

Heading towards Sustainability

The Third Review of Progress on the 1989 White Paper *Pollution in Hong Kong - a time to act*

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(I) The 1989 White Paper - Progress against Targets

This Table summarises progress made against the targets set out in the 1989 White Paper and the 1st and 2nd Reviews. *Annex A* of the Second Review reported progress made against 119 targets listed in the White Paper itself and in the 1st Review. Of these, 76 items were reported as completed in the 2nd Review; the remaining 43 items are further reported on in Section A of this Table. *Chapter 12* of the 2nd Review specified 89 further targets, which are reported on in Section B of this Table.

(A) Progress report on items listed in Annex A of the 2nd Review (White Paper targets)

WP para	Status	Item	Target	Progress (as at 1.9.95)
Waste Management				
2.15	√	Commission WENT landfill	late 92	Commissioned Nov 93
2.15	√	Commission NENT landfill	early 94	Commissioned mid-95.
2.15	√	Commission SENT landfill	mid-94	Commissioned September 94.
2.15	O	Commission HKIWTS	96/97	On target.
2.15	O	Commission Yuen Long/ Tuen Mun RTS (now called NWNT-RTS)	98/99	Construction due to start in 96.
2.15	√	Commission Shatin RTS	94/95	Commissioned Oct 94.
2.15	O	Commission North Lantau RTS	(97/98)	Works due to start in late 95.
2.15	O	Commission Outlying Is- lands transfer facilities	(97/98)	Tenders to be called in late 95.
2.16	O	Close Pillar Point landfill	95/96	Capacity has been increased. Remaining capacity after opening of WENT will be used as backup. Aim to close by end 96.
2.16	√	Close Shuen Wan landfill	93/94	Closed Sept 95.
2.16	√	Close Tseung Kwan O Stage III landfill	93/94	Whole landfill finally closed Feb 95.
2.20	√	Draft MARPOL regulations	92/93	Regulations on charging for MARPOL waste disposal enacted in July 95.

√ action completed L programme running late O action ongoing

Target dates in brackets are PELB's internal targets, not given in the White Paper.

2.21	L	Commission CIF for animal carcasses, clinical waste	93/94	Delayed by outstanding issues to be resolved. [See under Section B, para 6.94]
2.32	--	Draft regulations for import and use of PCBs	(92/93)	Regulations not necessary, as global PCB production and use are declining. Handling and disposal of PCBs are covered by the Waste Disposal (Chemical Waste) (General) Reg.
2.33	O	Extend powers under the WDO to control waste collection and disposal	--	Amendment Bill to control import/ export of waste enacted Feb 95. Other amendments being considered.
2.42	O	Commission landfill restoration facilities	(97/98)	Restoration studies completed by mid-95. Implementation programmes drawn up. First tenders were invited in late 95.

Water Pollution

3.23	√	Wanchai E/North Point SMP	92 start	Completed Feb 95.
3.23	√	North District SMP	92 start	Completed Nov 94.
3.23	√	Aberdeen, Pokfulam, Apleichau SMP	92 start	Completed mid-95.
3.23	√	Outlying Islands SMP	93 start	Completed Oct 94.
3.23	√	Tseung Kwan O SMP	94 start	Completed late 95.
3.24	O	Construct sewerage systems arising from SMPs	ongoing	About \$5.5 billion allocated since 1991
3.25	O	Declare Victoria Harbour WCZ	93	Being declared in phases between 94-96. First phase declared Nov 94; 2nd phase Sept 95, 3rd phase planned for April 96.
3.25	O	Control effluents in all WCZs	95	Follows declaration of each WCZ.
3.26	√	WPCO Amendment Bill (2): sewer connections, treatment plants	(92)	Enabling Bill enacted Nov 93. Regs came into effect June 94.
3.29	√	Establish high level committee with Guangdong	(90)	Committee meets yearly. 2-year joint monitoring programme of Deep Bay and its catchment began in 93.

3.30	O	Implement Tolo Harbour Action Plan	(94/95)	Most actions completed. Effluent export scheme partly implemented. Provision of village sewerage is continuing.
3.31	√	Assess feasibility of privatising floating refuse collection	end 91	Feasibility study completed. But tenders received were too costly. [See below, Section B, para 6.96]
3.31	O	Encourage private sector initiatives	ongoing	General support continues for recycling initiatives, and work of the Private Sector Committee on the Environment.

Air pollution

4.21	√	Examine means to reduce reliance on diesel vehicles	92	Proposals drawn up in 91; decision deferred on grounds of inflation. New proposals published in Sept 95. [See below, Section B, para 6.12]
4.28	O	Start phasing out incinerators	--	Staged programme in progress. [See below, Section B, para 6.20]
4.29	L	Reduce construction dust	92	[See below, Section B, para 6.15]
4.30	O	Expand fixed air monitoring network	94	Nine stations in operation. Three more will be set up by 97.
4.31	O	Monitor acid rain and long-range transport of pollutants	(89)	Ongoing action.
4.15	O	Control specified processes by licensing, remove exemptions, extend to new processes	97	Implementation in progress.

Noise

5.14	O	Expand school noise insulation programme	ongoing	Stage III (240 schools affected by traffic noise) to be completed in 96. [See also Section B, para 6.76]
5.17	L	Control noise from vehicles	93	[See under Section B, para 6.67]

Planning against pollution

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| 6.14 | O | Review Town Planning Ordinance to include environmental considerations | 93 | Drafting instructions being prepared |
| 6.17 | O | Strategies to improve the NT environment | (90/91) | Ongoing. [See under Section B, para 5.19] |

Enforcement and compliance policies

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| 7.8 | √ | Regionalise control activities | (91) | Done. There are now 6 local control offices. |
| 7.14 | √ | Review levels and mechanisms of support to industry | (90) | See under Section B, para 7.36 |

Environmental education

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| 8.20 | √ | Secure site for environmental resource centre, and open | - | First resource centre in Wanchai opened in Dec 93. Visitor Centre in revenue Tower opened June 94. More centres are planned, for operation by community groups. |
| 8.22 | O | ED to set up 3 new field centres | (93/94) | The 2nd centre, on Route Twisk, opened in 95. Two more are being planned. |

(B) Progress report on additional measures described in the 2nd White Paper Review

Para	Status	Item	Situation at 1 December 1995
Conservation			
5.19	√	Task forces to clean up the NT will be established	Task forces set up in August 94
5.25	√	The TDSR will formulate a landscape conservation strategy	A landscape strategy is one input into the TDSR decision-making process.
5.25		The TDSR will formulate an urban forestry plan	A draft plan was prepared; but is superseded by the Urban Council's 'Green Hong Kong' strategy.

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| 5.31 | O | A comprehensive inventory of historical buildings will be compiled | A photo archive of 460 buildings has been compiled. A survey of all historical buildings in Hong Kong will begin early 96. |
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6.84 | O | Disused urban landfills will be restored | Tenders were invited in late 95. Work on most landfills will be completed by 1997. |
| 5.27 | O | Disused quarries will be rehabilitated | Plans are being prepared. |
| 5.33 | √ | An environmental baseline for the territory will be published in TDSR | Report published in July 93. More detailed studies are proposed [see Chapter 3]. |
| 5.34 | √ | Government will help WWF(HK) compile a comprehensive environmental profile of HK | Project began in Dec 95 with funding from the Environment and Conservation Fund and Woo Wheelock Green Fund. |
| 5.35 | O | The need for a Conservation Authority will be examined | A review of conservation policy is in hand, for completion by May 1996. |

Pollution Control

Air

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| 6.11 | O | Government planners will work closer together to promote environmentally more efficient land use development | Ongoing. Air quality issues are now incorporated in land use planning studies. |
| 6.12 | L | Penalties for smoky vehicles will be increased by 1995 | Higher penalty scheme in preparation. New target is Dec 96. |
| 6.12 | L | Inspection and maintenance programmes for commercial vehicles will be stepped up in 1995 | In preparation. New target for a basic inspection programme is late 96. |
| 6.12 | O | Additional measures to control pollution from diesel engines will be implemented | Public consultation on a diesel-to-petrol scheme began in Sept 95 |
| 6.12 | √ | Emission standards for diesel vehicles over 2.5 tonnes will be tightened | Regulations came into effect in April 1995. |
| 6.12 | √ | A requirement for higher quality automotive diesel will be introduced to meet improved emission standards by 1995 | Diesel fuel with sulphur content of max. 0.2% has been available since 1 April 95. |

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| 6.13 | O | Government will encourage introduction of electric vehicles | A working group is monitoring technical developments and vehicle availability. Two electric vehicles are under government trial. In April 94, first registration tax exemption for electric vehicles was introduced for a 3-year trial. |
| 6.15 | L | Open burning of refuse in urban areas will be banned by 1994 | Legislation has been drafted; target implementation date Jan 96. |
| 6.15 | L | Construction dust control measures to be implemented in 1994 | Legislation is being prepared; target implementation date 96. |
| 6.20 | L | The Kwai Chung incinerator will be closed in 1996 | Scheduled closure date now late 97. |
| 6.21 | L | A toxic air contaminant study will be completed by March 95 | Final consultancy report is due by end 95. |
| 6.21 | O | A comprehensive programme to control toxic air pollutants will be introduced by 1997 | Programme to be developed in the light of the consultancy report. |
| 6.23 | √ | A radon exposure survey will be completed by end 1993 | Completed on schedule. |
| 6.23 | √ | Radon mitigation measures will be compiled and published | Information pamphlet on simple mitigation measures issued in 95. |
| 6.23 | L | Measures to mitigate sick building syndrome will be introduced by 1995 | A consultancy on indoor air pollution was commissioned in Oct 95. |
| 6.23 | O | Air quality objectives for semi-enclosed spaces will be established by 1994 | Air quality guidelines for vehicle tunnels were endorsed by EPCOM in Oct 93. Guidelines are being prepared on other enclosed spaces. |
| 6.23 | O | Guidelines and practice notes on ventilation design and systems and their operation will be published by 1996 | Practice notes for semi-enclosed car parks prepared for issue in Sept 1995, and for bus termini in mid-1997. Regulatory control of road tunnel air pollution is being considered. |

Water

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| 6.32 | O | Measures to control non-point source polluting discharges and toxic discharges will be considered | Still under consideration. |
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| 6.56 | O | The High Priority programme of the sewage strategy will be implemented for completion by mid-97 | On schedule. |
| 6.53 | O | Discussions with PRC on the EIA for the oceanic outfall will continue | Action ongoing. The PRC will be consulted on the environmental impact assessment of Stage II. |
| 6.57 | O | Victoria Harbour WCZ will be declared in phases 1994-97 | Phase 3 will be effective 1 April 96. |
| 6.57 | √ | Charges for sewage services will start in 1994 | Sewage charging scheme implemented from 1.4.95. |
| 6.61 | O | Government will build c. 110 km of sewers and 65 treatment and other facilities [by end 1998] | Generally on schedule. |
| Noise | | | |
| 6.66 | √ | Noisy aircraft will be banned from Kai Tak | Stage 1 (Hong Kong airlines) began in Oct 94. Stage 2 (all airlines) began in Nov 95. |
| 6.67 | O | Regulations on motor vehicle noise will be proposed in 1994 | Proposals considered by ACE in March 94 and Sept 95. Target date to LegCo: Nov 95. |
| 6.69 | O | Stricter controls on powered mechanical equipment and noisy manual work will be introduced in 1994 | Amendments to Noise Control Ordinance enacted Jan 94. Subsidiary legislation being prepared for tabling in LegCo late 95/early 96. |
| 6.69 | L | Piling with diesel hammers will be banned in built-up areas by 1994 | Local test of quieter hydraulic hammers completed to satisfaction of the Building Authority. Trade and professional bodies being consulted. New target implementation date: 1996. |
| 6.69 | L | Use of excavator-mounted breakers in certain works operations will be restricted by 1994 | Control to be implemented in stages. Consultation is in progress on requiring the use of quiet road opening equipment for a Construction Noise Permit. Target implementation date: 1996. |
| 6.75 | O | Schemes to minimise vehicle noise at night will be proposed | After public consultation in 1995, heavy vehicles have been banned from part of Lai King Hill Road at night. Further schemes being considered. |
| 6.76 | O | \$445 m. will be spent on the School Insulation programme [by end 97] | 350 schools have been insulated; work on a further 70 will be completed in 1996. Insulation of schools exposed to less serious noise will be considered. |

