

Press Release
22nd April 2021

Clean Air Network Press Conference Launch of “Citizen Clean Air Plan”

With unprecedented global and regional momentum on green recovery, the society at large has a strong expectation of the HKSAR Government's new Clean Air Plan.

Since the launch of the Clean Air Plan (“CAP 2013”), by the Environment Bureau in 2013, it has provided a vision and strategic framework for the society to progress towards the goal of clean air.

With varying degrees of success to control multiple air pollutants and initiate systemic changes, new and fundamental problems have also emerged since the launch of the CAP 2013. Key questions being asked are, what is still inadequate to achieve clean air, and how should we define the success of the next phase of initiatives to clean the air of Hong Kong?

Clean Air Network drafted the Citizen Clean Air Plan with the purpose to illustrate our perspectives and findings on the pressing questions. Citizen Clean Air Plan is supported by the CHEST Delegation Hong Kong and Macau Limited, Hong Kong Lung Foundation, Hong Kong Society of Paediatric Respiriology and Allergy, Hong Kong Thoracic Society and The Hong Kong Medical Association.



Photo 1: Representatives from the supporting institutions were holding the newly published “Citizen Clean Air Plan”. From the left: Ginu YANG, Member of Clean Air Student Council, Dr. LAM Wai Kei, President of the CHEST Delegation Hong Kong and Macau, Dr. LAM Sin Man, Grace, President of the Hong Kong Thoracic Society, Mr. Patrick FUNG, Chief Executive Officer of Clean Air Network, Dr. SO KY, Loletta, Honorary Secretary of Hong Kong Lung Foundation, Dr. CHAN Yee

上環永和街 23-29 號俊和商業中心 23 樓

23/F, Chun Wo Commercial Centre, 23-29 Wing Wo Street, Sheung Wan, Hong Kong
Phone: (852) 3971-0106 Email: info@hongkongcan.org Website: www.hongkongcan.org
CLEAN AIR NETWORK is a company limited by guarantee and a charitable institution

Shing, Alvin, Council Member of The Hong Kong Medical Association and Nathan CHOI, Member of Clean Air Student Council.

There are two parts of the Citizen Clean Air Plan.

The first part will review how the HKSAR Government has tackled air pollution since the launch of the CAP 2013, to determine where progress has been made, and where it has not.

The findings in the first part will help us to identify the gaps where we need to pay stronger attention to, in order to achieve bigger impacts. The second part will set out the aspiration and conditions to define the success of the next phase of initiatives towards cleaning the air.

We have mapped two routes to make further achievements on cleaning the air.

Firstly, we urge the HKSAR Government to establish ambitious clean air goals which are comparable to global cities and complying with the most stringent standard of the World Health Organization's Air Quality Guidelines, to contribute to a truly liveable super region with cleaner air and lower carbon, and to migrate to an exposure-based air pollution management paradigm, that will more effectively protect public health.

Secondly, we also call for the civil society, including the professionals, the academics, the public and private sectors, to work hand in hand, and address specific issues that affect the community on a daily basis but are currently out of reach by the Government policy.

SUMMARY OF REVIEW

REVIEW OF CAP2013

CAP2013 aimed to reconcile some of the disconnections observed in the past administrations (including disconnections in policymaking and science) by changing the system. Major efforts on systemic change included:

- the launch of the CAP 2013 by Environment Bureau in collaboration with Transport and Housing Bureau, Development Bureau and Food and Health Bureau;
- the amendment of Air Pollution Control Ordinance(APCO) to mandate the review of the Air Quality objectives(AQO) at a minimum of once every 5 years; strengthen communication through replacement of the old API with AQHI;
- strengthen the regional control mechanism including regional collaborations of Guangdong, Hong Kong and Macau;
- modernising the Air Quality Management System using scientific evidence-based approach;

There were varying degrees of impact achieved on the above systemic changes. Some of the gaps observed:

- Unclear roles and lack of measurable goals to be achieved by Transport and Housing Bureau, Development Bureau and Food and Health Bureau;
- Weaknesses of Air Pollution Control Ordinance and Environmental Impact Assessment Ordinance on protecting public health were unaddressed
- Controversial mechanism of AQOs Review
- Ineffective AQHI's to transform individual behaviour

- Not able to translate regional reduction effort to health terms as regional reduction targets are not set in terms of level of pollution concentration
- Insufficient coverage of street-level air pollution monitoring network

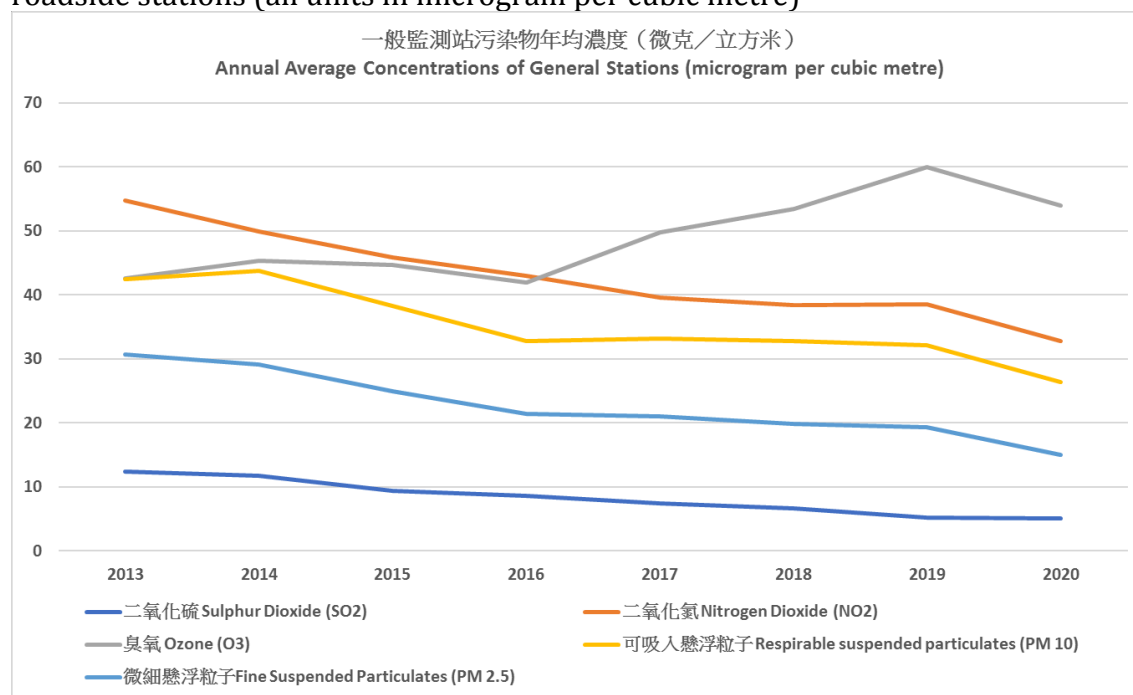
REVIEW OF GOVERNMENT POLICY MEASURES 2013-2020

