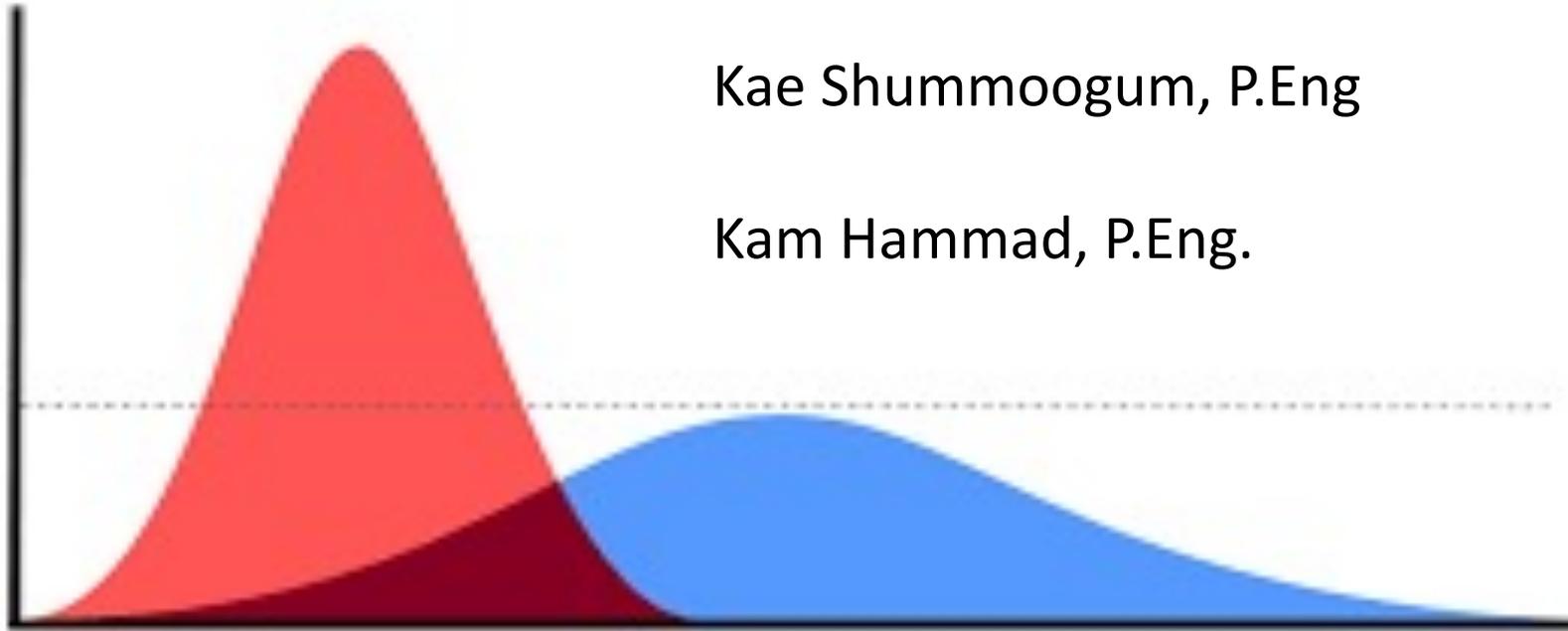


# Flattening the Curve on Indoor Air Pollution in Parking Garages

Kae Shummoogum, P.Eng

Kam Hammad, P.Eng.