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| 6.76 | O | \$101 m. will be spent on noise mitigation for households affected by the ACP [by end 95] | 660 dwellings will be insulated by end 1995, at a cost of \$20 million. Further dwellings will be treated as ACP proceeds. |
| 6.76 | O | More roads will be treated with noise reducing overlay | All new highways will be treated. About 8.5 km. of existing road has been resurfaced, benefiting 11,000 dwellings; further resurfacing is planned. |
| 6.71 | O | KCRC and MTRC will introduce noise abatement programmes | <i>KCR</i> : 10-year programme covering 18 projects. Tai Wo station has been enclosed.
<i>MTR</i> : depot and rolling stock measures completed. Anti-vibration dampers being installed on train wheels. A noise enclosure will be built in 1996 between Shau Kei Wan and Heng Fa Chuen. |
| 6.72 | O | Professional input on noise will be included in project planning | The EIA process includes noise impact assessments for all major public and private projects. |

Waste

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| 6.85 | O | Study of measures to reduce waste will be commissioned by end 93 | Waste Reduction Study began in Feb 94, covering waste avoidance, minimisation, recycling, and bulk reduction technologies, including incineration with energy recovery. |
| 6.92 | √ | Charges for solid waste at landfills will be introduced from early 94 | Landfill charging regulations enacted June 95. Implementation date to be fixed following discussion with affected parties. |
| 6.88 | L | Charges for disposal of chemical waste at CWTC will be introduced in mid 94 | Charging scheme introduced in March 95. Delay caused by need for a comprehensive waste generator database to guard against illegal disposal. |
| 6.94 | O | Planning for a Centralised Incineration Facility will continue | Ongoing. Revised proposals being drawn up to address concerns of medical profession and legislators. |
| 6.94 | O | Code of Practice for clinical waste will be published in 1994 | EPD, Hospital Authority, HK Medical Association have published codes of practice and guidelines. A draft legislative control framework is being discussed with the profession; consultation will begin mid 96. |
| 6.96 | - | Scavenging of floating refuse will be contracted out in 1994 | Private tender bids proved too expensive. Marine Dept has bid for funding to provide service. |
| 6.97 | √ | Revised livestock waste controls will be introduced in 1994 | Done. |

Pre-empting problems

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| 7.7 | L | Legislation for EIAs will be introduced in 1994 | Target for introduction into LegCo is now early 96. |
| 7.8 | O | Environmental monitoring and auditing of major infrastructure projects will be conducted | Major infrastructure projects may proceed only after EIA is endorsed by ACE and followed up by means of a monitoring and audit programme. |
| 7.10 | √ | Study of environmental auditing in government depts will be completed by 1994 | Pilot audits completed in two departments (EMSD, Planning Dept). Training for other departments is in progress to enable them to undertake such audits. |
| 7.10 | √ | Green managers will be appointed in government depts by 1994 | Green Managers appointed from Jan 94. Scope of their work is constantly reviewed to cover new environmental management initiatives. |
| 7.19 | O | Recycling and waste minimisation in government and private sector will be encouraged and emphasised in publicity campaigns | Action ongoing |
| 7.21 | O | Government will continue to explore with industry ways to divert construction waste from landfills | Landfill charging scheme will provide an incentive. Since 93, Housing Dept demolition contracts require on-site sorting. A plant for sorting construction waste has opened at the SENT landfill. |
| 7.22 | O | The Waste Management Model will be improved | A computerised waste management planning tool, to facilitate systematic evaluation of options and effects of new initiatives, should be operational in early 96. |
| 7.36 | O | Government will promote clean production technology | Action ongoing. Industry Dept has published booklets for the textile finishing, electroplating and printed circuit board industries. The Waste Reduction Study identifies clean production technology as one way to minimise waste. |
| 7.39 | O | Government will plan an overall waste minimisation strategy for HK | A draft Waste Reduction Plan is the main outcome of the Waste Reduction Study. Public consultation to begin by mid 96. |

Energy efficiency

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| 8.6 | O | EEAC will complete research on patterns of energy consumption by 1994 | Research completed on a sample of commercial and institutional buildings. Consultants are developing an energy end-use database, due by early 97. |
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8.7	√	Advisory notes on domestic energy efficiency will be published in 1994	Done.
8.7	O	An Energy Efficiency Display Centre will be set up in the Science Museum by 1996	Planning in progress. Opening scheduled for mid-96.
8.9	O	Power companies will be required to explore and pursue Demand Side Management measures	DSM working group set up in Nov 93. Some pilot programmes launched (energy efficient lighting in the home; time-of-use tariffs). Large-scale programmes being considered for 96/97.
8.13	√	Energy managers will be appointed for government buildings in 1994	Done.
8.14	√	The first award for energy efficient building design will be made in 1994	Done.
8.15	√	An OTTV handbook will be published in 1994	Code of Practice issued April 95. Building (Energy Efficiency) Regs introduced in July 95, covering OTTV in new commercial buildings and hotels.
8.16	√	Advisory notes on industrial energy efficiency will be published in 1994	Advisory notes on energy audit for industry and commerce issued in September 95.
8.17	L	Draft energy codes will be published by the EEAC in 1994	Draft lighting and air-conditioning design codes being prepared; consultation in 96/97
8.20	O	Government will publish more consumer information on electric appliance energy efficiency	A voluntary labelling scheme has been devised. In June 95, household refrigerator manufacturers were invited to join.
8.21	√	The energy efficiency section of EMSD will be expanded in 94-95	EMSD's Energy Efficiency Office was set up in August 94.

Global goals

9.5	O	Greenhouse gas inventory will be updated	Action ongoing.
9.6	O	Government will work closely with WWF on a full environmental profile for HK	See para 5.34
9.7	O	Additional measures to reduce reliance on tropical hardwoods will be explored	Consultancy report discussed at a seminar in Feb 94. Consideration being given to set up a public/private sector working group.

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| 9.16 | √ | Additional measures to reduce use of ozone depleting substances will be examined | All measures under the Montreal Protocol have been fully met. |
| 9.17 | O | Government will seek extension of Basel Convention to HK | Legislation enacted in Feb 95 to enable controls under the Convention to be introduced. |
| 9.24 | √ | Penalties for dumping at sea will be increased | Increased penalties included in Dumping at Sea Ordinance, enacted March 95. |
| 9.25 | O | Government will continue membership of APEC energy conservation groups | Ongoing. Hong Kong to host 12th APEC Energy Working Group meeting in 1996. |
| 9.27 | O | Co-operation with Canada will continue under MOU | Ongoing. |
| 9.32 | √ | Consideration will be given to Ramsar status for Mai Po | Arrangements for Ramsar status being finalised. |
| 9.33 | O | Co-operation with China on environmental issues will continue under the HK-GD EP Liaison Group | Ongoing. |

Shared Responsibility

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| 10.3 | O | The rate of government spending on environment will be sustained for the foreseeable future | Recurrent funding will rise from \$2.2 billion in 95/6 to \$2.7 billion in 99/00 in constant prices. Up to the year 2000, capital spending on the environment will be about \$20 billion. |
| 10.8 | √ | Funding for the ECC will be put on a more permanent basis in 1994 | The Environment and Conservation Fund supports ECC's core programmes. |
| 10.12 | O | EPD's local control offices will be extended | Six offices have been set up. More are planned. |
| 10.13 | √ | Government will set up an Environment and Conservation Fund | The Fund started operations in August 94. |
| 10.14 | O | An Environment Resource Centre will be opened in 1993; more centres will be considered | Wanchai ERC opened Dec 93. EPD Visitor Centre opened June 94. A second ERC in Tsuen Wan, to be operated by community groups, has received funding from Environment and Conservation Fund. |
| 10.24 | O | Liaison with Environmental Contractors Management Assn will be improved | Ongoing. |

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| 10.35 | O | Liaison with the main trade organisations on environment will be improved | Ongoing. |
| 10.43 | √ | EPCOM will be given wider responsibilities as ACE | Completed January 1994. ACE's scope covers conservation and energy efficiency. Representation from environmental groups expanded and formalised. |
| 10.50 | O | Government will meet regularly with green groups | Ongoing. |

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(II) Where are we now?

Every activity we pursue to meet our daily needs creates pressure on the environment. In producing and consuming goods and services, we create emissions, effluent discharges and wastes which need to be tackled properly so that they can be assimilated by the environment. The scale of the pressure on the environment of our small territory (and also on our neighbours, where emissions travel across our borders) is indicated by the following figures -

Solid waste In 1994 our activities generated each day about 24,000 tonnes of solid waste, comprising 8,500 tonnes of municipal waste, over 15,000 tonnes of construction waste, 110 tonnes of sewage sludge, and 2,200 tonnes of pulverised fuel ash. Thus, in the course of a single year we produce about 9,600,000 tonnes of solid waste, which must be handled and disposed of properly if it is not to cause environmental nuisance and damage.

Liquid waste Every day about 1,700,000 cubic metres of liquid effluent flow through our sewerage system, and another 520,000 cubic metres flow through stormwater drains straight into watercourses or the sea.

Chemical waste About 100,000 tonnes of chemical waste are generated every year, which must be collected, treated and disposed of safely.

Air pollution Every year our factories, power stations, traffic and other sources release into the atmosphere about 140,000 tonnes of sulphur dioxide, 150,000 tonnes of nitrogen oxides, 33,000,000 tonnes of carbon dioxide and 11,000 tonnes of particulates (excluding construction dust and natural aerosol emissions). These emissions not only affect Hong Kong's immediate environment; they also contribute to global atmospheric pollution.

Noise Some 380,000 people are affected by unacceptable levels of aircraft noise, 400,000 by noise from percussive piling, and one million by traffic noise.

2.2 The message from these statistics is clear. We exert tremendous pressure on the capacity of the environment to absorb the wastes resulting from our activities. The 1989 White Paper on Pollution set out long-term strategies to mitigate the environmental impact of our activities in respect of waste disposal, sewage treatment, air pollution, and noise control. The rest of this chapter outlines progress to date, and highlights the main issues for the future.

WASTE

The legislative framework

2.3 The Waste Disposal Ordinance provides an overall framework for managing the collection and disposal of waste, and requires the Government to prepare and publish a Waste Disposal Plan. The current statutory Waste Disposal Plan gives effect to the comprehensive waste disposal strategy set out in the 1989 White Paper. Recent legislation includes the Waste Disposal (Amendment) Ordinance, which strengthens control over the trans-boundary movement of hazardous and other wastes in line with international standards; and the Dumping at Sea Ordinance, which strengthens and localises control over the dumping of waste at sea. Both were passed into law in 1995.

The solid waste strategy

2.4 Most programmes stipulated in the Waste Disposal Plan have an implementation time of up to 10 years. The following paragraphs report on progress.

