

Press Release  
8<sup>th</sup> October 2020

## Air Pollution U-Turn

### Air Quality Improved over First Half of 2020 Pollution Rebounded with Easing Social Distancing Measures after July 2020



#### EXECUTIVE SUMMARY

Global cities experienced varying degrees of social distancing policies during COVID-19. One of the benefits was on improvement of air quality.

Hong Kong followed a similar pattern. For the first six months of 2020, Hong Kong's roadside air pollution level hit the 5-year record low. From the clinical observation by respiratory paediatric expert, we understand that the public health benefits due to reduced air pollution were significant.

However, as soon as the social distancing policies were eased, Hong Kong experienced a sharp increase of roadside air pollution level from July to September 2020. It is a worrying trend because medical study showed that increased human exposure to air pollution will increase the COVID-19 associated death rate.

A review of Green Recovery measures implemented by foreign cities exposed Hong Kong's backwardness in terms of emission control and traffic demand management.

#### Key observations

1. Roadside particulate matters and nitrogen dioxide in 1H 2020 reached 5-year low while roadside ozone of same period hit 5-year high;

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CLEAN AIR NETWORK is a company limited by guarantee and a charitable institution

2. Roadside air pollution rises sharply with easing social distancing policies from July to September 2020;
3. Improvement of air quality observed among most General Stations in 1H 2020. Western part of Hong Kong continued to be more polluting than the Eastern;
4. Hong Kong fell behind global counterparts in terms of “Green Recovery” policies

## DETAILED ANALYSIS

Clean Air Network analyzed primarily air pollution data collected by Air Pollution Monitoring Stations operated by the Environmental Protection Department of the HKSAR Government, and the traffic data collected by Transport Department to reach the following observation and analysis.

### 1. Roadside particulate matters and nitrogen dioxide reached 5-year low while Ozone hit 5-year high

In the below section, first six-months data over the past 5 years (2016-2020) of 3 Roadside Stations were analysed.

#### Observations

- Roadside air pollution in 1H 2020 reached the lowest compared to same period in last 4 years (1H 2016 - 1H 2020).
- The six-month average level of roadside PM2.5, PM10 and NO2 in 1H 2020 was at 26.6, 29 and 70.8 microgram per cubic meter respectively.
- The reduction of roadside PM2.5 level in 1H 2020 was the most significant among the 3 roadside stations, compared to 1H 2019. The reduction of roadside PM10 and roadside NO2 level was at 12.6% and 5.1% respectively.
- However, the roadside Ozone has reached 5-year high. The six-month average of roadside Ozone was recorded at 33.3 microgram per cubic meter in 1H 2020, which was 21.1% higher compared to 1H 2019.

Image1-4: Average of three roadside stations (unit: microgram per cubic meter)

Image1:

Year	2016	2017	2018	2019	2020	Compare to 2019
PM2.5	33.3	35.4	34.3	31.6	26.6	-16.0%

Image2:

Year	2016	2017	2018	2019	2020	Compare to 2019
PM10	37.0	39.0	36.9	33.2	29.0	-12.6%

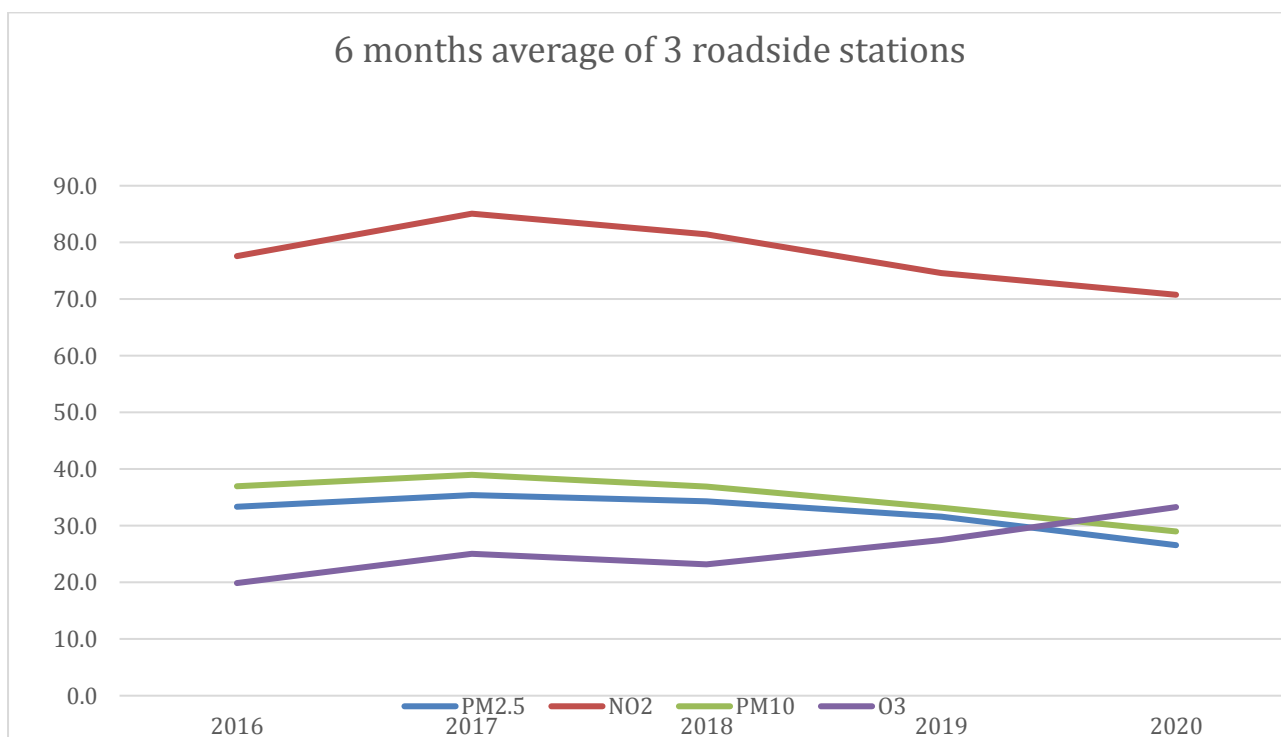
Image3:

Year	2016	2017	2018	2019	2020	Compare to 2019
NO2	77.5	85.1	81.4	74.6	70.8	-5.1%

Image4:

Year	2016	2017	2018	2019	2020	Compare to 2019
O3	19.9	25.0	23.2	27.5	33.3	21.1%

Image 5: 6-month average pollution level of 3 roadside stations (unit: microgram per cubic meter)



Although the levels of PM2.5, PM10 and NO2 reached 5-year low, they still does NOT comply with the World Health Organization's most stringent Air Quality Guideline.

Image6: WHO Guideline and average of 3 roadside stations (unit: microgram per cubic meter)

	WHO Guideline	3 roadside stations	Level of exceeding
PM2.5	10	26.6	166%
PM10	20	29.0	45%
NO2	40	70.8	77%

Remarks: the WHO Guideline of ozone is 100 microgram per cubic meter for 8-hour mean.

## 2. General improvement of air quality observed in Hong Kong Tung Chung recorded most significant improvement

In the below section, first six-months data over the past 5 years (2016-2020) of 12 General Stations were analysed. There are in total 15 General Stations in Hong Kong. However there was no 5 year data for Tseung Kwan O, Southern District and Northern District so they are omitted here.

### Observations

- All General Stations recorded improvement of level of PM2.5, PM10 and NO2 in 1H 2020 compared to 1H 2019.
- Most (11 out of 12) General Stations recorded the lowest level of PM2.5, PM10 and NO2 in 1H 2020 in 5 years time (during the 1H 2016 - 1H 2020 period). The only exception is at Tap Mun.
- There are 7 General Stations (out of 12) recorded worsening Ozone level. Tuen Mun recorded the largest rise of Ozone level of 15.2%, at six-month average of 43.5 microgram per cubic meter.

Image 7-10: average pollutants level of 12 stations (unit: microgram per cubic meter)

Image 7:

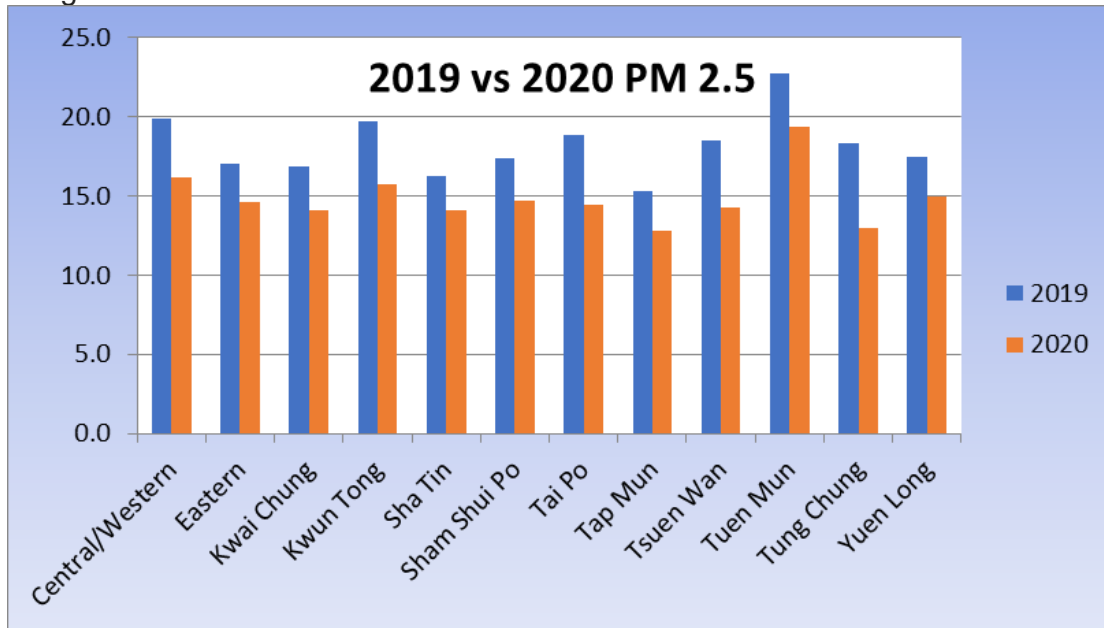


Image 8:

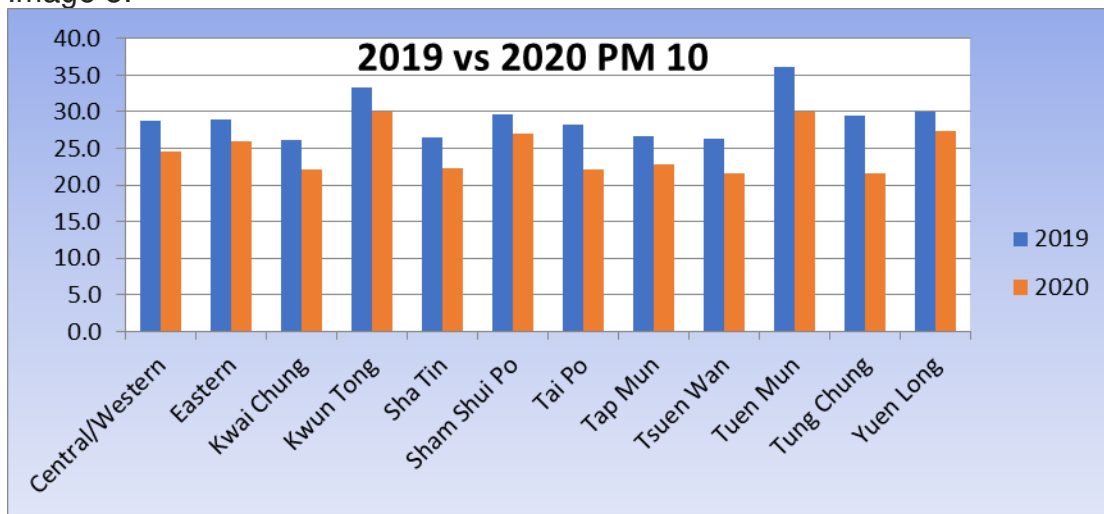


Image 9:

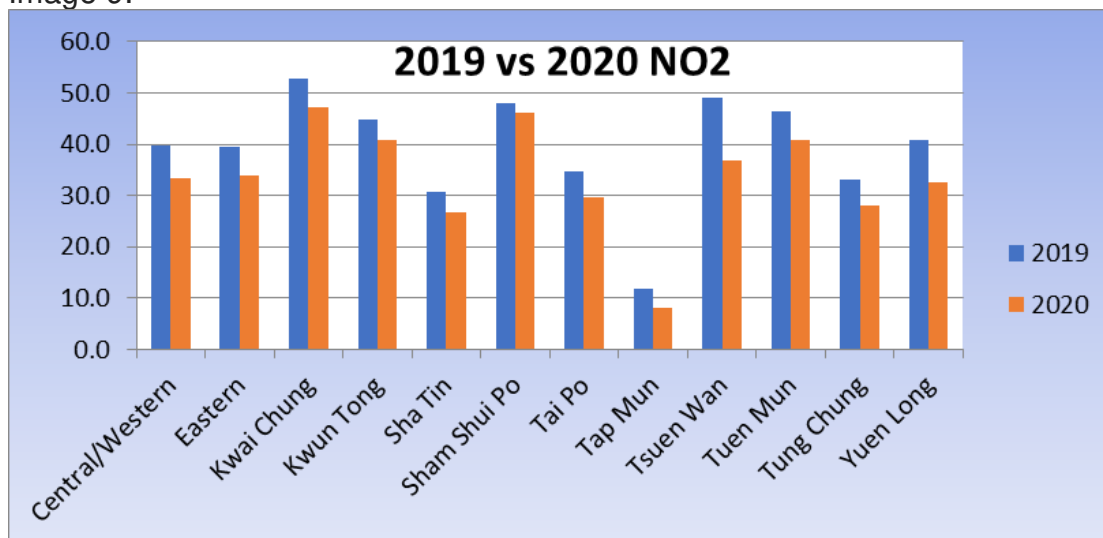
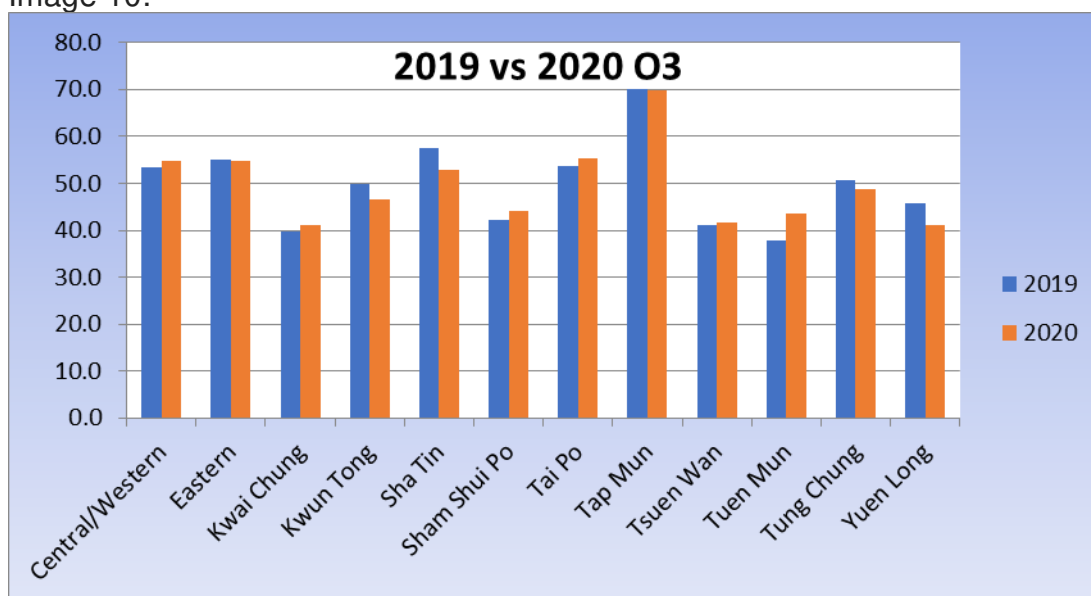