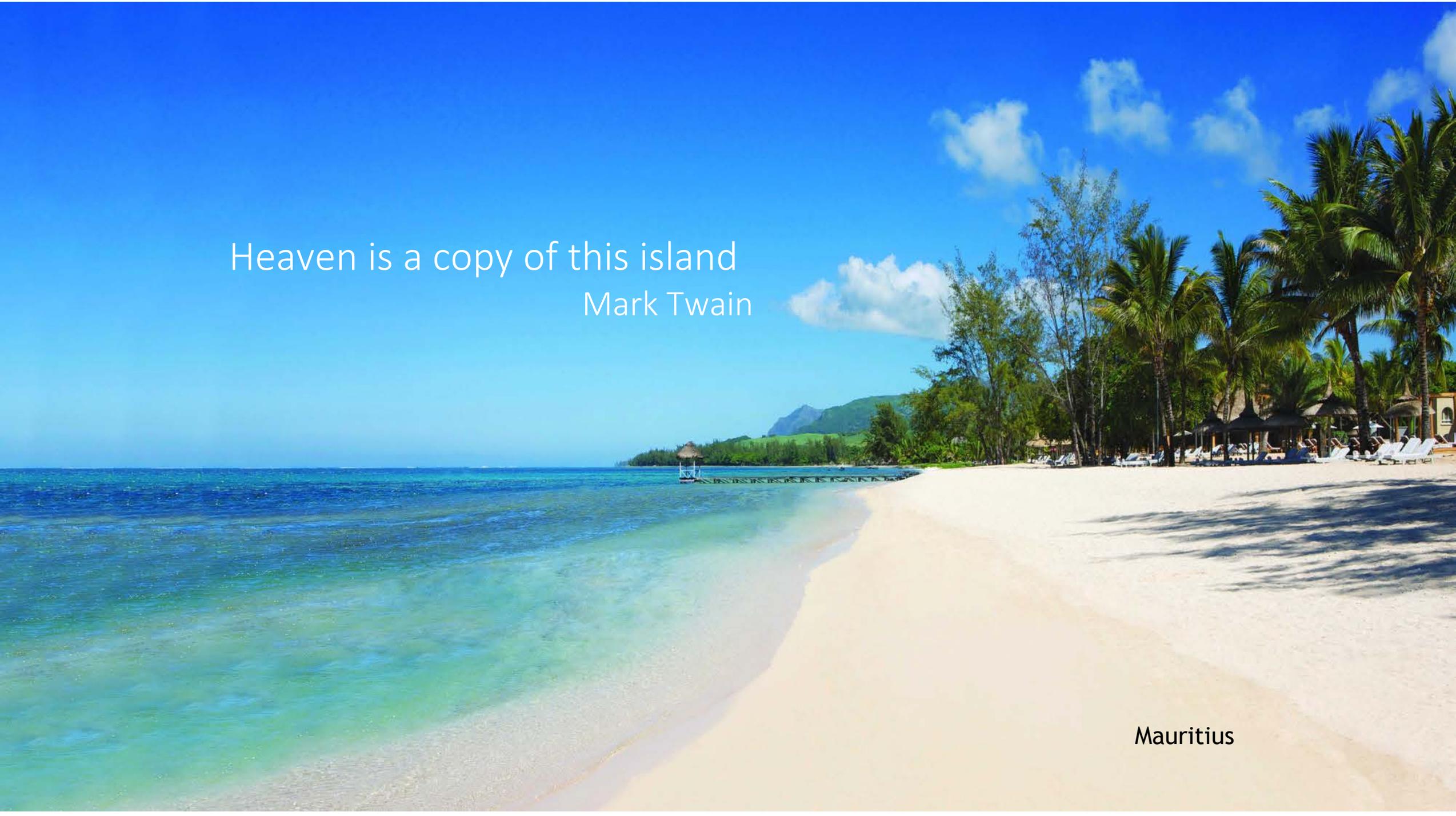
# Fastened your seat belts and relax

## Pollution and technological solutions journey around the world

Kae Shummoogum, P.Eng  
Chief Visionary Officer

Kam Hammad, P. Eng.  
Visionary CEO



A wide-angle photograph of a tropical beach. The foreground is dominated by a wide expanse of bright white sand. To the left, the ocean's edge is marked by gentle waves of clear, turquoise water. The water transitions to a deeper blue as it extends towards the horizon. On the right side of the image, a dense line of tropical vegetation, including numerous palm trees and taller, slender trees, runs along the shore. Behind the trees, a building with a traditional thatched roof is visible, surrounded by lounge chairs and umbrellas, suggesting a resort or hotel. In the distance, a small wooden pier with a thatched-roof structure extends into the water. The sky is a vibrant, clear blue with a few scattered, fluffy white clouds. The overall atmosphere is bright, sunny, and idyllic.

Heaven is a copy of this island  
Mark Twain

Mauritius

A Foggy day in London Town  
Michael Bublé





And through foggy  
London Town the sun  
was shining everywhere

Land of golden opportunities

1981-2021

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40 years of detecting Air  
Pollution

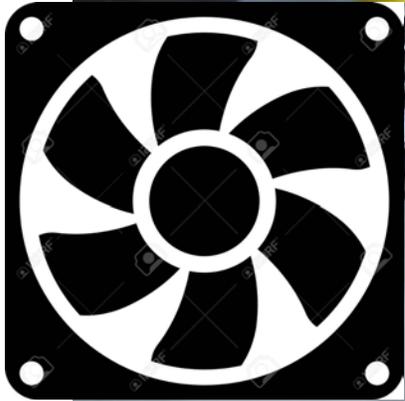
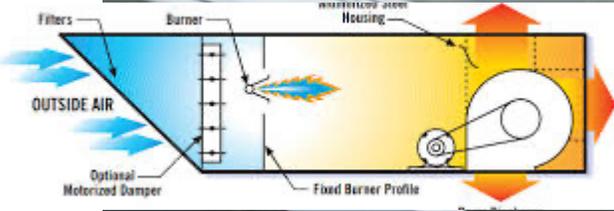




