

INDOOR AIR QUALITY IN MICRO ENVIRONMENTS

Technologies, Reporting, and Solutions
for Hong Kong and beyond



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LIST OF ACRONYMS

Acronyms	Meaning
AQHI	Air Quality Health Index
BMS	Building Management System
CAN	Clean Air Network
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
ERVs	Energy Recovery Ventilators
HK EPD	Hong Kong Environmental Protection Agency
HKUST	Hong Kong University of Science and Technology
HEPA	High-Efficiency Particulate Air
HCHO	Formaldehyde
HRVs	Heat Recovery Ventilators
HVAC	Heating, Ventilation, and Air Conditioning
IAQ	Indoor Air Quality
IEQ	Indoor Environmental Quality
IR	Infrared
IoT	Internet of Things
MOS	Metal Oxide Semiconductor
MVAC	Mechanical Ventilation and Air Conditioning
OAQ	Outdoor Air Quality
PCO	Photocatalytic Oxidation
PM	Particulate Matter
Rn	Radon
TVOCs	Total Volatile Organic Compounds
UV	Ultraviolet
US EPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WHO	World Health Organization

PROJECT FOREWORD

Indoor air quality (IAQ) in Hong Kong remains a critical yet under-addressed public health issue. Despite decades of progress in outdoor air pollution control, IAQ has not received equivalent levels of attention. Scientific evidence shows that poor IAQ contributes to serious health risks, including respiratory diseases, cardiovascular conditions, and cognitive impairments, especially among vulnerable groups such as children, the elderly, and those with chronic illnesses.

This report is part of a broader 24-month initiative led by Clean Air Network (CAN) to address the growing concern of IAQ in Hong Kong. The project combines a Study Program and a Key Sector Engagement Program, designed to build awareness, consolidate knowledge, and drive systemic change in IAQ management.

The Study Program includes five research components, with this Study Component focusing on 'Identifying existing solutions for IAQ Monitoring, Reporting, and Improvement'. This component maps technologies such as real-time sensors, purification systems, and ventilation upgrades, and evaluates their applicability across different sectors in Hong Kong.

The study serves multiple purposes:

- **Knowledge Building:** consolidating international and local expertise to inform institutions about available IAQ solutions and their benefits.
- **Policy Dialogue:** using findings to engage policymakers and regulators, encouraging the development of a long-term IAQ roadmap.
- **Sectoral Empowerment:** identifying common challenges and showcasing success stories to support institutions in adopting proactive IAQ management practices.
- **Public Health Advocacy:** highlighting health risks of poor IAQ and promoting scalable interventions to protect vulnerable populations.

Ultimately, this study lays the foundation for larger-scale research, cross-sector partnerships, and policy reform — positioning Hong Kong as a leader in IAQ innovation for dense urban environments.

EXECUTIVE SUMMARY

This report presents a comprehensive evaluation of IAQ technologies, policies, and practices in global cities comparable to Hong Kong. Despite notable advances in IAQ monitoring, Hong Kong faces challenges such as limited reporting, inadequate air quality management, and the need for stronger regulatory frameworks.

Cities like Tokyo, Seoul, Shanghai, Dubai, New York, and Singapore offer valuable lessons through their use of advanced sensor systems, integrated building management solutions, and robust regulatory structures. These cities demonstrate the benefits of centralized IAQ governance, mandatory testing, and public transparency.

Key insights include:

1 Advancements in real-time sensor technologies



2 Integration with building management systems (BMS)



3 Use of High-Efficiency Particulate Air (HEPA) filters, Ultraviolet Germicidal Irradiation (UVGI) systems, and demand-controlled ventilation



4 Implementation of certification schemes (e.g., WELL, Leadership in Energy and Environmental Design (LEED), Regenerative, Ecological, Social and Economic Targets (RESET))



5 Case studies from Hong Kong and other cities



The report advocates for the following:

1 Establish mandatory IAQ reporting and certification



2 Develop a public IAQ portal with real-time data



3 Promote inter-agency collaboration and public engagement



BACKGROUND

Hong Kong's dense urban environment presents growing concerns around IAQ, with significant implications for public health and sustainability. Globally, poor IAQ contributed to 3.2 million deaths in 2020, including 237,000 children under five (WHO). Despite community efforts and voluntary schemes, Hong Kong lacks the mandatory regulations and integrated technologies seen in cities like Singapore, Tokyo, Seoul, New York, Dubai, and Shanghai.