Image 10:



- Among all General Stations, Tung Chung recorded the largest improvement in 1H 2020, with a reduction of approximately 30%, 25% and 10% for PM2.5, PM10 and NO2 respectively, compared to 1H 2019. Tung Chung district is also one of the three districts that recorded a reduction of Ozone level, of 3.3%.
- The other two districts with reduction of Ozone level compared to 1H 2019 are Kwun Tong and Sha Tin.
- Tsuen Wan ranked top three among General Stations with largest improvement of PM2.5, PM10 and NO2 in 1H 2020, with a reduction of 22.4%, 16.1% and 20.9% respectively compared to 1H 2019. Tai Po also recorded significant improvement of key pollutants in 1H 2020, with a reduction of 23%, 21.3% and 13.9% of level of PM2.5, PM10 and NO2 respectively.

Image 11:

PM2.5 reduction	
Tung Chung	28.9%
Tai Po	23.0%
Tsuen Wan	22.4%

Image 12:

PM10 reduction	
Tung Chung	24.9%
Tai Po	21.3%
Tsuen Wan	16.1%

Image 13:

NO2 reduction	
Tap Mun	28.5%
Tsuen Wan	20.9%
Yuen Long	20.3%

Image 14:

O3 reduction	
Yuen Long	10.2%
Sha Tin	7.9%
Kwun Tong	6.3%

- However, even with improvement recorded at Tung Chung, Tsuen Wan and Tai Po in 1H 2020 compared to same period last year, the level of PM2.5 and PM10 still does NOT comply with the World Health Organization's most stringent Air Quality Guideline.

Image 15: WHO Guideline and average of three districts (unit: microgram per cubic meter)

	WHO Guideline	Tung Chung	Tsuen Wan	Tai Po
PM2.5	10	12.9	14.3	14.4
PM10	20	21.6	21.6	22



### 3. Western part of Hong Kong continues to be more polluting than the Eastern

In the below section, General Stations located at Western and Eastern parts of Hong Kong are compared.

#### Observations

- The Western stations include: Central/Western, Kwai Chung, Sham Shui Po, Tsuen Wan, Tuen Mun, Tung Chung, Yuen Long
- The Eastern stations include: Eastern, Kwun Tong, Sha Tin, Tai Po, Tap Mun
- In the past 4 years of our analysis, the Western stations consistently recorded a higher pollution level than the Eastern stations. The pattern remained during 1H 2020. With stronger improvement of air pollution observed among Western stations, the difference between Western and Eastern stations reduced during 1H 2020.

Image16-17: PM2.5 First Six-Month Average of Eastern and Western Stations (unit: microgram per cubic meter)

Image 16:

	2016	2017	2018	2019	2020
Eastern	21.0	22.8	21.5	17.8	14.7
Western	22.5	23.8	22.2	18.6	15.2

Image 17:

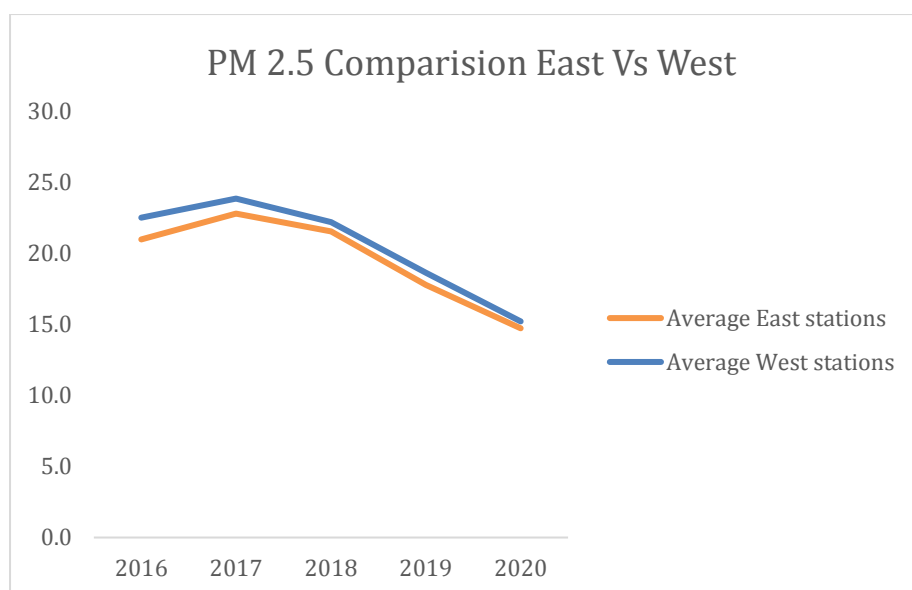


Image 18-19: PM10 First Six-Month Average of Eastern and Western Stations (unit: microgram per cubic meter)

Image 18:

	2016	2017	2018	2019	2020
<b>Eastern</b>	30.5	32.9	34.0	28.6	25.1
<b>Western</b>	33.1	35.8	35.0	29.0	24.9

Image 19:

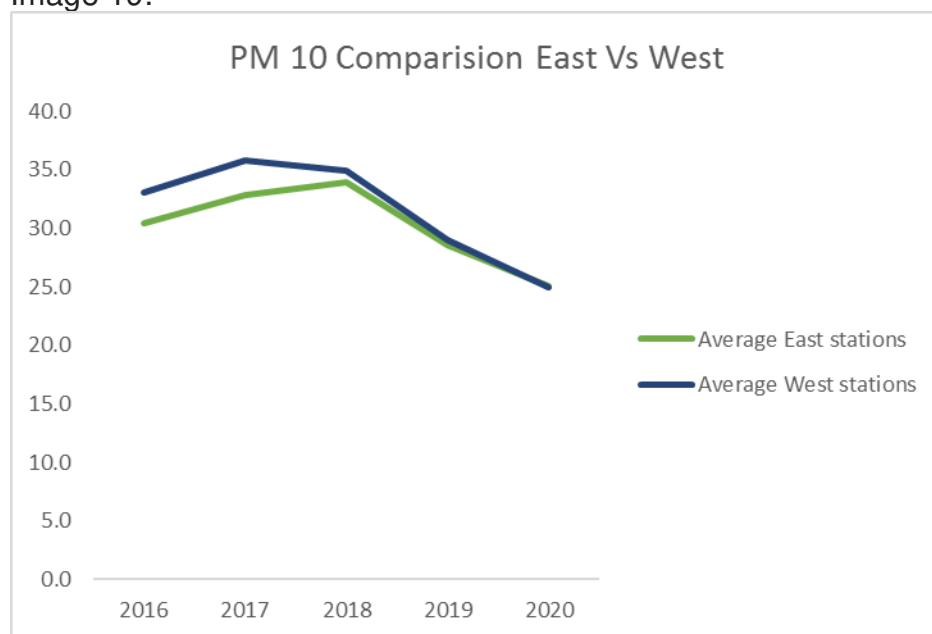


Image 20-21: NO2 First Six-Month Average of Eastern and Western Stations (unit: microgram per cubic meter)

Image 20:

	2016	2017	2018	2019	2020
<b>Eastern</b>	41.7	39.6	38.4	36.9	32.8
<b>Western</b>	47.7	49.1	46.3	45.2	37.9

Image 21:

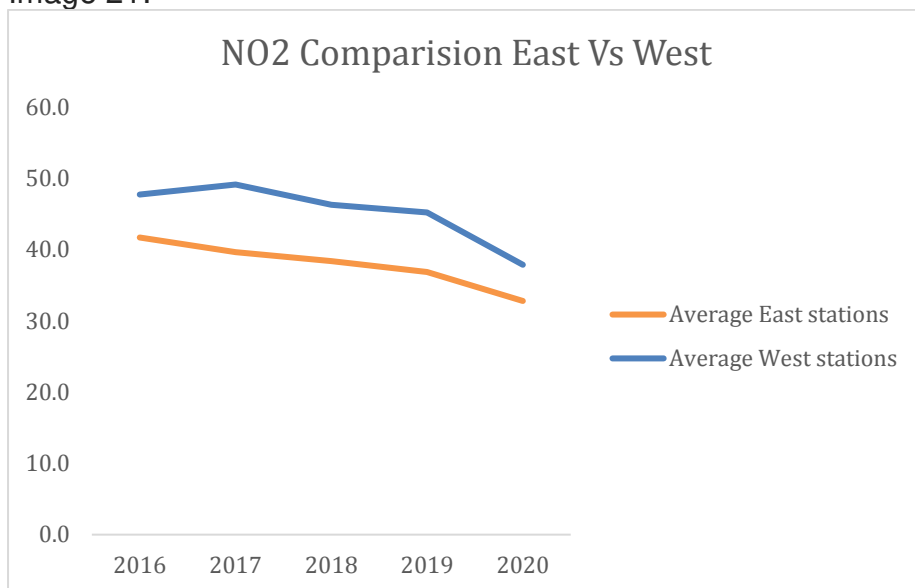
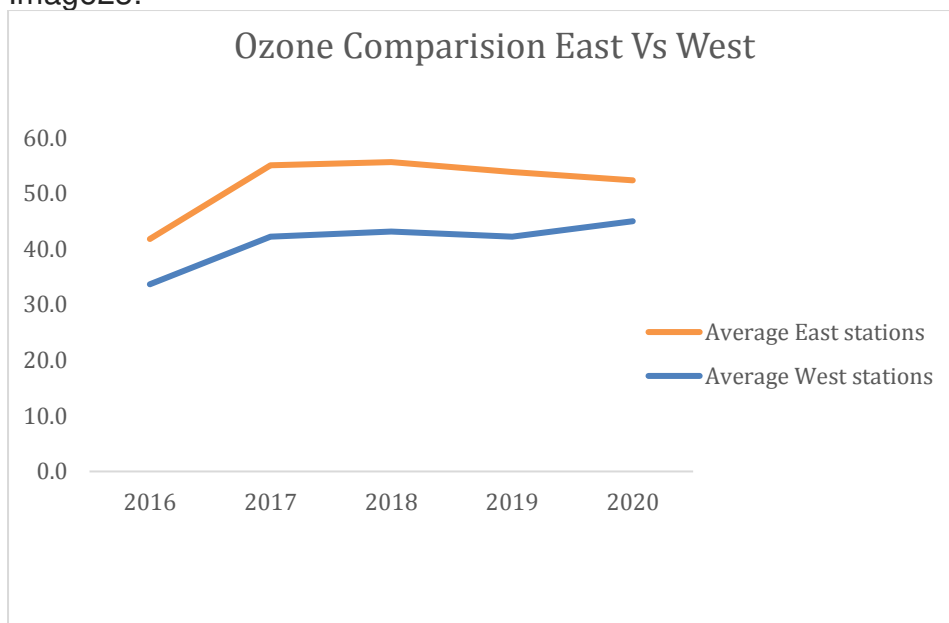


Image 22-23: O3 First Six-Month Average of Eastern and Western Stations (unit: microgram per cubic meter)

Image 22:

	2016	2017	2018	2019	2020
<b>Eastern</b>	41.8	55.1	55.6	53.8	52.4
<b>Western</b>	33.7	42.2	43.1	42.2	45.0

Image23:



#### 4. Trend of air pollution level largely followed trend of bus passenger volume

Social distancing policies were introduced during January 2020 and mid-March 2020, including work-from-home policies practised by Government and private sector, closure of border crossings, inhibit group gatherings, limit of opening hours of entertainment and restaurants, etc.

With reduced bus passengers volume, the operation frequency of franchised buses were reduced.

##### Observations

- According to Transport Department's figure, there was approximately 30% reduction of bus passenger volume recorded in 1H 2020 compared to 1H 2019. With reduced traffic activity, the roadside air pollution reduced in 1H 2020 compared to 1H 2019. However, in consistent to the trend in recent years, level of Ozone at General and Roadside stations continued to hit record-high.

Image 24: Passenger journeys of franchised buses (thousands)

Year	2016	2017	2018	2019	2020	Compare to 2019
<b>Passenger journeys (thousands)</b>	118149	119080	120769	125575	91542	-27%

## 5. Air pollution rebounded with easing social distancing policy

Social distancing policies were introduced as the third wave of COVID-19 outbreak emerged in July 2020.

### Observations:

- With easing social distancing policy, roadside air pollutions rebounded in September 2020 compared to July 2020 for at least 55%.
- During July - September 2020, Mongkok recorded the most significant rise, with 165% and 161% increase for Ozone and PM2.5 level respectively.

For reference, in 2019, the rise of level of roadside air pollutions, PM10, PM2.5 and NO<sub>2</sub>, from July 2019 to September 2019 was 46%, 43% and 40% respectively.