Municipal waste

2.5 The municipal waste disposal strategy is based on three large landfills in the Western New Territories (WENT), South East New Territories (SENT) and North East New Territories (NENT), to be supported by nine refuse transfer stations which enable a cleaner and more efficient system for transporting waste to landfill sites. Both publicly and privately collected municipal waste will be delivered to the refuse transfer stations, and then compacted, containerised and transported in bulk containers to the landfills for final disposal. All three strategic landfills have been commissioned, at a capital cost of \$4,100 million and annually recurrent costs of \$273 million. WENT started to receive waste in November 1993, SENT in September 1994, and NENT in June 1995.

2.6 Of the nine planned refuse transfer stations, three have been brought into operation at a capital cost of \$800 million and annually recurrent costs of \$253 million. These are in Kowloon Bay (opened May 1990), Island East (November 1992) and Shatin (October 1994). Work has begun on the \$600 million Island West transfer station, to be commissioned in April 1997. Of the remaining stations, West Kowloon, North West New Territories, North Lantau, and the Outlying Islands will all start operation in 1997. The North New Territories RTS will come into operation around the turn of the century.

2.7 The landfill strategy was selected as preferable, on environmental and cost grounds, to a strategy based on incineration. With the opening of the new landfills, it has been possible to close down the waste incinerators at Lai Chi Kok (1990) and Kennedy Town (1993), which had caused air pollution and smell nuisances to increasing numbers of nearby residents. The Kwai Chung incinerator is scheduled to close in 1997, a little later than originally scheduled.

2.8 Landfill disposal is environmentally sound only if the landfill site is properly prepared, managed, and in due course restored for some useful purpose. Our older landfills lack facilities to control the hazardous gases and polluting liquids produced by decomposing waste, and so do not meet today's environmental standards. The last of the older landfills, at Pillar Point Valley, was scheduled to close by the end of this year, but will now be used as a backup facility until the end of 1996. A restoration programme costing \$2,300 million has been drawn up to safeguard against environmental problems (such as leachate and gas emissions) in 13 old landfill sites. This will prepare the way for safe alternative uses for the landfill sites. (*Table 1*)

2.9 The present landfill programme should meet our municipal waste disposal needs for the next ten years. Thereafter disposal by landfill will become increasingly problematic, given the severe shortage of sites suitable for landfills and not needed for other purposes. Like other developed societies, we face the necessity of reducing our output of solid wastes, by changing our behaviour as manufacturers, importers, distributors, and consumers. To raise awareness of the disposal cost of solid waste, legislation was passed in June 1995 allowing charges to be made for deliveries by private collectors to landfills (other than household waste). A commencement date for charging will

be set once details of the arrangements have been agreed with waste producers, collectors and other affected parties.

Table 1 Landfill Restoration Programme

Project	Retortion facilities installed by -	Estimated cost (\$ mn, Dec 94 prices)
Package A Shuen Wan landfill	late 1997	185.0
Package B Urban landfills <u>Part 1</u> <ul style="list-style-type: none"> • Jordan Valley • Ma Yau Tong West • Ma Yau Tong Central • Ngau Chi Wan • Sai Tso Wan 	late 1997	194.6
<u>Part 2</u> <ul style="list-style-type: none"> • Gin Drinkers Bay 	mid 1998	81.0
Package C Tseung Kwan O landfills <u>Stage I</u> <ul style="list-style-type: none"> • Siu Chik Sha <u>Stage II and III</u> <ul style="list-style-type: none"> • Tai Chik Sha 	late 1997	581.0
Package D Northwest NT landfill <u>Part 1</u> <ul style="list-style-type: none"> • Siu Lang Shui • Ngau Tam Mei • Ma Tso Lung 	mid 1998	119.6
<u>Part 2</u> <ul style="list-style-type: none"> • Pillar Point Valley 	mid 1999	461.5

Chemical Waste

2.10 The strategy for handling chemical wastes is based on (a) statutory controls from the point where the wastes arise to the point at which they are disposed of in a satisfactory manner, and (b) the provision of treatment facilities to enable manufacturers and other chemical waste producers to comply with the regulations. The Waste Disposal (Chemical Waste) (General) Regulation under the Waste Disposal Ordinance was made in February 1992. The Chemical Waste Treatment Centre on Tsing Yi Island began operating in April 1993; and full statutory controls came into effect in the

following month. Under the Polluter Pays Principle, the full operating cost of the Treatment Centre will be met from user charges. A charging scheme came into operation in March 1995, with charges designed to meet 20% of variable operating costs initially, to rise gradually in stages to 100%.

Construction Waste

2.11 The disposal strategy for construction waste calls for inert materials to be segregated for recycling or for beneficial re-use at public dumps for reclamation purposes, so that scarce landfill space is not occupied by waste which could be put to some useful purpose. However, large quantities of inert construction materials are still mixed with other waste and delivered at landfills for disposal. To preserve landfill space and encourage recycling, a construction waste reception facility opened at the SENT landfill in July 1995. After segregation and sorting, inert materials are either handled on site for recycling, or diverted to public dumps for land reclamation. To provide an economic incentive for on-site sorting under the Polluter Pays Principle, charges for landfill disposal were legislated for in mid-1995. Waste producers will initially be charged 50% of the disposal cost of any materials disposed of at the landfill.

Clinical Waste

2.12 Over 70% of clinical waste is disposed of at landfills and municipal incinerators, and the rest is burnt in hospital incinerators. These disposal outlets are environmentally unsatisfactory. The clinical waste disposal strategy is similar to the chemical waste strategy, being based on cradle-to-grave controls and the provision of a centralised incineration facility, which would also dispose of animal carcasses and high security waste such as seized drugs. The affected professions and organisations will be consulted on a draft clinical waste control scheme in 1996. We plan to seek Legislative Council approval during 1996 for legislative amendments controlling the handling of clinical waste, aiming to bring the controls into effect in mid-1997 to tie in with the commissioning of the centralised incineration facility. However, following queries by legislators and some medical professionals, the scale and cost of the facility are being re-examined.

Radioactive Waste

2.13 All radioactive waste arising in Hong Kong is low-level, comprising principally medical and industrial elements totalling about one cubic metre in any year. Hence extensive measures of the kind needed in countries which have nuclear reactors are not necessary here. Good environmental practice requires that such waste be stored properly until it has decayed naturally to an extent which allows its safe final disposal at a landfill. We plan to construct a low-level radio-active waste storage facility at Sum Wan on Siu A Chau. Construction should begin in 1996 and the facility should be commissioned in 1997.

Floating Refuse

2.14 Floating refuse is an eyesore, a potential health hazard and a nuisance to shipping. The prevention and collection of floating refuse, and enforcement action against those who deliberately or carelessly let rubbish fall into watercourses or the sea, is more complex than for land based refuse. Although privatisation was earlier identified * as a feasible way to improve floating refuse collection, tenders called in November 1994 produced prices higher than was considered reasonable. The Marine Department is therefore continuing to collect floating refuse using a combined fleet of Government and contract vessels. Meanwhile, longer term improvement measures identified by a working group on marine and littoral refuse are being considered. The Marine Department plans to buy an improved fleet of scavenging vessels in 1996, at an estimated cost of \$55 million.

Livestock waste

2.15 A revised livestock waste control strategy was introduced in mid-1994, and is being implemented in phases. Under the revised scheme, the keeping of livestock is banned in some areas, and in other specified areas requires a licence setting out waste treatment requirements. Livestock farmers may choose any treatment system, but must comply with specified discharge standards. Financial assistance, in the form of grants and loans, may be given to help farmers install suitable waste facilities, and ex-gratia allowances are available to farmers who decide to

* The Government is grateful to the Private Sector Committee on the Environment for its assistance with this exercise.

stop keeping livestock. The measures taken so far have reduced livestock pollution of the worst-affected streams and rivers in the New Territories by about 70%. The remaining phased programme will be completed within four years. The whole scheme, at a cost of \$1,350 million, will lead to an overall 98% reduction in livestock waste pollution in the New Territories.

Waste reduction study

2.16 The 1989 Waste Disposal Plan focuses on a long term strategy to dispose of the growing quantity of wastes which we all produce. It was necessary at that time to deal with the immediate threat of inadequate capacity in outdated disposal facilities which could not meet modern environmental standards. As the preceding paragraphs show, good progress has been made in implementing this disposal strategy.

2.17 At the same time, the Plan recognises that strategies must be developed to reduce the amount of waste generated and encourage waste recovery and recycling. An effective waste management strategy must include the following elements, in descending order of priority -

- waste avoidance and minimisation through changes in industrial, commercial and household practices;
- waste recovery and recycling;
- bulk waste reduction, to reduce the volume of waste before final disposal; and
- disposal in environmentally satisfactory ways.

The Waste Disposal Plan concentrates on the last of these elements. With the disposal strategy well in hand, it is now possible to turn our attention to a waste reduction strategy focusing on the first three elements.

2.18 A waste reduction consultancy study was commissioned by the Environmental Protection Department in February 1994, to review Hong Kong's existing waste generation and collection patterns and identify ways to increase waste avoidance, minimisation, recovery and recycling. It also evaluated waste reduction technologies which might be applicable to Hong Kong. The study identified several possible measures for further consideration -

- increase community awareness through education;
- encourage commerce and industry to set voluntary waste reduction targets, e.g. packaging materials and plastic bags;
- help commerce and industry to adopt waste reduction practices and upgrade to cleaner production technology, e.g. by green labelling, recycling incentives, and funding support for demonstration projects; and
- introduce disposal charges to provide an economic incentive.
- introduce and promote waste separation schemes, especially for domestic waste, for example by providing setting-up grants;
- encourage commerce and industry to set voluntary recovery/recycling targets, e.g. take-back and deposit-refund schemes;
- help the recycling industry by e.g. preferential purchase of recycled products and assistance in finding suitable sites; and
- introduce disposal charges to provide an economic incentive.

Two bulk *waste reduction* technologies were identified in the study as applicable to Hong Kong: waste-fired power generation; and composting of source-separated organic waste.

2.19 Like other societies, we in Hong Kong must change our attitude towards waste in order to put our waste management and disposal arrangements on a more sustainable basis. The recommendations in the Waste Reduction Study aim to stimulate positive changes in attitudes and behaviour. Consultation with concerned parties began in early 1996. We shall formulate a Waste Reduction Plan in 1996, setting out priorities for action.

WATER

Statutory framework

2.20 The Water Pollution Control Ordinance is the main water quality management law. Its objects are to protect the aquatic environment, ensure that water quality objectives are met, and protect our large investment in sewerage infrastructure.

2.21 Following enactment of the Water Pollution Control (Sewerage) Regulations in June 1994, property owners are required to connect their sewage outlets to public sewers where these are provided, in order to collect waste water for proper treatment and disposal in an environmentally satisfactory manner. The Regulations also require that private wastewater treatment facilities be properly operated and maintained. This will help in attaining water quality objectives in water control zones.

2.22 Water control zones are declared under the WPCO to control pollution at source. The 1989 White Paper stated that ten water control zones would be set up to cover all territorial waters. Nine of these have already been declared. The remaining zone, covering Victoria Harbour, is being declared in three phases between late 1994 and 1996. When this action is completed, pollution from about 21,000 major polluters around the harbour will have been brought under control.

Sewage Strategy

2.23 The proper collection, treatment and discharge of liquid effluent in order to protect our watercourses and coastal waters is the aim of the largest and most expensive environmental programme ever undertaken in Hong Kong: the 10-year Sewage Strategy, costing some \$20,000 million in capital works.

