Environment and Food Bureau

Report on Progress with Protection against Environmental Pollution

PURPOSE

This report provides information on progress that has been made in the avoidance and mitigation of environmental pollution over the last decade. It outlines the actions, expenditure and results in five areas:

- Air pollution control
- Water quality improvement
- Waste management
- Noise control
- Energy Efficiency

2. Committed and planned actions in these areas are also outlined for reference, and a summary is provided of overall expenditure on environmental protection and conservation between 1990 and 2000.

AIR POLLUTION CONTROL

I. BACKGROUND

Air quality in Hong Kong is typical of any large modern city. High concentrations of particulates and nitrogen oxides in the urban areas are the most pressing problems, causing a nuisance and constituting a health concern. The problems are compounded by a combination of factors including high population density, high-rise buildings that hinder or prevent circulation of air at street level, and a high concentration of vehicles, especially diesel vehicles, at urban roadside.

2. A wide range of measures have been introduced in Hong Kong to control air pollution. Industrial emissions of particulates, sulphur dioxide and nitrogen oxides were reduced sharply in the late 1980's and early 1990's and have remained low since then due to banning of high sulphur heavy fuel oil. With the introduction of other measures such as installation of flue gas desulphurisation system and use of low nitrogen oxides technology, emissions from local power generation plants have been decreasing steadily as well. The impact of emissions from power stations on street level air quality is limited. This is because the power stations have been sited and their chimneys designed so that under most weather conditions the emissions are well dispersed and carried away from urban areas.

3. With regard to the street level air pollution problem, previous measures introduced to control emissions from motor vehicle has been offset by the growth in vehicle numbers and mileage driven. The Government therefore introduced in 2000 a new comprehensive programme to reduce motor vehicle emissions with the target of reducing the particulate and nitrogen oxides emissions by vehicles by 80% and 30% respectively by end-2005.

4. Air pollution respects no boundaries. Emissions from Hong Kong and from Southern China each affect the other's ambient air pollution. To address the ambient air pollution in the Pearl River Delta Region, we are conducting a joint study with the Guangdong Provincial Government to identify the major air pollution sources in the region and practicable improvement measures. The study is due for completion in the earlier part of 2001.

II. LEGISLATIVE FRAMEWORK

5. There are a number of main Ordinances that deal with different air pollution problems. They are the Air pollution Control Ordinance, the Ozone Layer Protection Ordinance, the Road Traffic Ordinance and the Shipping and Port Control Ordinance. Most of these laws have subsidiary regulations and other statutory provisions to give effect to the principal laws.

III. INVESTMENT AND PROGRESS

Investment

6. In the past, the measures introduced to reduce emissions from the polluting sources were mainly in the form of statutory controls. However, $1.4 billion has been earmarked for implementing the comprehensive programme to reduce motor vehicle emissions mentioned in paragraph 3 above. The investment is for providing grants to owners of diesel taxis, light buses and pre-Euro diesel vehicles for the purpose of switching over to liquefied petroleum gas (LPG), installation of particulate traps and the fitting of catalytic converters.

7. Following Finance Committee' s approval, an amount of $50 million is being provided to subsidize owners of pre-Euro light diesel vehicles to retrofit their vehicles with particulate traps or catalytic converters. Another $720 million is being made available to provide a one-off grant to encourage owners of diesel taxis to replace their vehicles with ones that run on LPG. After the completion of the current trial of different types of catalytic converters for use on pre-Euro heavy vehicles, we will apply to the Finance Committee for funds to subsidise another retrofitting programme. We will also be seeking the funds required to encourage owners of diesel light buses to switch to environmentally cleaner vehicles.

8. To support the LPG taxi programme, land at nil premium is being provided for the establishment of dedicated LPG stations and no duty is imposed on motor LPG.

9. To encourage the use of the environmentally cleaner ultra low sulphur diesel (ULSD), a duty concession is currently provided to make the price of ULSD competitive with regular motor diesel. This means an amount of $608

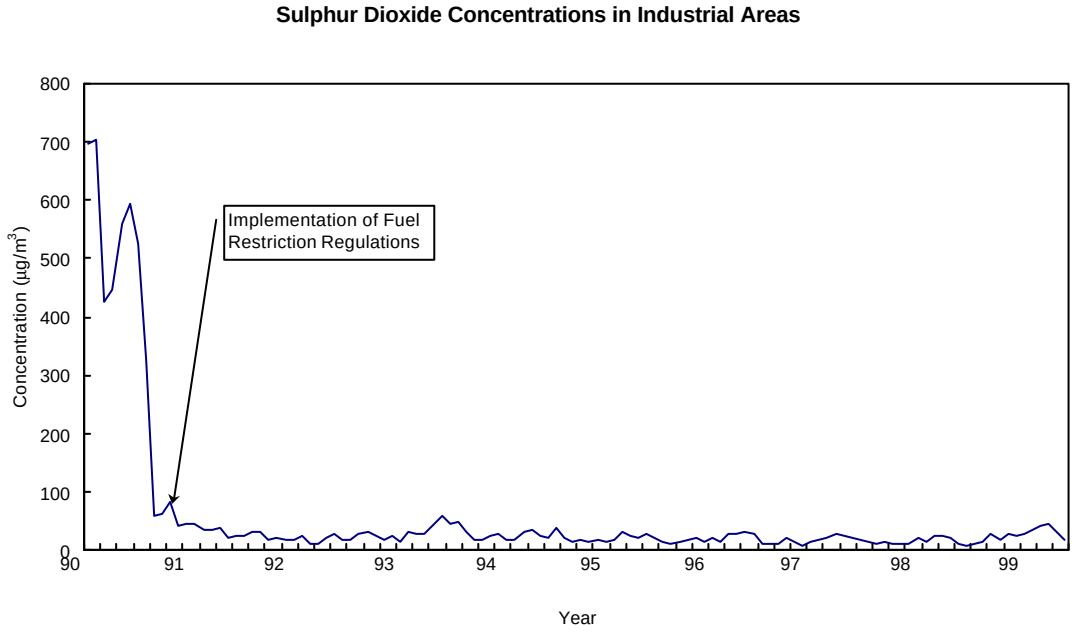
million revenue foregone each year.

10. Railways are environmentally friendly and efficient mass carriers. This will form backbone of Hong Kong' s transport system. Over the next 15 years, we will be spending $220 billion on expanding the urban and New Territories railways network to bring 70% of homes and 80% of workplaces within one kilometer of a railways station.

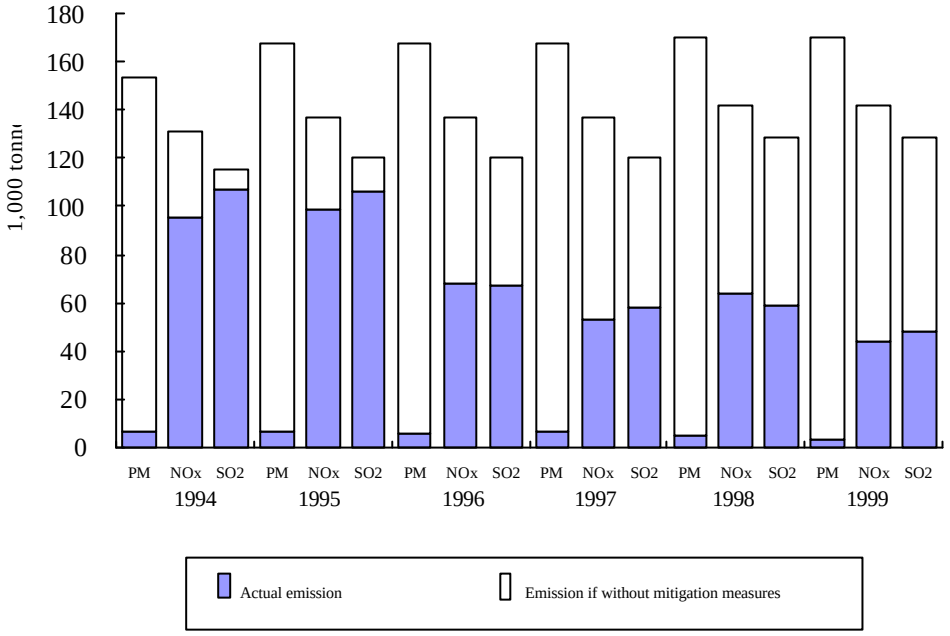
Progress

Reducing emissions from stationary sources

11. To reduce emissions from industries, licensing control of major polluting sources have been implemented since 1987 and high sulphur fuels have been banned since 1990. As a result of the control on fuel sulphur content, sulphur dioxide concentrations fell by up to 80% in industrial areas. Combined with the reduction in industrial activity, total industrial sulphur dioxide emissions fell from 46,616 tonnes in 1989 (before the ban of high sulphur fuels) to 8,835 tonnes in 1999 and have remained at this low level. The chart below shows the trend of sulphur dioxide concentrations in industrial areas and the effect of licensing control of major polluting sources, respectively -



Effect of Emission Reduction by Licensing Control



PM - particulate matters
NOx - nitrogen oxides
SO2 - sulphur dioxide

12. To reduce emissions from power generation, natural gas plants were introduced and coal units built after 1991 were required to have flue gas desulphurisation system. As a result, the sulphur dioxide emissions from power generation fell from 131,600 tonnes in 1991 to 47,750 tonnes in 1999.

13. Power generation units built after 1991 are to be fitted with low nitrogen oxide technology and most of the old units were retrofitted with low nitrogen oxides burners. These measures resulted in the reduction of nitrogen oxides emissions from power generation plants from 149,400 tonnes in 1991 to 41,744 tonnes in 1999. They also help to reduce ozone formation.

14. With the introduction of the measures to reduce emissions from industries and power plants, their nitrogen oxides emissions were reduced by 72% from 1992 to 1999 and their sulphur dioxide emissions by 69% from 1993 to 1999 since their peaks in the early 1990s.

Reducing dust emissions from construction activities

15. Construction Dust Regulation was introduced in 1997 to reduce dust emissions from construction activities. As a result, dust emitted from individual construction activities has been reduced by up to 80%.

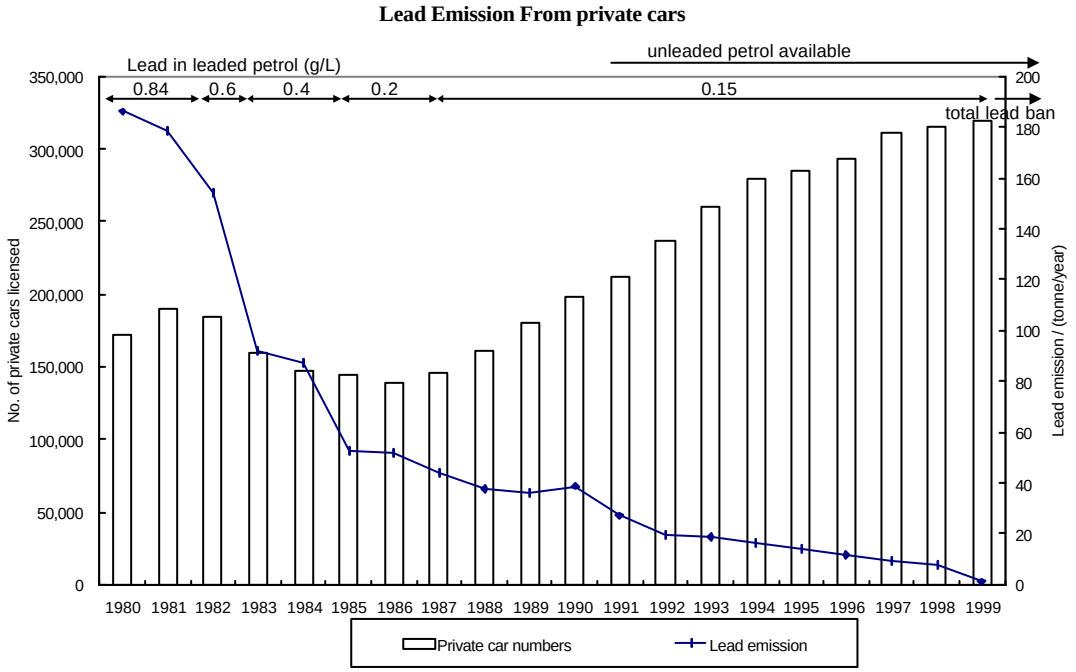
Reducing emissions from motor vehicles

16. We adopt a multi-pronged approach -

(a) adopt stringent diesel and vehicle emission standards;
(b) replace in-use diesel vehicles with cleaner alternatives where practicable;
(c) retrofit in-use diesel vehicles with filtering devices and catalytic converters;
(d) promote better vehicle maintenance; and
(e) enhance enforcement against smoky vehicles.