In examining the unique challenges faced by Hong Kong, it is essential to consider the interplay of urbanization, pollution, and health outcomes. Despite significant efforts in IAQ monitoring and management – including community initiatives and voluntary certification schemes – gaps remain. The city's approach lacks mandatory compliance measures and comprehensive regulatory frameworks, limiting its ability to proactively address IAQ issues.

This report aims to adapt global best practices to Hong Kong's context, focusing on technology, policy, and collaboration to improve air quality and public well-being.

Objectives

- Assess current IAQ technologies in Hong Kong and identify improvement areas.
- Highlight innovative local and international solutions for IAQ monitoring and management.
- Analyze strategies from comparable cities to extract actionable insights.
- Evaluate the feasibility of adapting these solutions for Hong Kong's unique urban landscape.

Scope and Limitations

The report focuses on IAQ technologies and strategies in Hong Kong and similar cities. It draws from secondary data sources, offering comparative insights but acknowledging limitations due to the absence of primary data. Findings are tailored to urban environments like Hong Kong and may not apply to cities with different geographical or environmental contexts.

SENSOR, AIR PURIFICATION AND VENTILATION TECHNOLOGIES FOR IAQ MONITORING

OVERVIEW

Hong Kong's dense urban environment presents unique challenges for maintaining a healthy IAQ. With most residents spending significant time indoors, effective IAQ monitoring is essential. This chapter explores the IAQ technologies currently used in Hong Kong, their applications, limitations, and opportunities for improvement.

FACTBOX

People spend over 90% of their time indoors, where pollutant concentrations can be significantly higher than outdoors.

TYPES OF IAQ TECHNOLOGIES IN HONG KONG

1 | Sensor technologies for IAQ monitoring

Type	Function	Usage	Notes
Electrochemical Sensors	Detect gases like CO, NO ₂ , SO ₂ , O ₃	Residential & commercial buildings for localized assessments, e.g., Aeroqual series 200	Cost-effective, portable, but prone to interference from environmental factors and lack of standardization
HVAC CO₂ Sensors	Measure CO ₂ levels to assess ventilation	Used in commercial setting like offices & shopping centres e.g., ICC skyscraper	Accuracy affected by occupant activity
MOS Sensors	Detect VOCs and other gases	Potential usage in green buildings due to its versatility	Long lifespan, low power, but lack specificity
PM Sensors	Measure airborne contaminants, including dust, smoke and aerosols	Residential buildings & small commercial establishments	Limited accuracy at low concentrations, cost effective
Infrared (IR) Sensors	Detect CO ₂ via IR absorption	Large commercial buildings & industrial environments e.g. various Swire Properties	High accuracy, expensive, limited detection for stationary occupants
IoT-Integrated Sensors	Real-time data collection and remote monitoring via IOT platforms	Hong Kong smart building system e.g., by JLL Hong Kong	Enables centralized management, alert mechanism and comprehensive data analysis; high initial cost

TYPES OF IAQ TECHNOLOGIES IN HONG KONG (CONT')