2.24 The water quality objectives specified under the WPCO for each water control zone can only be achieved when adequate sewerage is provided and used. The Sewage Strategy is based on a comprehensive programme of new sewerage infrastructure, and the diversion of all sewage into foul sewers rather than stormwater drains. It is implemented through sewerage master plans which together cover the whole territory. Planning has been completed in all 16 main sewerage catchment areas. Detailed design or construction work has started in 13 areas: Hong Kong Island South; East Kowloon; North West Kowloon; North & South Kowloon; Chai Wan & Shaueiwan; Central, Western and Wanchai West; Tsuen Wan, Kwai Chung & Tsing Yi; Tolo Harbour; Port Shelter; Yuen Long & Kam Tin; Tuen Mun; Wanchai East and North Point; and North District.

2.25 Once properly collected, wastewater must be properly treated and disposed of. Under the Strategic Sewage Disposal Scheme (SSDS), deep tunnels are being bored to deliver wastewater to treatment works before discharge into the sea. The serious pollution of waters in Victoria Harbour lends some urgency to constructing and commissioning the first stage of the scheme as quickly as possible. This comprises a tunnel system to collect sewage from the most polluted urban areas around the harbour to Stonecutters Island, where it will receive chemically-enhanced primary treatment. This first stage, together with the six most urgent sewerage master plans covering areas around the harbour, form the High Priority Programme, scheduled for completion in 1997 at a cost of \$9,400 million.

2.26 Construction work for Stage I of the SSDS began in April 1994 and is progressing on schedule. All contracts were let by the end of 1995. When completed, the High Priority Programme will intercept and treat 70% of the pollution which now enters Victoria Harbour.

2.27 The 1989 Sewage Strategy Study recommended an oceanic outfall to discharge treated effluent into deep water near the Dangan Channel (Stage II of the SSDS) and the collection of Hong Kong Island flows to Mt. Davis for treatment before discharge via the long oceanic outfall (Stages III and IV). It was envisaged that a combination of land-based sewage treatment and the self-purification capabilities of the ocean would provide an energy-efficient and cost effective solution to Hong Kong's water pollution problem.

2.28 In response to concerns by Legislative Councillors and others, the government has commissioned consultants to review the various treatment and disposal options in the light of current best practice and emerging sewage technology. Implementation details of Stages II, III and IV will depend on the outcome of further studies and investigations.

Sewage Charges

2.29 Every one of us in Hong Kong contributes to water pollution. Under the Polluter Pays Principle, everyone is made more aware of this fact by the need to pay sewage charges, which contribute towards the costs of pollution prevention. The Sewage Services Ordinance, the enabling legislation for introducing a sewage charging scheme, was enacted in December

1994. Subsidiary legislation was approved in February 1995, and the charging scheme commenced on 1 April 1995. The sewage charge is designed to cover only the operating cost of sewage services, through a general charge paid by all dischargers, and a trade effluent surcharge paid by 30 selected trades and industries which produce effluent of a higher strength than domestic sewage. To keep the charges modest, in particular for households, the capital cost of sewerage facilities will be funded in full under the Capital Works Programme, in the same way as other public works. As a result, over 15% of users enjoy sewerage services free of any charge; and 77% pay \$15 per month or less. *Table 2* shows the range of charges paid by domestic consumers.

Table 2 Range of Sewage Charges paid by Domestic Consumers

Water Consumption per Billing Period (4 months)	Proportion of Domestic Consumers	Sewage Charge per Billing Period (4 months)
12 cubic metres and below	15.5%	Nil
13 - 43 cu. m.	40.0%	\$1.20 - 37.20
44 - 62 cu. m.	21.5%	\$38.40 - 60.00
63 - 120 cu. m.	20.3%	\$61.20 - 129.60
over 120 cu. m.	2.7%	over \$129.60

AIR

2.30 Based on overseas epidemiological studies, it is likely that air pollution causes several hundred early deaths each year in Hong Kong (compared, for example, with about 340 deaths from traffic accidents), as well as respiratory illnesses among those exposed to high concentrations of pollutants. Air pollution also causes higher cleaning costs for individuals and companies, and leads to deterioration of the fabric of our buildings and other property. The immediate target of air quality policy is to achieve compliance with a set of air quality objectives for seven main air pollutants listed in the Air Pollution Control Ordinance. (*Table 3*) These objectives are in line with interna-

tional standards, and are set having regard to the impact of these pollutants on public health. We still have some way to go before all these objectives can be achieved and maintained.

Table 3 Hong Kong Air Quality Objectives

Pollutant	Concentration in micrograms per cubic metre (i)					Health effects of pollutant at elevated ambient levels
	Averaging time					
	1 hr (ii)	8 hrs (iii)	24 hrs (iii)	3 months (iv)	1 yr (iv)	
Sulphur Dioxide	800		350		80	Respiratory illness; reduced lung function; morbidity and mortality rates increase at higher levels.
Total Suspended Particulates			260		80	Respirable fraction has effects on health.
Respirable Suspended Particulates ^(v)			180		55	Respiratory illness; reduced lung function; cancer risk for certain particles; morbidity and mortality rates increase at higher levels.
Nitrogen Dioxide	300		150		80	Respiratory irritation; increased susceptibility to respiratory infection; lung development impairment.
Carbon Monoxide	30 000	10 000				Impaired co-ordination; deleterious to pregnant women and those with heart and circulatory conditions.
Photochemical Oxidants (as ozone) ^(vi)	240					Eye irritation; cough; reduced athletic performance; possible chromosome damage.
Lead				1.5		Affects cell and body processes; likely neuropsychological effects, particularly in children; likely effects on incidence of heart attacks, strokes and hypertension.

(i) Measured at 298° K (25°C) and 101.325 kPa (one atmosphere).

(ii) Not to be exceeded more than three times per year.

(iii) Not to be exceeded more than once per year.

(iv) Arithmetic means.

(v) Respirable suspended particulates means suspended particles in air with a nominal aerodynamic diameter of 10 micrometres and smaller.

(vi) Photochemical oxidants are determined by measurement of ozone only.

Legislative framework

2.31 The legislative framework for tackling air pollution problems is largely in place. Ten Air Control Zones have been declared under the Air Pollution Control Ordinance, covering the whole territory and allowing regulations to be made targeting specific emission problems. Regulations influencing air quality have been introduced under other ordinances, e.g. the Road Traffic Ordinance and the Buildings Ordinance.

Air pollution sources

2.32 The main sources of air pollution are manufacturing industry, power generation, construction work, and road traffic. Although power stations emit the largest quantity of air pollutants, their location and pollution control specifications ensure that no large concentrations of population are affected. The main urban air polluters are road traffic and industry. (Table 4) Dust pollution from construction activity is also a major concern, given its proximity to populated areas.

Table 4 Main Air Polluters

(a) Traffic and Industry

Pollutant	Quantity	Main sources
sulphur dioxide	24,000 tonnes/year	34% road vehicles 66% industry
nitrogen oxides	51,000 tonnes/year	87% road vehicles 13% industry
particulates	7,000 tonnes/year	88% road vehicles 12% industry

(b) Power generation

Pollutant	Quantity
sulphur dioxide	108,000 tonnes/year
nitrogen oxides	92,000 tonnes/year
particulates	3,500 tonnes/year

Industrial sources

2.33 Air pollution from *industrial* sources has become less serious in recent years. The reasons include requirements to use cleaner industrial fuels; licensing controls of specified industrial processes; and the restructuring of Hong Kong's manufacturing industry.

2.34 So far 30 industrial processes have been brought under the licensing requirements of the Air Pollution Control Ordinance. Of these, five processes were declared during 1994 and 1995. By the year 2000, a total of 260 industrial processes will be controlled in this way.

Construction sources

2.35 Legislation to control dust from construction activity is being prepared, and should be in place in 1996. Meanwhile contract requirements in public works projects are helping to reduce construction dust problems through better management.

2.36 Regulations to ban the open burning of construction waste, tyres and metal salvage, and to control other forms of open burning, will be implemented by early 1996.

Pollution from road vehicles

2.37 Pollution from motor vehicles continues to be a problem, despite the wider use of less-polluting fuels (unleaded petrol, low-sulphur diesel) and stricter emission requirements for newly registered vehicles. There are two reasons for this -

- the continued prevalence of poorly-maintained diesel engines; and
- continued growth in vehicle numbers.

Unless action is taken to tackle both issues, some statutory air quality objectives are unlikely to be achieved. Indeed, without action, air quality in some areas can be expected to worsen.

2.38 In 1991 it became mandatory for all petrol stations to supply unleaded petrol. In January 1992, stringent emission standards were introduced for new petrol-engined vehicles, requiring catalytic converters to be fitted, and for light duty diesel engined vehicles. In April

1995, even more stringent emission standards came into effect for both petrol-engined and diesel-engined vehicles. To coincide with these tougher standards, cleaner diesel fuel having a sulphur content less than 0.2% by weight became generally available on 1 April 1995. The Government will continue to tighten up emission standards for new road vehicles in line with technological developments and experience in other places. For example, work has already begun to consider the feasibility of introducing diesel fuel with a sulphur content of 0.05%.

2.39 It is relatively easy to impose stringent emission standards on new vehicles. It is much harder to ensure that vehicles adhere to those standards throughout their working life. While vehicles operating on unleaded petrol generally maintain satisfactory emission performance over time, the same is not true of many diesel-engined vehicles operating in Hong Kong. It is evident that removing poorly maintained diesel engines from our roads requires more than persuasion: it requires a comprehensive programme of inspections, enforcement and penalties for smoky vehicles.

2.40 However, given the present size and mix of the diesel vehicle fleet in Hong Kong, a strict inspection and enforcement programme would be expensive, disruptive to the travelling public, and of doubtful effectiveness. For example, taxis and public light buses are responsible for 88% of all emissions of respirable suspended particulates in some densely populated urban districts. A strict inspection and enforcement programme aimed at ensuring clean operation of diesel taxis and PLBs would require constant daily enforcement activity on a wide scale, which would affect the travelling public, and probably give rise to confrontations.

2.41 In these circumstances, the Government believes that rapid improvements in air quality can best be achieved by requiring all smaller vehicles (including all taxis and PLBs) to operate on unleaded petrol. Public consultation has begun on proposals to phase out, over five years, the use of diesel fuel for all vehicles below 4 tonnes in weight, in order to eliminate a major emission source of respirable suspended particulates and make it easier to introduce stricter controls on emissions from heavier vehicles for which no alternative 'clean' fuel is available at present or in the foreseeable future.

2.42 Meanwhile, planning is already in progress for introducing a mandatory annual smoke check for larger diesel vehicles.

2.43 In considering the diesel-to-petrol proposals, the community is faced with a trade-off between environmental gains (rapid and measurable improvement in air quality, particularly in some urban black spots where limits for some air quality objectives are frequently exceeded) and the internalised cost of those gains (in the form of slightly higher fares for petrol light buses and taxis, and increased operating costs for other categories of light vehicle which now use diesel). Such trade-offs between environmental gains and the costs of polluting activities will play an increasingly important part in debates on the environment in the coming years.

2.44 *Growth in vehicle numbers* The variation in numbers of different categories of vehicles over the past 10 years is shown in *Table 5*. Two issues are of particular concern -

- the demand (including suppressed demand) for private car ownership; and
- the projected growth in road freight traffic in line with port development.

The balance between public and private transport on the roads, between road and rail passenger transport, and between road, rail and waterborne freight transport will be important factors affecting air quality, noise, visual amenity and conservation in the coming years.

