July 17th 2021

Hon Vincent Cheng Wing-shun,
Chairman, Panel on Environmental Affairs, Legislative Council
1 Legislative Council Road, Central, Hong Kong

Dear Hon Vincent Cheng Wing-shun and Members of the Panel on Environmental Affairs,

Our submission for "The Clean Air Plan for Hong Kong 2035"

We are five academics, each with over 25 years of experience working on air quality issues in Hong Kong. We welcome and support the government's Clean Air Plan for Hong Kong 2035 (CAP 2035) as a solid and good strategic framework towards clean air in Hong Kong.

With the government following through most of the targeted emission policies laid out by the first Clean Air Plan (2013), and with the collaboration with the Guangdong and Mainland authorities, we have seen dramatic improvements in the air quality over Hong Kong in the past 7 years. This can be clearly noted by the public through improved visibility, or scientifically through the substantial decrease in mass concentrations of the primary air pollutants (SO_2, NO_2, $PM_{2.5}$, and PM_{10}), and the corresponding decrease in health risks as indicated by the Air Quality Health Index (AQHI). These are hard-earned successes and improvements for the public that we want to congratulate the government.

The concentrations of some key pollutants are still high as compared with the World Health Organization (WHO) Air Quality Guidelines (AQGs), showing that there is still much work to be done. The continual strengthening of the "Comprehensive Emission Reduction" and "Regional Collaboration" efforts and the increased adoption of "Green Transport" and "Clean Energy" outlined in CAP 2035 are definitely needed for further improvement of air quality and protection of public health in Hong Kong.

We are particularly pleased that CAP 2035 has explicitly highlighted two new action areas of "Liveable Environment" and "Scientific Management".

"Liveable Environment" refers back and underscores our ultimate goal of environmental protection in the provision of the best sustainable living environment for the public. We welcome the government's effort to enhance walkability, improve air quality at traffic exchanges, and initiate a cohort study to assess the long-term health effects of air pollution. We are excited that the ENB plans to update the AQHI for better air pollution health risk communication. Currently, similar to the AQHI system first adopted in Canada, Hong Kong's AQHI reports mainly the day-to-day variations in short-term health risks; we hope that the ENB can lead the world by incorporating also the long-term health risks and improve the overall air pollution risk communication when updating the AQHI.

"Scientific Management" is particularly important at this point in our journey for clean air. Hong Kong has achieved much success in the last decade by targeting major emission sources (power plants, vehicles, and marine vessels). Experience from other dense world cities (e.g. Los Angeles) suggests that further improvement in air quality will be more difficult; targeted and evidence-based control policies must be used for further improvement.

In particular, when the emissions from the major sources are dominant, the relationship between pollutant emissions and ambient pollutant concentrations is mostly linear, and emission reductions translate linearly to air quality improvements. However, as emissions from the major sources are lowered, the relative significance of other emission sources increases. More pollutants from a wider spectrum of sources begin to contribute significantly to the pollution problem. Furthermore, the dominant atmospheric interactions amongst this complex soap of pollutants can be much more complicated and nonlinear. This is especially true for secondary pollutants like ozone, the pollutant of increasing concern in the past few years. Many sources contribute to the release of volatile organic compounds contributing to the ozone problem; only targeted reduction of sources identified through careful research can lead to significant improvement in ozone.

Another important effort outlined in CAP 2035 is the increase use of smart micro-sensors for ambient and indoor air quality monitoring. This should help provide more timely and scientific data for better policy formulation and reduction in air pollution health risks, particularly for remaining pollution hot spots in the city and during high pollution episodic situations. We fully support the development of a real-time air quality monitoring and forecasting system that integrates the Internet of Things, artificial intelligence, existing and future monitoring stations, and numerical models to strengthen the public's awareness and understanding of the risks they are exposed to in their daily lives.

In conclusion, we congratulate the government's past effort since the last Clean Air Plan in helping to significantly improve Hong Kong's air quality, and look forward to the enhanced emission control and regional collaboration policies outlined in CAP 2035 to further help reduce air pollutant levels towards the WHO AQGs. We also welcome the government's explicit highlight of "Liveable Environment" and the proposed update of the AQHI. Nevertheless, it will be more and more difficult to further improve the city's air quality as the overall pollutant concentrations get lower. Hence, it is most important that the government establishes robust monitoring and analysis systems and trains more people to allow more evidence-based scientific and smart management of our city's air quality as envisioned in the new CAP 2035.

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