2 | Air Purification Technologies for IAQ Monitoring

Type	Usage	Benefits & Limitations
Air Purifiers	Minimize or eliminate particulate matter and gases; used in residential and commercial buildings	Require regular filter maintenance which can be costly
HEPA Filtration Units	Remove $\geq 99.97\%$ of particles ≥ 0.3 microns; deployed in hospitals, laboratories, and some homes (e.g., Hospital Authority and universities)	High cost, energy consumption and limited VOC filtering
Centralized Air Purification Systems	Integrated into HVAC to manage air quality; used in large hotels, offices, and commercial buildings (e.g., EPD offices, eco-parks, and various Swire properties)	High initial cost, efficient over time but uneven air distribution
UV Light and Photocatalytic Oxidation (PCO)	Use UV light to deactivate biological contaminants and break down pollutants; used in hospitals, laboratories, high-rise commercial buildings, and upscale residences	Effective for biological and gaseous pollutants but costly and may produce harmful by-products like formaldehyde
Air Ionization Devices	Generate ions to settle airborne particles; used in homes, offices, and transport hubs	Affordable and low maintenance but may produce harmful ozone

TYPES OF IAQ TECHNOLOGIES IN HONG KONG (CONT')

3 | Ventilation Technologies/Systems

Type	Usage	Benefits & Limitations
MVAC Systems	Facilitate air exchange and reduce pollutants; deployed in commercial buildings (e.g., ICC)	High installation and maintenance costs, can be energy-intensive if not managed properly
Natural Ventilation Systems	Use architectural elements to facilitate airflow; installed in heritage buildings and modern residential developments	Affordable and sustainable, although effectiveness depends on external weather conditions
Demand-Controlled Ventilation (DCV)	Adjust ventilation rates based on occupancy and CO ₂ levels; common in shopping malls and airports	Energy-efficient but involves substantial initial investments and ongoing maintenance
Smart Ventilation Control Systems	Automated platforms to monitor and control IAQ; used in modern buildings with advanced management systems	Require high maintenance and pose potential privacy concerns
Renewable and Hybrid Ventilation Systems	Combine natural and mechanical ventilation for energy efficiency; featured in innovative buildings like 15W in Hong Kong Science Park; use heat recovery ventilators (HRVs) and operable windows	Effective in pollutant and moisture removal

NOTE

Demand Control Ventilation (DCV) adjusts airflow based on real-time measurements like CO₂ or humidity to provide ventilation only when needed. Smart Ventilation is a broader concept that uses multiple sensors and data inputs to optimize ventilation for energy efficiency, indoor air quality, and comfort in a more comprehensive way.

FACTBOX

IoT-enabled sensors facilitate real-time IAQ monitoring across entire buildings, improving response times and energy efficiency.

INTEGRATED IAQ MANAGEMENT SYSTEMS

Integrated IAQ Management Systems combine real-time monitoring and automated control of indoor air quality using IAQ sensors and Building Management Systems (BMS). These systems regulate ventilation, filtration, and purification based on pollutant levels and occupancy, improving health and energy efficiency.

1 | Smart Building Applications

- Pacific Place Mall uses intelligent IAQ sensors linked to its BMS to automatically adjust ventilation based on pollutant levels.
- Parameters monitored include temperature, humidity, CO₂, CO, TVOC, PM2.5, PM10, and O₃.
- These systems align with WELL Building Standards and leverage IoT for centralized control and data access.

Challenges

- High implementation costs limit adoption in residential settings.
- Data privacy and cybersecurity risks are emerging concerns (Business Environment Council, 2022).

2 | School-Based Initiatives

The Clean Air Schools for Hong Kong project (2022-2024), led by CAN and HKUST, installed IAQ sensors and mobile apps in schools in high-pollution areas like Sham Shui Po and Tuen Mun. These systems help reduce indoor pollutants such as CO₂ and PM through targeted interventions like fresh air units, air purifiers and ventilation strategies.



INTEGRATED IAQ MANAGEMENT SYSTEMS (CONT')

3 | Retrofitting IAQ and Energy Efficiency

A study by Che et al. (2019) analyzed retrofitted HVAC systems in commercial buildings:

- Included outdoor air dehumidification, two-stage particle filtration, positive indoor air pressure, and sensor-based BMS.
- Achieved 51% reduction in energy consumption from 2012 to 2018, saving 670,000 kWh.
- IAQ metrics met WHO guidelines, showing that retrofitting improves both air quality and energy efficiency.
- Despite benefits, retrofitting involves high upfront costs, which may deter widespread adoption.