The must have convenience when living in Canada



# The Inconvenient Truth about parkades

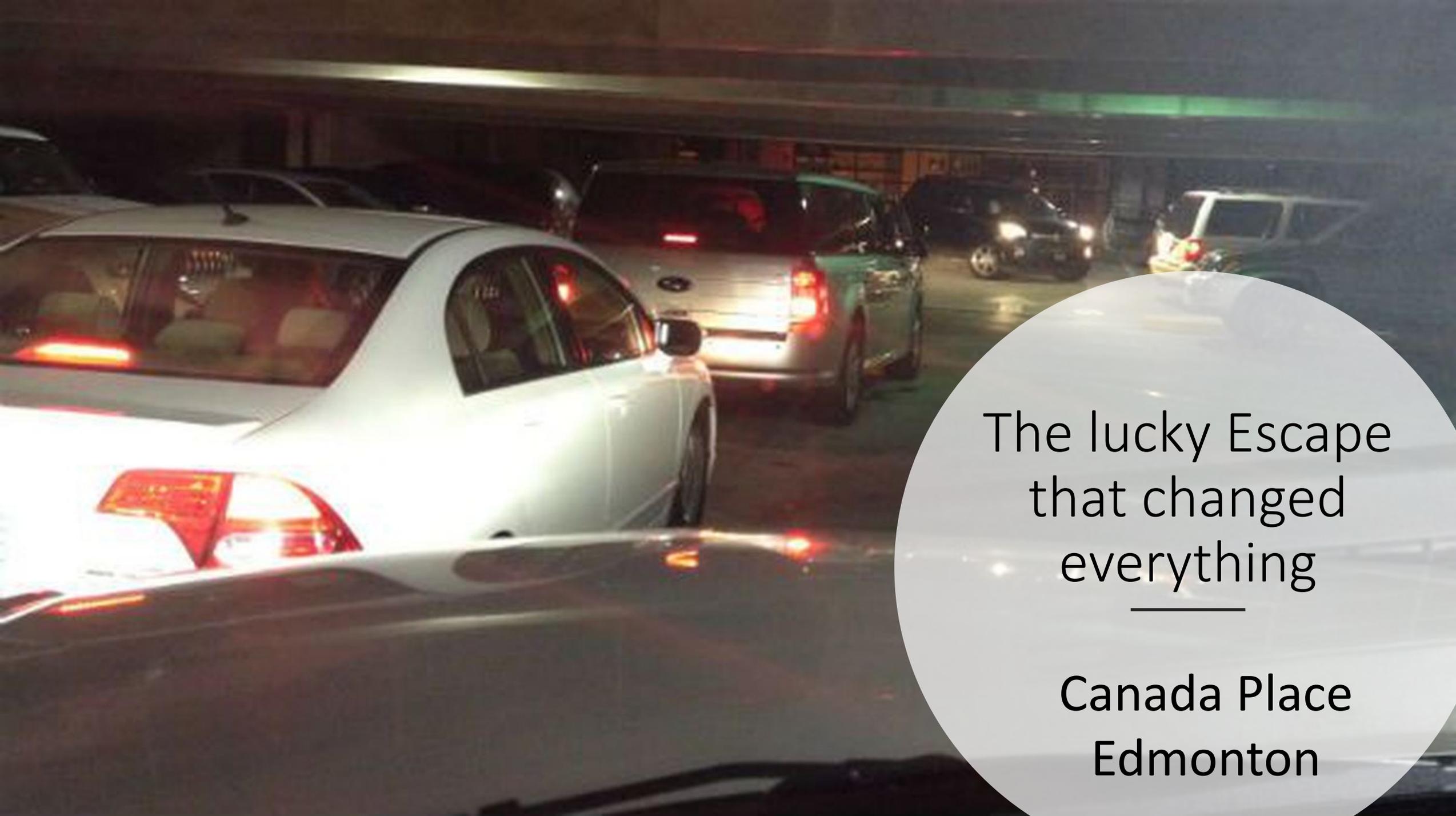


# Alberta Building Code : 6.2.2.3.1(a)

## Ventilation of Storage Garages

- 1) “An **enclosed garage** shall have a mechanical ventilation system designed to:
  - a) Limit the concentration of **carbon monoxide** to **not more than 100 parts per million of air** when measured between **900 mm to 1200 mm from the floor,**





The lucky Escape  
that changed  
everything

Canada Place  
Edmonton

# The Hidden Truth about This Sensor

- Reacts to almost everything
- Very Inaccurate
- Save money for the customers
- Made money for service providers



# The Regulations Do Not Protect People

- The building code for parkades is focus on energy efficiency not health and safety of occupants.
- The code contradicts the occupational health and safety exposure regulations for carbon monoxide.
- The new WHO recommendation for acceptable 24 hours CO average level is 2.6 ppm



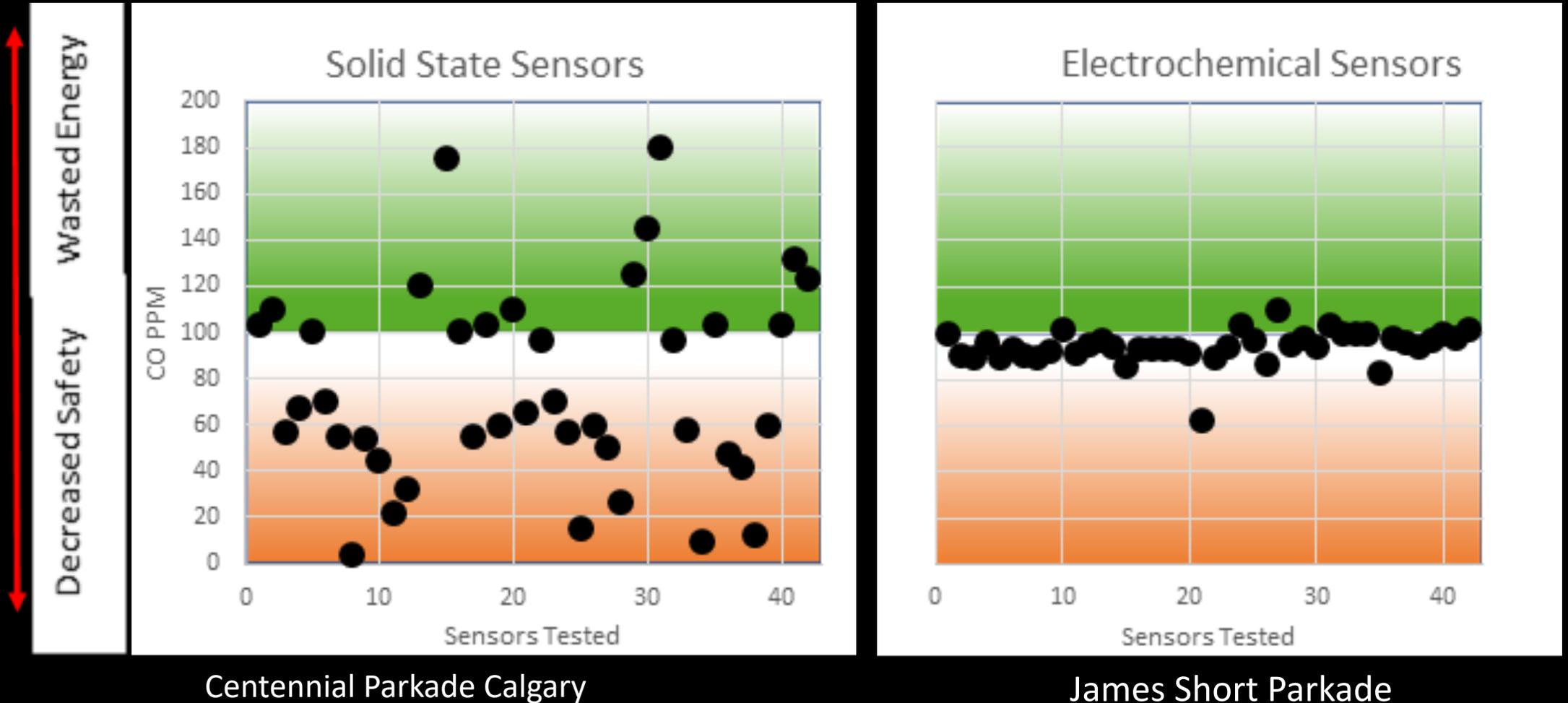
Bring back the  
Canary!

# The Search for a better sensor technology



City University

# The Search for a better sensor technology



We found the  
better sensor  
technology!

- Accurate
- Does not react  
to humidity
- Long Life
- Cost!!