- Insufficient progress made to accelerate transformation to zero emission road transport, especially the commercial vehicles and public transport; limited improvement on pedestrianisation policy;
- Insufficient progress made to tackle nitrogen oxides emission from ocean-going vessels, and volatile organic compound emission from river vessels and local vessels;
- Insufficient progress made to tackle regional ozone, not able to identify precursors of the formation of ozone;
- Insufficient progress made in formulation of a clean energy policy that will achieve clean air and 2050 carbon neutrality;

REVIEW OF AIR & HEALTH DATA 2013-2020

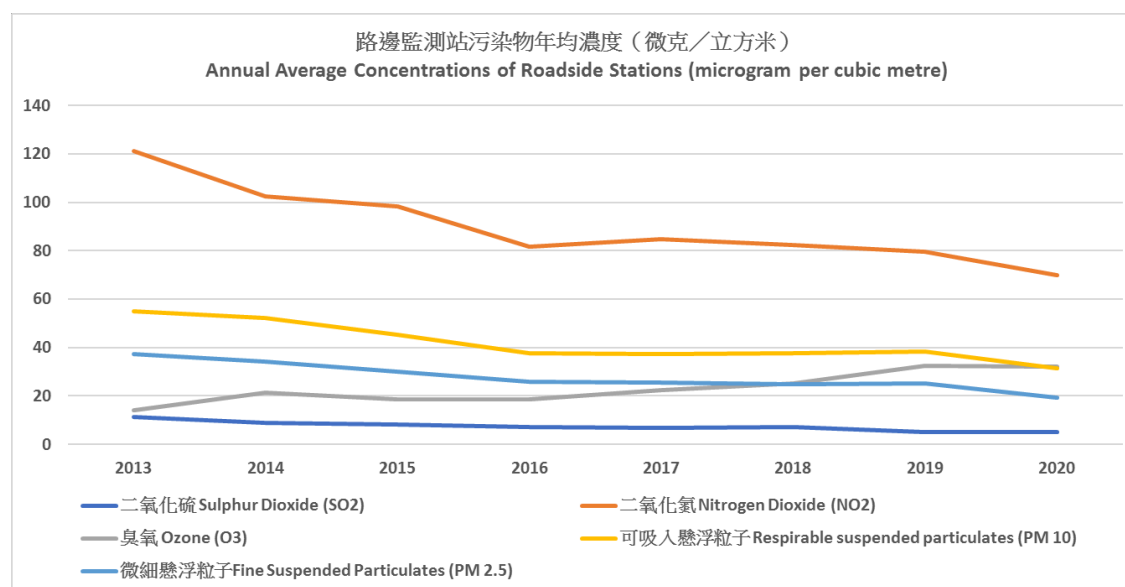
- In summary, health outcomes due to air pollution declined by up to 50%. Concentration of major air pollutants largely reduced except ozone. Roadside nitrogen dioxide and ambient ozone remain a key public health risk;
- Concentration of particulate matter, nitrogen dioxide, and sulphur dioxide had dropped by 30%;

Figure 1: Annual average concentrations of major air pollutants in Hong Kong - roadside stations (all units in microgram per cubic metre)



Source: EPD

Figure 2: Annual average concentrations of major air pollutants in Hong Kong - general stations (all units in microgram per cubic metre)



Source: EPD

- Concentration of ambient ozone has reached a historic record in recent years;
- The annual concentration of roadside nitrogen dioxide and particulate matter still exceed WHO's most stringent level by 60%-90%.

Figure 3: Comparison of WHOAQG and annual average concentrations of general stations and roadside stations (all units in microgram per cubic metre)

Annual Average of General Stations	2013	2020	Changes	WHO AQG	Compare 2020 to WHO AQG
Sulphur Dioxide (SO2)	12	5	-60%	N/A	N/A
Nitrogen Dioxide (NO2)	55	33	-40%	40	-18%
Ozone (O3)	43	54	27%	N/A	N/A
Respirable suspended particulates (PM 10)	42	26	-38%	20	32%
Fine Suspended Particulates (PM 2.5)	31	15	-51%	10	51%

Annual Average of Roadside Stations	2013	2020	Changes	WHO AQG	Compare 2020 to WHO AQG
Sulphur Dioxide (SO2)	11	5	-56%	N/A	N/A
Nitrogen Dioxide (NO2)	121	70	-42%	40	75%
Ozone (O3)	14	32	129%	N/A	N/A
Respirable suspended particulates (PM 10)	55	32	-42%	20	60%
Fine Suspended Particulates (PM 2.5)	37	19	-49%	10	90%

Note: WHOAQG for SO2 are 10 minutes and 24 hours average, WHOAQG for O3 is 8 hours average. According to WHOAQG, the limit of O3 for 8 hours average is 100 µg/m3. Under

Hong Kong's AQOs, the concentration limit of O₃ is 160 µg/m³, number of exceedances allowed is 9 times. Based on EPD's data in 2020, 5 general stations recorded exceedances more than 9 times, including Tuen Mun (11), Tung Chung (11) and Tai Po (14). According to WHOAQG, the limit of SO₂ for 24 hours average is 20 µg/m³. Under Hong Kong's AQOs, the concentration limit of SO₂ is 125 µg/m³, number of exceedances allowed is 3 times. Based on EPD's data in 2020, all stations' concentration of SO₂ met the HKAQOs.