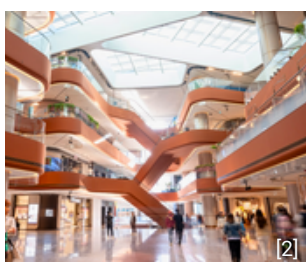
4 | Policy and Equity Implications

- Most school IAQ projects are privately funded, highlighting a gap in government support.
- Stronger public sector involvement is needed to ensure equitable access to healthy indoor environments, especially in educational institutions.

CASE STUDY HIGHLIGHT: AIRSIDE, HONG KONG



AIRSIDE stands as an example of integrated IAQ management in a dense urban environment.



Vision	Promotes occupant health aligned with UN Sustainable Development Goals
Technologies	• Energy-efficient HVAC with demand-controlled ventilation • HEPA and carbon filtration • UV-C sterilization • digital twin for adaptive microclimate management
Results	Real-time IAQ data shows PM2.5 below 8 $\mu\text{g}/\text{m}^3$ and CO2 under 700 ppm across offices and retail spaces, meeting WELL Building standards.
Opportunities	While transparency in IAQ data is commendable, enhancing occupant feedback mechanisms could further improve health outcomes.

OVERVIEW

Effective IAQ management rests on robust reporting frameworks, transparent data availability, and responsible governance. This section reviews the existing IAQ reporting landscape in Hong Kong, benchmarked against leading global systems. It highlights technological enablers, policy frameworks, stakeholder engagement, and showcases international best-practice case studies.

IMPORTANCE OF TRANSPARENT IAQ REPORTING

Transparent and timely IAQ reporting empowers building managers, policymakers, and occupants to make informed decisions and take prompt corrective actions. Public access to accurate data fosters trust and accountability, forming the backbone of effective IAQ governance.

IAQ REPORTING IN HONG KONG

Hong Kong's IAQ reporting infrastructure comprises a patchwork of voluntary government schemes, independent platforms, and private sector initiatives.

- **Public Data Platforms:** Sites like AIRSIDE provide real-time outdoor and select IAQ, including pollutant trends, heatmaps, and alerts.
- **Voluntary Certification:** The Environmental Protection Department (EPD) offers a voluntary IAQ certification scheme that classifies buildings based on pollutant levels, attracting primarily commercial projects.
- **Mobile Awareness Tools:** Apps like HK-AQHI and PRAISE-HK alert users to outdoor pollution, with increasing indoor data integration anticipated.
- **Limited reporting:** Residential buildings, Offices, Public Spaces, Schools, Elderly Homes lag in both monitoring and voluntary reporting highlighting a vital gap.



FACTBOX

Only about 22 residential premises in Hong Kong have achieved IAQ certification to date, underscoring underrepresentation in this critical sector.

POLICY AND REGULATORY FRAMEWORK

Hong Kong operates under the Building Management Ordinance (BMO Cap. 344), which mandates building safety and ventilation maintenance but lacks explicit IAQ standards or mandatory reporting requirements. The EPD's voluntary IAQ Certification Scheme, while useful, has limited reach without regulatory backing.

Comparative Analysis

NEW YORK

Has passed the Asthma Free Housing Act (2018/055) (Environmental Law Institute, 2025), which requires private landlords to eliminate and control indoor allergen hazards, such as mold and pest infestations, in accordance with the city's housing maintenance code.

JAPAN

IAQ regulations and guidelines are primarily overseen by the Ministry of Health, Labour and Welfare (MHLW). The regulations particularly focus on formaldehyde and volatile organic compounds (VOCs), aligning with WHO recommendations to reduce health risks and enhance IAQ.

DUBAI

Mandates air quality testing for all buildings prior to occupancy and use. The Dubai Municipality has also established IAQ regulations that affect commercial buildings, hospitals, and educational institutions. Setting specific thresholds for pollutants such as CO₂, PM_{2.5} and humidity.

