

EPD announces 2020 air quality monitoring results

The Environmental Protection Department (EPD) announced today (January 8) an overview of Hong Kong's air quality in 2020. The annual average concentrations of five major air pollutants, namely respirable suspended particulates (PM10), fine suspended particulates (PM2.5), nitrogen dioxide (NO2), sulphur dioxide (SO2) and ozone (O3) in 2020 are listed in Annex 1.

With the continuous implementation of emission reduction measures and collaboration with Guangdong Province to improve air quality in the Pearl River Delta (PRD) Region over the years, the overall air quality in Hong Kong has shown a discernible improvement. From 1999 to 2020, the ambient concentrations of PM10, PM2.5, NO2 and SO2 have been reduced by 43 per cent to 80 per cent from their highest levels. In 2020, the overall ambient annual average concentrations of these pollutants in the territory are 27 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$), 15 $\mu\text{g}/\text{m}^3$, 33 $\mu\text{g}/\text{m}^3$ and 5 $\mu\text{g}/\text{m}^3$ respectively, meeting the Air Quality Objectives (AQOs) limits. Their concentrations at the roadside have been reduced by 43 per cent to 82 per cent from their highest levels as well in the same period (as detailed in Annex 2). As for smog, the number of hours of reduced visibility in Hong Kong has been greatly reduced by 78 per cent from its peak. Furthermore, the Guangdong-Hong Kong-Macao PRD Regional Air Quality Monitoring Network recorded a continuous reduction in regional PM2.5, which has reflected evident improvement in regional air quality in recent years. The analysis of satellite data conducted by the Hong Kong University of Science and Technology also shows that the PM2.5 level in the PRD Region has improved significantly (as detailed in Annex 3).

Although roadside NO2 shows a significant declining trend, it is still at a high level. Its annual average concentration in 2020 was 70 $\mu\text{g}/\text{m}^3$, exceeding the AQOs limit (40 $\mu\text{g}/\text{m}^3$). Although commercial vehicles (including trucks, buses, light buses and taxis) account for only about 20 per cent of the total number of vehicles, they are the main source of nitrogen oxide (NOx) emissions at the roadside, accounting for more than 90 per cent of the total NOx emissions of all vehicles in Hong Kong. Therefore, commercial vehicles will remain the focus of the Government's efforts to improve roadside air quality.

Meanwhile, ambient O3 is still on a long-term upward trend. An EPD spokesman said, "O3 is a complicated air pollution issue as well as a regional issue. It is not directly emitted from pollution sources but formed by photochemical reactions between NOx and volatile organic compounds (VOCs) under sunlight. The rise in our O3 in recent years could be attributed to high regional background O3 and reduction in NOx emissions from local vehicles, which will also indirectly lead to an increase in roadside and urban O3 levels (with less nitric oxide to react with and titrate O3, resulting in more O3 remaining in the ambient air). Nevertheless, reducing NOx emissions can reduce NO2 levels, and the sustained regional efforts to

reduce NOx and VOCs will help reduce the overall O3 level and its exceedances in the region and Hong Kong in the long run. We will step up control on VOCs, enhance regional collaboration and conduct scientific studies to deal with the O3 problem."

Based on the experience in improving air pollution in Europe and the United States, a lag effect is often encountered in the improvement of O3 concentration. Owing to the complicated photochemical reactions involved, at the early stage of smog problem improvement and NOx reduction, there is usually an increase in O3 levels. The O3 concentrations do not start declining until the emission reduction work has taken place continuously for a certain period. Regional collaboration is the key to O3 reduction. The Hong Kong and Guangdong governments have commenced a study on post-2020 regional air pollutant emission reduction targets and concentration levels, with a view to formulating emission reduction targets to 2030. To combat the regional O3 problem, the governments of Hong Kong, Guangdong and Macao will launch a three-year joint study on "Characterization of photochemical ozone formation, regional and super-regional transportation in the Greater Bay Area" this year, in order to better understand the origins of O3 precursors, its formation mechanism and regional as well as super-regional transportation characteristics in the Greater Bay Area. In addition, the Hong Kong and Guangdong governments are introducing VOCs real-time monitoring in the regional air quality monitoring network by stages. The Hong Kong SAR Government is installing a Light Detection and Ranging system to measure real-time vertical and three-dimensional distribution of the concentrations of O3 and particulates, as well as meteorological data at higher altitudes for tracking transportation of pollutants over Hong Kong, with a view to formulating policies to reduce O3 pollution.

"The Environment Bureau released in 2013 'A Clean Air Plan for Hong Kong' and has been implementing a wide range of emission reduction measures targeting local emission sources such as land transport, sea transport, power plants and so on. The measures include completing the phasing out of some 80,000 pre-Euro IV diesel commercial vehicles last year, strengthening the control of emissions of petrol and liquefied petroleum gas vehicles, tightening vehicle emission standards, progressively tightening the emissions of power plants and requiring vessels to use cleaner fuel, etc. Further control measures were rolled out, such as a new scheme to progressively phase out about 40,000 Euro IV diesel commercial vehicles and the introduction of a \$2 billion EV-charging at Home Subsidy Scheme to promote installation of electric vehicle charging-enabling infrastructure in car parks of existing private residential buildings, with both being launched in October 2020," the spokesman said. The details of the emission reduction measures are set out in Annex 4.

Regarding the review of the AQOs, taking into account various factors and views gathered, the Government recommends tightening three AQOs, namely the 24-hour AQO of SO2, the annual AQO and 24-hour AQO of PM2.5. The Government plans to introduce an amendment bill to the Legislative Council for promulgating the new AQOs as soon as possible. In the first quarter of 2021, the Government will launch Hong Kong's first roadmap on the

popularisation of electric vehicles. The Government will also later update the "Clean Air Plan for Hong Kong", with a view to formulating long-term plans to further improve Hong Kong's air quality.