Stringent fuel standards

17. Unleaded petrol was introduced in 1991 and leaded petrol has been completely banned since April 1999. This measure has virtually eliminated lead emissions from motor vehicles. The chart below shows the result -



18. As regards the standard of diesel, we have been following the mandatory maximum sulphur content standard adopted by the European Union since 1995 -

	Maximum sulphur content allowed
Pre-1995	0.5%
1995 (Euro I)	0.2%
1997 (Euro II)	0.05%
2001 (Euro III)	0.035%

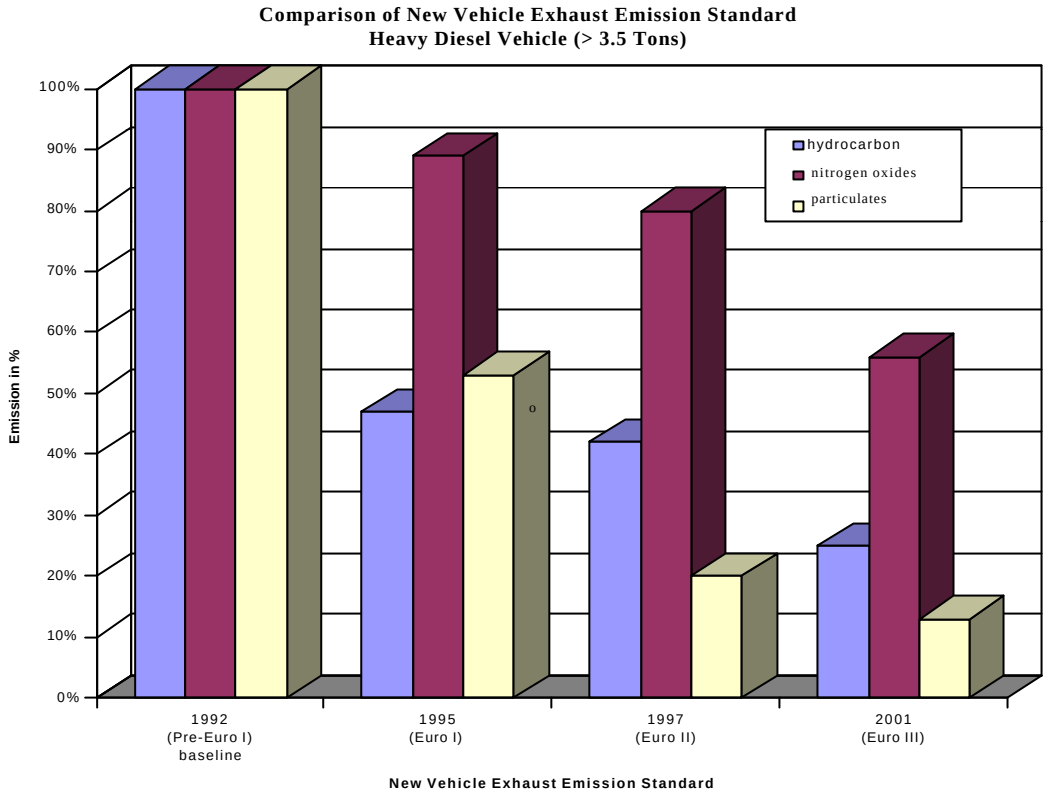
The sulphur dioxide emissions from diesel vehicles have been reduced by over 90% as a result.

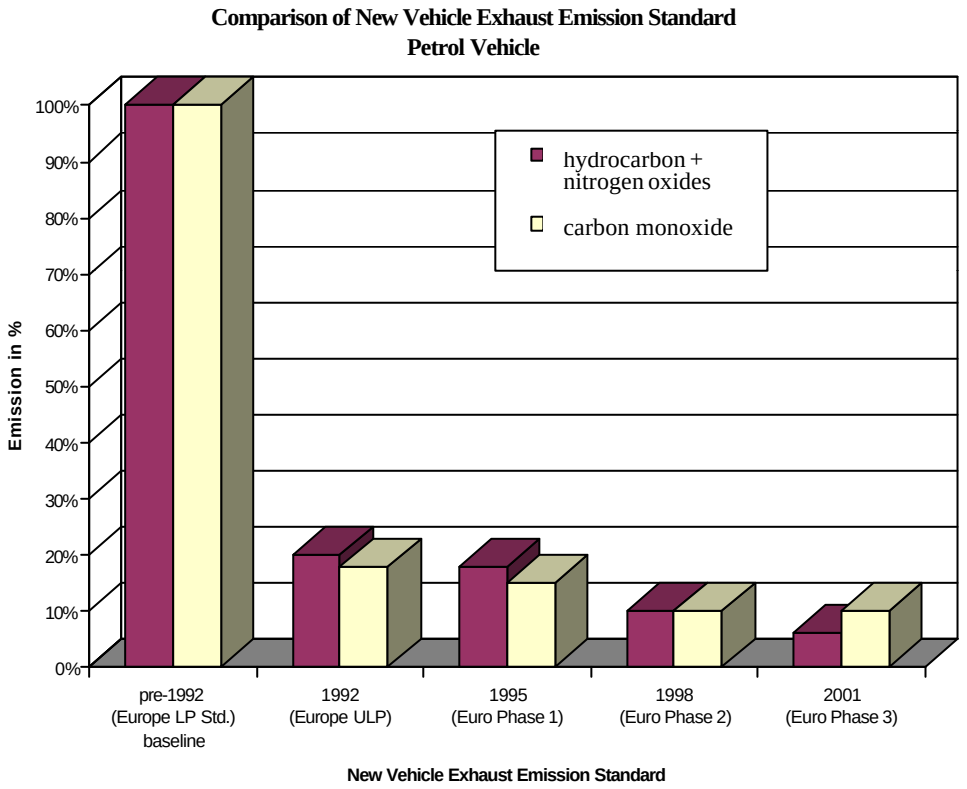
19. Other than mandating the Euro fuel standards in Hong Kong, we also encourage the introduction of fuels that are even more environmentally friendly. Since 7 July 2000, we have introduced a concessionary duty on ultra-low sulphur diesel (ULSD) so that it could be made available at a competitive price to regular motor diesel. ULSD has a sulphur content of 0.005%, even lower that that of Euro III standard diesel.

Stringent vehicle emission standard

20. We require all newly registered petrol vehicles to be equipped with 3-way catalytic converters. This requirement reduces their nitrogen oxides, hydrocarbon and carbon monoxide emissions by 90%.

21. Since 1995, we have progressively tightened the emission standards for newly registered vehicles in line with the European Union. At present, our controls are not only on par with the European Union but also one of the most stringent in Asia. The two charts below compare the improvements in emission performance that have been brought about by this measure -





(LP - leaded petrol)

22. We are providing financial incentives for owners of old private cars to trade in for a new car.

Replace in-use diesel vehicles with cleaner alternatives where practicable

23. We are providing a one-off grant of $40,000 for each diesel taxi replaced by one that operates LPG. The purpose is to encourage a quick switch of the 18,000 diesel taxis to the environmentally cleaner vehicles. Replacement of the 18,000 diesel taxis will reduce the particulate and nitrogen oxides emissions by the entire motor vehicle fleet by 25% and 6% respectively. Over 3,500 diesel taxis have been replaced so far.

24. We are also conducting a trial of LPG and electric public light buses with a view to replacing the 6,000 diesel light buses with cleaner alternatives. The trial is due for completion early next year. Subject to the results of the trial, we will devise an incentive scheme to encourage owners of the diesel light buses to switch to cleaner models.

Retrofit in-use diesel vehicles with filtering devices/catalytic converters

25. Pre-Euro standard vehicles emit almost twice the amount of pollutants than their successors. To reduce their particulate emissions, we have started to provide financial assistance to retrofit the 42,000 pre-Euro light diesel vehicles with particulate traps or catalytic converters since September 2000. Over 6,000 vehicles have been retrofitted with such device so far.

26. The retrofitting programme when fully implemented will reduce the particulate emissions by motor vehicles by 6%. We are conducting a trial of different types of catalytic converters with a view to identifying those that are suitable for use on pre-Euro heavy vehicles in Hong Kong's intensive driving conditions. Subject to the results of the trial, we will provide financial assistance to retrofit pre-Euro heavy diesel vehicles with converters. The trial is due for completion early next year.

Promote better vehicle maintenance

27. Since August 1999, the Environmental Protection Department, in

collaboration with the Vocational Training Council and the Hong Kong Productivity Council, has been providing training sessions for vehicle mechanics on proper engine repair and maintenance to reduce smoke emissions. The Department is also conducting workshops for vehicle mechanics and the transport trades to promote better understanding of the dynamometer emission test.

28. A Working Group on Vehicle Maintenance Services comprising transport trade representatives, government departments and professional bodies has been formed since January 2000 to study ways in which vehicle maintenance standards can be improved.

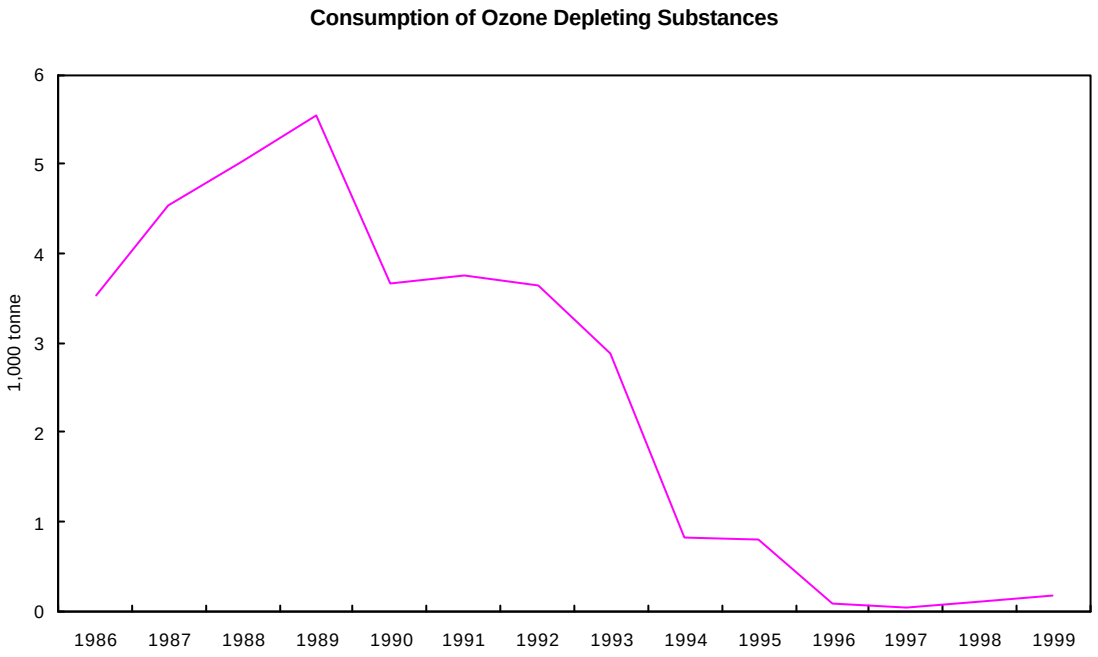
Enhance Enforcement against smoky vehicles

29. The fixed penalty on smoky vehicle has been increased from $450 to $1,000 from 1 December 2000. Owners of vehicles issued with a fixed penalty ticket are requested to repair their vehicles and required to take them to the Environmental Protection Department for a subsequent smoke test. Failure to pass the test will result in the vehicle's licence being cancelled.

