

INFORMATION NOTE

Environmental Issues in Tokyo

1. Introduction

1.1 The purpose of this information note is to provide members of the Panel on Environmental Affairs with background information on some of the environmental issues faced by the city of Tokyo, such as air pollution, global warming and the heat island effect, as well as measures taken by the Tokyo Metropolitan Government (TMG) to tackle these issues.

2. The Tokyo Metropolitan Government Master Plan for Environment

2.1 According to TMG, Tokyo is faced with two major environmental crises. The first one is the threat of damage to health caused by air pollution aggravated with the increase in the number of automobiles on the road and the amount of chemicals released into the atmosphere. The other crisis is the problem of the heat island effect in the urban areas caused by enormous energy consumption and global warming due to the increase of carbon dioxide in the air.

2.2 Considering these environmental crises and its responsibilities, TMG formulated the "TMG Master Plan for Environment" in January 2002, based on the policy "to make [a] healthy and safe environment and to build [a] sustainable society" in Tokyo. Some of the strategic programmes under the plan include:

- (a) returning blue sky to Tokyo by implementing extensive air pollution preventive measures;
- (b) positively addressing the crises in Tokyo by preventing global warming; and
- (c) cooling down Tokyo by implementing measures against the heat island effect.

3. Air pollution

3.1 With the growth in automobile traffic and diesel vehicle emission, the compliance rate of the concentration of nitrogen dioxide and suspended particulate matter (SPM) in Tokyo's atmosphere is considered low in regard to the environmental quality standards. For instance in 2003, the environmental quality standard for nitrogen dioxide was qualified at 18 out of 34 vehicle emission measuring stations, while that for SPM was only qualified at 4 out of 34 vehicle emission measuring stations. For this reason, since October 2003, TMG, in collaboration with eight prefectures and municipalities, has led the initiative in carrying out the Diesel Vehicle Emissions Control Programme.

3.2 In accordance with the Ordinance on Environmental Preservation, the types of diesel vehicles regulated under the Programme are buses, trucks, and special category vehicles such as concrete mixers, garbage collection trucks and refrigerator/freezer vehicles. Passenger cars are not included. Diesel vehicles failing to meet the particulate matter (PM) emission standards prescribed by the Ordinance are banned from travelling throughout the metropolitan area. Such vehicles must be replaced with low-pollution vehicles or equipped with a diesel PM reduction system certified by TMG. Exemption, however, is granted for seven years from the date of new car registration.

3.3 To further improve air quality in Tokyo, TMG continues to introduce various emission control measures in addition to the Diesel Vehicle Emissions Control Programme. Those new measures include reinforcing the guidance concerning emission regulations at factories and other manufacturing sites, measures against emission of volatile organic compounds¹ and measures to counter emission by maritime vessels.

4. Global warming

4.1 According to a report by the Japan Meteorological Agency² on the weather in 1999, the temperature had increased by 0.6°C worldwide and 1°C in Japan during the preceding 100 years. Such phenomenon was primarily attributed to the increased emission of carbon dioxide and other greenhouse gases due to energy consumption by humans.

¹ Volatile organic compounds not only promote photo-chemical reactions of nitrogen oxide and generate pollutants known as photo-chemical oxidants, but also are causative substances that generate SPM by becoming particles in the air through photo-chemical reactions. Therefore, the reduction of volatile organic compounds is necessary in reducing photo-chemical reactions as well as SPM.

² The Japan Meteorological Agency is a government agency which provides national meteorological services to both local and international communities.

4.2 In Tokyo, the total carbon dioxide emission in 2002 was approximately 16% higher than that in 1990. Carbon dioxide accounts for 96% of the gases generated under the greenhouse effect and its emission is closely related to energy consumption. Under the TMG Master Plan for Environment, TMG sets forth the goal of reducing greenhouse gas emission by 6% in Tokyo by 2010 compared to the 1990 level as a way of coping with the global warming phenomenon. In addition, TMG has introduced the "CO₂ Emission Reduction Program" and "Green Building Program" based on the Ordinance on Environmental Preservation with the aim to realize energy conservation in office buildings and other large-scale business operations, and to prevent global warming in Tokyo.

5. Heat island effect

5.1 According to the Ministry of the Environment, the number of hours when the temperature in Tokyo was above 30°C rose from 168 to 357 between 1980 and 2000, a period when the number of heatstroke victims almost tripled. The rising heat in the city is attributed to absorbent surfaces such as concrete and asphalt, tall buildings that block air breezes, heat-generating cars and the omnipresent air conditioners. The phenomenon is known as the heat island effect because the temperature is higher in the city than the suburbs and the isothermal lines create a shape like an island.

5.2 In order to abate the heat island effect, TMG has recommended the embracement of rooftop gardens. This idea was instigated by the Tokyo governor, Shintaro Ishihara, who, in his Tokyo Plan 2000³, promoted environmental rejuvenation as a central administration concern. Under the Nature Conservation Ordinance, TMG has required greening rooftops and wall surfaces for new grounds and buildings that have a ground surface of over 1 000 sq m scheduled for construction since April 2001. As a result, 54.5 hectares of rooftops were greened as at 1 January 2005.

³ Formulated in December 2000, the Tokyo Plan 2000 outlines TMG's vision for shaping the future of the Tokyo Metropolis in view of the drastic population decline facing the Japanese society. Covering a 15-year period from 2001 to 2015, the Plan serves as a set of guidelines for the administrative and financial management of the city.

5.3 The Ministry of Land, Infrastructure and Transport has found that summer daytime temperatures above conventional rooftop tiles reach almost 60°C. However, a green rooftop with a carpet of grass, water and trees is comparatively cooler at 38.6°C, while beneath the surface the soil is at 28.1°C. This implies cooler temperatures inside the building, which in turn minimizes electricity consumption. The Tokyo-based Organization for Landscape and Urban Greenery Technology Development⁴ estimates that if half of the roofs in the city were planted with gardens, daytime high temperatures in summer would fall by 0.84°C, which would save ¥110 million (HK\$7.78 million)⁵ on air conditioning costs on a daily basis.

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⁴ The Organization for Landscape and Urban Greenery Technology Development is an organization which promotes greenery in urban cities, such as setting up awards for corporations that have been models in promoting green technology.

⁵ The average exchange rate of ¥1 to HK\$ for 2005 was ¥1 = HK\$0.0707.

References

1. Metropolis Tokyo. (2003) *Seeing Green*. Issue 485.
2. Sutic, N. (2003) *How Green Roofs Can Improve the Urban Environment in Uptown Waterloo*.
3. Tokyo Metropolitan Government. Bureau of Environment. (2005) *Environment of Tokyo in 2005*.