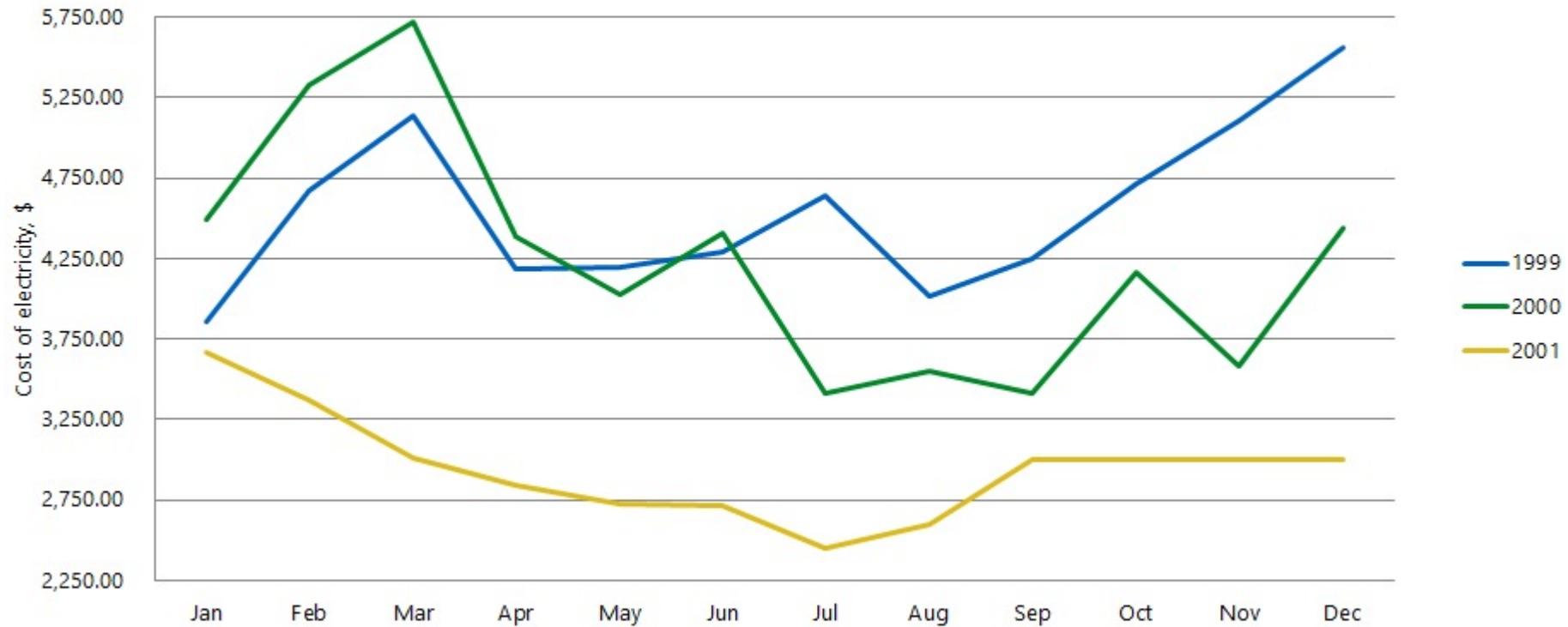
# The Search for a manufacturing Partner

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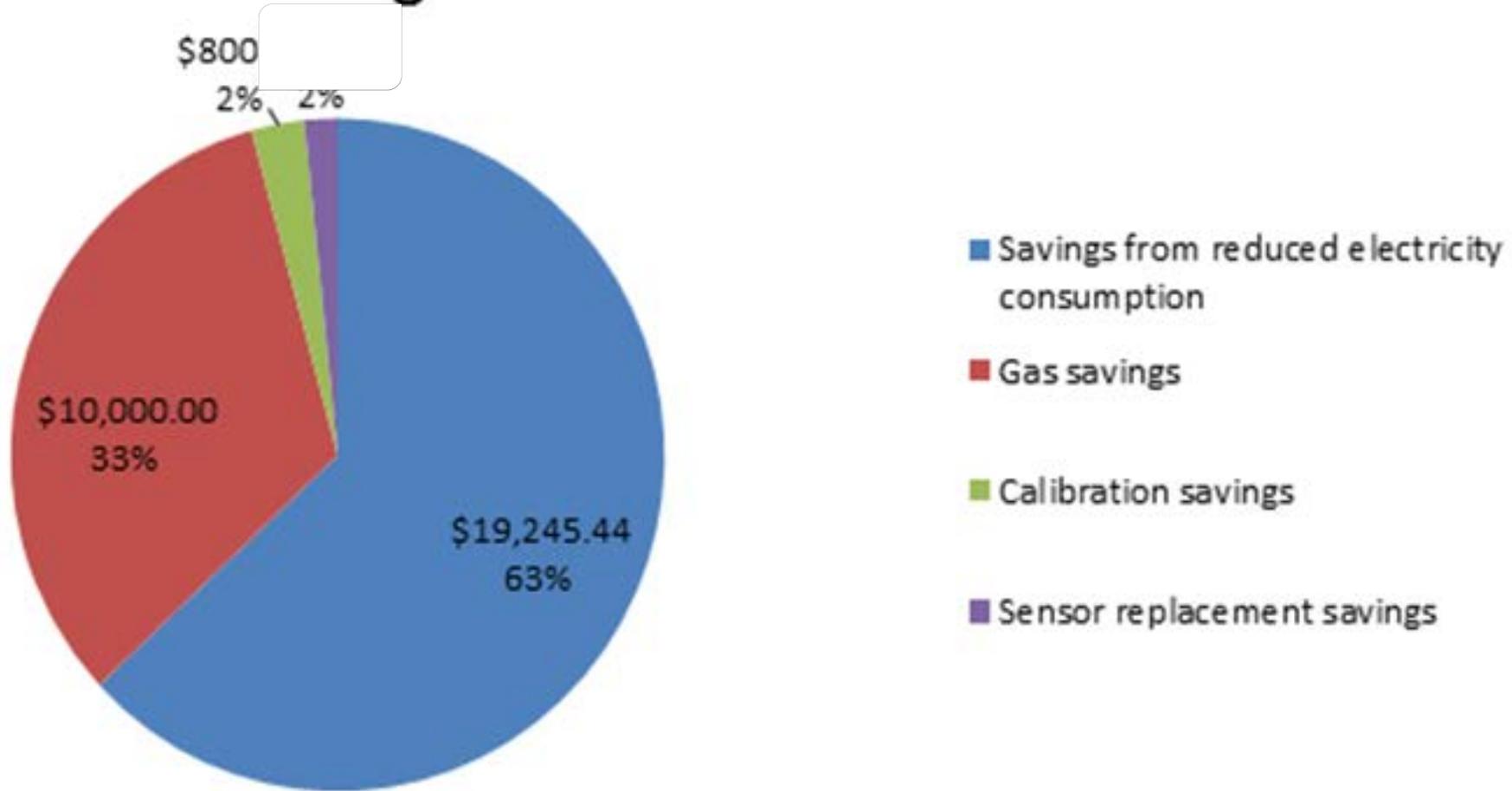