Reducing ozone depleting substances

30. Hong Kong has a responsibility to reduce ozone-depleting substances(ODS). In 1987, Hong Kong was included in the ratification of the Montreal Protocol on ozone depleting substances. To fulfill this international obligation, we introduced the Ozone Layer Protection Ordinance in 1989; implemented a quota system to control the local consumption of ODS; banned the import of products containing certain ODS such as halons and CFCs; launched campaigns to enhance control awareness of ODS; and initiated an ODS destruction programme.

31. As a result, local consumption of ODS has been reduced to 177 weighted tones in 1999, only 3% of the 1989 level. We have fully complied with the Montreal Protocol ODS phasing-out schedule.



IV. WAY AHEAD

32. More imminently, we will be devising an incentive scheme to encourage an early switch of the 6,000 light buses to environmentally cleaner models and to retrofit 50,000 pre-Euro heavy diesel vehicles with catalytic converters. We will let out more sites for development of dedicated LPG stations and encourage more operators of existing petrol filling stations to add to them LPG filling facilities.

33. We are also considering the following additional measures -

(a) control of idling engines;
(b) raising the standard of industrial diesel;
(c) restricting the amount of fuel carried by cross-boundary vehicles;
(d) incentives for introduction of environmentally cleaner vehicles; and
(e) enhanced hydrocarbon recovery system

We will also be looking at practicable ways to encourage the replacement of other in-use vehicles by cleaner alternatives in the longer term.

34. As regards the ambient air pollution problem, the joint study being carried out by the HKSAR Government and the Guangdong Provincial Government to determine the extent of regional air pollution and to analyse the major sources of pollutants is due for completion in early 2001. On completion of the study, there will be more information to help us assess the impact of regional air pollution on Hong Kong's air quality and map out practicable improvement measures.

WATER QUALITY IMPROVEMENT

I. BACKGROUND

Inland and coastal water quality has suffered badly through increasing pollution loads arising from population growth and human activity insufficiently matched with sewerage development and pollution control measures. To safeguard the health of the community and to conserve the natural resources provided by coastal and inland waters, objectives for water quality have been established and measures are being implemented to achieve or maintain those objectives.

2. The whole territory of Hong Kong is divided into 10 Water Control Zones (WCZs). Specific Water Quality Objectives (WQO) have been devised for each control zone, based on the use and nature of the water body.

3. To achieve these WQOs, various measures are being taken. These include control of sources of pollution, expanding waste water collection systems, improving treatment systems and improving the discharge of treated waste water. An extensive monitoring programme has been set up to track water quality trends and help direct action to priority areas.

4. Although a small proportion of effluent can be re-used, nearly all of Hong Kong's effluent must eventually be discharged into the sea. After collection of the wastewater, treatment must be provided so that the effluent will not significantly degrade the environment. The treatment requirements and the location of discharge depend on the assimilative capacity of the receiving waters (this can be definded as the amount of waste that a body of water can safely absorb without leading to an infringement of the water quality objectives). This capacity is affected by tides, by flows in the Pearl Estuary and by oceanic currents. It is also affected by the specific environmental needs of each area. For example:

(a) In Semi-enclosed Marine Waters (e.g. Tolo Harbour, Port Shelter, Mirs Bay) and in Rivers there is little water exchange and only small quantities of high-grade effluent can be discharged. This is also true, to a lesser extent, in Inshore Waters;

(b) In Offshore and Oceanic Waters the deep, fast-flowing currents favour the dispersion and breakdown of effluent;

(c) To protect specific Aquatic Resources and Human Uses, the requirements for discharge near sensitive areas, such as bathing beaches and fish culture zones, are generally stricter than those for other areas.

5. At least biological treatment is required for inland waters and semi-enclosed marine waters, whereas chemical treatment or primary treatment can be provided for offshore and oceanic waters. The cumulative effects of all types of pollution source plus discharges from neighbouring catchments are assessed in determining environmentally acceptable solutions.

6. The water quality improvement strategy can be summarized as:

(a) Implementing effective legislation to control the discharge of pollutants into water bodies; and

(b) Developing a comprehensive sewerage system for collecting, treating and discharging wastewater generated throughout the territory,

so as to protect public health and the quality of local water bodies, as well as contributing to the protection of the marine environment in the region.

7. Detailed information on water quality objectives and water quality monitoring can be found in the following website: http://www.info.gov.hk/epd/water/.

II. LEGISLATIVE FRAMEWORK

8. We have four Ordinances and associated regulations to prevent water pollution. They are -

(i) Under the Buildings Ordinance, dischargers must properly maintain their own sewers to avoid incidental discharge of untreated wastewater to the environment.

(ii) Under the Water Pollution Control Ordinance (WPCO), effluent discharged to sewers, inland waters, inshore or coastal waters must comply with the relevant set of prescribed standards.

(iii) Under the Chemical Waste Control Scheme of the Waste Disposal Ordinance (WDO), chemical waste must be collected by licensed waste collectors for delivery to licensed chemical waste disposal facilities (for example the Chemical Waste Treatment Centre at Tsing Yi).

(iv) Under the Livestock Waste Control Scheme as implemented through the WDO, livestock farming is only permitted in certain areas, and livestock waste from these areas must be either collected or treated to prescribed standards.

(v) Under the Dumping at Sea Ordinance, all marine dumping and related activities are regulated under a permit control system.

III. INVESTMENT AND PROGRESS

9. An effective wastewater collection system is required to ensure that wastewater can be transferred to treatment plants. Treatment standards and arrangements for discharge of the treated effluent are developed to ensure that the beneficial uses of the marine environment are protected. Projects are designed to be cost effective and to retain flexibility given the likelihood of changes in population and town planning over the long periods in which sewage systems are developed and operated.

Investment

10. Between 1989 and 1999, about $15 billion was spent on upgrading sewerage infrastructure. ***Chart 1*** shows annual capital expenditure, including approved expenditure for the coming five years.

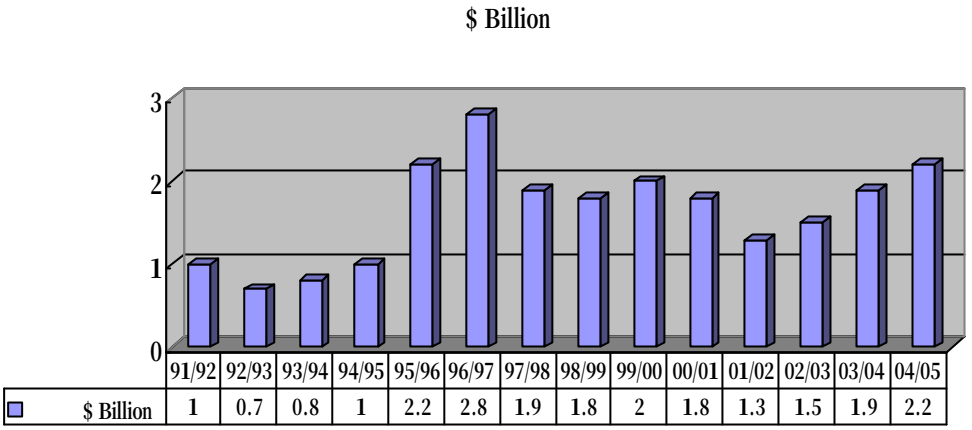


Chart 1: *Capital investment on sewerage projects in HK$ billion*

Sewage Charges

11. Increased capital investment in sewerage systems entails increased recurrent expenditure in operate the systems so as to achieve the environmental improvements required by the community. Since sewage charges have not been raised since 1995, an increasing proportion of the costs of providing sewage treatment is being met out of general tax revenue rather than by user charges, as shown in ***Chart 2***[1].

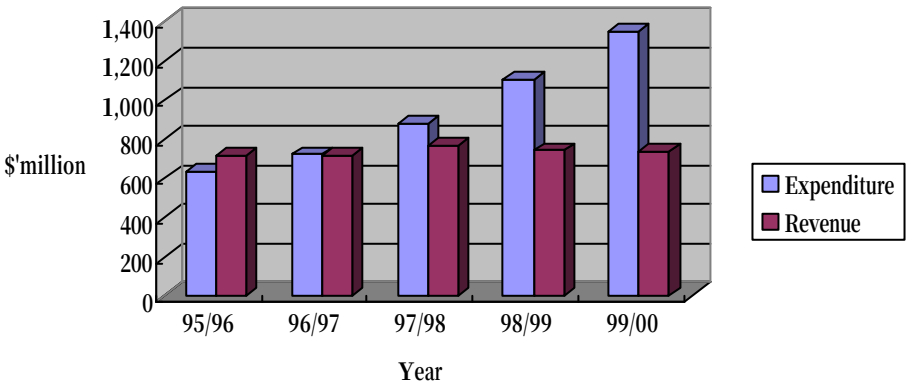


Chart 2: *Recovery of costs for provision of sewage services*

[1] The chart includes depreciation cost which reflects the capital cost of sewerage infrastructure.

Progress

12. In 1989 over 50% of the total human sewage produced in Hong Kong was discharged directly into the sea or inland waters without treatment. Less than a quarter of the sewage collected received advanced levels of treatment.

13. In the early nineties, the Administration formulated 16 Sewerage Master Plans (SMPs) to identify the sewerage infrastructure necessary for meeting population demand and improving water quality in coastal waters throughout Hong Kong. These SMPs are being implemented in phases.

14. One priority was to clean up the water in Victoria Harbour. In 1989, most of the untreated sewage in the territory was coming from the urban areas on either side of the harbour. A scheme to collect and treat this sewage was prepared, and construction of the first stage began in 1995. Under Stage 1 of the scheme, existing preliminary treatment works have been upgraded; 23.6 km of deep collection tunnels have been excavated to bring sewage from urban Kowloon, Tsing Yi, Kwai Chung, Tseung Kwan O and northeast Hong Kong Island to a new treatment works; and that the first stage of that treatment works has been constructed at Stonecutters Island. The treated effluent is discharged through a dispersive outfall in the waters west of Victoria Harbour.

15. The Stonecutters Island Sewage Treatment Works has been treating 300,000 cubic metres of sewage a day since its completion in May 1997. This has reduced the amount of sewage discharged into the harbour with only preliminary treatment by 20%. When the Stage I system is commissioned in the second half of 2001, it will reduce the amount of sewage discharged after only preliminary treatment by 70 to 75%.

16. The first stage of the Stonecutters Island Treatment works provides chemical treatment to the sewage. The process has been operating very well, removing 83% of suspended solids and 74% of BOD, which is equivalent to 90% of the efficiency of a biological secondary treatment plant (it was predicted that it would remove 70% of suspended solids and 55% of BOD).

17. Due to the works around the harbour, together with works on SMPs elsewhere in the territory, the amount of sewage which now receives treatment has increased by more than 100% since 1989. In addition, polluted flows have

been intercepted in many sensitive areas and the capacity of the sewerage system has been enhanced. The proportion of sewage which recieves high levels of treatment had also increased, as illustrated in ***Chart 3***.