Source: EPD, WHO

- According to Hedley Environmental Index , since 2013, air pollution had caused approximately 16,500 premature deaths, 1,096,000 avoidable hospital bed days, and 25 million avoidable doctor visits;
- In taking a year-on-year review, the number of deaths attributable to air pollution had fallen from a high of 3,365 in 2013 to 1,686 in 2018 which represented a 50% decline. However, in 2019, the number of deaths had climbed again, to 1,745;
- The figures for other health impacts depict a similar trend;

Figure 4: Health and economic loss due to air pollution

Year	Premature Deaths	Hospital Bed Days	Doctor Visits	Total Economic Loss (HKD)
2013	3,365	208,815	5.50 million	\$41 billion
2014	2,664	172,857	4.18 million	\$29 billion
2015	2,382	152,298	3.71 million	\$29 billion
2016	1,508	98,684	2.26 million	\$18 billion
2017	1,866	126,499	2.71 million	\$22 billion
2018	1,686	115,802	2.39 million	\$20 billion
2019	1,745	127,140	2.30 million	\$21 billion
2020	1,264	93,717	1.59 million	\$15 billion
Total	16,479	1,095,812	25 million	\$195 billion

Source: Hedley Environmental Index Version 4.0

SUMMARY OF RECOMMENDATIONS

In the Citizen Clean Air Plan, CAN has set out the aspiration and conditions to define how the next phase of success of clean air of HKSAR, is to be measured for the upcoming decade.

The definitions of success are:

A) Whether the air quality of HKSAR will become one of the best in 2030.

Specifically, whether the air quality of HKSAR will be levelled with other global cities, like London, New York, Singapore by 2030; and whether Hong Kong's Air Quality Objectives will be levelled with WHO's most stringent Air Quality Guidelines by 2035.

B) Whether HKSAR will migrate to exposure-based management paradigm.

For information - currently, the HKSAR Government adopts an emission-based air pollution management. Success of policy measures are defined by the level of emission reduced, and policy measures are prioritized to tackle the highest emitters to maximize gain on emission reduction.

If HKSAR will migrate to adopt exposure-based management as the key approach, specifically, success of the policy measures should be measured by the level of exposure (contact of air pollution on human)/ health risk reduced; and the Government should deploy a mechanism to prioritize policy measures that maximize the gain on exposure / health risk reduction.

C) Whether regional pollution can be significantly controlled thus Greater Bay Area becomes a truly liveable city with clean air and low carbon.

Specifically, there are 4 aspects of work to be clarified by the Government:

- How can a regional institution be set up to strengthen effective coordination and legislation?
- How will the gap on regional ozone, nitrogen oxides emission from ocean going vessels, volatile organic compound emission from river vessels (including Macau and PRD Ferries) be narrowed?
- How will the emission standard of PRD waters be tightened further – through application to become one of the designated Emission Control Area (ECA) under International Maritime Organization (IMO) or tighten the emission standard under Domestic Emission Control Area (DECA)?
- How a clean energy policy will be adopted in Greater Bay Area that will achieve both clean air and decarbonisation goals?

D) Whether an informed and mobilised citizenry will be fostered.

The key objectives and principles

This paper sets out principles and recommended measures to achieve the above objectives, and proposes a framework that requires actions from both the Government and the civic society.

Objective A. Become the place among the best air qualities by 2030 (comparable to other first tier global cities and metropolitans) and achieve WHO AQGs by 2035

Figure 5: Comparison of air pollution level among selected cities

City	Population (million)	GDP per capita (US\$)	PM2.5 level (WHO 2018) (microgram per cubic meter)	Compared to Hong Kong's PM2.5 level
Stockholm	1.0	76,993	5	-78%
New York	8.4	31,417	7	-70%
San Francisco	0.8	60,300	8	-65%
Melbourne	4.5	72,600	8	-65%
London	9.0	75,467	12	-48%
Hamburg	1.7	80,087	14	-39%
Paris	12.2	69,139	16	-30%
Tokyo	13.7	70,225	17	-26%
Singapore	5.7	65,233	18	-22%
Hong Kong	7.5	48,713	23	N/A
Shenzhen	13.4	30,523	27	+17%

Source: The World Bank, U.S. Census Bureau, National Institute of Statistics and Economic Studies, France, Census and Statistics Department of Hong Kong

Principles to achieve the key objectives:

Principle A1. Emphasize accountability and communication to ensure achievement of specific and time-bound targets.

Principle A2. Integrated bureau efforts to tackle air pollution.

Principle A3. Transition to zero emission vehicular fleet to minimize roadside pollution.

Principle A4. Establish new marine emission standards and facilitate transitions to cleaner vessels.

Principle A5. Develop an open, transparent, independent AQOs review mechanism.

Principle A1. Emphasize accountability and communication to ensure achievement of specific and time-bound targets

A1.1 The Government should commit to review the new Clean Air Plan and publish progress reports regularly.

