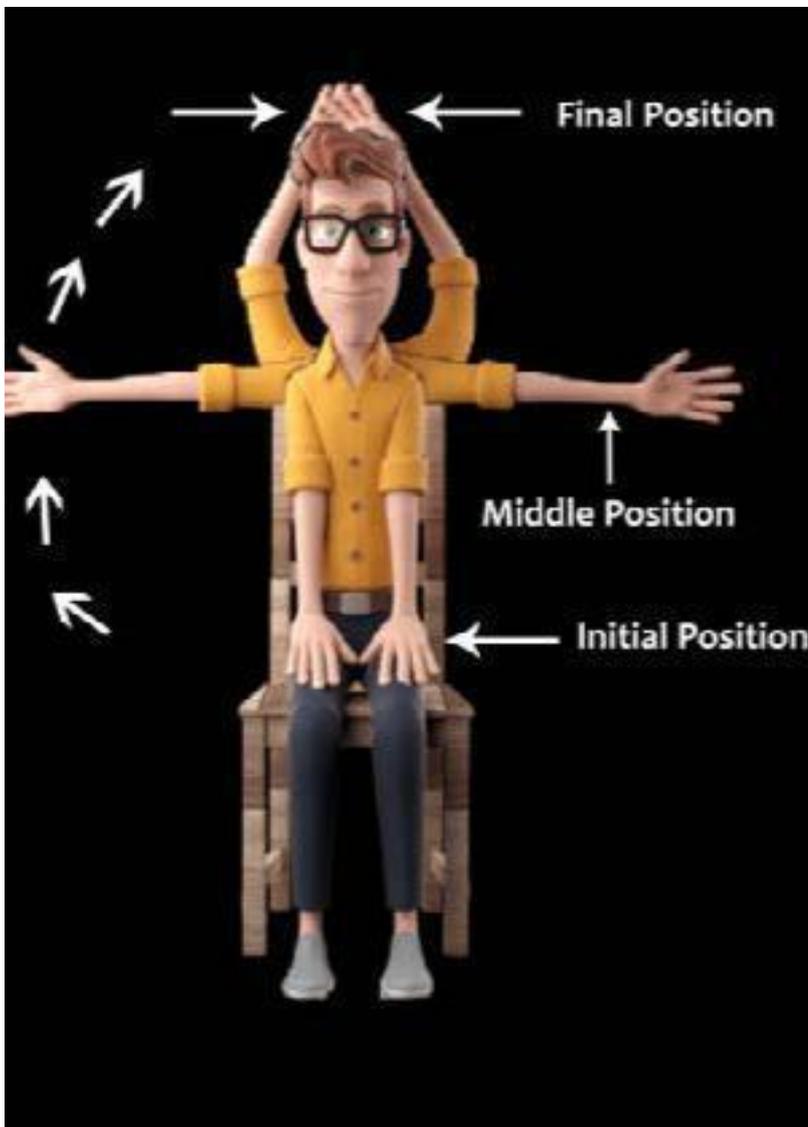


- Sitting. Shoulders relaxed.
- Breathe out as you raise one arm forwards and up towards the ceiling.
- Pause and breathe in. Breathe out and lower arm.
- Repeat with other arm.

(5 TIMES TO EACH SIDE)