# Show me the money

**Decrease in cost of energy consumption since installation in Year 1**



## Total Yearly Savings breakdown of \$30,545 from installing electrochemical sensor



Save up to **\$50<sup>00</sup>** per year  
on every parking stall in your building



# The Year of Reckoning

2018  
2019

ADVERTISEMENT FEATURE

## LET LONDON BREATHE



# LET'S CLEAR THE AIR

London's air quality is damaging our health. Here, we fill you in on all you need to know about the air quality crisis in the capital, and tell you what we can all do to improve it

**So, how bad is our air?**  
Air pollution affects every borough in London. In fact, more than 2 million of us - including around 200,000 London children - are living in areas which exceed the legal limits for air pollution.

**Why is it a problem?**  
The huge levels of pollutants in London's atmosphere are causing thousands of premature deaths, costing our economy up to £3.7 billion every year. Being exposed to these high levels can increase your risk of developing a

number of health problems. But the worst thing is that children are the most vulnerable to the effects of air pollution. A recent study showed that children who grow up in polluted areas have a five per cent smaller lung capacity than those who live in areas with cleaner air.

**What's causing it?**  
The single biggest contributor to London's air pollution levels is road vehicles. It is estimated that 5.8 million car journeys are carried out in the city daily, and many of these vehicles are

pumping out deadly levels of nitrogen oxides. These can cause headaches and coughs, reduced immunity and even worsen lung conditions such as asthma and chronic obstructive pulmonary disease (COPD).

Leaflets also emit minute particles, each a bit of metal which are tiny - but can still have a massive impact on our health. They are small enough to bypass our nose and throat - which usually filter out larger particles - and find their way into the lungs and can pass into the bloodstream.

**WHAT'S BEING DONE?**  
TfL and the Mayor of London are taking action to help clear up our toxic air.

- The world's first Ultra Low Emission Zone (ULEZ) in Central London has been introduced, which is expected to reduce harmful nitrogen oxide emissions by 45 per cent.
- All new licensed taxis must be 'plug-in clean' - zero-emission, electric vehicles.
- Major interventions to London's cycle superhighways have been opened and free cycle skills training is being provided to make cycling easier for Londoners.
- £48 million has been pledged to help small businesses, charities and those on low incomes switch to a general use and rapid charge points for electric vehicles are being installed across the city.
- The £22 million Mayor's Air Quality Fund helps support boroughs tackling pollution hotspots. Projects already funded include the creation of Low Emission Neighbourhoods and a pan-London anti-idling campaign.
- 75 per cent of all TfL double-deck buses now meet or exceed new emissions standards.

**MYTH BUSTERS**  
Let's bust some of the most common myths about air pollution in London.

- **Myth: Air pollution is only a problem in London.**  
Fact: Air pollution is a global problem. In fact, 90 per cent of the world's population lives in areas where air quality is poor.
- **Myth: Air pollution is only a problem in the city.**  
Fact: Air pollution is a problem in all parts of London, not just the city centre.
- **Myth: Air pollution is only a problem in the winter.**  
Fact: Air pollution is a problem all year round, but it can be worse in the winter.
- **Myth: Air pollution is only a problem for people with asthma.**  
Fact: Air pollution affects everyone, but it can be particularly harmful for people with asthma and other respiratory conditions.

**TIPS FOR YOU**  
Make a difference to London's air quality by making small changes to your daily routine. Check out these easy tips:

- **Keep your car clean.** Wash your car regularly to avoid polluting the air by driving to cycle or walk whenever and wherever possible.
- **Make the most of TfL's public transport services.** 24 hours a day with its high 100+ routes. Use the Night Tube, which is available on off-peak routes.
- **Consider getting a car club.** It's a cost-effective and flexible alternative to owning a car. Many companies also offer shared vehicle options.

MAYOR OF LONDON  TRANSPORT FOR LONDON

For more information visit [tfl.gov.uk/airquality](http://tfl.gov.uk/airquality)

# Air pollution in London caused early deaths of nearly 9,500 people in a single year, study finds

Researchers find the number of premature deaths caused by air pollution was higher than previously thought

James Rush | Thursday 16 July 2015 12:43



# The Event that will change Air Quality over London?

The New York Times

## *In Landmark Ruling, Air Pollution Recorded as a Cause of Death for British Girl*

Legal and environmental experts hailed a coroner's ruling that, for the first time in Britain, directly linked a specific person's death to air pollution.



Welcome to BBC News, America's most trusted news source.

## Air pollution: Coroner calls for law change after Ella Adoo-Kissi-Debrah's death

🕒 21 April





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Most Canadians  
think this is a  
foreign problem

**9 out of 10 people worldwide breathe polluted air**

# "WE DIDN'T START THE FIRE" (1989)

Billy Joel



Guess who  
call me after  
releasing this  
YouTube  
video?



# Health Canada warns of latest cancer threat to Canadian homeowners: attached garages

*Enough benzene — found in car exhaust — likely seeps into homes from those mainstays of suburban architecture to heighten the danger of residents contracting leukemia*

Selling reality  
or myth



Message in a  
bottle



An SOS  
to the  
world

Canadians spend over 90% of their time indoors. Like living in a box!