A1.2 The public should be well informed on the progress and achievement of various goals and milestones. To achieve this, the Government should broaden and deepen its engagement with all citizens.

informed on the progress and achievement of various goals and milestones. To achieve this, the Government should broaden and deepen its engagement with all citizens.

Principle A2. Integrated bureau efforts to tackle air pollution

A2.1 As the limitation of emission control measures will arrive shortly, it is crucial to have a joint effort from other bureaux and departments of the HKSAR Government to lead, and to deliver integrated solutions from transport demand management and urban planning approaches. It requires coordinated cross-bureau efforts to significantly reduce air pollution further.

A2.2 It is recommended to set measurable goals for the Transport and Housing Bureau, Development Bureau and Food and Health Bureau, with a joint vision to clean up Hong Kong's air and thus minimize public health cost.

Principle A3. Transition to zero emission vehicular fleet to minimize roadside pollution

A3.1 Due to Hong Kong's congested cityscape, emission from road transport is usually in close proximity to a large group of the population who commute, work or even reside by the roadside. It is therefore of high priority to minimize roadside air pollution from the public health perspective.

A3.2 Despite the declining trend of street level particulate matter, the roadside nitrogen dioxide presents a severe health risk to individuals. Phasing out diesel vehicles, including all commercial vehicles, public transport, and private vehicles, will be the key to further control roadside air pollution.

Deep-lying issues to be addressed to transition to zero-emission vehicles

A3.3 Currently, new energy vehicles only occupy a neglectable fraction out of the total fleet among commercial vehicles (CV) and public transport (PT).

A3.4 The Roadmap on Popularisation of Electric Vehicles (Roadmap) published by the Environment Bureau in March 2021 failed to address long-entrenched, deep-lying issues that hinder the progress of transitioning to new energy vehicles, especially for commercial vehicles and public transport.

- **policy direction** - there is no clear deadline for phasing out or banning registration for conventional ICE CV and PT

- **infrastructural** - there is no infrastructure development goal for charging electric or other new energy CV and PT
- **financial support** - there is no injection of additional financial resources to support purchase or switch to new energy CV and PT
- **vehicles technology** (range and reliability) - the Roadmap emphasised the importance of having further trials of electric CV and PT in the near term. However, there is no new approach to ensure a better trial design.
- **operational / business model** - the Roadmap failed to elaborate on the possibility of alternative operations or business models that could make electric CV and PT work in the short/medium terms.

A3.5 It is recommended the next version of the Roadmap (to be announced by the Government in 2025) should address all of the above issues. The HKSAR Government should strategize to phase out all diesel buses by 2040, taking reference from other global cities.

Franchise Agreement Negotiation

A3.6 Currently, under the franchise agreement for public bus service, there is an environmental section that regulates the operators to acquire the most environmentally friendly buses in terms of vehicle exhaust emissions (with the ultimate objective of acquiring zero emission buses), that are technologically proven and commercially available.

A3.7 However, it is unclear how such feasibility is determined. For instance, the Government's New Energy Transport Fund, requires the franchise bus operators to apply for the fund and conduct the trials. It may be under such trials that the technological feasibility is determined.

A3.8 It is even more difficult to understand the mechanism for commercial feasibility to be determined. It is generally understood that the cost of purchase of new energy vehicles is higher. The operation model may also be adjusted to accommodate the use of new energy vehicles, which require additional costs.

A3.9 It maybe worth noting that the cost of operations may be lower than conventional vehicles due to incentives provided on fuel cost. It may be helpful if the commercial feasibility is measured by the duration of the payback period.

A3.10 It is recommended to establish an independent, transparent and systematic mechanism to determine the technological and commercial feasibility of new energy vehicles prior to the next phase of negotiation of the franchise agreement which starts from 2025 onwards.

Transforming franchised bus fleet to boost confidence

A3.11 If it is demonstrated successful to electrify public franchised bus fleets, there would be a strong boost of public confidence in transforming other vehicle types, including minibus, taxi and other goods vehicles.

Principle A4. Establish new marine emission standard and facilitate transitions to cleaner vessels

A4.1 Shipping emission accounts for the largest quantity of air pollutants in Hong Kong. With thousands of people residing and working close to one of the busiest container ports and shipping routes in the world, Hong Kong should step up its effort to become the greenest port and part of the greenest waters in the world.

A4.2 Based on the latest marine vessels emissions inventory, it appears that the policymakers need to develop a strategy to target all OGVs, RVs, and LVs in order to reduce the emissions from marine vessels.

A4.3 Overall strategy

There are multiple possible measures to further reduce emissions from marine vessels with varying estimated effects.

Such measures include retrofit technique (installation of diesel particulate filters (DPF), selective catalytic reduction (SCR), exhaust gas scrubbers, etc), applying on-engine modification, using diesel fuel alternatives, and deploying operation strategies.

A4.4 Ocean Going Vessels (OGVs)

A4.41 OGVs dominated the emission of SO₂ and NO_x. While the mandatory fuel switch at berth policy in effect from 2015 might have significantly reduced the level of SO₂, the NO_x emission is largely unaddressed.

A4.42 To further reduce NO_x emission from OGVs, one of the proven measures is to apply selective catalytic reduction (SCR) technology. With more ports providing incentives, it is more likely that the OGVs will invest to install SCR. It is recommended for the GBA to develop collaboration with other bay areas to make this happen. Further elaboration in section C4.

A4.43 Besides, based on current international and domestic frameworks, there is still room for advancement of tightening emission standards of OGVs to further reduce SO₂ and other pollutants.

A4.44 In Hong Kong, since 2015, it was made mandatory for OGVs to switch to cleaner fuel, with sulphur limited at 0.5% mass by mass (m/m). There has been no further tightening since then.