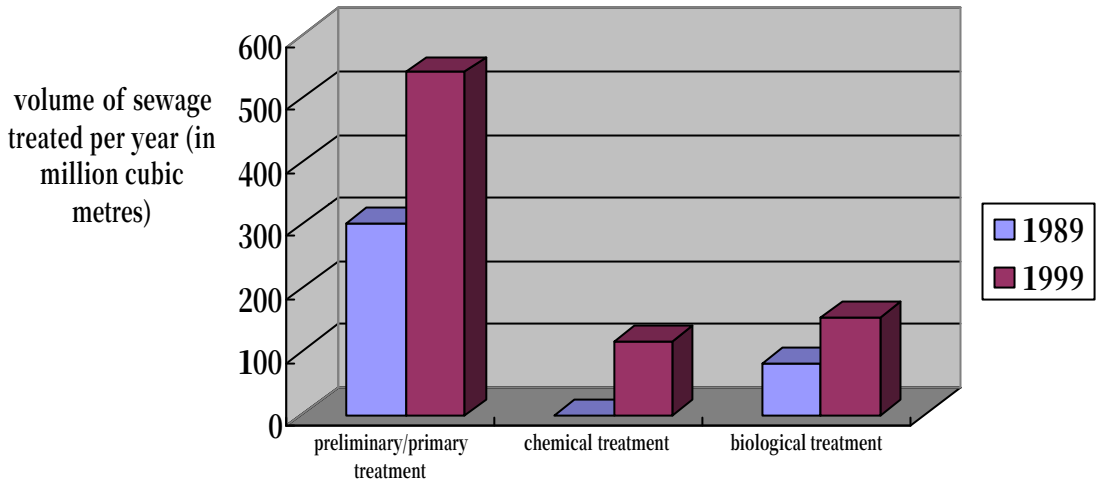


Chart 3*: Level of treatment for sewage generated in Hong Kong*

IV. SOURCE CONTROL THROUGH IMPLEMENTATION OF ENVIRONMENTAL LEGISLATION

18. The introduction of source controls for discharges into the marine environment over the last 10 years has resulted in substantial improvements to the aquatic environment. The amount of pollutants being discharged into the marine environment has reduced substantially. There has been a marked beneficial effect on watercourses and marine waters in a number of areas. In particular, specific control schemes were introduced to tackle the pollution problem brought about by two sources: livestock waste and chemical waste.

Livestock Waste Control

19. A Livestock Waste Control Scheme was begun in 1988 to step up control on discharge of livestock waste into rivers and coastal waters. As of end 1999, measures taken under the Scheme have reduced the pollution load discharged into streams and rivers in Hong Kong from 1.67 million population equivalent to 0.05 million population equivalent. ***Chart 4*** shows the successful reduction of loads by the Scheme.

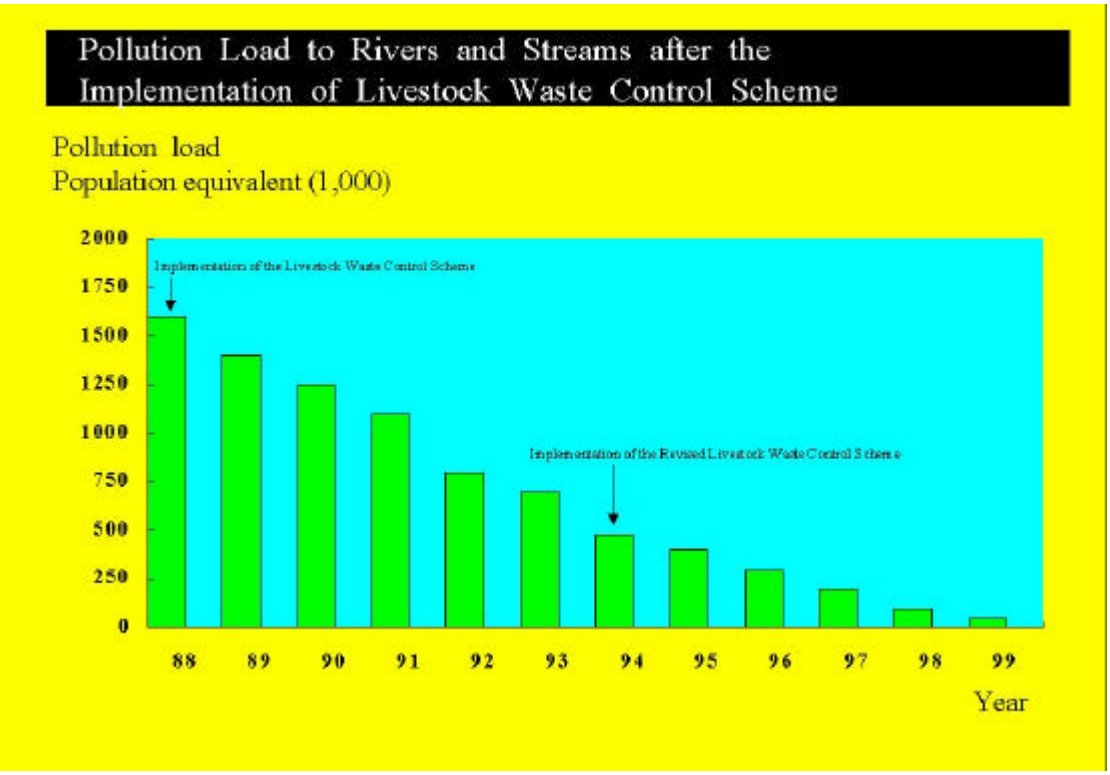


Chart 4: *Pollution Load to Rivers and Streams after the Implementation of Livestock Waste Control Scheme*

20. About $ 1,137 million was spent on implementing the LWCS from 1987 to end 1999 ($ 1,149 million for 1987 to mid-2000).

Control of Chemical Waste Discharge into Marine Waters

21. Chemical waste contains different types of hazardous substances such as toxic metals and organic compounds. Most comes from industries. Such substances can be directly toxic to aquatic life at very low levels and could reduce the efficiency of our sewage treatment plants by killing the bacteria used

to break down waste.

22. A Chemical Waste Control Scheme was fully implemented in 1993 to prevent the discharge of hazardous substances into Hong Kong waters. As a result of the implementation of the Scheme and the WPCO, the amount of hazardous substances being discharged into the marine environment has been reduced dramatically, as illustrated in ***Chart 5***.

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Chart 5:*.Toxic metals being discharged into Victoria Harbour*

V. OVERALL POSITION IN 2000

River Water Quality

23. A pollution load of about 100 tonnes per day (tpd) of BOD has been removed from our river catchments over the last 10 years (1990 - 1999) as a result of implementation of the WPCO and WDO. To put this in context, 100 tpd BOD[2] is equivalent to the typical pollution load from 1.5 million people.

24. This effort has resulted in long term sustained improvements in river water quality as indicated in ***Chart 6***.

[2] BOD (Biochemical oxygen demand) is a measure mainly of the amount of oxygen used up by bacteria to break up the organic matter in wastewater. The more organic matter there is, the more oxygen will be used up. When the oxygen level drops, living creatures may suffocate and it is possible for the whole water body to die and become black and evil-smelling.

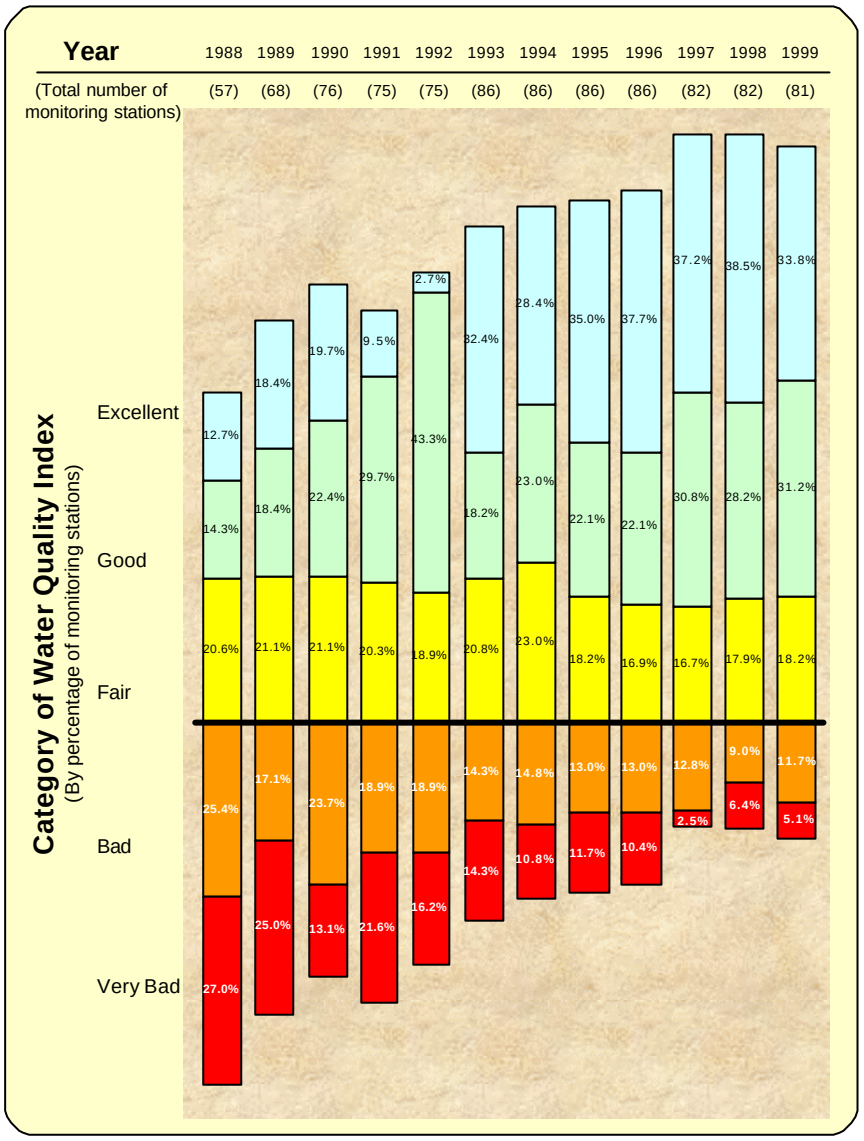

***Chart 6:**.Water Quality of Rivers between 1987 and 1999*

Marine Water

25. There has been a 20% population increase in the past 10 years (from 5.8 million in 1990 to 6.9 million in 1999). This increase would have resulted in an additional 70 tpd of BOD pollution load, and a commensurate decline in water quality, if adequate facilities were not provided. In spite of the population

increase, implementation of major infrastructure development projects, marine water quality has remained largely stable with an overall compliance rate with the Water Quality Objectives of about 80%.

26. Some improvements have been made locally in particularly sensitive water bodies such as Inner Deep Bay near the Mai Po Ramsar site and Inner Tolo Harbour.

(a) Intensive development along the shore of Tolo Harbour had previously resulted in eutrophication of the water body due to enrichment by nutrients. Due to the implementation of various measures such as the effluent export scheme, village sewerage scheme and the implementation of environmental legislation during the ten-year period from 1990 to 1999, the nutrient load on the Harbour has reduced substantially, as illustrated in ***Chart 7.***

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Chart 7:*.Total nitrogen loading on Tolo Harbour.*

(b) Water quality in Inner Deep Bay had deteriorated during the last 15 years as a result of uncontrolled discharges of domestic sewage and livestock waste. Notwithstanding the additional population and development pressure, improvement has been made in reducing the pollution load for the last few years. As a result, levels of dissolved oxygen in the area have improved and the onset of hypoxic conditions (Dissolved Oxygen < 2 mg/l) has been minimised in recent years. Concentrations of sewage borne bacteria and ammonia have also improved as indicated in the table below.

Water Quality in terms of three parameters in Deep Bay in 1995 and 1999		
Year	***1995***	***1999***
Dissolved Oxygen (mg/l)[3]	3.4	4.6
E.coli bacteria (cfu/100ml)[4]	6200	690
Ammonia N (mg/l)[5]	3.6	3.2

Beach Water

27. The general water quality of gazetted beaches has improved in the last few years. The compliance rate with the WQO has improved to 85.4% and no beach had "Very Poor" water quality in 1999. Before the completion of various improvement measures, the compliance rate was as low as 58.5% and four beaches were ranked "Very Poor" in 1995. Improvement of the sewerage infrastructure in the beach hinterland, implementation of various pollution control schemes and enforcement of various environmental legislations had resulted in reversing the trend of deteriorating beach water quality since 1995. This is illustrated in the following table and ***Chart 8***.