SINGAPORE

Robust mandatory IAQ testing with clear performance standards and public reporting embedded within the BCA Green Mark certification. The National Environment Agency (NEA) (2024) mandates the monitoring of CO₂ levels and ventilation in all indoor areas, focusing on spaces that cater to vulnerable populations, such as hospitals, eldercare facilities, and venues where food and drinks are served, as well as gyms, event venues, function rooms, and nightlife establishments.

Recommendations

- Transition Hong Kong's current voluntary IAQ reporting towards mandatory frameworks, with tiered requirements prioritizing schools, hospitals, and high-occupancy venues.
- Expand real-time sensor deployment citywide, linked to centralized public dashboards.
- Incorporate IAQ performance into building permit processes and lease agreements for ongoing compliance.

FACTBOX

In Shibuya Station in Tokyo as per a study conducted by Agarwal et al. (2025) the PM levels above the ground train lines exhibit comparatively healthier air quality as compared to underground train lines.

INTERNATIONAL BEST PRACTICE CASE STUDIES



The cases of Shanghai and South Korea underscores the power of combining advanced technologies with interactive public data sharing to reinforce occupant confidence and wellbeing.

1 | CORDIS Shanghai: Elevating Hospitality IAQ Transparency

The Shanghai Hongqiao Cordis Hotel demonstrates excellence in IAQ management through:

- Continuous monitoring of PM_{2.5}, TVOC, CO₂, CO, temperature, and humidity via RESET Air Accredited Monitors, ensuring pollutant levels consistently stay below US EPA guidelines.
- Display of real-time IAQ data in guest rooms, enabling transparency and enhancing guest trust in air quality.
- HVAC systems with advanced filtration and double-glazed sealed windows maintain superior indoor freshness.
- Achievement of RESET Air certification—the world's first sensor-based IAQ performance certification emphasizing continuous measurement and transparency.

2 | Rail System IAQ Monitoring in South Korea

South Korea's urban subway networks, including Seoul Metro and Busan Subway, manage IAQ in challenging conditions characterized by high passenger density and underground constraint.

- Widespread fixed IAQ sensors track PM_{2.5}, PM₁₀, CO₂, temperature, and humidity across stations and train cars.
- Data is centralized into building management systems responsible for dynamic ventilation adjustments enhancing fresh air supply during peak pollutant or passenger loads.
- Passenger-facing information displays in stations and mobile app alerts improve transparency and encourage health-conscious behavior.
- Reinforcement through regular audits and disclosure aligns with the Indoor Environment Management System regulations for underground facilities.
- Additional measures like platform screen doors and proactive air purifiers mitigate particulate buildup.



FACTBOX ABOUT SOUTH KOREA

Seoul metro has deployed over 840 air quality sensors across 277 stations and plans to install an additional 4432 air purifiers to further enhance IAQ.

In South Korea the IAQ market is expected to increase to US\$ 10.1 billion by 2033 which highlights the crucial role IAQ plays within the broader air quality market.

TECHNOLOGICAL FOUNDATIONS OF MODERN IAQ REPORTING

The advent of IoT and cloud analytics supports:

- Real-time, granular IAQ data collection.
- Dynamic ventilation and purification system control.
- User-friendly dashboards, alerting mechanisms, and historical trend analytics.

Advancements such as digital twin models further optimize building performance by simulating environmental interactions for preventive IAQ management.

PUBLIC ENGAGEMENT AND EDUCATION

Data transparency is complemented by active stakeholder participation facilitated by:

- Tenant engagement and feedback systems in commercial and residential settings.
- Public education campaigns by government bodies and NGOs.
- Collaborative forums and academia-industry partnerships elevating IAQ awareness.

OVERVIEW

Improving IAQ requires a multifaceted approach that includes enhanced ventilation, air purification technologies, green building initiatives, effective policies, and active community engagement. Densely built environments like Hong Kong face particular challenges in maintaining healthy indoor air due to outdoor pollution infiltration and limited natural ventilation.