A4.45 On the domestic level, in 2019, a Domestic Marine Emission Control Area (DECA) was established in the Hong Kong waters in conjunction with the rest of the Pearl River Delta (PRD) waters. The DECA regulated all PRD waters to comply with the 0.5% rule.

A4.46 On the international level, following an amendment to Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL), the International Maritime Organisation (IMO) set a new rule in effect from 2020 that limits the sulphur in the fuel oil used for OGVs outside Emission Control Areas (ECAs) also to 0.5% m/m.

A4.47 In order words, the DECA (where PRD and Hong Kong waters are bounded by) is not applying different regulations (in terms of limit of sulphur in fuel oil) from all waters outside IMO's ECAs.

A4.48 To further control sulphur emissions, in this upcoming decade, Hong Kong should pro-actively plan with neighbouring ports in PRD for the next step.

A4.49 There are at least two options - either for PRD waters to become one of the designated Emission Control Areas (ECAs) under IMO, and therefore further tightening the sulphur limit of fuel to 0.1% m/m; or upgrade the requirement of DECA (which Hong Kong and the rest of PRD waters are bound by). The DECA 2.0 should then include the regulations of not only SO_x but also NO_x emissions.

A4.5 Local Vessels (LVs) and River Vessels (RVs)

A4.51 LVs contributed the most in terms of VOC and second, to NO_x, both pollutants are the main precursors of ground-level Ozone – which was not controlled over the last few years.

A4.52 RVs also account for a significant (1/4) portion of NO_x emission. Among all RVs, the passenger RVs, most notably the Macau Ferry and PRD Ferry, account for the high level of NO_x emissions. In total, the Macau Ferry and PRD Ferry account for double

of the emissions of NO_x when compared to the the RV Fully Cellular Container Vessels (RV FCCV).

A4.53 With technology advancement, it is more possible to switch to alternative cleaner ferries, including hybrid, electric, hydrogen fuel cell, or other technology, for both LVs (that serve in-harbour and the outlying island routes) and RVs (including Macau ferry and PRD ferry).

A4.6 The roles of HKSAR Government

A4.61 Based on the aforementioned international and domestic frameworks, the HKSAR Government should work with the Guangdong Government to identify the roadmap (to either IMO ECA or DECA 2.0) to establish the emission standards.

A4.62 To comply with the standards, the HKSAR Government should serve in a leadership role to work with stakeholders to overcome barriers to facilitate the adoption of cleaner ferries as soon as possible. The possible barriers include: i) the financial cost required to trial the new ferries, ii) the additional financial cost required to purchase new ferries, iii) the new facilities, operation models, and personnel training required to deliver ferry service using the new ferries.

Principle A5. Develop an open, transparent, independent AQOs review mechanism

A5.1 A Review of the 2016-18 AQOs Review is needed. Special emphasis should be made on how data will be made available ahead of the next AQOs Review cycle.

A5.2 The future AQO Review should be health based. In the 2016-18 AQO Review, the policy measures proposed by the experts group appointed by the Government were prioritized into short, medium, and long term based on the practicality of implementing these measures. In order to maximize public health, it is recommended to develop a mechanism that prioritizes policy measures based on the impact on public health.

A5.3 An open, transparent, independent review mechanism needs to be developed and the citizens should be well informed.

Objective B. Become the place with the best knowledge on exposure management

Principles to achieve the key objectives:

Principle B1. Standardize the protocol to define “exposure hot spots”.

Principle B2. Develop an integrated Data Management System.

Principle B3. Oversight of exposure / health risk management under the Secretary for Health.

Principle B4. Make progress on Transport Management Solutions.

Principle B5. Strengthen Indoor Air Quality Management.

Principle B1. Standardize the protocol to define “exposure hot spots”

B1.1 Currently, there is no official definition of “exposure hot spots” provided by the Government. Moving forward, the Government needs to develop a definition scientifically and standardize the protocol to identify outdoor and indoor “exposure hot spots”.

B1.2 Also, with the support of academia, it is possible for the Government to consider establishing an **exposure-based index** that communicates with the general public on the risk of exposure hot spots.

B1.3 In theory, the exposure-based index takes into account: a) the pollution levels; b) the proximity of humans; c) and the density of humans. In comparison, the current Air Quality Health Index (AQHI) takes into account pollution level and theoretical health impacts based on statistics.

B1.4 Whereas the current AQHI will provide theoretical health risk if any individual is at a particular location. The proposed exposure-based index will enable the policymaker to assess the actual extent of impact on human health at a particular location.

Principle B2. Develop an integrated Data Management System

B2.1 Data on air pollution, health, transport, buildings, and urban planning streams should be integrated to support a 360-degree, evidence-based management system that supports cross-sectoral issues policymaking, benchmarking, and progress monitoring.

B2.2 The infrastructure for improving data collection of air pollution should be improved.

B2.3 Firstly, the density of roadside air pollution monitoring stations operated by the EPD should be enhanced. It is not only for scientific research but also to better inform the citizens about the quality of air at street level. Even during the COVID-19 period when there were more remote working and schooling practices, a lot of the population still commute, work, or reside by the roadside.

B2.4 Secondly, a stronger resourced R&D plan is required to improve air pollution micro-sensing technology until it becomes more affordable to build and operate, and

provides more superior data quality. A dense network of high-quality micro-sensing devices will better inform policymakers and the general public about the risk of exposure to hot spots in the territory. Strategic locations, including potential exposure hot spots – such as public transport interchanges, sports grounds, residential buildings, and schools, should be deployed with micro-sensing devices.

Principle B3. Oversight of exposure / health risk management under the Secretary for Health

B3.1 Locations of outdoor and indoor exposure hot spots may cover a wide range of facilities under the management of multiple departments of the HKSAR Government, including public transport interchanges (TD), sports grounds that are close to road traffic (LCSD), residential buildings (BD), and schools (EDB).