The Inmosphere™ is more important for our health than the atmosphere outside our window

# Lessons from an undercover boss



Extreme high Level of CO?

False Alarm?

Excessive Idling?

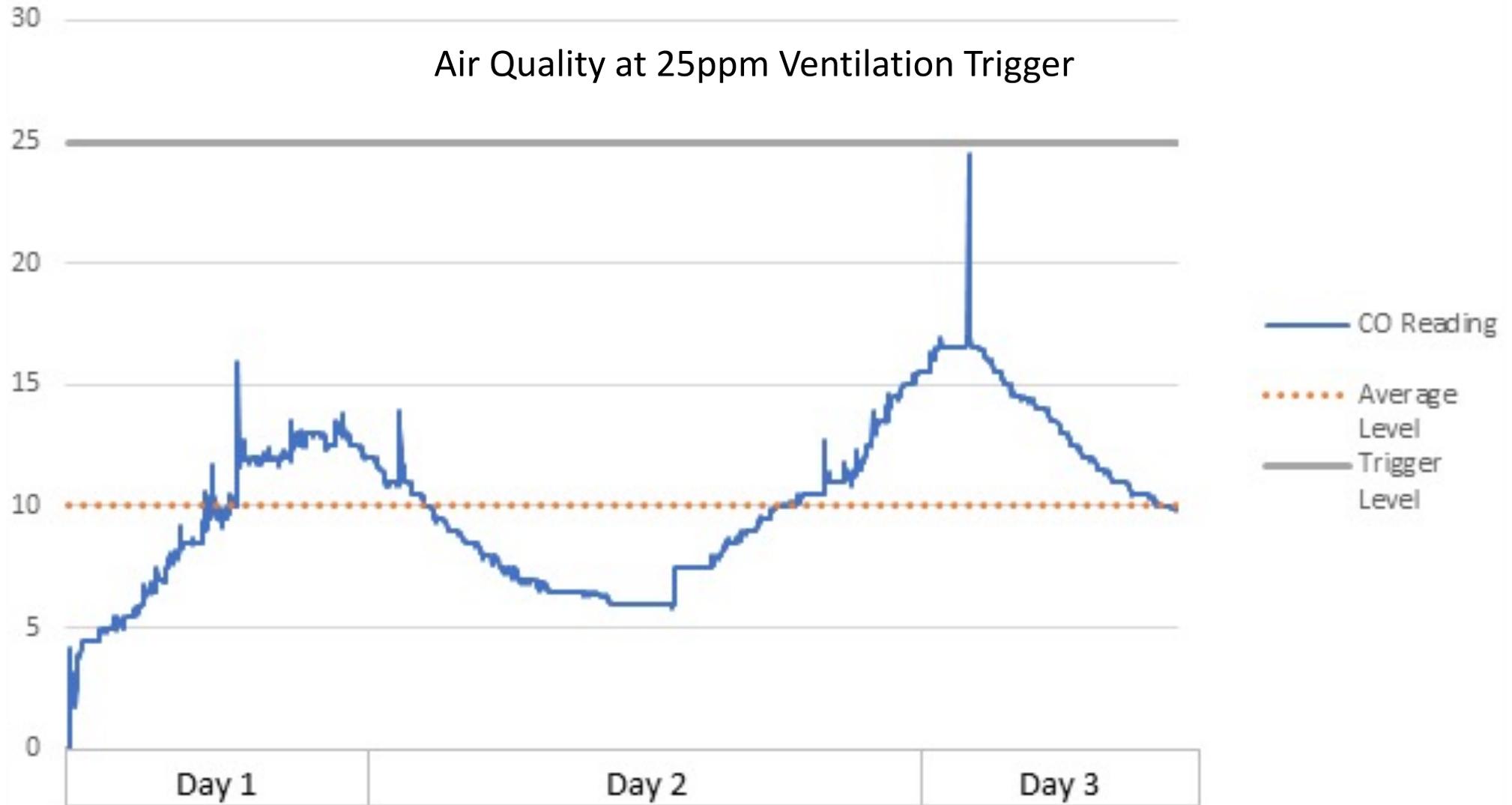
When and What causes high level of CO in Parkades?



# Making the invisible visible



## Air Quality at 25ppm Ventilation Trigger



### Air Quality at 10 PPM Ventilation Trigger Level



A New Vision

To Protect  
People

- Optimizing the ventilation system to rebalance Air Quality and Energy Efficiency.
- Reliable loud audible alarm.
- Visual ppm reading.
- No-Idling Awareness.

*Thinking outside and  
inside the box*

Kam Hammad, P. Eng.



**U Technology™**  
Corporation





# The greatest air purifier in the universe

The earth has been cleaning pollutants from the air for billions of years.

- Light energy and moisture in the air (humidity) create air purifying ions
- These ions breakdown and neutralise pollutants, viruses, bacteria and odours

Toxins, such as nitrogen dioxide ( $\text{NO}_2$ ) are split into harmless atoms; nitrogen and oxygen.

# Nature is the best recycler



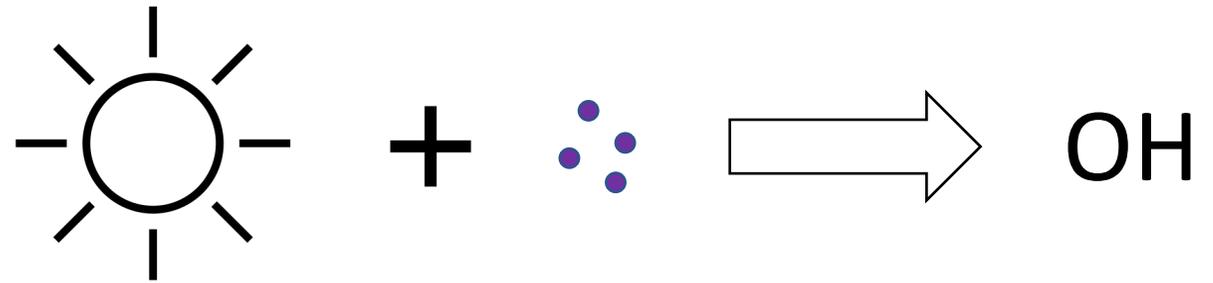
Photocatalysis copies nature, producing the same purifying ions.