Electric Vehicles

2.45 An inter-departmental Working Party on Electric Vehicles is monitoring the development of electric vehicle technology and the feasibility of applying it in Hong Kong. Following the tax incentives introduced in 1994 for a three-year trial period, the Transport Department has begun to receive applications for type-approval of electric vehicles. The case for extending tax concessions to other low-emission vehicles and hybrid vehicles has been considered, but the potential environmental benefits of these vehicles do not appear to warrant such concessions at present.

Table 5 Growth in Vehicle Numbers

Category	Number licensed in		
	Dec 1985	Dec 1990	Dec 1995
Motorcycles	14 067	16 628	20 923
Private cars	144 723	197 852	285 026
Taxis	16 223	17 060	17 839
Public and private buses	5 711	7 489	9 459
Public and private light buses	6 369	6 746	6 738
Light goods vehicles	54 648	91 868	82 122
Medium goods vehicles	14 492	24 907	34 887
Heavy goods vehicles	182	758	1 735
Trailers	3 965	11 283	21 596
Special purpose vehicles	351	212	268
Government vehicles	6 122	6 640	6 967
TOTAL	266 855	381 443	487 721

Category	Growth 1985-1995
Private cars	+ 97%
Buses and light buses	+ 34%
Light goods vehicles	+ 77%
Medium/heavy goods vehicles	+ 150%

Asbestos

2.46 Regulations are being prepared to control the standards of professionals and contractors taking part in asbestos abatement works. Once these are in force, an Asbestos Administration Committee will be set up by mid-1996 to oversee the registration and regulation of asbestos-abatement professionals and companies.

Indoor Air Pollution

2.47 A radon gas exposure survey was completed in late 1993, and an information pamphlet advising on simple mitigation measures was issued in February 1995. A consultancy on indoor air pollution will be commissioned by the end of 1995.

2.48 Air quality guidelines for road tunnels were endorsed by EPCOM in October 1993. Practice notes on ventilation in semi-enclosed carparks were issued in November 1995, and further notes for bus termini are being prepared and should be issued in mid-1997. The case for regulatory control of air quality in road tunnels is being considered.

Toxic air pollution

2.49 A consultancy study on toxic air pollution is almost completed. This has found that benzene, 1,3-butadiene, diesel particulates, hexavalent chromium and perchloroethylene are the air pollutant chemicals of most concern in Hong Kong. The requirements of a control programme are being considered.

Ozone Layer Protection

2.50 In view of the imminent ban on the imports of CFCs, HCFCs and halons, a working group comprising representatives of government departments, professional bodies and relevant trade associations has been formed to co-ordinate the phasing out of these ozone-depleting substances in Hong Kong.

NOISE

2.51 In a densely-populated and busy place like Hong Kong, noise is an inevitable part of the environment. But much can be done, and is being done, to reduce the impact of noise on our homes, schools, hospitals, places of work, and streets. Noise pollution problems are tackled in three ways: controlling noisy activities and products through the enforcement of noise control legislation; incorporating noise mitigation measures in new projects by providing advice at the planning stage; and providing control measure to abate existing noise problems.

Noise control legislation

2.52 The principal legislation is the Noise Control Ordinance (NCO), which enables regulations to be made covering most situations where there are possibilities for reducing noise levels. Regulations are presently being drawn up in several areas.

Construction Noise

2.53 The Noise Control Ordinance was amended in January 1994 to enable stricter regulation of noisy mechanical equipment. Regulations will be introduced to the Legislative Council shortly imposing controls on the use of specified powered mechanical equipment and the carrying out of other noisy construction work during restricted hours in populated areas. The Environmental Protection Department is also preparing an amended Technical Memorandum to tighten control on the use of diesel hammers in populated areas.

Traffic Noise

2.54 High levels of traffic noise from the many passenger and goods vehicles on our roads remain a major environmental problem. Traffic noise results from two components: mechanical noise from vehicle engines, and noise from the impact of tyres on the road surface. Action being taken includes careful attention early in the land-use planning process; measures to reduce engine and tyre-impact noise emissions; and mitigation measures for noise-sensitive receivers.

2.55 Land-use planning: The land-use planning process now takes noise into account early in the planning stage, to reduce potential problems later on. As far as possible noise-sensitive receivers are located away from sources of noise. Where this is not possible, the necessary mitigation measures are specified for inclusion in the scope of the relevant project.

2.56 Mechanical noise: New regulations were introduced into the Legislative Council in late 1995 to impose stricter controls on mechanical noise from vehicles.

2.57 Car Burglar Alarms: The false activation of car burglar alarms has become an increasing nuisance. Regulations will be introduced into the Legislative Council in early 1996.

2.58 Noise from Loudhailers on Vessels: Legislation to control noise from loudhailers and public address systems on vessels is being prepared.

2.59 Aircraft noise: Relocation of the airport to Chek Lap Kok will greatly reduce the impact of aircraft noise on populated areas. Interim action has been taken to ban noisy aircraft from Kai Tak.

2.60 Rail noise: Both the Kowloon-Canton Railway Corporation and the Mass Transit Railway Corporation have embarked on major programmes to reduce noise impacts from their operations. Tai Wo Station has been enclosed, and another 17 KCR projects are planned or in progress. In 1996 the MTRC will build a noise cover between Shau Kei Wan and Heng Fa Chuen, and other measures are being taken to reduce vibration and friction noise.

2.61 Noise mitigation measures: Some 350 school buildings have already been insulated against aircraft and traffic noise, and work on another 70 will be completed in 1996. Dwellings badly affected by noise from Airport Core Projects are being insulated. Noise-reducing road surfaces have been laid along several stretches of road, benefiting about 11,000 dwellings, and further resurfacing is planned. To reduce night-time noise disturbance from traffic, schemes are being examined to ban heavy traffic from certain roads at night. The first such scheme came into operation at Lai King Hill Road earlier this year.

ENVIRONMENTAL IMPACT ASSESSMENT

2.62 The Environmental Impact Assessment process is largely administrative at present. Proponents of a major development are required to undertake an EIA and incorporate mitigation measures to minimise potential adverse environmental impacts. EIA reports owned by the Government are made available for public inspection. An EIA sub-committee has been set up under ACE, to review reports and suggest any further measures or development conditions. Submissions to the Executive Council and the Public Works Sub-committee of LegCo relating to major policies and infrastructural projects include a section on 'environmental implications'.

2.63 Legislation is being drafted to make the EIA process a statutory one, to give legal backing to requirements for developers to take into account the environmental implications of their proposals and implement mitigation measures where necessary. The legislation will be introduced into LegCo in early 1996.

INTEGRATED POLLUTION CONTROL

2.64 There is a trend in developed countries towards integrating the regulation of all forms of pollution from an activity, rather than tackling each waste stream separately. This enables a more holistic approach, and avoids a situation where a solution to a problem in one waste stream may give rise to further problems in other streams. In the Hong Kong context, this integrated approach is most relevant in the case of power stations and construction sites. The provisions of the proposed Environmental Impact Assessment legislation will cover power stations; while the EPD is developing a 'one-stop shop' for construction site licences and permits. This should be in place by the end of 1996.

2.65 EPD inspectors are meanwhile being trained and equipped to conduct multi-disciplinary pollution control inspections, in order to optimise the use of staff resources and improve the co-ordination of visits to premises. Multi-disciplinary teams will be introduced progressively through 1996 and 1997.

CONSERVATION

2.66 Hong Kong's physical and climatic environment supports habitats for a wide variety of plant and animal life. But our large, active and increasingly affluent population exerts intense pressures on our small area of land and coastal waters. Our conservation policy needs to strike a reasonable balance between the need for development and the needs of the natural environment. To maintain a reasonable balance means paying greater heed to the sustainability of our development programmes; for development which is not environmentally sustainable will impoverish rather than enrich Hong Kong.

2.67 Our current conservation policy aims to conserve and enhance the natural environment, by protecting designated conservation areas, identifying new areas for protection, and compensating where possible where areas which merit conservation are lost to essential development projects.

Conservation of terrestrial habitats

2.68 Despite our limited space and rapid development, we preserve and manage extensive tracts of scenic countryside, providing diverse habitats for many native plant species and resident and migratory wildlife species. Country Parks and Special Areas now cover 41,000 hectares, or 40% of Hong Kong's total land area, and 14 potential extension sites have been identified. One such site, at Tai Tong, was designated in 1995.

Conservation of marine habitats

2.69 In 1995 the Marine Parks Ordinance was enacted to provide a statutory framework for protecting valuable areas of sea, and managing them for conservation, education and recreation. Two marine parks (at Hoi Ha Wan and Yan Chau Tong) and one marine reserve (at Cape d'Aguilar) will be established in 1996, and a marine sanctuary will be established at Sha Chau and Lung Kwu Chau.

Conservation of flora and fauna

2.70 Wild plants and animals are protected by conserving their habitats and enforcing various ordinances: Country Parks Ordinance, Marine Parks Ordinance, Forests and Countryside Ordinance, Animals and Plants (Protection of Endangered Species) Ordinance, and Wild Animals Protection Ordinance. Administrative measures are used to provide buffer zones between developed and natural land uses, and sites of special scientific interest. The Hong Kong Government participates in international efforts to protect plants and animals. The United Kingdom has extended to Hong Kong the provisions of CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna - 1976); the Ramsar Convention (Convention on Wetlands of International Importance - 1979); and the Bonn Convention (Convention on Migratory Species of Wild Animals - 1985). In September 1995 the Mái Po Marshes were designated a Ramsar Site, and a consultancy on the management of Mái Po and Inner Deep

bay as a Ramsar site will start in early 1996. Hong Kong is to participate in the East Asian-Australasian Shorebird Reserve Network being set up to protect migratory birds.

2.71 Some legal and practical problems prevent Hong Kong from formally adopting the Convention on Biological Diversity, but we are committed to meeting the environmental objectives of the Convention. Two biodiversity baseline surveys have begun: one on terrestrial and freshwater habitats, the other on corals and fishes. A marine ecosystem enhancement project is planned for 1996, to construct artificial reefs.

ENERGY CONSERVATION

2.72 Our daily activities do not only put pressure on the assimilative capacity of the environment. They also contribute to the depletion of natural resources, especially non-renewable energy resources. Hong Kong's consumption of electricity has increased by about seven per cent a year for the past 10 years, and is forecast to continue growing. The second review of the 1989 White Paper brought energy efficiency and conservation within the scope of our environmental programmes. Several measures to promote energy efficiency and conservation were outlined there, and progress has been made in the following areas -

- an Energy Efficiency Office was set up in the Electrical and Mechanical Services Department in August 1994, to provide expert advice on possibilities for energy savings, and to plan, implement and monitor energy efficiency programmes;
- a voluntary energy efficiency labelling scheme for refrigerators was launched in mid-1995, and planning is in hand to extend this to other kinds of appliance;
- statutory control of the overall thermal transfer value of new commercial and hotel buildings came into effect in August 1995. This will help to reduce the cooling demand in such buildings;
- other measures to improve the energy efficiency of buildings at the design stage include the issue for consultation in 1996/97 of draft codes of practice on the design of lighting systems and air-conditioning systems design;
- new guidelines for energy audits were distributed in September 1995;

- publicity materials on promoting energy conservation in the transport sector are being prepared;
- the Energy Efficiency Display Centre at the Hong Kong Science Museum is on schedule for opening in mid-1996.

In addition, we shall keep the work, terms of reference and membership of the Energy Efficiency Advisory Committee under regular review.

2.73 To set a good example for the private sector, the Government has appointed an energy manager for each Government building, and the energy efficiency of government buildings is being systematically audited by the Electrical and Mechanical Services Department. By mid-1995, preliminary investigations had been conducted in 31 Government buildings.