Percentage of beaches ranked Good, Fair, Poor and Very Poor in 1995 and 1999		
Year	***1995***	***1999***
Beaches with good water quality	34.1%	53.7%
Beaches with fair water quality	24.4%	31.7%
Beaches with poor water quality	31.7%	14.6%
Beaches with very poor water quality	9.8%	0%

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Chart 8:*.Compliance with WQOs for beaches from 1995 to 1999*

VI. WAY AHEAD

28. The Government estimated that Hong Kong's population at 2012 could be in the range of 7.9 to 8.5 million i.e. an increase of about 0.9 to 1.5 million on top of the existing population of nearly 7 million. This increase in population

[3] Dissolved oxygen is a measure of the amount of oxygen dissolved in the water body. The higher the oxygen level, the more marine life the water body could support.
[4] *E coli* is a measure of the amount of faecal bacteria within the water body.
[5] Ammonia is one of the breakdown products of organic matter. It is the chemical responsible for the pungent smell in badly maintained public toilets. As gas dissolved in wastewater (unionized ammonia), it is poisonous to aquatic life, in four days killing 50% of some fish populations at concentrations as low as

could potentially generate additional pollution load of about 90 to 160 tonnes of BOD pollutants each day in Hong Kong by 2012. To cope with the increasing population and development pressure, work is being carried out in the following areas :

Review of Sewerage Plans

29. To assess sewerage infrastructure needs to meet housing demands, EPD reviewing the SMPs for the entire territory. The first review for the Yuen Long and Kam Tin areas was completed in 1999. Arising from this review, sewerage works are proposed to extend the sewerage system to serve the unsewered areas in Yuen Long, Kam Tin, Ngau Tam Mei, San Tin, Lau Fau Shan and Yuen Long South. There is also a programme to upgrade the treatment level of San Wai Sewage Treatment Works from preliminary to chemical plus disinfection.

30. Similar reviews are being undertaken for Tuen Mun, Tsing Yi, Central and East Kowloon, Hong Kong Island, the Outlying Islands, North District and Tolo Harbour. Reviews of the remaining SMPs will be carried out between 2001 and 2004.

Additional Spending on Sewerage Upgrading Works

31. We plan to invest about another $9 billion on sewerage projects in the next 5 years in line with the programmes under the SMPs and other sewerage plans. We plan to seek funding approval from the Finance Committee on the following sewerage projects within the next two years :

Urban areas -

(i) Central, Western and Wanchai West Sewerage, Stage 2 Phase 1
   - Construction of sewers to upgrade local sewerage network

(ii) North and South Kowloon sewerage, Stage 2
   - Upgrading of sewerage network in the area to cater for new housing developments

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0.08 parts in one million.

Rural areas -

(i) Tolo Harbour Sewerage of Unsewered Areas, Stage 1 Phase 1D & 2B
- Provides sewerage to unsewered villages to reduce pollution load to Tolo Harbour

(ii) Tuen Mun Sewerage, Stage 1
- Provides rural sewerage and pumping stations to villages on both sides of Tuen Mun River/Nullah

(iii) North West New Territories Development - Trunk Sewers, sewage pumping station and rising mains, Stage 3
- Provides a trunk sewer and a sewage pumping station in Yuen Long new town to cater for new developments

(iv) North District Stage 1, Phase 2
- Provides rural sewerage to unsewered villages in the area

(v) North East New Territories landfill – village sewerage
- Provides rural sewerage to unsewered villages in the Ta Kwu Leng area

32. In addition, to ensure the treatment capacity of existing sewage treatment works (STW) matches the anticipated flows and assimilative capacity of the receiving water bodies, we plan to upgrade a number of STWs e.g. the San Wai STW, the Tai Po STW and the Pillar Point STW.

Further Stages of Harbour Area Sewage Treatment System

33. An International Review Panel was appointed in April 2000 to consider the experience with Stage I works, the present plans for Stages II to IV, and advise the Government on the most sustainable way forward for the development of the sewage system for the main urban area. The Panel presented its findings in November 2000. The Administration is now studying the Panel's recommendations.

Streamlining Control of Discharges into Marine Environment

34. The WPCO was enacted in 1980 and applied to all Hong Kong waters by 1996. Given the rapid economic development and population growth, our discharge control regime has been under considerable pressure. As a result, a comprehensive review of the WPCO and the Technical Memorandum made under the Ordinance has been undertaken. We will consult interested parties on the review findings and in the light of those consultations will consider introducing changes to the existing legislation in the coming year.

Cross-boundary Cooperation

35. Cleaning up the waters of Hong Kong, particularly in the New Territories, is not just a local concern. Pollution is being discharged by both Hong Kong and Shenzhen into the Shenzhen river, Mirs Bay and Deep Bay. The effect of discharges into the Pearl River elsewhere in Guangdong Province also have effects on the marine environment in and around Hong Kong, particularly on western waters.

36. Under the auspices of the former Hong Kong Guangdong Environmental Protection Liaison Group, the Hong Kong and Shenzhen Governments devised a 15-year plan to clean up Deep Bay, home to the internationally-recognised Mai Po wetlands. Under the plan, both Shenzhen and Hong Kong agreed to treat their polluted flows. We are considering diverting the treated effluent from Hong Kong away from the Bay (as is already done for Tolo Harbour).

37. Under the newly established Hong Kong Guangdong Joint Working Group on Sustainable Development and Environmental Protection, both sides also agreed to initiate discussion on protecting the other water body shared by both sides, namely Mirs Bay.

38. The polluted flows of the Pearl River Delta are a more serious and complicated problem because of the thousands of different sources of effluent. Through the Joint Working Group we are working to establish stronger exchanges with the Guangdong Provincial Government on this issue.

Payment for sewage services

39. Increasing expenditure to maintain sewerage systems will be necessary as a consequence of investment decisions that have already been made. For example, increases will come by the end of 2001 due to full commissioning of the stage I scheme for the harbour area in 2005 due to commissioning of the Sham Tseng Treatment works and by 2008 on full commissioning of the Shatin Treatment works upgrading. Consideration needs to be given to whether it is in the best interests both of the efficiency of operating and maintaining the sewage treatment system and of the use of public funds to continue to increase the subsidy for the operation and maintenance of the system from general public revenue.

WASTE MANAGEMENT

I. BACKGROUND

Solid Waste needs to be managed properly to prevent threats to public health and avoid other impacts on the environment. Traditionally the management process has targeted two areas, efficient collection and safe disposal. The former municipal councils used to have the major responsibility for the collection stage – though the private sector play a significant role as well, especially for construction and demolition materials and for industrial and commercial waste. The Food and Environmental Hygiene Department has taken over as the main agency for the collection of municipal waste. Disposal of municipal waste is the responsibility of the Environment Protection Department, while reuse of inert construction and demolition materials as public fill is the responsibility of the Civil Engineering Department.

2. We are now working to establish a sustainable waste management programme, under which attention is focussed not just on efficient collection and safe disposal, but on the avoidance of waste and on the efficient recovery of reuseable materials.

II. LEGISLATIVE FRAMEWORK

3. The Waste Disposal Ordinance is the principal legislation for waste management in Hong Kong. With its subsidiary regulations, the Ordinance provides a comprehensive statutory framework for the management of wastes.

4. Additional provisions for dealing with certain types of waste are also available in other pieces of legislation (e.g. the Shipping and Port Control Ordinance prohibits pollution of the sea by oil from land-based and marine sources; the Public Health and Municipal Services Ordinance provides for the control of discharges of hazardous materials to sewers and littering etc).

III. INVESTMENT AND PROGRESS

5. Since 1989, a network of waste management facilities has been

developed. Between April 1989 and March 2000, more than $10.2 billion has been invested in new waste management facilities. These comprise -

- Three new sanitary landfills with leachate and gas collection ($6.1 bn)
- Seven refuse transfer stations and refuse transfer facilities for the outlying islands ($2.8 bn)
- A chemical waste treatment centre ($1.3 bn)
- A livestock waste composting plant ($14 million)

6. In addition, $2.3 billion is being spent on restoration of 13 old landfill sites to ensure safety and to provide for the future beneficial uses of the space created.

7. At present, waste disposal is heavily subsidized by Government. For instance, disposal at landfills is free while charges for the use of the Chemical Waste Treatment Centre is currently set at 31% of the variable operating cost. In 1999, the recurrent expenditure on waste management was $1.5 billion. Only a small proportion of the expenditure was recovered from the revenue arising from charges for chemical waste and refuse transfer stations (Chart 1)

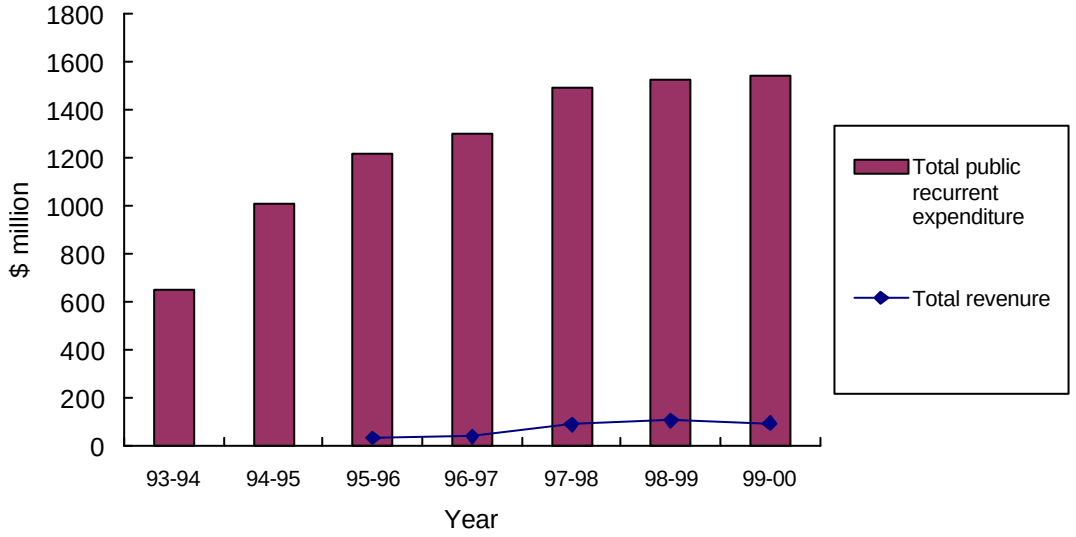


***Chart 1**: Total public recurrent expenditure on and revenue from waste management services*

8. As a result of the continuous growth in population and economic activities, the amount of solid waste has been rising. In 1999, the total amount of

Municipal Solid Waste (MSW) generated[6] was 5.2 million tonnes, representing a 45% increase over 1989. The total amount of Construction and Demolition (C&D) materials[7] generated was 13.5 million tonnes, representing a 100% increase over 1989. Over the same period, the MSW recovery rate varied from 33% in 1989 to 35% in 1999. The rate of re-use of C&D materials increased from 70% in 1989 to 79% in 1999. Charts 2 & 3 below illustrate the amount of waste disposed of and re-used in the past decade –

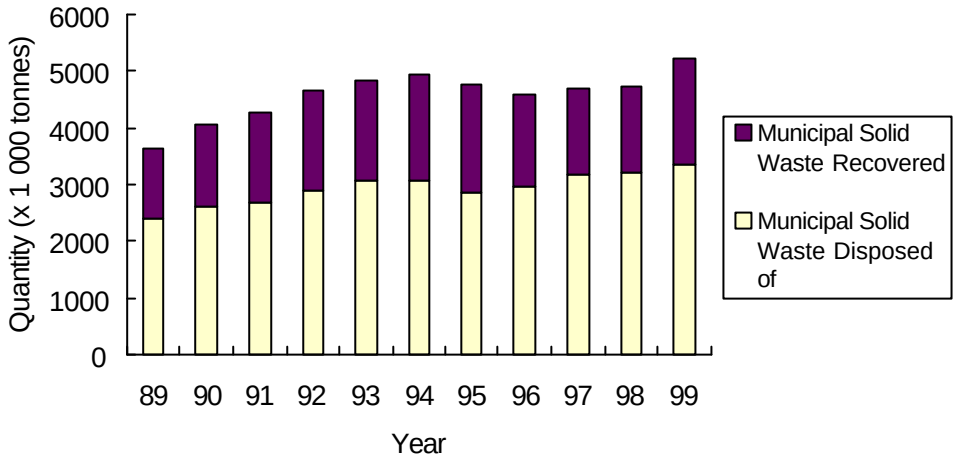


***Chart 2**: Quantity of Municipal Solid Waste Disposed of and Recovered (1989-1999)*

[6] Total MSW generated comprise MSW disposed of and recovered for recycling.