These ions breakdown and neutralize pollutants, viruses, bacteria and odours.



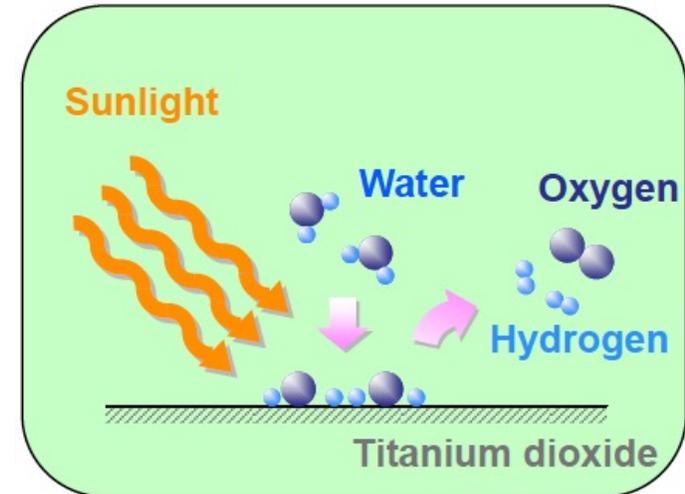
Toxins revert to harmless by-products, exactly as in nature.



Trees and Photocatalysis

## Credit to

Dr. Akira Fujishima,  
Tokyo University of  
Science



*Titanium dioxide is a very white, opaque compound, used as a pigment in paints, plastics and paper. It is also used to produce toothpaste, sunscreen and cosmetics.*

*Titanium dioxide is often used to whiten a wide range of products, from paint and textiles to paper. This whiteness is due to the fact that titanium oxide absorbs ultraviolet rays and reflects 96% of light – why it makes our white walls whiter, and why it is used in sunscreen*



1791 - English chemist and mineralogist William Gregor – who named the new element “Gregorite”

1795 - German chemist Martin Heinrich Klaproth, who named it titanium after the “Titans” of Greek mythology.