ENVIRONMENTAL SUPPORT TO INDUSTRY

2.74 More than enforcement is needed to spread good environmental practice. Awareness, knowledge and technical advice are also essential. In the past few years the Industry Department has stepped up efforts in this direction, by -

- publishing an annual *Guide to Pollution Control Legislation affecting Manufacturing Industries*;
- producing a comprehensive *Guide to Environmental Technology and Services in Hong Kong*;
- conducting a technical outreach programme, together with the Hong Kong Productivity Council, for the bleaching and dyeing, electroplating, and printed circuit board industries;
- issuing reference books for these three industries with advice on pollution prevention and indicating how attention to this can improve production efficiency;
- publishing design manuals for environmentally acceptable production processes;
- producing an eco-audit manual and video, to help manufacturers assess their compliance with environmental requirements and identify areas for improvement;

- setting up an Environmental Hotline; and
- planning an industrial pollution awareness campaign for 1996.

2.75 The Industry Support Fund, set up in 1994, is funding a number of environment-related projects covering cleaner production technology, improved waste treatment, noise control, and eco-labelling.

ENVIRONMENTAL EDUCATION

2.76 The school curriculum from kindergarten upwards incorporates concepts of environmental education and awareness. Apart from environmental aspects of specific subject syllabuses, schools are advised in the Guidelines on Environmental Education in Schools issued in 1992 to consider a whole-school approach to the environment, including cross-curricular and extra-curricular themes and activities. The Student Environmental Protection Ambassador Scheme launched by the Environmental Campaign Committee involves 220 schools; and 250 schools take part in a Waste Paper Recycling Scheme. Many programmes are also organised by the government to promote public awareness of the need to conserve country parks and the countryside. These include the Community Tree Planting Scheme, summer Forestry Work Camps, a Forest Adoption Project, the Clean and Green Scheme, and Greening for the Chest. Leaflets and posters are published; exhibitions are mounted at Country Park Visitor Centres and the Lions Nature Education Centre.

INTERNATIONAL LIAISON ON THE ENVIRONMENT

Asia-Pacific Economic Co-operation (APEC)

2.77 APEC was set up in 1989 to sustain growth and development in the region, strengthen multilateral trade, and reduce barriers to trade and investment. Hong Kong joined in 1991. APEC working groups have been formed to promote and co-ordinate practical co-operation in infrastructure rationalisation, technology transfer, and environmentally sound development. An expert group on Minerals and Energy Exploration will be set up shortly. APEC has started a

process to explore how sustainable development considerations can be incorporated into the deliberations of all its working groups. Hong Kong is involved in this process.

2.78 In the area of energy, Hong Kong is involved in the APEC Working Group on Regional Energy Co-operation, and its four expert groups on Energy Data, Energy Efficiency and Conservation, Clean Coal Technologies, and Technology Co-operation. Current and planned projects include consolidation of an energy database aimed at producing a regional energy outlook, development of a framework to facilitate investment in energy infrastructure, mutual recognition of testing standards and laboratory accreditation, co-operation on demand-side management programmes, and promotion of clean coal technology and renewable energy sources.

World Trade Organisation (WTO)

2.79 In 1995 a Committee on Trade and Environment was set up under the WTO to examine the relationship between trade and environmental policies. The aim of the Committee is to identify interlinkages between the two policy areas with a view to promoting sustainable development. Hong Kong is an active participant. The Committee's work will be reviewed by the first WTO Ministerial Conference in Singapore in 1996.

Liaison with Guangdong Province

2.80 The Hong Kong - Guangdong Environmental Protection Liaison Group was set up in 1990 to improve co-operation between the Hong Kong and Guangdong governments on environmental issues of mutual concern. The group is jointly chaired by the Secretary for Planning, Environment and Lands and the Director of the Environmental Protection Bureau of Guangdong Province. It holds annual meetings alternately in Hong Kong and China. The fifth meeting in December 1994 has led to improved information exchanges on cross-border issues such as transboundary waste shipments, marine dredging and dumping, and controls on vehicle fuel. The Technical Sub-group is continuing the joint monitoring of Deep Bay, is developing a similar study plan for Mirs Bay, and is exchanging information on selected topics of mutual concern such as pollution control, legislation, and ecological protection.

2.81 At the 6th meeting in January 1996 in Guangzhou, the Liaison Group will continue to focus on exchanging information on broad environmental issues affecting both sides of the border.

* * *

(III) Where should we be heading?

In 1995, half-way through the programme set out in the 1989 White Paper, we are able to report solid progress. The previous sections tell a story of -

- comprehensive strategies to remedy past neglect;
- ambitious, expensive multi-year programmes to provide Hong Kong with a modern pollution-control infrastructure; and
- efforts to raise public awareness of the environment and the impact our daily activities make upon it.

3.2 Once targets have been achieved, it is easy to take them for granted, forgetting the technical and political problems encountered along the way. Getting to where we are now took much effort, resources, and public debate. The next stages in our journey towards a cleaner, greener, more sustainable Hong Kong will be no easier.

3.3 The task of the 1989 White Paper - to put a comprehensive pollution-control infrastructure in place - is clearly a *necessary* one. But it is not, by itself, *sufficient* to safeguard the quality of life we want for our future. If Hong Kong is to continue thriving in the 21st century, we must begin now to give more attention to the sustainability of our way of life. In this section we explore the concept of 'sustainable development', which has become increasingly a focus of attention world-wide, and set out proposals for incorporating sustainability considerations into our development planning and policy making processes.

What is meant by 'sustainable development'?

3.4 Sustainable development has been defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The concept arose from the growing recognition of a simple fact: present patterns of resource consumption and pollution in the world's richest countries cannot be generalised to all the world's present population, let alone to future generations, because the world's most fundamental natural resources (atmosphere, soil, water, etc.) on which all life depends would be depleted in the attempt.

3.5 For a long time, economists and policy makers looked on the environment as an unlimited resource - a limitless source of raw materials, and a limitless sink for the pollution arising from our activities. During the past few decades, it has become increasingly clear that the environment is in fact a *scarce* resource, which can all too easily be squandered if we pay insufficient attention to the consequences of our actions on the environment. For example -

- consumer items like aerosol sprays and refrigerators provided convenience and an improved quality of life to millions in the decades after the Second World War. Then scientific evidence emerged that chemicals used in these products were depleting the ozone layer in the atmosphere, which protects all living things on Earth from harmful ultraviolet radiation. Following the Montreal Protocol of 1987, governments have undertaken to phase out the production of ozone-depleting substances, but the adverse effects of these harmful substances on the ozone layer will persist for many decades;
- increased investment in fishing fleets leads to increased catches - for a time. But (as the philosopher Mencius recognised over two thousand years ago) overfishing leads to rapid declines in fish stocks, to smaller catches, and ultimately to the loss of an important food source which, properly managed, could have been sustained indefinitely.

3.6 These examples illustrate two points: the importance of information about the environment as an input to national and international policy making; and the importance of incorporating environmental considerations into our conception of economic progress.

How is this concept relevant to Hong Kong?

3.7 Hong Kong occupies a very small area, is often assumed to have few natural resources of its own, is heavily urbanised, and has an economy based more and more on services rather than manufacturing industry. So why should we be concerned about questions which seem more relevant to big countries with economies based on primary production or manufacturing?

3.8 The answer is that the environment is just as important to the continued well-being of Hong Kong people as it is to the people of any other place. Consider the following examples.

3.9 Tidal flows and biochemical processes enable coastal waters to be naturally self-cleansing. But the self-cleansing abilities of the water body may be impaired if natural water flows are impeded and/or excessive pollutant burdens are poured into it. Beaches along Castle Peak Road are a case in point. They used to be generally pleasant and safe places to bathe, but our activities over the past twenty years have caused such a decline in water quality that we and our children can no longer assume that a swim in the sea will be a healthful and enjoyable experience. Our present pollution control programmes are helping to reverse some of the decline in water quality that occurred during the 1970s and 1980s; but it is not certain that we shall fully restore to these beaches the level of amenity they used to offer.

3.10 It might be argued that, while the loss of sea-bathing amenities is regrettable, the activities which caused sea-water quality to decline have helped make us all richer, and that the community has made a conscious trade-off between increased prosperity and a decline in environmental quality. To counter this, consider another example: the quality of the air we breathe.

3.11 Breathable air, unlike bathing beaches, is not an optional environmental good that we can choose to trade off for some other good. It is a basic necessity for life and health. Already polluted air is estimated to contribute to more early deaths than there are deaths from road accidents. Our efforts to achieve statutory air quality objectives are hampered by emissions from road traffic. Further growth in road traffic, particularly diesel vehicles, will expose more people in more districts to below-standard air for more of the time. Unless we take action to reduce substantially the harmful emissions from traffic, these emissions will lead to more

health problems, a less attractive city in which to live, and consequential adverse effects on Hong Kong's further development as a knowledge-based economy.

3.12 Apart from water quality and air quality, the well-being of Hong Kong people is affected by other environmental matters, including -

- levels of noise from traffic, construction and other sources;
- the effectiveness of waste collection and disposal programmes; and
- the aesthetic and recreational amenity offered by the landscape and the plant and animal life which it supports.

We must also look beyond these immediate *local* concerns to consider Hong Kong's contribution to *global* environmental concerns. For example -

- our emissions of atmospheric pollutants also contribute to global climate change;
- our use of fossil fuels and other non-renewable raw materials also contributes to the depletion of the Earth's natural capital;
- our exploitation of oceanic food stocks, together with other fisheries in the region, also contributes to the risk of over-fishing and possible loss (perhaps permanently) of this source of food;
- the wetlands around Deep Bay are of critical importance for birdlife and its related ecosystems stretching from Siberia to Australia.

How can we work towards a sustainable, thriving Hong Kong?

3.13 To ensure that Hong Kong continues to thrive into the next century, its environment must meet the expectations of its own prosperous and well-educated population and of the many visitors from elsewhere.

3.14 Increasingly our economy is based on services whose further development depends on knowledge and brainpower. People with knowledge-based skills are highly mobile: so if environmental quality deteriorates too far, they and their families may leave Hong Kong for places

perceived as more pleasant. Tourism is increasingly important to our economy, and is expected to grow strongly well into the next century - one reason why we are building the new airport. But poor environmental quality can deter visitors.

3.15 In the past, decision-makers around the world tended to see economic growth and environmental concerns as mutually exclusive, to assume that growth must inevitably be at the expense of the environment, or that concern for the environment must automatically mean reduced prosperity. That view has begun changing in the past decade or so, as it has become increasingly clear that promoting growth without concern for the long-term health of the environment is short-sighted and self-defeating. Governments around the world are now talking more - and in many cases doing more - to promote sustainable economic and social policies.

3.16 Our present environmental programmes have laid a foundation for more sustainable approaches to the environment. The next major challenge is to incorporate sustainability considerations into strategic planning and policy making.

3.17 A review of the Territory Development Strategy, now nearing completion, has outlined scenarios for Hong Kong's further development to 2011, in order to evaluate the impacts of development pressures arising from population growth within Hong Kong and the continued rapid growth of the Pearl River Delta. The review concludes that, given sufficient forward planning and infrastructure support, there is likely to be spatial capacity to meet the needs of a 2011 population of 7.5 - 8.1 million, albeit with some additional strains on the environment. However, the review raises questions about the extent to which Hong Kong can continue to meet expanding regional demand for port facilities. It also notes the need for a comprehensive environmental baseline study.

3.18 Further growth in population and economic activity will take place in a context of increasingly scarce solution spaces for housing, roads and other infrastructure needs, and diminishing capacity of the environment to absorb the loads we place upon it. In order to select development strategies and implementation plans which will sustain the vitality of Hong Kong in the long term, we shall need increasingly sophisticated informational tools.