This chapter explores practical solutions and innovations applied globally and locally to foster healthier indoor environments while optimizing energy use and occupant well-being.

VENTILATION AND AIR PURIFICATION STRATEGIES

1 | Enhanced Ventilation Systems

Type	Usage, Benefits & Limitations
Mechanical Ventilation and Air Conditioning (MVAC)	• Widely used in commercial and residential buildings to supply fresh air and exhaust stale air • Reduce indoor pollutant buildup effectively • High energy consumption & maintenance demands if systems are not optimized • ICC employs centralized MVAC with filtration units maintaining good IAQ
Demand-Controlled Ventilation (DCV)	• Uses CO₂ sensor data and occupancy detection • Adjust fresh air supply dynamically to optimize air quality & energy efficiency • Prevalent in busy commercial hubs like shopping malls and airports • The AIRSIDE complex in Hong Kong incorporates DCV with real-time IAQ monitoring to tailor ventilation rates.
Natural Ventilation	• Architectural designs leveraging window placement, atriums, and cross-ventilation provide energy-efficient airflow mainly in residential and heritage buildings. • Effectiveness depends on outdoor air quality and weather conditions.
Renewable and Hybrid Ventilation	• Combines mechanical ventilation with natural airflow (e.g., heat recovery ventilators with operable windows) to offer sustainable IAQ solutions • Example includes 15W in Hong Kong Science Park.

VENTILATION AND AIR PURIFICATION STRATEGIES (CONT')

2 | Advanced Air Purification Technologies

Type	Usage & Limitations
High-Efficiency Particulate Air (HEPA) Filters	- Remove 99.97% of particles ≥ 0.3 microns - Commonly applied in healthcare, research facilities, and increasingly in public and residential environments
UV Germicidal Irradiation (UVGI) & Photocatalytic Oxidation (PCO)	- Deactivate airborne pathogens and break down VOCs - While effective, they require careful maintenance and monitoring for potential by-products

BUILDING DESIGN AND MATERIAL CONSIDERATIONS

- Use of airtight construction methods and low-VOC emitting materials improves source control of pollutants.
- Retrofitting existing buildings with modern HVAC and IAQ systems significantly enhances air quality and reduces energy use.
- Case studies in Hong Kong show that building design improvements correlate with healthier indoor environments, especially in schools and eldercare facilities.

FACTBOX

Ensuring adequate ventilation and filtration can reduce indoor pollutant levels by up to 70%, significantly lowering risks of respiratory infections and improving occupant productivity.



POLICY DEVELOPMENTS AND REGULATIONS

- Strengthening IAQ regulations is critical to ensure compliance and health protection.
- Hong Kong's Clean Air Plan 2035 should include focus areas addressing indoor pollution with goals aligned to WHO guidelines.
- Policies promoting green building certifications, mandatory IAQ testing, and transparency through public IAQ dashboards advance systemic improvements.
- Targeted support for vulnerable populations (children, elderly) through guidelines and audits improves equity in IAQ protection.



PUBLIC ENGAGEMENT AND EDUCATION

- Empowering occupants through awareness campaigns, workshops, and user-friendly IAQ data visualizations enhances behavioral changes promoting better IAQ (e.g., opening windows, reducing indoor pollutant sources).
- Tenant feedback mechanisms and community forums help tailor and optimize IAQ management strategies at the building level.



CASE STUDY HIGHLIGHT: DAIKIN SINGAPORE PTE LIMITED



Daikin Singapore combines HVAC innovation with targeted IAQ solutions to serve commercial and residential sectors.

- Their IAQ solutions integrate sophisticated ventilation technologies beyond standard cooling/heating to improve IAQ. Advanced air conditioning units incorporate filters and heat reclaim ventilation to reduce pollutants like mold, viruses, and allergens.
- Retrofitting services include steam cleaning and antimicrobial coatings preventing microbial buildup.
- A bungalow retrofit project demonstrated improved IAQ parameters and occupant health feedback, showcasing the effectiveness of integrated IAQ solutions.