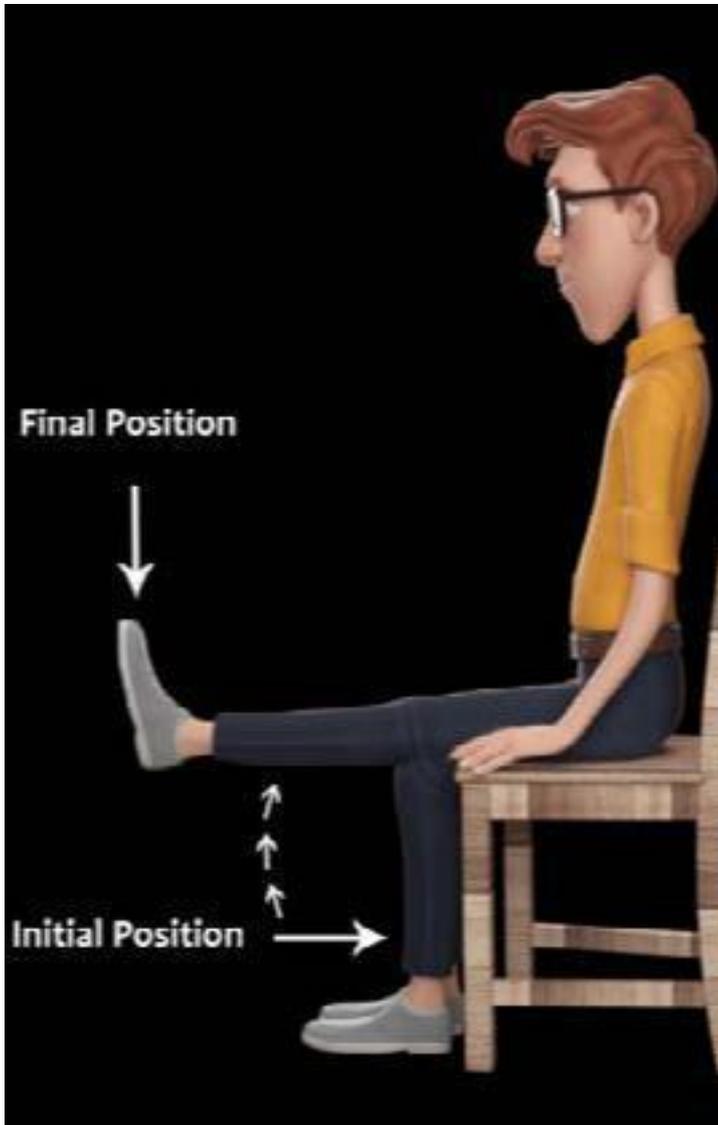
Windmill



- Sit in a relaxed position.
Arm's on lap.
- Breathe out as you raise arms out to the side and up over head.
- Pause and breathe in.
- Breathe out lowering arms out to the side and back to your lap.



Thigh strengthening

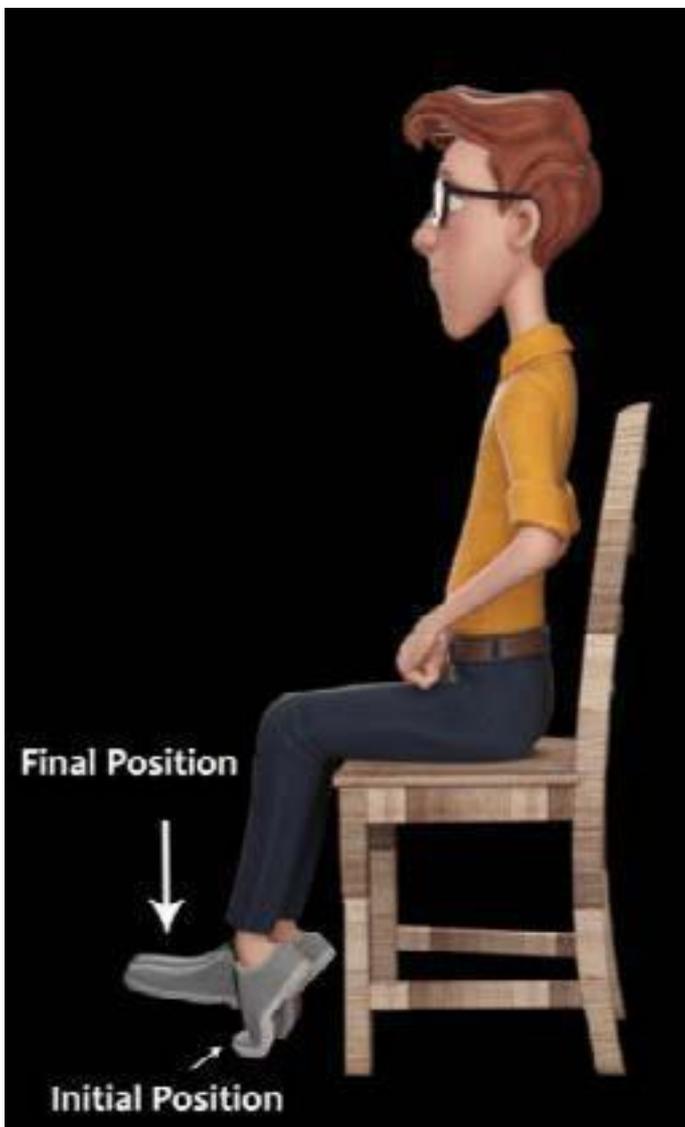


- Sitting, shoulders relaxed.
- Breathe out as you straighten one leg. (Keep your toes pointing to the ceiling).
- Pause and breathe in.
- Breathe out slowly, lowering your foot to the floor.
- Repeat with other leg.
- Don't let your leg drop.

(5 TIMES FOR EACH LEG)



Foot treadling



- Sitting, shoulders relaxed.
- Pump heels and toes up and down.
- Breathe continuously using pursed – lips.



Anulom Vilom

- Sit in a relaxed position.
- Inhale through the left nostril, while inhaling, close the right nostril with thumb.
- Hold breath and count to 20.
- Close left nostril with finger and exhale from right nostril
- Repeat the same step, starting with right nostril to complete the cycle.
- Repeat five times

Kapal Bhati

- Sit in a relaxed position. Take a deep breath in.
- Exhale and pull stomach. Pull navel in - back towards the spine.
- Relax the navel and abdomen.
- The breath will flow into lungs automatically.
- Repeat it 20 times to complete one round of Kapal Bhati Pranayam.