3.19 In previous major strategic planning exercises, the environmental impacts of a range of development options were assessed in broad-brush terms. Some models were developed relating to transport, air quality, tidal flows and water quality; these need to be updated and enhanced to enable better assessment and monitoring of cumulative impacts, and a better understanding of the potential costs (in terms of air and water quality, noise, consequential infrastructure requirements and land use requirements, public health and quality of life) as well as the potential benefits of different development scenarios. Otherwise there is a risk that developments considered economically desirable and technically feasible may prove after the event to be unsustainable, or sustainable only with expensive corrective programmes.

3.20 In order to incorporate sustainability considerations into our strategic development planning, we need to -

- develop sustainability indicators;
- develop a framework for sustainable development, including a stocktaking review of current baseline environmental conditions, and a strategic environmental assessment process;
- draw up a comprehensive policy on conservation; and
- include environmental factors in our system of National Accounts.

Sustainability indicators

3.21 We are all familiar with economic and social indicators, such as Gross Domestic Product, the Consumer Price Index, the unemployment rate, and indicators of community well-being in the areas of health, public safety, and education. Such indicators provide a model of complex reality in a simple, easily grasped form. They are a powerful means for focusing the attention of the public and decision-makers on matters of concern and importance to the community.

3.22 At present, however, like most other places around the world, we have few indicators relating to the state of our environment, and trends relating to the environment's capacity to sustain the well-being of our community. As a result, the environment often receives less than

Environmental Indicators in The Netherlands

In 1991 the Netherlands began to publish indicators for six environmental issues of major concern to that country -

- climate change;
- ozone layer depletion;
- acidification of lakes and soils;
- eutrophication of water bodies;
- toxification of soils, water bodies and ecosystems;
- accumulation of solid wastes.

For each issue, relevant data are aggregated and weighted to provide a composite unit value which can be shown on a simple graph, along with the policy target for that issue.

Publication of these indicators led to much public debate, focusing at first on the relevance and methodology used. Once the indicators became accepted as a valid representation of real environmental pressures, they began to exert influence on policy making, helping to set the policy agenda for environmental issues, and to measure policy success or failure.

Before long, debate began to focus on the specific components contributing to each indicator, and the indicators began to be seen as a useful tool for setting clean-up priorities. The visibility and transparency of the information system supporting the indicators has led to changed attitudes in various business sectors. One result has been the signing by industry representatives of voluntary agreements to reduce toxic emissions. This reduces the need for regulation, and enables the knowledge and creativity of the private sector to be harnessed in finding ways to reduce emissions.

The development and publication of environmental indicators has helped the Netherlands to progress towards sustainability. By quantifying key trends and compressing large amounts of data into simple, understandable graphs, this process has moved the policy debate towards specific measures, and has stimulated additional policy measures to maintain progress. Many other countries are observing the Dutch example with keen interest.

[Information drawn from *Environmental Indicators: a systematic approach to measuring and reporting on environmental policy performance in the context of sustainable development*, World Resources Institute 1995]

adequate attention when policy decisions are made, and we lack a systematic framework for evaluating policies which have an impact on the environment.

3.23 In 1989 the G-7 group of leading industrial countries asked the Organisation for Economic Development and Co-operation to develop environmental indicators. The 1992 Earth Summit led to wider international interest in this issue. The box on page 00 summarises the Dutch experience.

3.24 We intend to develop a set of sustainability principles appropriate to Hong Kong, and a set of environmental and other indicators, as an information tool for -

- assessing the sustainability of various development scenarios and
- monitoring trends so that targeted action can be taken to reduce adverse impacts.

Work will begin in 1996, as part of a consultancy project called Sustainability and Development for the 21st century (SUSDEV21). We expect to be able to consult the public on the principles and indicators during 1997.

Strategic development framework

3.25 The present approach to environmental impact assessment is project-based, and focuses on measures to mitigate whatever undesirable impacts are identified. We lack a broader framework for assessing cumulative impacts of different projects and policies, and have inadequate data on the capacity of the local environment to sustain the impacts of our activities.

3.26 The SUSDEV21 study will also develop a framework for sustainable development, starting in 1996. This exercise will involve -

- a comprehensive *stock-taking review* of current baseline environmental conditions and the natural capital stock of Hong Kong. Three studies already under way are relevant to this, namely the Biodiversity Baseline survey of corals and fish fauna, being conducted by the Agriculture and Fisheries Department and Swire Institute of Marine Sci-

ence with funding from the Royal Hong Kong Jockey Club Charity Trust; the Biodiversity Survey of Hong Kong, being conducted by a team from Hong Kong University; and the Environmental Profile Project undertaken by WWF(HK) with funding from the Environment and Conservation Fund and the Woo Wheelock Green Fund;

- drawing up a *sustainable development framework* to help in assessing future development scenarios. This will involve, for example, integrating enhanced quantitative modelling tools, covering air quality, water quality, transport and other aspects, developed under various other studies, in order to enhance our ability to assess the carrying capacity of the environment and the cumulative impacts of development strategies and projects;
- undertaking a *transport-related strategic environmental assessment* in order to assess the impact of current transport and infrastructure development trends on air quality, noise and ecologically sensitive areas, and identify a framework of policy, land use and technological measures to mitigate damage to public health and deterioration in the quality of life; and
- developing a *methodology* for continuous strategic environmental monitoring and audit.

3.27 Based on the findings of this study, decisions will be made about applying the data, indicators, modelling tools and sustainable development framework to future development scenarios, in order to identify the optimal development pattern needed to meet unavoidable demands from population growth and economic development.

Conservation

3.28 The Planning, Environment and Lands Branch has begun work to formulate a comprehensive policy on conservation, review the current Government machinery relating to sustainable development and conservation, and propose measures to improve the ability of that machinery to respond in a co-ordinated and proactive way to sustainability and conservation issues. Firm proposals should be ready by about May 1996.

Accounting for the environment

3.29 Since the Second World War, national governments have developed sophisticated systems of national accounts, from which highly aggregated indicators such as Gross Domestic Product (GDP) or Gross National Product (GNP) are derived. These provide useful information about the economy, which help to guide government and private decision making. But in their present forms around the world they have a number of limitations, both as indicators of the community's well-being, and as models of the economy. In particular, their inadequate treatment of environmental costs has led to a growing divergence between what is measured in the national accounts (i.e. cash flows) and the real wealth of the community. To give a simple example, where water pollution leads to increased spending on drinking water treatment, bottled water, swimming pools etc., this shows up in the national accounts as contributing to GDP growth, whereas the loss of natural supplies of clean water for drinking or bathing -- a net reduction in the community's well-being -- is not accounted for at all.

3.30 International efforts are now under way to find ways to better incorporate environmental considerations into national accounts and the accounting of private enterprises, so that government and private sector decision makers have better information for assessing possible actions. The Organisation for Economic Development and Co-operation (OECD), for example, has identified three approaches to environmental accounting:

- *natural resource accounts* : these aim to collect, within a consistent framework, quantitative and qualitative information on stocks and flows of natural resources (e.g. water; forest products). Information is typically expressed in physical units.
- *satellite accounts* : these complement economic information in the national accounts without modifying the system. They combine physical information from environmental statistics and natural resource accounts with monetary information such as environmental protection spending, and allow alternative accounting aggregates to be formed.
- *adjustment to the system of national accounts* : this approach aims to adjust the framework and boundaries of the national accounts system to remedy its shortcomings with respect to the environment (neglect of resource depletion, inadequate treatment of defensive expenditures, and failure to account for environmental degradation).

The demand for environmental accounts occurs at three levels:

- the *micro-level* of the individual enterprise. Here there is rapidly growing use of environmental accounting, supported by the development of International Standards Organisation standards for environmental audits (ISO 14000).
- the *sectoral level* focusing on a particular well-defined aspect. Examples of sectoral natural resource accounts include water accounts in Spain, and energy accounts in Norway, which link into policy making and economic models.
- the *macro level* of national account aggregates. At this level progress around the world has so far been slow, with methodological problems and a lack of data leaving large uncertainties in the adjusted aggregates.

3.31 In Hong Kong, the proposed work on sustainability indicators discussed above will help to provide improved information about the state of the environment and environmental trends, and should enable us to track trends in environmental and economic performance and the interactions between the two. In addition, we propose to consider, in the light of work being done around the world, the feasibility of devising a set of satellite accounts focusing on the environment, which would facilitate environment-oriented analyses but without jeopardising the primary purposes served by the current framework of economic accounts.

Environmental Education

Community awareness

3.32 The 1989 White Paper noted the low level of environmental awareness in Hong Kong, and the low level of spending by the Government (only \$0.4 million between 1984 and 1989) aimed at stimulating awareness, explaining Government programmes for improving the environment, and encouraging public participation in improvement efforts.

3.33 Following publication of the White Paper, there has been a substantial increase in funding, from several sources, for programmes to increase public awareness and harness the community's own contributions to reducing pollution. These programmes involving the Environmental Campaign Committee, a growing number of green groups, youth associations,

educational institutions, and a new Environment and Conservation Fund together with a parallel private sector fund set up by the Wheelock group -- have had some success; but their activities have lacked co-ordination and focus, with no input from communications professionals on ways to stimulate community action to complement the very large sums spent by the Government to control pollution and provide an environmental infrastructure.

3.34 To help us move forward, the SUSDEV21 study will outline a strategy for developing greater community understanding of environmental issues and an improved community environmental ethic.

Environmental education in schools

3.35 There are three distinct ways in which education systems deal with the environment -

- education *about* the environment (environmental studies) in which facts, concepts and skills are taught, drawing on various subject disciplines;
- education *in* the environment (nature study) in which the students have opportunities to experience nature; and
- education *for* the environment (environmental education), involving student values, attitudes, and personal participation in projects characterised by complexity, differing values and points of view, and a need for the participants themselves to construct knowledge in an inter-disciplinary way.

Examples of environmental studies in Hong Kong schools are found in the secondary science subjects, e.g. the Physics topic on 'conservation and transformation of energy' includes consideration of alternative energy sources and the environmental impacts of major projects such as dams or nuclear power stations; and the Biology topic on 'Man's effect on his environment' covers the human health effects of air pollution, wastes, and noise. The Primary science syllabus adopts a mainly nature study approach, e.g. 'explore the countryside with a view to develop the desire to appreciate the values and conservation of our natural resources'.

3.36 More recently, some syllabuses have begun to include multi-aspect and multi-value approaches envisaged in the broader concept of environmental education. For example, the current Chemistry syllabus for S4/S5 includes objectives such as -

- students should be able to argue for or against the use of chemistry in technological situations based on scientific, economic, environmental, political and social considerations;
- students should be able to make judgements from chemical data and from arguments presented on scientific, ethical, economic, environmental, political and social considerations.

Schools are encouraged to approach the environment on a whole-school basis, including cross-curricular and extra-curricular themes and activities.

3.37 However, while there are many environment-related activities in schools at present, a clear movement towards environmental education (*education for the environment*) in the sense described above would benefit from a clear strategy of support for schools to explore innovative approaches. Internationally, it has been found that strategies based on encouraging and facilitating bottom-up school-based initiatives can be more effective than centrally-devised programmes or materials, and that such initiatives tend to be hampered by the absence in universities, teacher education institutions and school support services of a strong academic base for a broad approach to environmental education (in contrast, for example, to the strong base of the separate scientific and economic disciplines).