Image 25: Roadside air pollution levels in September 2020 (unit: microgram per cubic meter)

	PM10	NO <sub>2</sub>	O <sub>3</sub>	PM2.5
Causeway Bay	34.3	75.2	27	22.7
Central	22.7	77.1	31.4	15
Mong Kok	23.4	80.3	30.5	16.5

Image 26: Level of air pollution increased from July to September 2020

	PM10	NO <sub>2</sub>	O <sub>3</sub>	PM2.5
Causeway Bay	+73.5%	+55.6%*	+88.9%	+100%
Central	+91%	+68.2%	+61.7%	+145.7%
Mong Kok	+112.7%	+44.7%	+165.1%*	+161.4%
<b>Average</b>	<b>+92.4%</b>	<b>+56.5%</b>	<b>+75.3%</b>	<b>+136%</b>

\*the lowest level of this pollutant at this station was in June 2020

Image 27: Level of **Causeway Bay** Roadside Pollution from January to September 2020 (unit: microgram per cubic meter)

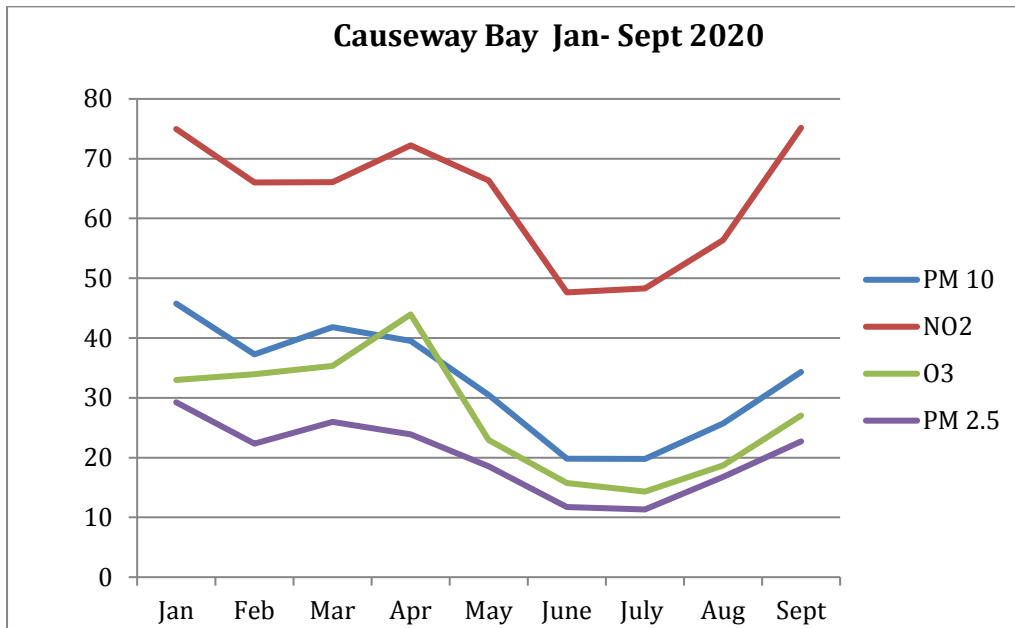


Image 28: Level of **Central** Roadside Pollution from January to September 2020 (unit: microgram per cubic meter)

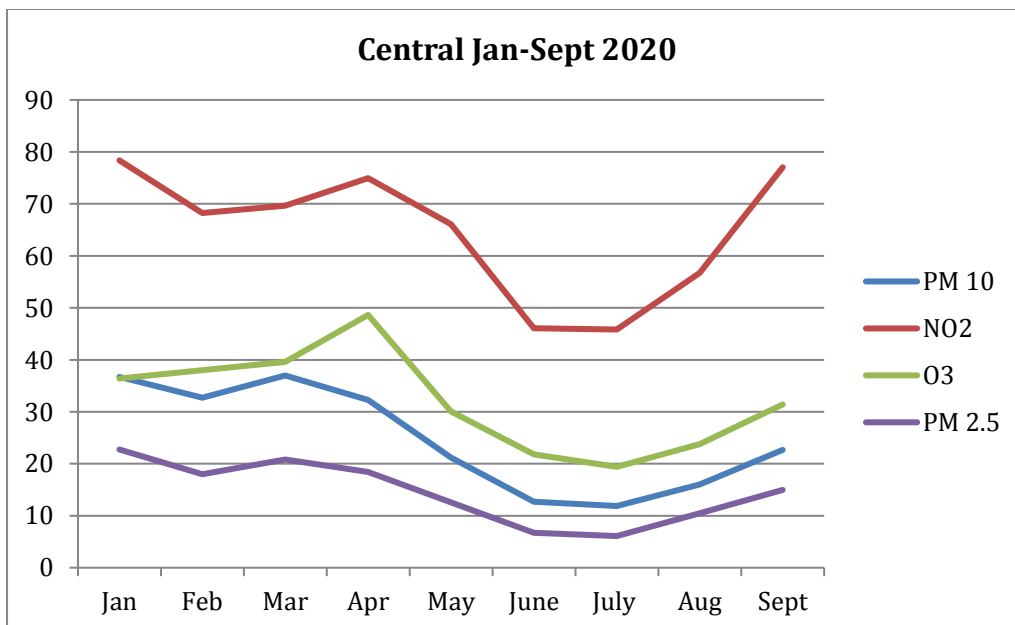
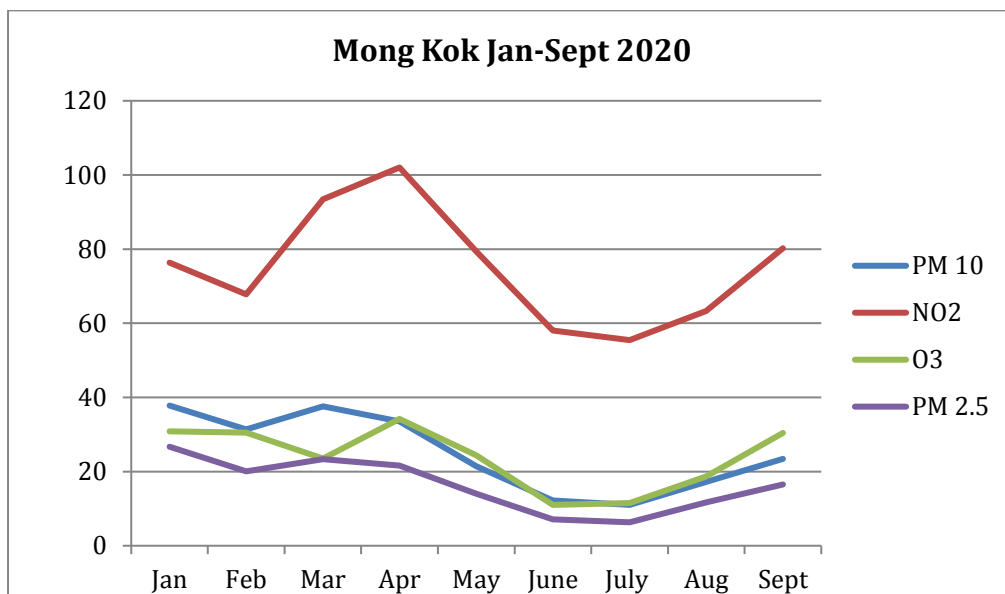