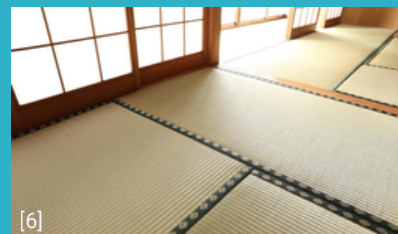
FACTBOX



[5]

Panasonic's Nanoe™ X technology features an air purification system that generates ionized particles within air conditioning units to neutralize viruses, bacteria, and indoor pollutants (Panasonic Corporation, 2025).

Japan's traditional emphasis on cleanliness is exemplified by the use of 'tatami mats,' which are naturally recognized for their air purification qualities and significantly contribute to enhancing IAQ.



[6]

4

RECOMMENDATIONS FOR ENHANCING IAQ MANAGEMENT

1 | Adopt Best Practices from Global Cities

Hong Kong can strengthen its IAQ strategies by adopting best practices from global cities like Tokyo, Seoul, Shanghai, Dubai, New York, and Singapore. Integrating advanced sensor technologies and improving filtration and ventilation systems, especially considering prevalent air conditioning use, can enable a comprehensive IAQ policy tailored to the city's dense urban environment.

2 | Sensor Accuracy & Standards

Despite progress in real-time IAQ monitoring through IoT, electrochemical, PM, and infrared sensors, challenges remain in ensuring the accuracy and standardization of low-cost sensors. Hong Kong should learn from Seoul and Singapore's certification and calibration protocols to enhance data reliability and IAQ management.

3 | Smart BMS Integration

Implementing centralized smart Building Management Systems (BMS) that integrate IoT and cloud computing can facilitate proactive IAQ monitoring and adjustments, minimizing human error and significantly improving air quality.

4 | Adopt New and Innovative Technologies

While Hong Kong relies on portable HEPA filters in homes and healthcare, adopting advanced filtration systems such as MERV 13 filters (recommended by New York State Education Department) is crucial. Innovations like microbial coatings, heat recovery, and UVGI systems in HVAC units, as seen in Singapore, Tokyo, and Dubai, offer sustainable solutions aligned with local climate and energy demands.

5 | Balance Sustainability with Cost

To address sustainability and cost challenges, Hong Kong should consider Singapore's integrated approach balancing natural and mechanical ventilation, alongside energy-efficient filtration and antimicrobial treatments.

6 | Mandate Testing & Reporting

Current voluntary IAQ standards limit widespread improvements. Mandatory testing, certification, and public IAQ reporting in building permits, following the examples of Dubai, Seoul, and New York, could strengthen accountability and drive ongoing progress.

7 | Multi-Stakeholder Partnerships

Collaboration among government agencies, health authorities, academia, and the private sector, supported by community engagement and awareness campaigns, is vital. Lessons from Dubai and New York highlight the importance of multi-stakeholder partnerships in identifying challenges and fostering proactive participation.

8 | Prioritize High Risk environments

Prioritizing continuous IAQ monitoring and proactive maintenance in high-risk environments—such as schools, healthcare facilities, aged care centers, and subdivided flats—is essential to protect vulnerable populations.

9 | Combine Sensors with Occupant Feedback

Effective IAQ management requires combining objective real-time sensor data with subjective occupant feedback for comprehensive issue identification and intervention.

10 | Continuous Innovation and Policy Alignment

Continuous IAQ innovation and rigorous policy evaluation are critical. Like Dubai, Shanghai, and New York, Hong Kong should commit to regular research, align with international standards (e.g., LEED, ASHRAE, WELL), and embrace new technologies to maintain high standards of IAQ.

REFERENCE

This concise report summarizes key findings and recommendations. Readers seeking comprehensive references, methodology, and additional discussion are encouraged to consult the full report. Retrieved from <https://hongkongcan.org/wp-content/uploads/2025/09/Study-4-Existing-IAQ-solutions.pdf>

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