Life Cycle Analysis and Eco-labelling

3.38 In order to assess the environmental merits of any product, it is necessary to take into account its entire life cycle from the extraction of raw materials through production, distribution and use, to final disposal. The technique of Life Cycle Analysis (LCA) has been developed to provide a sound basis for such assessments. Applying this technique often gives rise to surprising results; for example, recycled paper may not always be more environmentally friendly than virgin paper. Environmental merit is not always self-evident.

3.39 In early 1996 the Government will commission a \$4.5 million study to recommend a practical approach to product-related environmental assessments in the local context; undertake LCAs covering various types of paper and two other products frequently purchased by the Government Supplies Department; and make recommendations on a framework for consumer information on the environmental merits of products, i.e. an eco-labelling scheme, suitable for implementation in Hong Kong. This would enable the relative environmental merits of the products to be assessed alongside their fitness for purpose and their purchase price.

Toxic substance control

3.40 Over the past twenty years we have made good progress in controlling the emissions of certain well recognised and easily measured pollutants like sulphur dioxide and organic wastes. But today researchers around the world are beginning to connect subtle, acute and chronic effects on the health of people, wildlife and ecosystems with less obvious pollutants which are often less easily detected and measured. While it does not itself undertake fundamental research, including epidemiology, on toxic substances in the environment, the Hong Kong Government follows closely the work which is being done elsewhere, in case these should indicate the need for new policies or programmes locally.

3.41 In November 1993 the Government commissioned a study of "air toxics", to establish the local levels of 89 chemicals which may be emitted into the atmosphere. The study concluded that, in general, there is no cause for alarm, but that emissions of benzene from petrol filling stations and of perchloroethylene from dry cleaning processes should be controlled. Action is in hand.

* * *

(IV) Summary and Conclusion

This section recaps the main ongoing actions and new initiatives described in the Third Review. It can serve as a checklist to monitor progress in implementing the strategy initiated by the 1989 White Paper, and in pursuing the further tasks outlined in the Third Review relating to sustainability.

The White Paper objectives

Achieving the White Paper objectives will depend on a number of factors, including financial and staffing resources of the Government; consultation with those affected by particular proposals; and the general level of community and political support for the measures necessary to achieve the objectives. On attaining the White Paper objectives, we can expect -

- a) an environmentally acceptable waste management programme for the foreseeable future;
- b) comprehensive and environmentally acceptable territory-wide schemes for sewage collection and disposal, lasting well into the 21st century;
- c) our inshore waters to be a community asset, particularly for swimming and recreation;
- d) attainment of air quality objectives, with significantly reduced risks to health;
- e) a general improvement in environmental conditions as a result of improved procedures and better co-ordinated planning;
- f) a more environmentally aware and well informed community prepared to improve its environment; and
- g) a quieter city.

Main actions for the next two years

Paragraph	Action
2.2	We exert tremendous pressure on our environment. To mitigate this impact, we must continue to pursue the 1989 White Paper strategies vigorously.
2.4 - 2.15	<p>The solid waste strategy is well on track -</p> <ul style="list-style-type: none">a) all three strategic landfills are in operation;b) three refuse transfer stations are in operation, four more will be operational in 1997, and one will come into operation around the turn of the century;c) the last remaining municipal incinerator at Kwai Chung will close in 1997;d) a programme to restore older landfills will be completed between 1997 and 1999;e) a comprehensive chemical waste handling scheme is in place, and a charging scheme is in operation;f) measures are being introduced to ensure productive use of construction waste. These include a charging scheme for private waste deliveries to landfills;g) more satisfactory ways to handle clinical waste are being considered;h) plans are in hand for more satisfactory storage of radioactive waste by 1997;i) the Marine Department will introduce an improved marine refuse scavenging service in 1996, and further measures to reduce littoral and marine refuse are being considered;j) measures to tackle livestock waste have already reduced stream pollution substantially, and within four years will achieve a 98% reduction in livestock waste pollution in the NT.
2.16	A waste reduction strategy is being drawn up. A Waste Reduction Plan will be drafted in 1996.
2.20 - 2.29	<p>The water pollution control strategy is well on track -</p> <ul style="list-style-type: none">a) legislation is in place to require proper connections to mains sewerage where this is available;b) nine water control zones are already declared, and the tenth will be fully declared by the end of 1996. This will bring all major polluters under control;c) Stage I of the strategic sewage disposal scheme is well in hand, and planning for further stages is proceeding;d) a sewage charge has been introduced to meet the operating cost of sewage facilities
2.30 - 2.50	<p>The air pollution control strategy is on track in some areas, but the achievement of air quality objectives will depend to a large extent on our ability to reduce pollution from road traffic. Actions under this strategy include -</p> <ul style="list-style-type: none">a) further extensions to the legislative framework, including regulations on construction dust control, open burning and asbestos control to be introduced in 1996;b) extension of licensing requirements to 260 industrial processes by the year 2000 (at present 30 processes require a licence);

- c) pressing ahead vigorously with schemes to reduce substantially the harmful emissions from road vehicles, particularly diesel vehicles;
- d) encouraging informed public debate on issues concerning transport and the environment;
- e) considering action relating to indoor air pollution in the light of a consultancy that began in late 1995;
- f) issuing practice notes on air quality in bus termini, and considering the need for regulation of tunnel air quality;
- g) considering the requirements of a toxic air pollutant control programme;
- h) co-ordinating local action to phase out CFCs and HCFCs.

2.51 - 2.61 The **noise control strategy** is generally on track. Actions include -

- a) further extension of the regulatory framework to cover noisy mechanical equipment, noisy work during restricted hours, car burglar alarms, and loudhailers on vessels;
- b) action, in consultation with the trade, to reduce the use of diesel hammers in populated areas;
- c) continued action at the planning stage to minimise noise impacts on sensitive receivers;
- d) continuation of the programme to insulate schools against aircraft and traffic noise;
- e) extending the use of quiet road surfaces close to residential areas;
- f) considering further traffic management schemes to reduce night-time traffic noise.

2.62 - 2.63 Legislation to bring the **environmental impact assessment process** under statutory control will be introduced into the Legislative Council in 1996.

2.64 - 2.65 The EPD will better integrate its pollution control activities through a 'one stop shop' for construction site licences and permits, and multi-disciplinary inspection visits to premises.

2.66-2.71 Our **conservation** policy should strike a better balance between the need for development and the needs of the natural environment, to ensure that development is sustainable. Current conservation plans include -

- a) consideration of extension sites for country parks;
- b) setting up marine parks and marine reserves;
- c) developing a management scheme for Mai Po marshes as a Ramsar site;
- d) participation in the East Asian-Australasian Shorebird Reserve Network;
- e) constructing artificial reefs for the enhancement of marine ecosystems.

2.72-2.73 Measures being pursued to promote **energy conservation** include -

- a) extending the energy efficiency labelling scheme for domestic appliances;
- b) developing codes of practice for lighting and air-conditioning systems design;
- c) promoting energy conservation in the transport sector;
- d) opening an Energy Efficiency Display Centre at the Hong Kong Science Museum;
- e) continuing systematic audits of energy efficiency in Government buildings.

- 2.74-2.75 Further **environmental support to industry** includes an industrial pollution awareness campaign in 1996, and support for projects by the Industry Support Fund.
- 2.76 **Environmental education** activities in schools and the community will continue.
- 2.77-2.78 Hong Kong will participate in APEC discussions on incorporating **sustainable development** considerations into all its working groups. We shall also continue to participate in APEC working groups and expert groups on energy issues.
- 2.79 Hong Kong will continue to participate in the **WTO** committee on **trade and environment**.
- 2.80 Hong Kong will continue to liaise with Guangdong authorities on environmental issues of mutual concern, through the **Hong Kong - Guangdong Environmental Protection Liaison Group**.
- 3.2 **Getting to where we are now took much effort, resources and public debate. The next stages in our journey towards a cleaner, greener, more sustainable Hong Kong will be no easier.**
- 3.3 The tasks of the 1989 White Paper were necessary, but not sufficient to safeguard the quality of life we want for our future. We must now give more attention to the **sustainability** of our way of life.
- 3.5 Governments and individuals must acknowledge, more than they have in the past, that **the environment is a scarce resource** which can all too easily be squandered if we pay insufficient attention to the consequences of our actions on the environment.
- 3.6 **Information about the environment** should be regarded as a crucial input to policy making. **Environmental considerations** should be incorporated into our conception of **economic progress**.
- 3.7-3.11 A decline in environmental quality may be viewed by some as a conscious trade-off for increased material prosperity. But some environmental goods - such as clean air - are not items we can choose to trade for some other good. They are a basic necessity for life and health. **Action to achieve air quality objectives is essential for our health and for the attractiveness of Hong Kong as a place to live.**
- 3.12 For our own well-being, we must continue to pay attention to **local environmental problems** of -
- a) noise,
 - b) waste, and
 - c) the amenity value of the landscape and the life it supports.

- 3.12 As a responsible community we must also pay attention to the contribution Hong Kong makes to **global environmental concerns** such as -
- a) atmospheric emissions,
 - b) use of fossil fuels and other non-renewable resources,
 - c) exploitation of oceanic food stocks, and
 - d) protection of important wetlands.
- 3.13 **If Hong Kong is to continue to thrive into the next century, its environment must meet the expectations of its own prosperous and well-educated population and of the many visitors from elsewhere.**
- 3.14 Our economy is based increasingly on knowledge and brain-power. If environmental quality deteriorates too far, people with knowledge-based skills may leave Hong Kong for places with a more pleasant environment, and fewer tourists will want to visit Hong Kong.
- 3.15 It has become increasingly clear that promoting economic growth without concern for the long-term health of the environment is short-sighted and self-defeating. Like other places around the world, Hong Kong must begin to **promote sustainable economic and social policies.**
- 3.16-3.20 We intend to work towards **incorporating sustainability considerations into strategic development planning and policy making**, by -
- a) developing sustainability indicators,
 - b) developing a framework for sustainable development, including a stocktaking review of current baseline environmental conditions, and a strategic environmental assessment process,
 - c) drawing up a comprehensive policy on conservation, and
 - d) including environmental factors in our system of National Accounts.
- 3.21-3.26, 3.34 A major consultancy study called Sustainability and Development for the 21st Century (SUSDEV21) will start in 1996 (subject to funding approval by the Legislative Council). This study will -
- a) develop a set of **sustainability indicators** appropriate to Hong Kong,
 - b) conduct a **comprehensive review of current baseline environmental conditions**,
 - c) develop a **sustainable development framework** to help in assessing future strategic development scenarios,
 - d) undertake a **transport-related strategic environmental assessment**,
 - e) develop a **methodology** for continuous strategic environmental monitoring and audit, and
 - f) outline a strategy for developing greater **community understanding** of environmental issues and an improved **community environmental ethic**.
- 3.27 Based on the findings of SUSDEV21, decisions will be made about applying the data, indicators, modelling tools and sustainable development framework to future development scenarios.

- 3.28 Proposals for a comprehensive **policy on conservation** should be ready by mid-1996.
- 3.29-3.31 We shall consider the feasibility of devising a set of **satellite accounts focusing on the environment**, to facilitate environment-oriented analyses but without jeopardising the primary purposes served by the current framework of economic accounts.
- 3.38-3.39 A consultancy study on **product-related environmental assessments** will begin in 1996, leading to recommendations on an eco-labelling system suitable for Hong Kong.
- 3.40 We shall continue to follow work around the world on **toxic substances in the environment**, with a view to developing local policies and programmes where appropriate.
- 3.41 We shall pursue action to **control emissions of benzene** from petrol filling stations and **perchloroethylene** from dry cleaning processes.

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