Image 29: Level of **Mong Kok** Roadside Pollution from January to September 2020  
 (unit: microgram per cubic meter)



## Clinical Observation and Foreign Medical Study

Multiple foreign medical studies show an improvement of respiratory diseases among patients reside in cities with air quality improvement due to lockdown measures. Hospital admission due to respiratory disease / asthma / wheeze of preschool children reduced.

**Paediatric respiratory expert Dr. Daniel KK Ng** shared his clinical observation on pre-school children asthma/wheeze hospital admission; and expanded the correlation between air pollution and respiratory disease hospital admission based on past researches.

## Policy Recommendations

1. Formulate ambitious roadmap to transform franchised bus fleet and other commercial vehicles to zero emission
  - Include franchised buses and other commercial vehicles in the first EV Roadmap to be announced by Financial Secretary in 2021. The Roadmap should also indicate the infrastructure development goals.
2. Strengthen Exposure Control to Minimize Health Risk
  - We recommend the HKSAR Government to establish territory-wide exposure-based target as the success indicator of policy measures.

- To better control public exposure to health risk, we urge the HKSAR Government to implement district-specific policy measures, including to extend the Low Emission Zones to cover highly affected districts, such as Sham Shui Po, Kwai Chung and Tuen Mun.
- In parallel, we urge the HKSAR Government to tighten the emission standards of Low Emission Zones to allow only Euro VI, hybrid or electric buses to operate. The HKSAR Government should formulate a plan to regulate other types of vehicles from entering the Low Emission Zones at designated time.

### 3. Strengthen Control over Ozone

- CAN urges the Guangdong and HKSAR Governments to complete the study "Characterization of photochemical ozone pollution in the Greater Bay Area and its regional and super-regional transportation" as soon as possible and propose policy measures to minimize worsening of ozone within 3 years.

## Appendix: Global Green Recovery Measures

Hong Kong has been falling behind in terms of the intensity and scale of policy measures to improve air pollution. The current public policy measures are not sufficient to bring air pollution of Hong Kong to World Health Organization's recommended safe level.

Continent	Country / City	Measures
Asia	Japan / Tokyo	Tokyo announced to achieve at least 300 Zero-emission buses by 2030.
	Korea / Seoul	Seoul announced to achieve 3000 electric bus (40% of total) by 2025.
Europe	U.K. / London	London is planning to ban cars on the busiest roads to manage the return of tens of thousands of commuters to the streets of the financial district. It has drawn up proposals for 12- or 24-hour closures for cars on its main artery routes to widen pavements for walking and bike lanes, and to allow safe queueing for shops and cafés.
	France / Paris	Paris will devote 50 km (30 miles) of lanes usually reserved for cars to bicycles; it also plans to invest \$325million to update its bicycle network.
	Germany / Berlin	Berlin has repurposed some residential streets as "play streets" on Sundays during the lockdown and is also discussing the possibility of extending the program to other days of the week.



	Italy / Milan	Milan announced it will transform 35km (about 22 miles) of streets previously used by cars to walking and cycling lanes after the lockdown.
	U.S. / Seattle	Seattle permanently closed 30 km (20miles) of streets to most vehicles at the end of May, providing more space for people to walk and bike after the lockdown.
	Canada / Montreal	Montreal announced the creation of over 320 km (200 miles) of new pedestrian and bike paths across the city.

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