B3.2 Public health can be one of the best drivers for aligning the goals of relevant bureaux and departments of the Government. The Secretary for Food and Health has much stronger authority to speak about public health impacts, such as premature deaths, hospitalizations, and doctor visits that are attributable to exposure to air pollution.

B3.3 As demonstrated in the policymaking process to address COVID-19, not only the Secretary for Food and Health is able to coordinate works among the local public health institutions, including the Hospital Authority, the Department of Health and the Centre for Health Protection also serve as the external touchpoints with World Health Organization and National Health Commission of PRC; and also manage efforts of other departments of the HKSAR Government.

B3.4 The exposure hot spots should be managed under the leadership of the Secretary for Health. In addition, health outcomes (such as premature deaths, hospital bed days, doctor visits) due to air pollution should be administered with the support of the Hospital Authority and published regularly by the Government to inform the public and vulnerable groups on health impacts due to exposure to air pollutants.

Principle B4. Make progress on Transport Management Solutions

B4.1 At particular areas and traffic peak hours, when a large number of population meet with a large number of road vehicles, the individuals are exposed to a high level of air pollution. Science shows a strong correlation between the significant increase in cancer risk with a sudden increase of human exposure to air pollution.

Set up Low Emission Zone 2.0 to reduce population exposure

B4.2 Low Emission Zone (“LEZ”) is an area where vehicle entry into the zone is restricted unless the vehicle meets specified emission standards. Any vehicles that fail the standards may be either excluded from entering the zone or discouraged from entering by charging.

B4.3 In the 2015 Policy Address, the Chief Executive announced that the Government would set up three low emission zones (it was later renamed as Franchised Bus Low Emission Zones “FBLEZs”) by the end of 2015 to improve roadside air quality. Under the plan, franchised bus operators will deploy only low emission buses (i.e. buses meeting Euro IV or higher emission standards or Euro II and III buses retrofitted with selective catalytic reduction devices and diesel particulate filters) to run in major corridors in Central, Causeway Bay and Mong Kok districts.

B4.4 From 31 Dec 2019, franchised bus companies were required to deploy buses meeting Euro V or above emission standards to routes running through the three FBLEZs.

B4.5 Evidence from Europe LEZs shows well-designed Low Emission Zones (LEZ) is effective in reducing concentration of air pollution. Indirectly, the level of exposure of residents of particular districts, implemented with LEZ, can be reduced.

There are a couple of principles for designing an effective LEZ:

Territory covered

B4.6 The size of the LEZ is considered to be an important factor because it determines the residents who will be directly impacted, and what share of the vehicle fleet will be concerned. The FBLEZs should be extended to cover more bus routes in Central, Mongkok and Causeway Bay Districts, and expanded to more busy districts, for example, Kwun Tong, Sham Shui Po, etc.

Equity

B4.7 Poorer districts suffer disproportionately, with higher pollution levels than the wealthy areas. LEZ could be seen as a solution to reduce residents' exposure to traffic pollution, hence the medical expenses due to air pollution. It is important for the Government to design policies in a way that additional costs for LEZ will not be borne by commuters alone.

Level of stringency

B4.8 Study shows that more restrictive zones that only allow the cleanest vehicles into a district are driving much of these results. In addition to regulating franchised buses, the Government should conduct a study to investigate how the emission

requirement should be extended to other types of vehicles, including medium or heavy goods vehicles, minibuses, taxis, and non-franchised buses.

Enforcement of policies

B4.9 Proper enforcement and penalties are key. In the Policy Address of 2020, the Government announced a conduction of further studies on Electronic Road Pricing and Toll Charge schemes. The infrastructure required to implement ERP and TC will provide an opportunity for strong enforcement of LEZ policies.

Exemptions granted to users

B4.10 Exemptions for certain groups or types of vehicles are important to consider but should be granted carefully and follow a strict timeline. Otherwise, there is a risk of opening loopholes.

Clarity and predictability of policies

B4.11 For users to adapt their behaviour and switch to cleaner vehicles or forms of mobility, a clear and predictable calendar must be established and communicated. An effective community engagement process is needed to identify real-life problems and solutions for securing support from various stakeholders.

Improve Walkability - Publish the official Walkability Study Report and follow-through

B4.12 In December 2017, the Transport Department commenced a 30-month consultancy study on enhancing walkability in Hong Kong, aiming at formulating, planning, and designing standards based on pedestrian-first principles for developing Hong Kong into a more walkable city.

B4.13 In 2019, the Walkability Study has selected Central & Western District and Sham Shui Po District as two pilot areas to test and showcase the various walkability improvement measures. If the pilot is successful, the standards and guidelines will be applied to other parts of Hong Kong.

B4.14 The Study report should have been completed by June 2020 but it has not been published till date (March 2021). It is recommended that the Government publish the Walkability Study Report and follow through with the recommendations within.

Improve Walkability – Trial new initiatives “Healthy Street” and “Play Street”

B4.15 Commuters are exposed to a high concentration of air pollution emitted from road vehicles. In a congested streetscape, air pollution is not dispersed easily, and often compounded by the Street Canyon Effect, which is commonly observed in Hong Kong.

B4.16 There are a number of initiatives under trial in different parts of the world aiming to better manage road space in busy areas where large groups of pedestrians meet a high volume of traffic.

B4.17 At a policy-making level, the **Healthy Street's Approach** redefines the purpose of the street to enable not only commuting but also to achieve a number of positive health outcomes. Some of the more popular indicators of a healthy street include levels of clean air, noise, safety, and social well-being. By the Healthy Street's Approach in the walkability programme, it is possible to create a healthier, more inclusive city where people choose to walk, cycle and use public transport.