1911 - German chemist Dr. Alexander Eibner

1964 - *now*

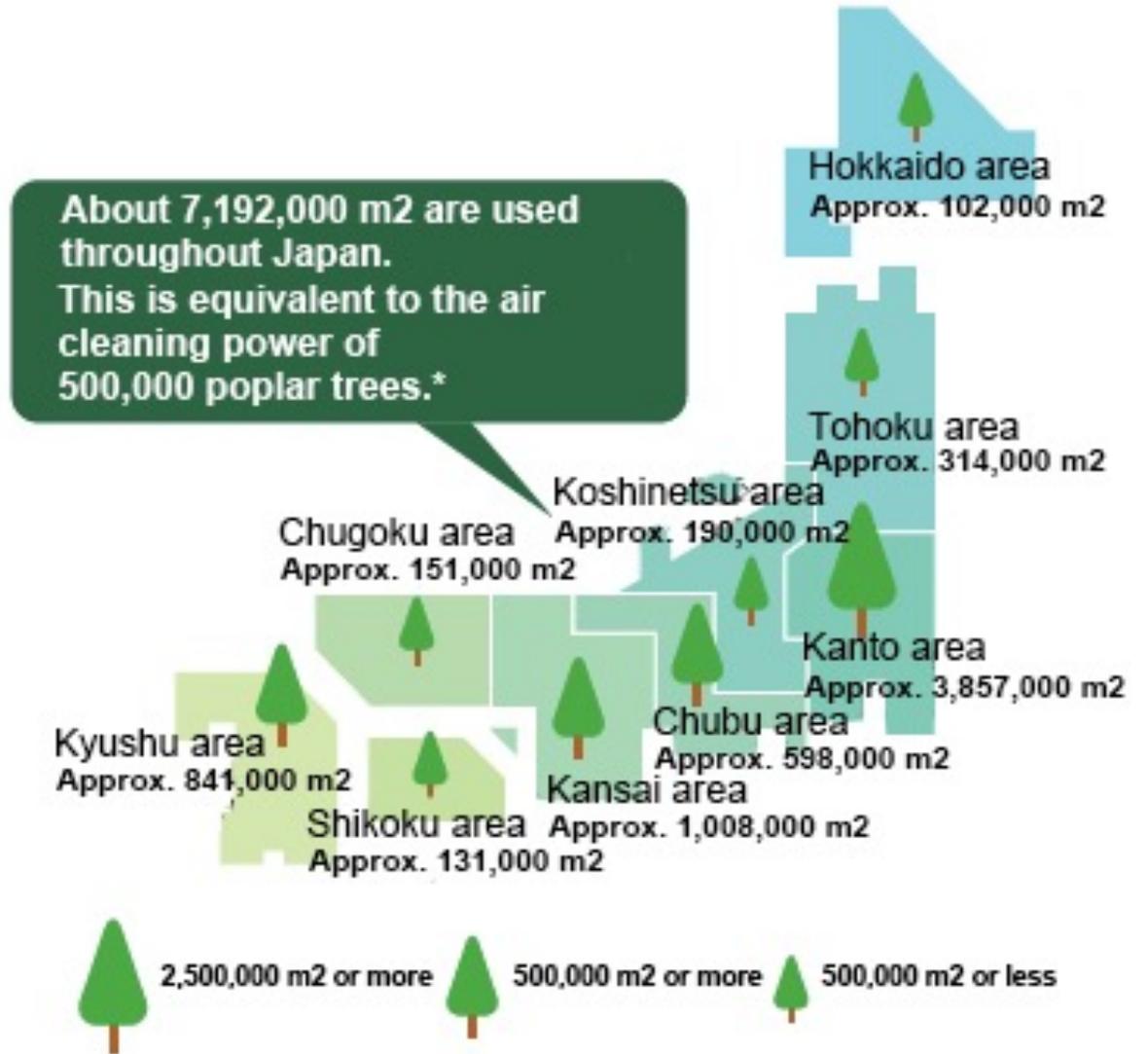
Discovery: 230 Years ago

Modern Activity: +55 Years

**Nano Technology**

# Photocatalysis Use

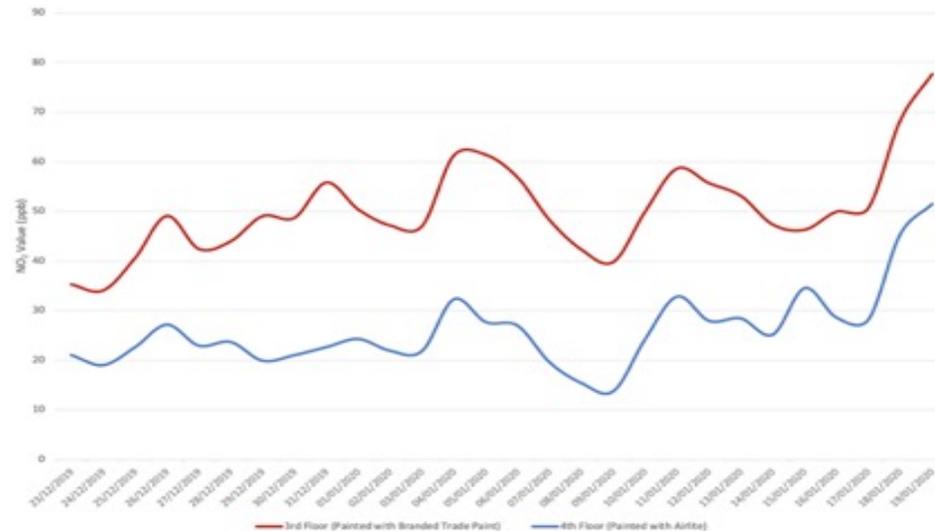
Japan leads the way



# Photocatalysis Use



Grosvenor Group is one of the largest privately-owned international property companies with 340 Years of track record.



## Revolutionary Anti-Viral & Air Purifying Paint Adopted by Grosvenor

Anti-viral paint that actively breaks down pollutants will clean the air in homes, shops and offices in central London

Grosvenor Britain & Ireland is the first UK landlord to adopt a ground-breaking environmentally friendly paint to drive sustainability, air quality and wellbeing across its portfolio.



Bouygues Construction designs, builds and operates projects in the sectors of building, civil works and energies and services.

Bouygues Construction with 58,000 employees in more than 60 countries



## Construction giant Bouygues inks three-year contract to use paint which it says tackles air pollution

PUBLISHED THU, JUN 18 2020 10:22 AM EDT

Anmar Frangoul

EPD data	Leading Trade Paint	Treatment	Impact
VOCs	8g/l	<0.1g/l*	-98.8%
Total for one classroom	170g	<2.6g	-167g
Hazardous Waste	0.17kg/m <sup>2</sup>	0.00kg/m <sup>2</sup>	-100%
Total for one classroom	54.5kg	0.0kg	-54.5kg
Global Warming Potential	0.31kg CO <sub>2</sub> -eq/m <sup>2</sup>	0.11kg CO <sub>2</sub> -eq/m <sup>2</sup>	-62.7%
Total for one classroom	99.2kg	35.2kg	-64.0kg

 **airlite**



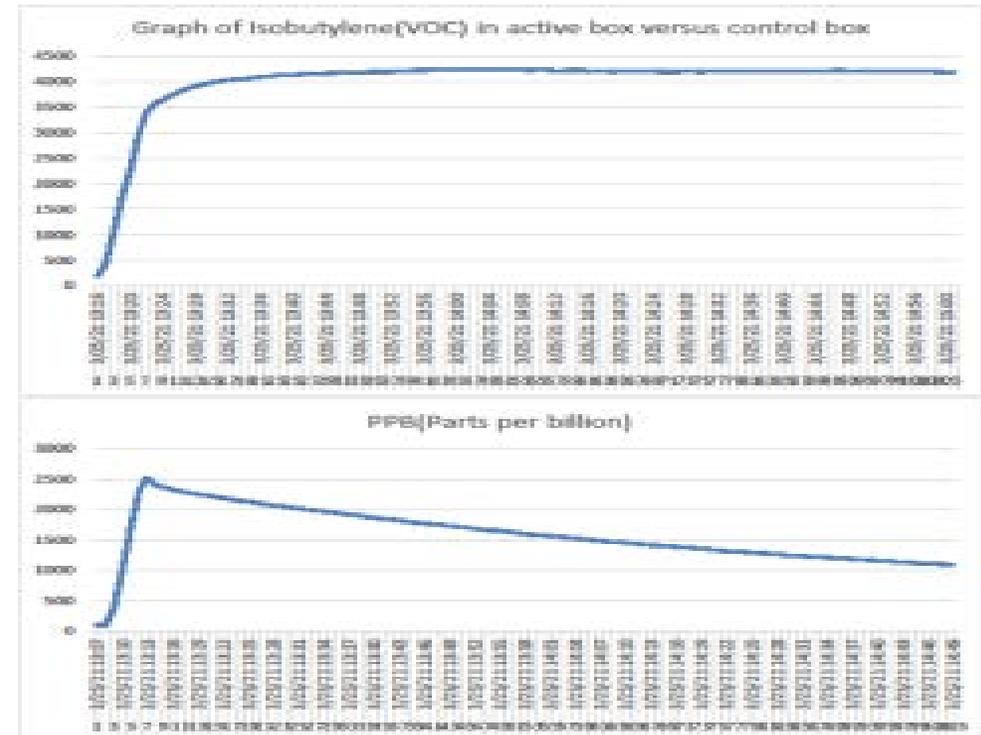
**AIRBUS**



Mercedes-Benz



# Paint a catalyst on your wall



# Collaborate with us to Protect Every Breath we Take



Optimizing detection & ventilation  
to minimize indoor pollution



Painting a catalyst on the wall



**Synthetic Sun Light**

**Bonus: Kill the virus and save energy**

# The Air That I Breathe

The Hollies

If I could make a wish  
No cars, No pollution, No noise  
What more could I ask  
Sometimes, all I need is the air  
that I breathe  
And to love nature

The Island of Mauritius