[7] Construction and demolition (C&D) materials are a mixture of inert materials and wastes arising from construction, excavation, renovation, demolition and road works. The useful inert materials comprising rocks, concrete, asphalt, rubbles, bricks, stones and earth are called public fill and are suitable for reuse in reclamation and site formation works. Some of them can also be recycled for use in construction works. The C&D wastes comprising bamboo, plastic, timber and packaging waste are often mixed and contaminated and therefore not suitable for reuse in reclamation works or recycling as construction materials, and have to be disposed of at landfills.

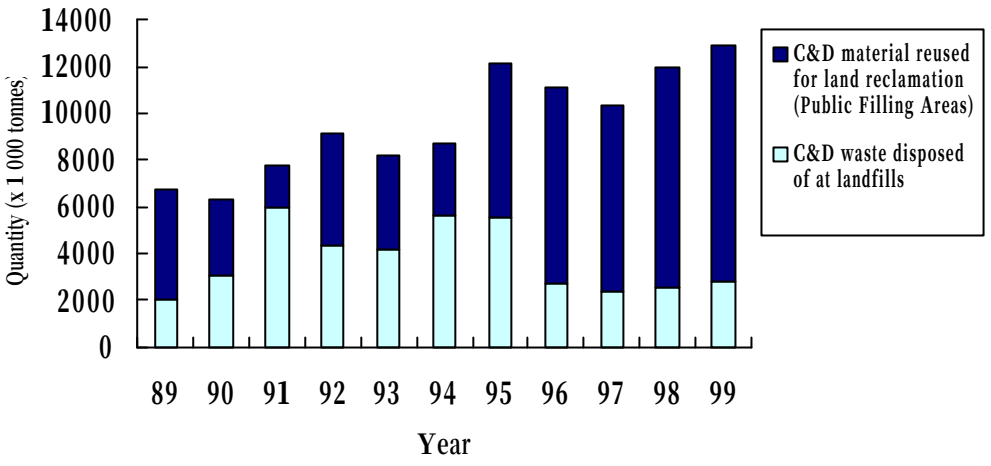


Chart 3: *Quantity of Construction and Demolition Materials Reused in Reclamation and Disposed of (1989-1999)*

9. We expect the quantities of MSW and C&D materials will continue to rise over the next decade. Without improvements in waste reduction and recycling, by 2010, the quantity of MSW generated is projected to reach about 7 million tonnes a year and C&D materials generated to grow to around 15.3 million tonnes (Charts 4 and 5).

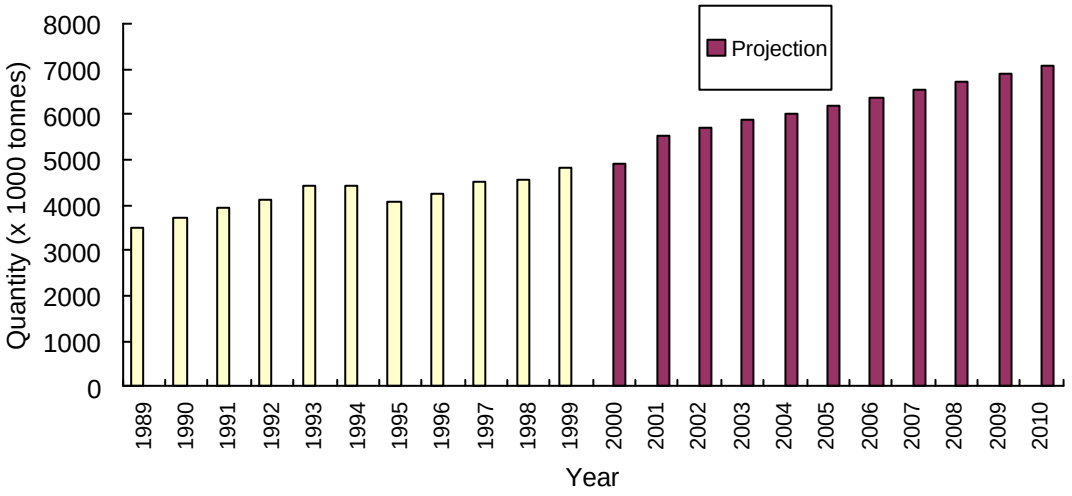


Chart 4*: Trend of Municipal Solid Waste Generated (1989-2010)*

Note: The projection of municipal solid waste generation is based on (i) the projected population and economic growth; and (ii) the "worst-case scenario" that there are no waste recycling and reduction activities.

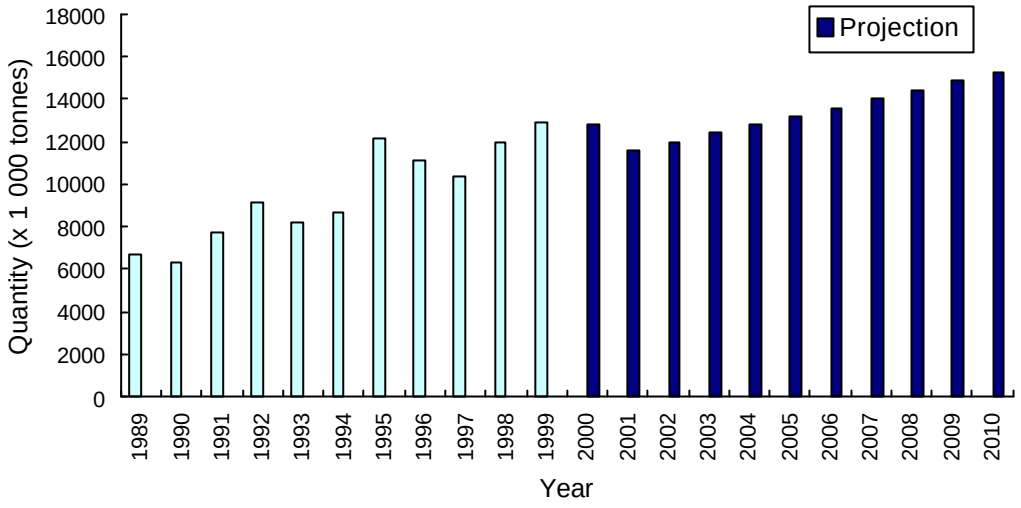


***Chart 5**: Trend of Construction & Demolition Materials Generated (1989-2010)*

IV. WAY AHEAD

10. Even though today we have nearly 10 times as much unused landfill capacity as in 1989 (110 million tonnes as compared with 11.6 million tonnes), given the rate at which waste is being produced by a population increasing in size and affluence, this will not last us long. On the most pessimistic projections – assuming that there is no avoidance of waste, no increase in the recovery rate, no bulk waste treatment facilities[8] and no new outlets are found for public fill, the three landfills could be exhausted in the next five to seven years. If measures to deter waste, increase recovery rates, introduce bulk waste treatment facilities and divert public fill are successful, the present landfills could last for about 15 years.

11. Faced with Hong Kong' s circumstances of a high and increasing level of waste production and limited space to set aside for waste disposal, a sustainable waste management programme for the territory requires:

- Economic and regulatory incentive to avoid waste
- Economic, regulatory and organizational frameworks to support recovery and reuse of materials

[8] Bulk waste treatment facilities would be able to reduce the volume of wastes substantially, though they would not eliminate wastes totally.

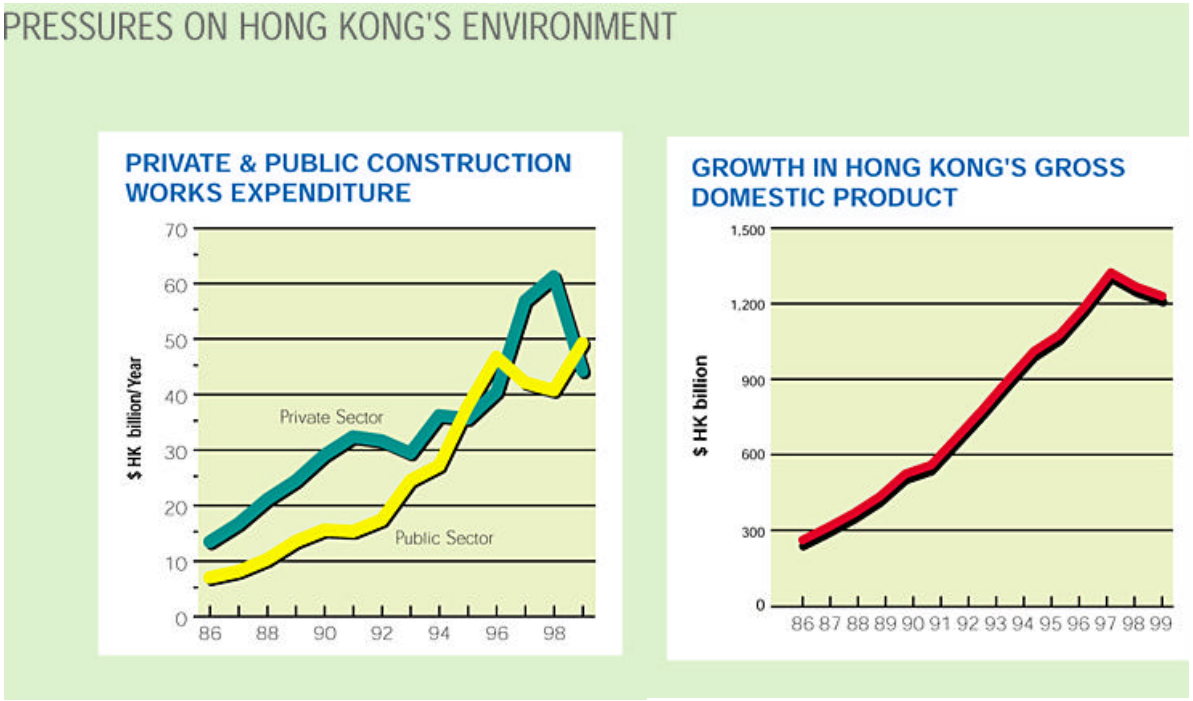
- Efficient collection services for recovered materials
- High levels of treatment of wastes to recover any useful component, including energy, and to render wastes safe before disposal
- Continued provision of sites for safe final disposal of residual wastes.

12. The Waste Reduction Framework Plan issued in 1998 has started the process of improvement in a number of areas. Later this year, we intend to present recommendations for sustainable waste management for Hong Kong, including action plans for strengthening waste recovery services and introducing economic incentives for waste avoidance and recovery.