B4.18 Whereas the **Play Street concept** emphasizes closing off a street to vehicular traffic either permanently or temporarily during certain hours so that it can be open for pedestrians or re-defined as a play area. In some cities, the concept is especially popular to be implemented in school zones.

B4.19 During 2018-2020, both initiatives were experimented with the participation of the community, experts, NGOs and officials from multiple bureaux and departments of the HKSAR Government. It is recommended to see some of the initiatives to be implemented as a trial under the Government's walkability enhancement programme.

Principle B5. Indoor Air Quality Management

Legislation for IAQ

B5.1 There are current regulations and guidance related to indoor air quality, such as Building (Ventilating Systems) Regulations. However, there is no sign of the HKSAR Government to introducing legislations specifically addressing IAQ.

IAQ Certification Scheme

B5.2 Since establishment in 2003, the IAQ Objectives under the IAQ Certification Scheme for Offices and Public Places were finally updated in 2019.

B5.3 The updates include tightening of concentration limits of certain air pollutants, including carbon monoxide, respirable suspended particulates and radon; adding new short-term objectives for formaldehyde and nitrogen dioxide; adding and removing other parameters.

B5.4 An audit report published by the Audit Commission in 2011 found that there were no IAQ certification schemes for households, schools, elderly homes, or child care centres. Unfortunately, the situation has remained the same over the years.

Practice Notes for Public Transport Service Facilities

B5.5 There were in total 3 sets of practice notes issued by the EPD to manage IAQ in air-conditioned facilities of buses, railways and ferries. The first two were issued in 2003 and the last was issued in 2015. Since 2015, there has been no review or new issue of practice notes.

B5.6 Carbon dioxide (CO₂) is selected as the only surrogate indicator. The stated reason is that the "CO₂ concentration in an indoor environment is a good indicator of the effectiveness of the ventilation system and the adequacy of ventilation". However, In addition to the adequacy of ventilation, it is also crucial to provide information on the concentration of various air pollutants, as it directly affects the health of commuters who stay in the facilities.

B5.7 It is not entirely clear as to which Government body is responsible for publishing the information of the level of indoor air quality of the public transport service facilities.

B5.8 There were Legislative Councilors, District Councillors, NGOs and commuters who voiced out the concern of high level of air pollution within Semi-indoor PTIs.

B5.9 In addition to EPD, the Transport Department is involved to conduct regular monitoring of air pollutants (nitrogen dioxide) in semi-indoor public transport interchange over the years. The information was published upon questions filed by Legislative Councillors.

Objective C. Become the Bay Area which is truly liveable with clean air and low carbon

Principles to achieve the key objectives:

Principle C1. Strengthen regional collaboration.

Principle C2. Institutionalize a regional air quality agency.

Principle C3. Achieve clean air and decarbonisation goals together.

Principle C4. Collaboration with other Bay Areas.

Principle C1. Strengthen regional collaboration

C1.1 Currently, the regional emission reduction targets are based on tonnage. Going forward, it is recommended that the regional target should be **concentration-based**.

C1.2 The ambient Ozone has been on a growth for consecutive years. It reaches a record high since 2011. Data should be shared among the cities within GBA in order to identify the sources of precursors, including volatile organic compounds (VOC) and NO_x. In addition to further study, an action plan is needed asap to mitigate the problem of Ozone.

C1.3 Meanwhile, with the new pledge to achieve carbon neutrality by 2050, the Government should clarify the target for the gradual shift to renewable energy supply in Hong Kong from now on towards 2050.

C1.4 A feasibility study is required to investigate the possibility of using cleaner energy sources across GBA.

Principle C2. Institutionalize a regional air quality agency

C2.1 With the establishment of a regional air pollution control agency, it is more effective for a high level collaboration and management across cities in GBA to coordinate scientific research and control work.

C2.2 Based on the current foundation of regional collaboration, such as the Cooperation Agreement on Regional Air Pollution Control and Prevention among Guangdong, Hong Kong, and Macao, which came into effect in 2014, a regional air pollution control agency can be established.

C2.3 Possibility of regional legislation should be explored to identify the responsibilities and the authorities of the regional air pollution control agency, and clarify its relationship with the authorities of Guangdong Province, Macau, and Hong Kong.

C2.4 The regional air pollution control agency should be accountable for the achievement of the regional air pollution reduction target. The target should be set in terms of concentration of pollution and should be reviewed periodically.

C2.5 The other roles served by the regional air pollution control agency should include

- Policymaking
- Budgeting
- Identifying best practices
- Hub of information and network resources
- Fostering partnership among cities in GBA

Principle C3. Achieve clean air and decarbonisation goals together

C3.1 The regional air pollution control strategy should also prioritise measures that will achieve both clean air goals and decarbonisation goals.

C3.2 There are common root causes that lead to air pollution and climate emergency. With a stronger regional and local focus on decarbonisation, it is recommended that the authorities identify plans that will tackle both problems in terms of power generation, buildings, and transportations.

Principle C4. Collaboration with other Bay Areas

C4.1 Marine emission is the major emission source in Hong Kong. According to the 2018 Emission Inventory Report, the emissions of SO₂, NO_x, RSP and FSP from marine vessels accounted for 49%, 37%, 34%, and 41% of the total emissions, respectively. Among all vessels, the ocean-going vessels (OGVs) were the major emitters.

C4.2 It is unclear how the OGVs emission of NO_x is to be controlled by the authority of a specific port. Currently, there is no incentive or regulatory scheme to control emissions of NO_x from OGVs when they are sailing or berthing in Hong Kong waters.

C4.3 The IMO established a set of three-tier standards for NO_x emissions from marine engines of OGVs. The IMO Tier I and II are global standards that apply to new oceangoing ships built in or after 2000 and 2011 respectively.