NOISE CONTROL

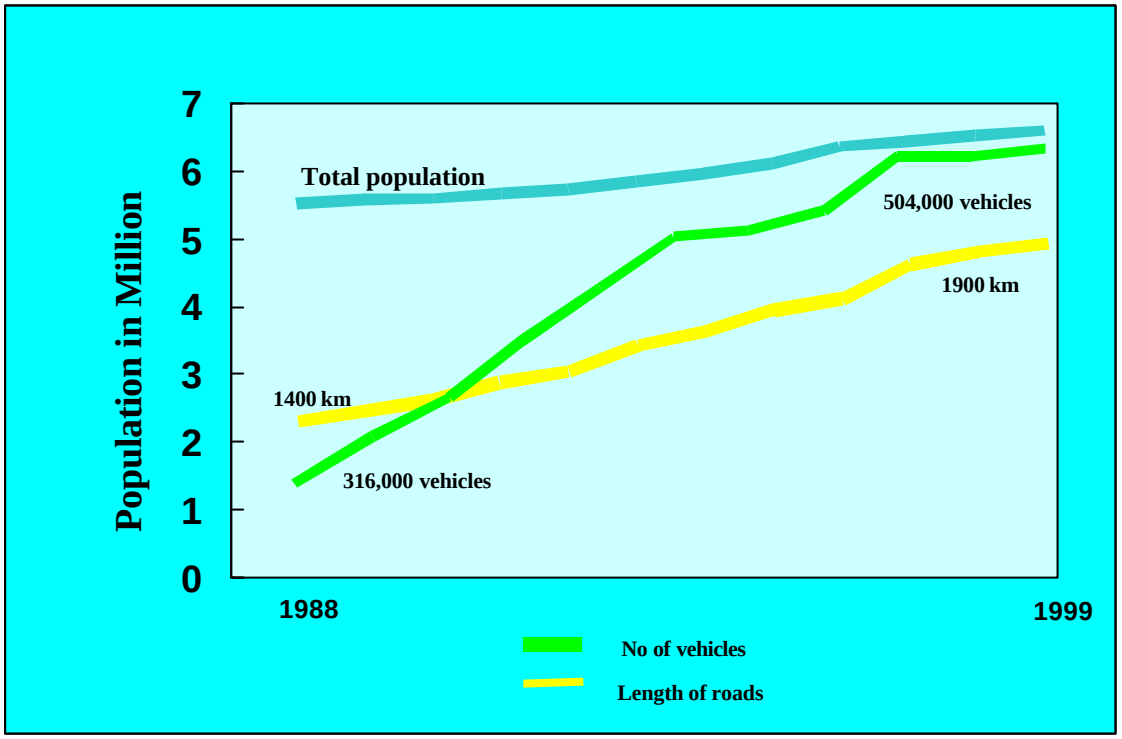
I. BACKGROUND

Hong Kong, like many metropolitan cities in the world, experiences various noise problems. These problems are exacerbated by a number of factors such as scarce habitable land, concentrated road network, huge housing demand and inadequate environmental concern in the earlier urban development. Much effort has gone into improving our noise planning. Many noise sources have been eliminated or brought under greater control. But inadequate attention in the past has left a legacy of too many people living close to noise sources.



2. We have adopted a three-pronged approach to tackle the noise pollution problem. Since the mid-80s, we have taken a more active environmental participation in the land-use and infrastructure planning process to pre-empt noise problem. We have implemented abatement programmes including the school insulation programme and a road-resurfacing programme to reduce the impact of noise on students and residents. We have introduced and implemented comprehensive noise control legislation since 1988 to control noise from construction, commercial and industrial activities. Many noise sources have been brought under greater control and some have been eliminated. However, there is no quick cure to the legacy of a large number of people living

close to noise sources left from inadequate attention in the past. A lot of work remains to be done.



II. LEGISLATIVE FRAMEWORK

3. The Noise Control Ordinance, Road Traffic Ordinance, Civil Aviation (Aircraft Noise) Ordinance, and their associated legislations are being relied upon to tackle various environmental noise sources. Specific controls are set out as below:

Noise Source	Legislation	Control Authority
General Construction Work	Noise Control Ordinance (Cap. 400) 1988 Noise Control (General) Regulations 1989 Noise Control (Construction Work) Regulation 1996 Noise Control (Construction Work Designated Areas) Notice 1996	Director of Environmental Protection and Commissioner of Police
Percussive Piling	Noise Control Ordinance (Cap. 400) 1988 Noise Control (General) Regulations 1989 Noise Control (Appeal Board) Regulations 1989 Noise Control (Amendment) Ordinance 1997	Director of Environmental Protection and Commissioner of Police
Industrial and Commercial	Noise Control Ordinance (Cap. 400) 1988 Noise Control (General) Regulations 1989	Director of Environmental

Noise Source	Legislation	Control Authority
Activities	Noise Control (Appeal Board) Regulations 1989	Protection
Neighbourhood Activities	Noise Control Ordinance (Cap. 400) 1988	Commissioner of Police
Noisy Products	Noise Control Ordinance (Cap. 400) 1988 Noise Control (Hand Held Percussive Breakers) Regulations 1991 Noise Control (Air Compressors) Regulations 1991	Director of Environmental Protection and Commissioner of Police
Individual Motor Vehicles	Road Traffic Ordinance (Cap. 374) 1982 Noise Control Ordinance (Cap. 400) 1988 Noise Control (Motor Vehicles) Regulation 1996 Road Traffic (Amendment) Ordinance 1996	Director of Environmental Protection and Commissioner for Transport
	Road Traffic (Construction & Maintenance of Vehicles) Regulations 1983	Commissioner of Police and Commissioner for Transport
Road Traffic	Road Traffic Ordinance (Cap. 374) 1982 Road Traffic (Amendment) (No 3) Ordinance 1992	Commissioner for Transport
Intruder Alarm Systems	Noise Control Ordinance (Cap. 400) 1988 Noise Control (Amendment) (No 2) Ordinance 1996	Commissioner of Police
Aircrafts	Civil Aviation (Aircraft Noise) Ordinance (Cap. 312) 1986 Civil Aviation (Aircraft Noise)(Certification) Regulations 1987	Director of Civil Aviation

General Construction Work – use of powered mechanical equipment and carrying out of noisy manual construction work in residential areas between 7 pm and 7 am and on general holidays are controlled under a permit system with stringent limits.

Percussive Piling – prohibits percussive piling between 7 pm and 7 am and on general holidays; restricts percussive piling during the daytime to 3, 5 or 12 hours by a permit system; bans the use of three types of noisy hammers, namely diesel, pneumatic and steam hammers for percussive piling.

Industrial and Commercial Activities – controls noise from industrial and commercial activities by means of Noise Abatement Notice to require compliance of relevant statutory limits.

Neighbourhood Activities – controls noise from households and public places from annoying the neighbours.

Noisy Products – requires noisy construction equipment including handheld percussive breaker and portable air compressor to meet stringent noise emission standards in order to obtain noise emission labels for use in Hong Kong.

Motor Vehicles – requires motor vehicles including motorcycles, cars, vans, bus and goods vehicles first registered in Hong Kong to meet stringent noise emission standards.

Road Traffic – allows implementation of traffic management such as diversion of traffic on environmental grounds.

Intruder Alarm Systems - limits the sounding of alarms installed in premises to no more than 15 minutes; and requires all vehicle alarms not to sound unless the vehicle is being tampered with and the alarm will not sound for more than 5 minutes.

Aircrafts - requires all subsonic narrow-bodied jet aircraft flying in and out of Hong Kong to meet with the stringent international noise standards.

III. INVESTMENT AND PROGRESS

Enforcement of legislation

4. The Environmental Protection Department is responsible for implementing the Noise Control Ordinance. Major enforcement functions being carried out include -

Regulate Construction Noise

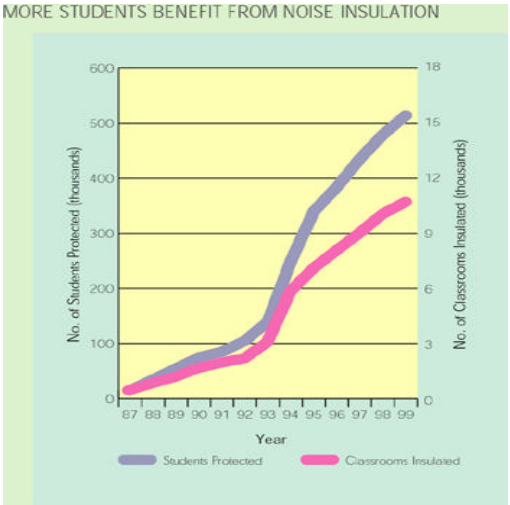
5. Construction activities at night or on holidays are under tight control to avoid noise disturbance. Gradual phasing out of three types of noisy hammers,

which completed in October 1999, has benefited over 400,000 people each year living in the vicinity of construction sites. The noise label system has prevented Hong Kong from being a dumping ground for substandard noisy breakers and air compressors.

Regulate Industrial/Commercial Noise

6. The statutory control on industrial/commercial noise has protected over a million people living adjacent to those common sources including large exhaust fans and air-conditioning systems of restaurants, shopping centres and other commercial or industrial activities. Through close liaison with concerned trade associations, developers and estate management agencies, vigilant enforcement efforts and service of legal abatement notices, residents living close to these commercial/industrial activities are relieved from unacceptable noise disturbance from both existing or new establishments.

Implementation of Noise Abatement Programmes

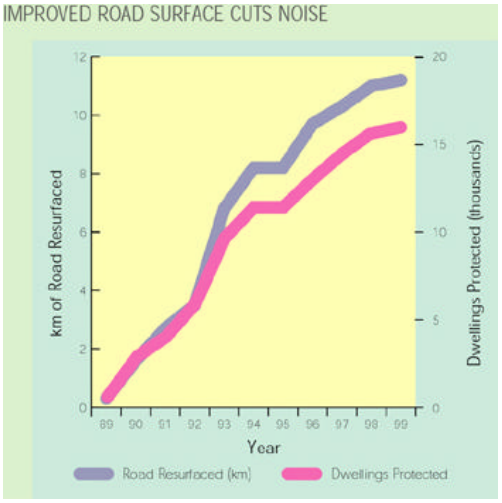


Noise Insulation for Schools

7. Before 1987, many thousands of students were exposed to very high levels of noise from aircraft, road traffic and railways, which seriously affected their learning environment. From 1987, acoustic window insulation and air conditioning have been progressively provided to classrooms affected by high noise levels. This programme was completed in 1999 and $658 million has been spent to insulate over 10,800 classrooms and restored a quiet learning environment for over 514,000 students.

Road Surface Programme

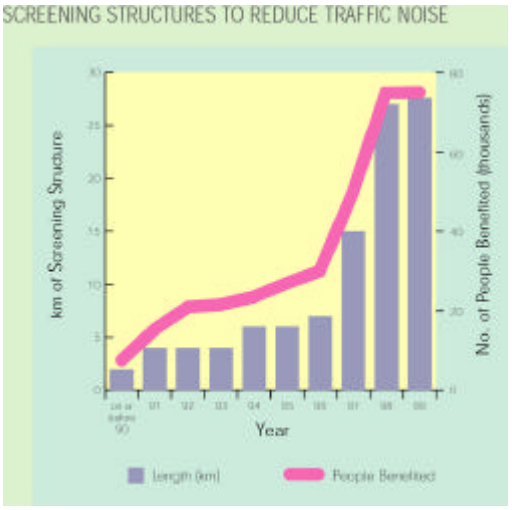
8. Interaction between tyres of vehicles and the surface of road is a significant noise source from the large volume of traffic on our roads. With the identification of a suitable low noise surface material, noisy highway sections have been gradually resurfaced with the low noise material to reduce the noise impact on residential buildings nearby. This programme was completed in 1999 and $95 million spent to upgrade 11 Km existing road sections with noise suppressing material benefiting 60,000 people. The noise levels of the resurfaced road sections have been reduced significantly, up to about 5 decibels. The low noise material is now a standard for new highways.



Planning to pre-empt noise problem

9. Environmental Protection Department has participated actively in planning against noise through providing professional advice on reducing noise impacts in the planning of transportation systems, land use, new towns and redevelopment.

Gains From Planning Against Traffic Noise



10. Considerable effort has been devoted to planning against road traffic noise. Since the mid-80's, proponents of new roads are required to go through the Environmental Impact Assessment process to optimize the road alignment, identify mitigation measures such as earth berms, barriers and enclosures as necessary to protect residential units and schools nearby from excessive traffic noise impacts. Also, over the years the Environmental Protection Department (EPD) has participated in the land use planning process to avoid new noise sensitive communities from being exposed to excessive noise. In

urban redevelopment cases, all opportunities for noise improvements are seized as they arise. Very often, good planning against noise goes unnoticed because problems are avoided before they have a chance to surface. Despite many difficult sites very close to busy highways were very often approved to change the land use for housing development, EPD's involvement in the planning process still helped to keep about 90% of newly developed flats to within the traffic noise planning standard. Developers were required to provide the remaining affected flats with good window insulation as a last resort protection. Better attention on the environment since the mid-80's in the planning of land use and new road projects has paid off. The planning effort together with provision of some 30 Km of screening structures on new roads as part of the project expenditure have protected 350,000 people from excessive road traffic noise.

Protection against Railway Noise

11. Some 200,000 people are protected from excessive railway noise through mitigation measures recommended in new railway proposals in the past years.

New Airport reduced Aircraft Noise

12. Fewer than 300 people are now exposed to relatively high aircraft noise since the airport relocation. These people have been provided with good insulation and air-conditioning as a last resort measure to minimize the noise impacts.

IV. WAY AHEAD

Tackle Existing Traffic Noise

13. Road traffic noise in existing developed areas remains a major problem. The trend of continual increase of motor vehicles will impose further pressure on the noise environment. We have recently introduced a new policy to address traffic noise impact of existing roads. The policy is as follows -

(a) engineering solutions, by way of retrofitting of barriers and enclosures, and resurfacing with low noise material, will be implemented where

practicable at existing excessively noisy roads; and

(b) non-engineering solutions, such as traffic management measures, will be explored on a case-by-case basis and implemented where practicable at roads where engineering solutions are impracticable or where engineering solutions alone are inadequate in reducing the noise to an acceptable level.

14. Based on the guiding principles under the new policy, we have currently identified 29 existing road sections technically suitable for retrofitting with noise barriers or enclosures. The indicative cost of the retrofitting works is $2,340 million. Upon full implementation, the annual recurrent maintenance cost of the barriers/enclosures for these 29 road sections will be around $54 million. We have also identified 72 existing road sections as candidates for further feasibility study on their suitability to be resurfaced with low noise surfacing material. The estimated cost of the resurfacing works is $76 million. We will seek funding for the retrofitting and road resurfacing works for the road currently identified and for any additional roads covered by the new policy.

Abate Noise From Existing Railways

15. We would continue our effort to ensure that railway companies reduce existing rail noise by monitoring their noise abatement programmes. All rolling stocks in the urban lines of the MTRC have already been retrofitted with wheel dampers. Noise abatement measures have been installed at eight locations along the KCRC line. Mitigating measures at another seven locations are being installed and design work for four more locations has commenced. The whole programme will be completed by 2002.

Control Vehicle Noise At Source

16. First registered vehicles are required to comply with prevailing noise emission standards which are on par with those adopted by the European Union.

Environmentally Friendly Transport System

17. We will continue our efforts in strategic planning by adopting environmentally friendly railway as transport backbone and quieter transportation modes in feeder routes.

Further Enhancement of Noise Control Legislation and Enforcement

18. Continual enforcement and education efforts are important to tackle noise from commercial and industrial activities, especially in the urban redevelopment process. On construction activities, it is necessary to keep up the enforcement efforts against unscrupulous contractors. We are also looking into imposing further control on noise at constriction sites and domestic renovation noise.

19. We will also be evaluating the effectiveness of the existing noise label system and review the need to include more items of noisy equipment which should be kept up to stringent international noise standards

20. Since 1996, construction sites within densely populated areas, which are classified as Designated Areas, are under a set of more stringent construction noise control. To offer wider protection to the community living in built-up areas, we intend to amend the schedule to include additional Designated Areas within the 2000-01 legislative session.

21. There is no panacea to addressing Hong Kong's noise problems. But the Government is committed to doing all it can within the current constraints to reduce the nuisance caused to residents.

ENERGY EFFICIENCY

I. BACKGROUND

The efficient use of energy is one of the fundamental elements to a more sustainable economy and environment. Our objectives are to promote energy efficiency and conservation, to encourage the adoption of energy efficiency measures in government and private buildings and to promote the use of cleaner sources of energy.

2. An Energy Efficiency Office under the Electrical and Mechanical Services Department was established in August 94 to work on various energy efficiency and conservation programmes.

II. INVESTMENT AND PROGRESS

3. The Energy Efficiency Office has been undertaking various initiatives on energy efficiency and conservation –

(i) Introduction of voluntary energy efficiency labelling schemes for electrical appliances. So far, 45 labels issued for washing machines, 130 for refrigerators, 266 for room coolers, and 396 for compact fluorescent lamps;

(ii) Carrying out energy audits and energy management for government buildings. So far, 124 energy audits have been completed;

(iii) Promotion of the implementation of building energy codes in buildings and building energy efficiency registration scheme. So far, 26 buildings are registered under the scheme ;

(iv) Promotion and public education of energy efficiency through publication of guidelines, seminars and activities; and

(v) Development of energy end-use database.

4. Since 1995-96, the Energy Efficiency Office has spent about $18 million on various energy efficiency studies/initiatives, including a project to establish a territory-wide energy end-use database, a feasibility study on wider use of water-cooled air-conditioning system in Hong Kong and energy management measures in government buildings.

5. By 1999, total end-use energy consumption had increased by 22% over 1989. The total energy end-use consumption per dollar of GDP was 0.34 megajoules, representing a 15% improvement in economic efficiency over 1989. After having taken into account the continuous implementation of energy efficiency and conservation initiatives, we predict that the total energy end-use consumption per dollar of GDP will further improve to 0.31 megajoules by 2010 (Chart 1) -

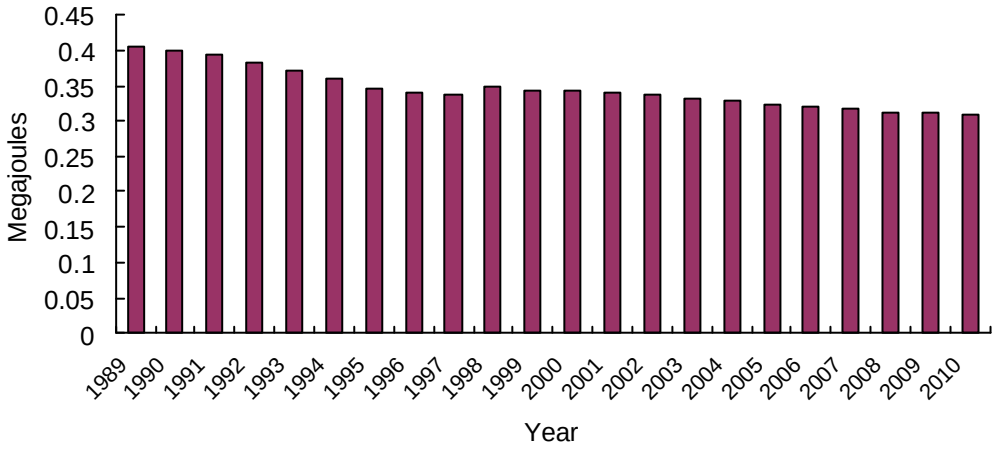


***Chart 1** : Trend of Total Energy End-use Consumption per dollar of GDP*

III. WAY AHEAD

6. In 2001, we will embark on a number of new initiatives, which include –

(i) Commencing a study on the potential applications of renewable energy in Hong Kong and implementing some pilot projects in government buildings on renewable energy;

(ii) Introduction of energy efficiency labelling schemes for vehicles, electric storage water heaters and photocopiers to strengthen public awareness of energy efficiency;

(iii) Extension of Water-cooled Air-conditioning System (WACS). We will commence a territory-wide and two district-specific implementation studies of WACS;

(iv) Preparing energy consumption indicators and benchmarks for selected energy-consuming groups;

(v) Pilot projects in some government buildings with the concept of Energy Efficiency Performance Contracting to improve energy efficiency in buildings; and

(vi) Consult the community on the proposed statutory requirements on energy efficiency and conservation.

SUMMARY OF EXPENDITURE

In order to compare overall expenditure on environmental programmes in 1999/2000 with expenditure in 1990/1991, we have collated the expenditure on programmes under policy area 23 (Environmental Protection and Conservation) with expenditure on refuse collection services now carried out by FEHD but formerly carried out by the two municipal services departments. The figures given below incorporate expenditure by the following departments:

- EPD – all departmental activities including waste disposal services
- DSD – sewerage services
- FEHD – refuse collection services (including USD/RSD spending before 2000)
- AFCD – conservation and country parks services
- EMSD – Energy efficiency, air quality and LPG safety services
- CED – public fill management services
- Government Laboratory – environmental analysis services
- Marine Department – floating refuse collection services
- Government Secretariat – PELB and subsequently EFB resources given to policy area 23.

2. While figures for capital expenditure are provided, these are only for direct expenditure by the departments listed above. It has not been possible to identify all capital expenditure on environmental measures undertaken in the course of works projects undertaken by other departments.

EXPENDITURE AND RECOVERY

3. Table A below sets out changes in recurrent expenditure on environmental programmes over the last ten years, together with the record of recovery of costs for waste management services provided by public agencies.

4. The increase in recovery of costs in 1995 was due to the introduction of sewage charges and the chemical waste charging scheme. The sewage charges aim to recover 50% of operating and maintenance costs for normal accounts and full operating and maintenance costs for strong trade effluent. The charges for chemical waste treatment recover 31% of variable operating costs. In 1999/2000 the actual cost of providing sewage services was $1.14 billion.

EPD's expenditure on fees for operating waste facilities was $1.29 billion (which represented over 60% of EPD's total recurrent expenditure).

5. Table B sets out capital expenditure in each year since 1990/91.

Environment and Food Bureau

January 2001

Table A

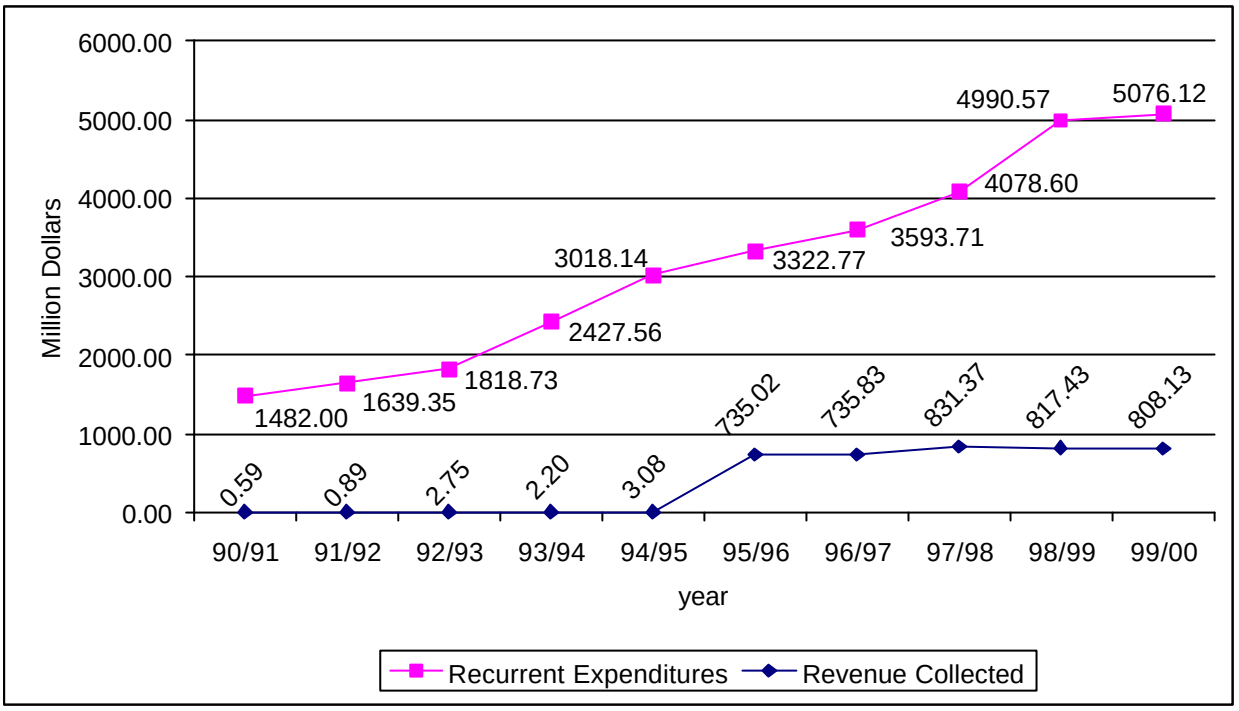


Table B