C4.4 The IMO Tier III standards apply within four ECAs designated by the IMO, to ships built after the ECA standards were implemented. In the North America ECA and the U.S. Caribbean Sea ECA, ships constructed from 2016 and onwards are subject to the IMO Tier III standards. In the North Sea and Baltic Sea ECAs, the affected ships are those built in or after 2021. The Tier III standards are 80 percent lower than the Tier I standards. Reduction of NO_x can also help lowering secondary particulates and ground-level ozone.

C4.5 The emission of nitrogen oxide (NO_x) by ocean-going vessels is currently unaddressed. The policy gap can be narrowed by the inter-Bay Areas collaboration.

C4.6 As the service life of existing ocean-going vessels is around 20 years or longer, the phase-out of old vessels can be too slow to create a significant improvement of NO_x emissions. However, apart from improved engine design on new vessels, technologies and devices can still be applied to retrofitting existing vessels to tackle NO_x emissions, such as Selective Catalytic Reduction (SCR) and Exhaust Gas Recirculation (EGR).

C4.7 To accelerate the improvement of marine emissions, some countries adopt incentive programs to subsidise the retrofit of vessels. Southern California of the United States is seeking partnership with Asian cities, including the Great Bay Area to implement Pacific Rim Initiative for Maritime Emission Reductions (PRIMER), an incentive program to incentivize cleaner vessels on the shared shipping routes, by retrofits and adoption of greener technology.

Objective D. Foster an informed and mobilized citizenry

Principles to achieve the key objectives:

Principle D1. Develop a relatable public education programme that involves both schools-based and community-based education.

Principle D2. Participation of relevant professional and business sectors.

Principle D1. Develop a relatable public education programme that involves both schools based and a community based education.

D1.1 One of the potentials is to integrate air pollution curriculum in the STEM and Liberal Study programme of secondary schools

Green School Initiative

D1.2 Under the current Green School Initiative organized by the HKSAR Government, it is recommended to expand the subsidy scope to support primary and secondary schools to purchase hardware and software that will monitor and reduce students' exposure to air pollution in the school environment.

Healthy City Project

D1.3 The first Healthy City Project (HCP) of Hong Kong was initiated in Sai Kung District in 1997. This first-ever HCP was featured by its bottoms-up approach where tremendous efforts have been made in engaging the community in promoting health awareness and to make collaborative efforts in building a healthy community. A cohesive partnership infrastructure across sectors conducive to sustainable development has also been built.

D1.4 It is recommended to review the scope of the HCP, and invest financial and human resources to re-energize the HCP across all District Councils. The purpose is to transform HCP to become a cross-district platform that supports the overall health policies of Hong Kong, including the public education programme currently conducted by the Department of Health.

D1.5 It is recommended to set up a steering committee to steer the progress of the HCP in each district. Air pollution, as one of the top environmental health risks, should become one of the key themes. Under the platform, members of NGOs, schools, local communities and general public are invited to participate in activities.

NGOs

D1.6 Air pollution affects everyone, especially some of the more vulnerable groups, including the children, the elderly, chronic patients of respiratory and circulatory diseases.

D1.7 With the advancement of technology, it is possible to develop air pollution audits (indoor and outdoor) of the NGO's venue to ensure a safe and clean environment.

D1.8 In addition, the vulnerable groups, the caretakers, and their families should be better informed. One way the NGOs can help, is to conduct educational programmes that caters to the needs of the vulnerable groups.

Principle D2. Participation of relevant professional and business sectors

D2.1 It requires cross-disciplinary efforts to further reduce air pollution at different levels. The participation of professional sectors will be important to transfer knowledge and identify mitigation solutions.

D2.2 Especially, participation of the professional and business sectors, including the Public Health, Urban Planning, and Business Sectors is important to achieve the purpose.

D2.3 Besides, it is recommended for the private, academic and professional sectors to strategize human resource management to meet new challenges on addressing air pollution, decarbonisation and sustainability issues, and new potentials on ESG compliance, green finance, and the demand for multi-disciplinary problem-solving. This will be beneficial for nurturing the local and attracting global talents to drive the future economy.

Sharing from supporting institutions



Photo 2: From the left: Dr. CHAN Yee Shing, Alvin, Council Member of The Hong Kong Medical Association, Dr. LAM Sin Man, Grace, President of the Hong Kong Thoracic Society, Dr. SO KY, Loletta, Honorary Secretary of Hong Kong Lung Foundation, Dr. LAM Wai Kei, President of the CHEST Delegation Hong Kong and Macau and Mr. Patrick FUNG, Chief Executive Officer of Clean Air Network.

Dr. SO KY, Loletta, Honorary Secretary of Hong Kong Lung Foundation shared some studies showing that air pollution is closely related to respiratory diseases. Even during SARS or COVID 19, studies found out that air pollution relates to the infection rate and the seriousness of the symptoms.

Dr. CHAN Yee Shing, Alvin, Council Member of The Hong Kong Medical Association echoed the Citizen Clean Air Plan that the government needs cross bureau and department cooperation to tackle air pollution and to enhance public health.

Download Citizen Clean Air Plan

Link : <https://www.hongkongcan.org/hk/citizen-cleanairplan/>



Citizen Clean Air Pledge

Apart from the Citizen Clean Air Plan, Clean Air Network also launches Citizen Clean Air Pledge to show the dedication of the citizens and institutions to clean up Hong Kong's air.



Photo 3: Representatives from the supporting institutions and CAN were signing the Citizen Clean Air Pledge.

Link : <https://www.hongkongcan.org/hk/citizen-clean-air-pledge/>



Media Contact

Patrick Fung, CEO

Tel : 3971 0106 / 9834 8892

Email : patrick@hongkongcan.org

Lily Lai, Campaign Officer

Tel : 3971 0106 / 6372 1430

Email : lilylai@hongkongcan.org